KING COUNTY

Signature Report

1200 King County Courthouse
516 Third Avenue
Seattle, WA 98104

November 6, 2015

Motion 14449

Proposed No. 2015-0252.3 **Sponsors** Phillips and Dembowski

A MOTION adopting the 2015 King County Strategic Climate Action Plan, submitted in compliance with K.C.C. 18.25.010.A.4.

WHEREAS, K.C.C. 18.25.010.A.4. requires the King County executive to transmit to the council a plan by June 29, 2015 updating the King County Strategic Climate Action Plan, and

WHEREAS, with this motion, the executive has transmitted to the council as Attachment A to this motion the updated plan called for in K.C.C. 18.25.010.A.4., and

WHEREAS, confronting climate change through effective strategies to reduce greenhouse gas emissions and prepare for the impacts of a changing climate requires an integrated countywide effort involving public, private and non-governmental partnerships, and

WHEREAS, the 2015 King County Strategic Climate Action Plan presents a bold course of action that will make progress toward achieving the countywide goal to reduce greenhouse gas emissions by eighty percent by 2050, and

WHEREAS, the 2015 King County Strategic Climate Action Plan identifies the county's top sources of greenhouse gas emissions and quantifies the greenhouse gas emissions reduction benefits of key strategies, and

WHEREAS, King County will continue to play a key role in the King County-Cities Climate Collaboration, whose members represent seventy-five percent of the population of the county, and which lays out a shared countywide vision for confronting climate change upon which the 2015 King County Strategic Climate Action Plan is built, and

WHEREAS, the 2015 King County Strategic Climate Action Plan strengthens the county's strategy to prepare for the impacts of a changing climate on local communities, infrastructure, economy, public health and safety, and the natural environment, and

WHEREAS, the 2015 King County Strategic Climate Action Plan advances King County's guiding principle of promoting fairness and opportunity and eliminating inequities by considering the equity and social justice impacts in its decision-making on climate change strategies, and

WHEREAS, the 2015 King County Strategic Climate Action Plan recognizes that the burdens and benefits of climate change will affect King County's current and future residents in disparate ways, with the potential to disproportionately affect some populations, such as those who are low-income, have limited English proficiency or reside in certain geographic areas, and

WHEREAS, with this motion, the executive has transmitted to the council, as part of the 2015 Strategic Climate Action Plan, the annual report on the county's major environmental sustainability programs as called for in K.C.C. 18.50.010, and

WHEREAS, Appendix B of the 2015 Strategic Climate Action Plan responds to Motion 14349, passed May 4, 2015, which requested that the executive consider specific

climate action activities and policies for inclusion in the 2015 Strategic Climate Action Plan, and

WHEREAS, the 2015 King County Strategic Climate Action Plan directly reflects the recommendations of a 2014 Performance Audit conducted by the King County auditor's office;

NOW, THEREFORE, BE IT MOVED by the Council of King County:

A. The 2015 King County Strategic Climate Action Plan, dated October 20, 2015, which is Attachment A to this motion and prepared in compliance with K.C.C 18.25.010.A.4., is hereby adopted.

B. Consistent with Ordinance 17285, which authorized the Interlocal Agreement for the King County-Cities Climate Collaboration, the executive is requested to coordinate with staff of the transportation, economy and environment committee, or its successor, in developing the annual work plans and budget for the King County-Cities Climate Collaboration under the interlocal agreement. The executive is requested to submit by January 31, and every year thereafter, the King County-Cities Climate Collaboration annual work plan and budget to the council for acceptance by motion. The 2016 work plan should include recommendations on the timing and approach for an update to the interlocal agreement that includes addressing drafting issues identified during the council's initial review of the agreement.

C. Implementation of the King County Strategic Climate Action Plan may lead to

the need for additional resources. However, any additional FTE/TLT requests are subject to approval through the county budget process.

Motion 14449 was introduced on 7/6/2015 and passed as amended by the Metropolitan King County Council on 11/2/2015, by the following vote:

Yes: 9 - Mr. Phillips, Mr. von Reichbauer, Mr. Gossett, Ms. Hague, Ms. Lambert, Mr. Dunn, Mr. McDermott, Mr. Dembowski and Mr. Upthegrove
No: 0
Excused: 0

KING COUNTY COUNCIL
KING COUNTY, WASHINGTON

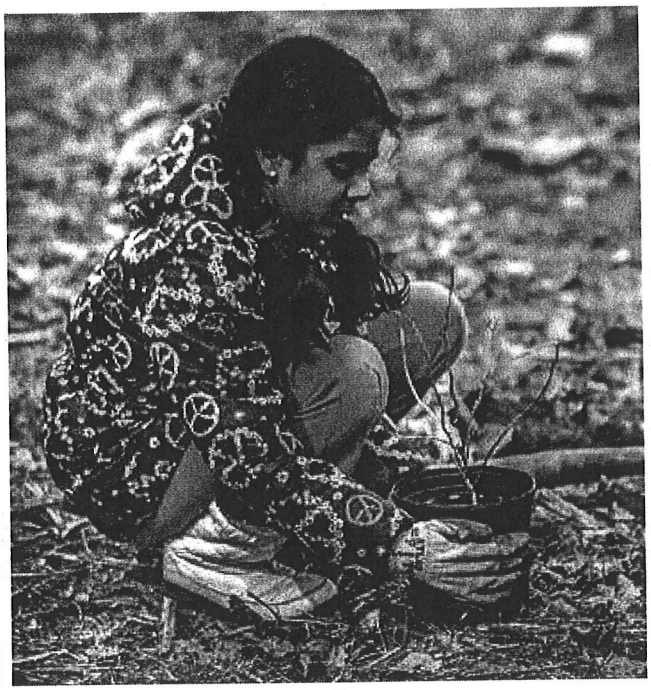
Larry Phillips, Chair

ATTEST:

Anne Noris, Clerk of the Council

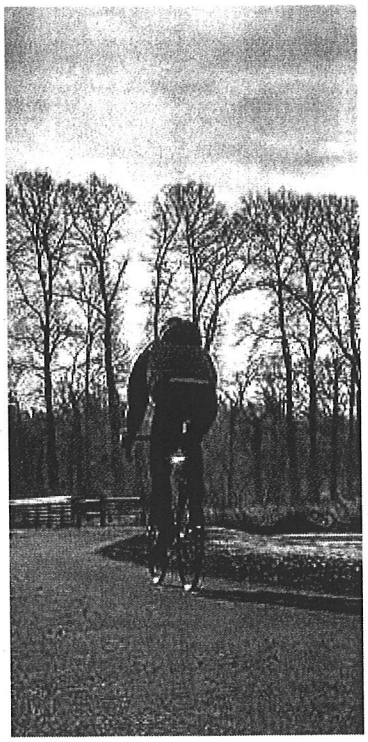
Attachments: A. Strategic Climate Action Plan November 2015

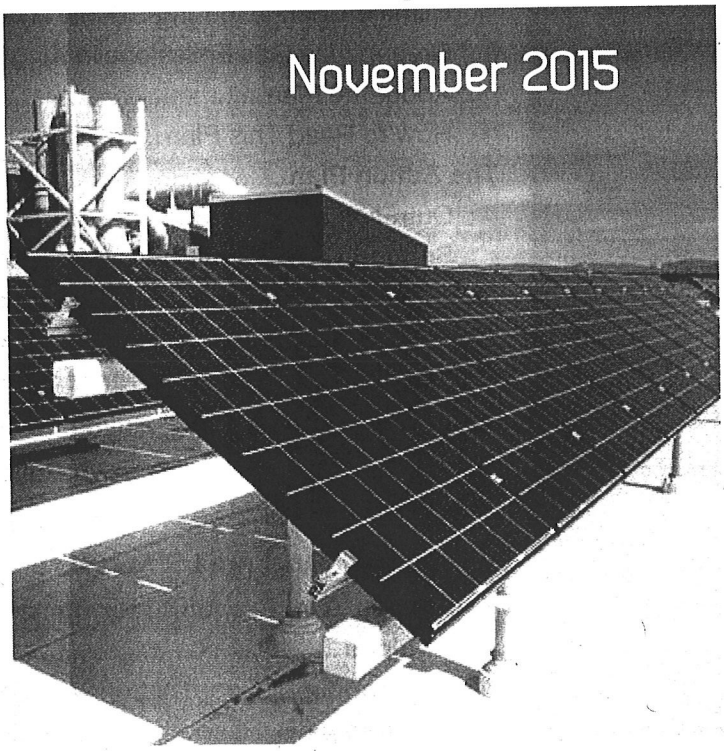
strategic

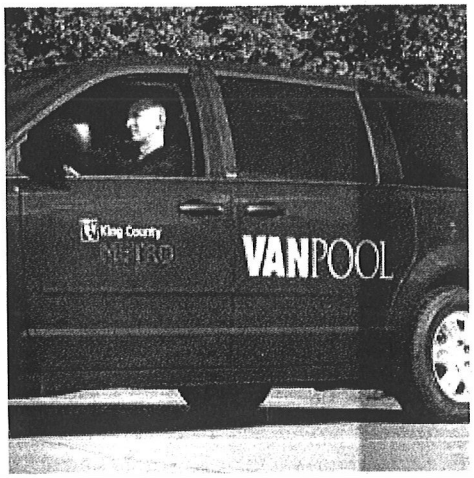


PLAN

November 2015



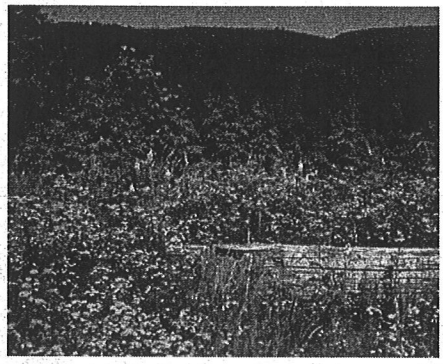
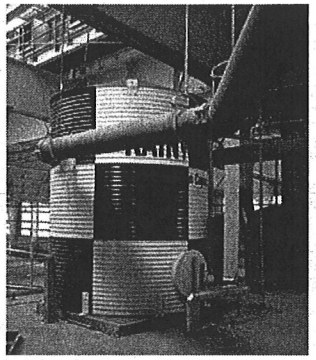
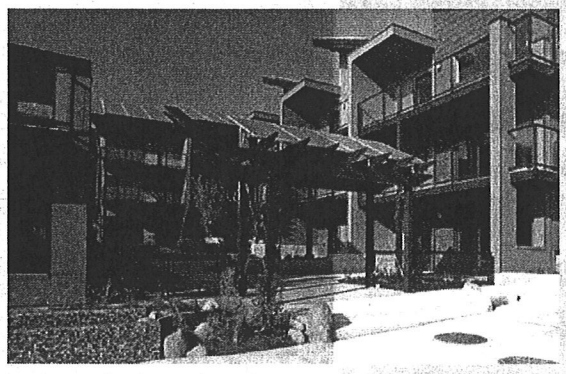




King County

14449

strategic CLIMATE ACTION PLAN

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For more information:
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climatechange@kingcounty.gov

Alternative formats available
206-477-4700 TTY Relay: 711

King County

1504_4674_StrategicClimateActionPLAN.indd skrau
Produced by: KCIT DNRP GIS, Visual Communications and Web Unit

EXECUTIVE SUMMARY

Overview

Climate change is one of the paramount environmental and economic challenges for our generation. The 2015 Strategic Climate Action Plan (SCAP) is a comprehensive update to the 2012 SCAP. The SCAP is King County's blueprint for climate action, and provides "one-stop-shopping" for county decision-makers, employees, and the general public to learn about the County's climate change commitments.

The 2015 SCAP charts a clear pathway to achieve a clean energy future, where the region's local governments, businesses and communities are working together towards an equitable, sustainable and thriving King County for all who live, work and play here. The SCAP builds on technical assessments of what actions and commitments, when taken together, ensure that climate targets are met. Through the integrated strategy presented in the 2015 SCAP, King County identifies priority actions that will lead to significant progress in achieving regional GHG reduction targets and conveys opportunities to act on climate solutions that achieve additional social, economic and environmental benefits for King County residents.

Climate Change Impacts

King County is already experiencing the impacts of a changing climate: warming temperatures, acidifying marine waters, rising seas, increasing flooding risk, decreasing mountain snowpack, and less water in the summer. Climate change will have long-term consequences for the economy, the environment, and public health and safety in King County. Impacts of a changing climate will be experienced differently by King County residents, influenced by factors such as income, age, health, and where they live. However, by working collaboratively to develop and implement strategies to prevent, respond to, and prepare for climate change, King County has many opportunities to address broader inequities.

GHG Emissions in King County

In King County, the top two sources of greenhouse gas (GHG) emissions are (1) from fossil fuels used for transportation, and (2) from energy used to heat, cool, and power our homes and buildings. An additional significant source of GHG emissions is local consumption of goods and services, including the energy needed to produce, transport, use, and dispose of goods and services supporting county residents and businesses. The largest local sources of GHG emissions frame the five GHG emissions reduction goal areas of the SCAP.

Although the GHG emissions from the operations of King County government are a relatively small part of the communitywide and global picture, the County is committed to reducing its operational GHG footprint to model best practices and demonstrate that climate solutions have broader environmental, economic and health benefits.

GHG Emissions Reduction Targets

King County is committed to countywide GHG emissions reduction targets adopted as Countywide Planning Polices by the King County Growth Management Planning Council in 2014, to "reduce countywide sources of GHG emissions, compared to a 2007 baseline, by 25 percent by 2020, 50 percent by 2030, and 80 percent by 2050." Internally, King County has committed to reducing GHG emissions from its operations, compared to a 2007 baseline, by at least 15 percent by 2015, 25 percent by 2020, and 50 percent by 2030. The County has further committed to achieving net carbon neutrality for the Department of Natural Resources and Parks

by 2017, with the Wastewater Treatment Division and the Solid Waste Division each independently achieving carbon-neutral operations by 2025. The 2015 SCAP outlines the results of technical analysis that established specific, quantifiable pathways to achieving the overarching GHG emissions reduction targets at both the countywide and government operations scales.

2015 SCAP Commitments

In addition to establishing targets and performance measures to track and assess the County's progress, the 2015 SCAP details more than 70 Priority Actions that King County will carry out between now and 2020. These actions cover diverse strategies including transit, renewable energy, green building, recycling and preparing for local climate impacts, such as increasing flood risks and extreme weather. Actions to reduce GHG emissions and prepare for climate impacts are embedded and integrated into the operations, services, and capital plans of all County agencies.

As detailed in the 2015 SCAP, King County continues to make progress towards diverse commitments outlined in the 2012 plan, including to:

- Double transit ridership by 2040.
- Reduce energy use in County buildings and facilities by 15 percent by 2015 (with new targets set in the 2015 SCAP).
- Achieve a 70 percent recycling rate in the King County solid waste service area by 2020.

Additionally, the 2015 SCAP commits King County to ambitious new actions and targets that will help the region meet countywide GHG emissions reduction targets and adequately prepare for the impacts of climate change, including to:

- Partner with utilities and others to phase out coal-fired electricity by 2025 and support development of increasing amounts of renewable energy resources.
- Use 100 percent GHG-neutral electricity in government operations by 2025.
- Update and implement green development codes by the end of 2017 for unincorporated King County.
- Permanently conserve remaining high-priority farm, forest, and other open spaces throughout King County within 30 years.
- Plant at least one million trees in King County by 2020 in cooperation with public and private partners.

The 2015 SCAP builds on the 2012 SCAP, but goes further by:

- Engaging stakeholders through partnerships such as the King County-Cities Climate Collaboration, as well as outreach and engagement specifically focused on shaping the 2015 SCAP.
- Quantifying GHG emission reduction strategies.
- Piloting a model for assessing the cost effectiveness of select SCAP GHG emissions reduction strategies.
- Defining how equity and social justice tools will be used as part of King County's climate commitments.
- Taking critical steps to plan for and coordinate regionally on climate change impacts on wastewater, stormwater, emergency management, public health, roads, flood risk reduction, and salmon recovery.

The 2015 SCAP also provides an update on the County's progress on implementing the 2012 SCAP through 2014 and serves as the County's annual environmental report.

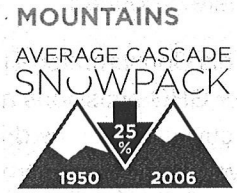
INTRODUCTION

CLIMATE CHANGE IN KING COUNTY

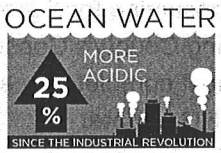
Across the globe, there is overwhelming evidence that increases in carbon dioxide and other GHGs in the atmosphere are causing the climate to change. The year 2014 was the warmest on record since 1880, and the ten warmest years on record have occurred since 2000. Climate change is causing more heat waves, more extreme weather events, sea levels to rise, glaciers to disappear, the ocean to acidify, species to go extinct or change their range, and rainfall and storm patterns to change in major ways. These changes translate into economic, public health and safety, national security and environmental impacts that affect people and communities in diverse ways.

Combatting climate change is the paramount challenge of this generation and has far-reaching and fundamental consequences for King County's economy, environment, and public health and safety.

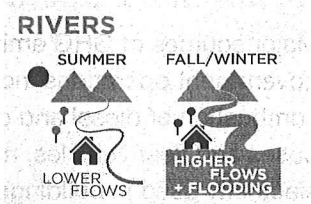
King County is **already experiencing the impacts of climate change:** warming temperatures, acidifying marine waters, rising seas, increasing flooding risk, decreasing mountain snowpack, and less water in the summer. For example:



- **Mountains:** In the Cascade Mountain Range snowpack has decreased 25 percent from the 1950s to the 2000s, with significant implications for water supplies and recreation.



- **Oceans:** Puget Sound has risen more than eight inches over the last century, and the rate of rise has increased in recent years. Across the globe and in the Puget Sound, marine waters are becoming more acidic, with potentially severe impacts to ocean ecosystems.



- **Rivers:** In 2012, more than 80 percent of surveyed streams and rivers in King County exceeded the state temperature standard for protection of salmon habitat. Over the last 40 years, all major rivers in King County have shown more flow and increased flooding risk during the fall and significantly less water in rivers during summer.

Climate change will have long-term consequences for the economy, the environment, and public health and safety in King County. Impacts of a changing climate will be experienced differently by King County residents, influenced by factors such as income, age, health, and where they live. Climate change will also affect resource-based economies like agriculture and forestry through changes in precipitation, water supplies, and pests, and will affect biodiversity of plants and animals as habitat conditions change.

The County is tracking human health and economic impact indicators that are showing increasing frequency of natural disasters, decreasing salmon populations, increasing incidence of forest fires, and more heat-related impacts to human health. These observed changes are consistent with the projected local impacts of climate change made by the University of Washington Climate Impacts Group and other leading scientists.

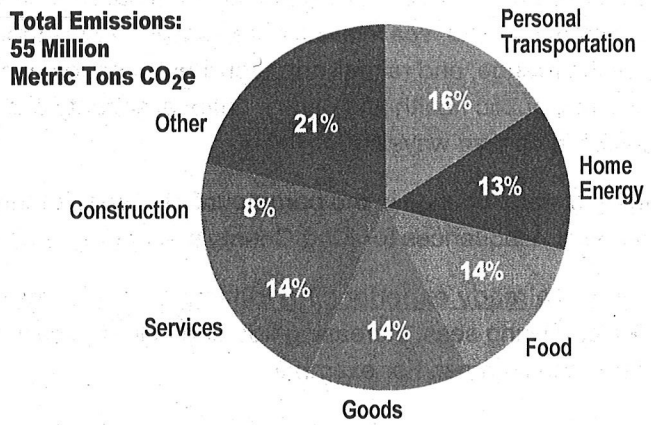
GREENHOUSE GAS EMISSIONS IN KING COUNTY

Community Sources

In 2012, King County published the findings from a comprehensive assessment of local sources of GHG emissions. The study, Greenhouse Gas Emissions in King County, was conducted in partnership with the Puget Sound Clean Air Agency, the City of Seattle, and the U.S. Department of Energy. It quantified all sources of GHG emissions within the county's geographic borders. It also estimated emissions associated with local consumption of food, goods, and services regardless of where these commodities were produced.

This Consumption-Based Inventory accounted for GHG emissions associated with local activities, such as driving or heating a home, as well as local consumption, such as the emissions associated with producing, transporting and consuming food grown outside the region but eaten locally. King County's Consumption-Based Inventory is the most complete assessment of communitywide GHG to date.

COMMUNITY CONSUMPTION BASED - GHG EMISSIONS

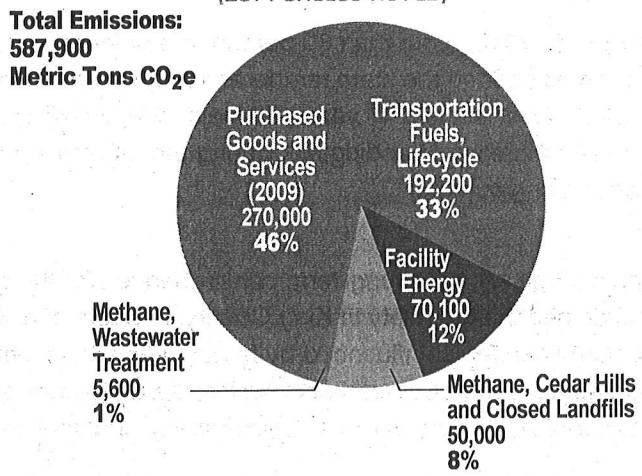


*From **Greenhouse Gas Emissions in King County, 2012.***

Government Operations Sources

Major sources of GHG emissions from King County government operations include those from the combustion of diesel and gasoline fuel by transit buses and fleet vehicles, methane from landfills, electricity used in buildings and for wastewater treatment, and the production, use, and disposal of government-purchased goods and services associated with capital and operational practices.

COUNTY OPERATIONS - GHG EMISSIONS
(2014 UNLESS NOTED)



*From **Greenhouse Gas Emissions in King County, 2012.***
GHG emissions from King County government operations are roughly one percent of the community consumption based emissions total.

The major sources of GHG emissions at the communitywide scale and from government operations align with the 2015 Strategic Climate Action Plan (SCAP) goal areas as outlined below.

Goal Area 1: Transportation and Land Use

- Personal Transportation (Countywide)
- Fossil Fuels Used in Vehicles (County Operations)

Goal Area 2: Buildings and Facilities Energy

- Home Energy and Construction (Countywide)
- Fossil Fuels Used in Facilities and Infrastructure (County Operations)

Goal Area 3: Green Building

- Home Energy and Construction (Countywide)
- Fossil Fuels Used in Facilities and Infrastructure (County Operations)

Goal Area 4: Consumption and Materials Management

- Goods and Services (Countywide)
- Purchasing, Methane from Landfills and Wastewater Facilities (County Operations)

Goal Area 5: Forests and Agriculture

- Food (Countywide)
- Forest Carbon Storage (GHG offset) (Countywide, County Operations)

ABOUT THE PLAN

Authority and Policy Guidance

Climate action, both to reduce GHG emissions and prepare for the impacts of climate change, is a long-standing and central priority for King County, as reflected in the County's overall Strategic Plan, Comprehensive Plan, and 2010 Energy Plan. King County's 2012 Strategic Climate Action Plan (SCAP) was developed through close collaboration between the Executive and Council and was unanimously adopted by the Council in December 2012. A companion Ordinance 17270 called for the SCAP to be updated by June 29, 2015, to be integrated with the Energy Plan, and to build on additional community engagement.

In January 2013, recognizing that the region was not on track to achieve significant reductions in GHG emissions, the King County Executive outlined additional climate priorities building on and implementing the 2012 SCAP, with a focus on collaborating with cities to develop a shared climate target and action commitments.

INTRODUCTION

Audit of the 2012 SCAP

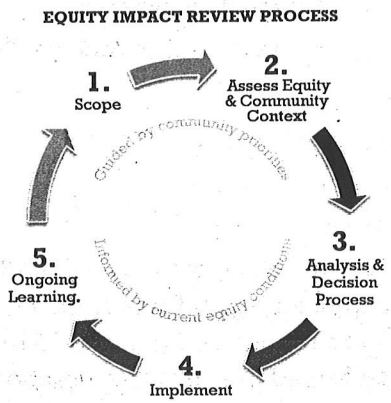
In 2014, the King County Auditor's Office (KCAO) completed a Performance Audit of the 2012 SCAP. The KCAO found that King County is a national leader in responding to climate change and made four key findings to further build on this leadership. These actions have been acted on through the 2015 SCAP. However, it will take continuing work beyond the 2015 SCAP to follow through on recommendations to better engage the King County community, quantify the GHG emissions reduction benefits of County climate commitments, and conduct and use cost-benefit and cost-effectiveness analyses to inform the County's climate work.

Key findings of the KCAO's 2014 audit included:

- The County Executive should ensure that the SCAP update and its subsequent implementation and monitoring are informed by input from a broad representation of community stakeholders in King County.
- The 2015 SCAP should establish explicit, and whenever possible, quantifiable connections between the overarching climate goals and specific strategies and actions.
- The County Executive should ensure that: (a) the 2015 SCAP incorporates verifiable economic analysis of the cost-effectiveness of current and potential actions to reach SCAP targets, and (b) subsequent SCAP annual reports provide explicit information about progress toward the overarching climate targets and goals.
- The County Executive should ensure there is an effective management structure in place to produce the 2015 SCAP and should ensure this project team has sufficient resources and support, to the extent possible, to complete the update.

Equity and Social Justice Ordinance

Climate change will have long-term consequences for the economy, the environment, and public health and safety in King County. It is anticipated that climate change will have disproportionate impacts on some communities, including low income populations and those with existing health issues. King County's Equity and Social Justice Ordinance requires the use of the Equity Impact Review process in the development of major program and project proposals. As County departments and divisions embed climate change impact considerations throughout their services and capital projects, their decision-making will be shaped by the equity frameworks outlined in the Equity Impact Review Tool, which include Process Equity, Distributional Equity, and Cross-generational Equity.



Approach for the 2015 SCAP

Consistent with Council direction and audit findings and building on King County's commitment to equity and social justice and accountability, the 2015 SCAP is:

- **Collaborative.** This update reflects a year-long collaborative effort with cities to develop a shared GHG reduction target and map out specific pathways and actions to meet that target given the sources of GHG emissions in King County. The plan also includes additional recommendations for working at the community scale to catalyze community efforts to improve energy efficiency and produce renewable energy.
- **Strategic.** It is informed by technical assessments of what is needed to achieve community-scale GHG reduction goals and reflects assessment of where the County can have the most impact in reducing

emissions, both through its own operations and at the community scale.

- **Integrated.** It brings together climate change actions from every area of King County government and is aligned with the King County Strategic Plan, which sets the long-term goals and priorities for King County, as well as with other key guiding plans and policies. Goals, Targets, Strategies, and Priority Actions were developed by cross-department teams for each goal area. The Climate Leadership Team, with representatives of multiple departments, the Executive Office, and Budget Office, reviewed recommendations and addressed policy issues. Appendix A provides an overview of how the 2015 SCAP goal areas align with other King County plans and policies.
- **Accountable.** The plan defines performance measures and targets and identifies accountable agencies and groups for each goal area.
- **Performance-based.** Progress has been monitored and published in the **Annual Report of King County's Climate Change, Energy, Green Building and Environmental Purchasing Programs**. Progress to date is presented in this plan and was used to inform this update. Additional work is recommended to further quantify the GHG emissions reduction benefits of County climate commitments and to conduct and use cost-benefit and cost-effectiveness analyses to inform the County's climate work.
- **Reflects County Priorities for Equity and Social Justice.** This update includes a focus on identifying disproportionate impacts of climate change, making recommendations for additional collaboration with diverse communities to identify local impacts and develop local solutions. The plan also highlights co-benefits of climate actions for health, safety, mobility, and economic outcomes. Implementation of the strategies, actions, and programs outlined in this plan will occur consistent with the King County Strategic Plan and the County's Fair and Just Ordinance. King County will seek opportunities to address equity and social justice issues when making investments in climate strategies. Additionally, when evaluating climate strategies King County will consider whether there are any potential inadvertent adverse impacts of those strategies on disadvantaged communities. In considering possible adverse impacts, King County will also consider whether doing nothing to mitigate or adapt to climate change will have greater adverse impacts on low income disadvantaged populations.

King County Council Motion 14349 – 2015 SCAP Suggestions

The King County Council provided further guidance on the 2015 SCAP through Motion 14349, which was adopted in May 2015 and requested the plan:

- Include a goal and proposed timeline for eliminating coal power from the County's operational energy portfolio.
- Consider and provide an explanation for how climate-related activities and policies suggested in the motion have been modified and reflected in the plan or why they have not been included.
- Identify the five largest sources of GHG emissions within King County and specify objectives, strategies, and priority actions to reduce emissions from these sources.

In response to Council Motion 14349, **Goal Area 2: Buildings and Facilities Energy** outlines a set of ambitious renewable energy targets, including a proposed timeline to transition to GHG neutral electricity for government operations by 2025. **Appendix B** outlines how activities and suggestions in Motion 14349 are addressed in the 2015 SCAP. The introductory section **GHG Emissions in King County** identifies the five largest sources of GHG emissions in King County and outlines how they are addressed through the five GHG emission reduction goal areas of the SCAP.

INTRODUCTION

HOW TO READ THIS PLAN

The 2015 King County Strategic Climate Action Plan (SCAP) synthesizes and focuses King County government's most critical goals, strategies and actions to reduce GHG emissions and prepare for the impacts of climate change. The 2015 SCAP builds on and updates the 2012 SCAP and provides one document for County decision-makers, employees, city and business partners, and county residents to learn about the county's climate change commitments. The Action Plan is organized into two major sections: **Section 1: Reducing Greenhouse Gas Emissions and Section 2: Preparing for Climate Change Impacts.**

The Action Plan

SECTION ONE: Reducing Greenhouse Gas Emissions

The Action Plan begins with an overview of the County's climate-related **Outreach and Engagement**, and how the public, stakeholders and partners informed the 2015 SCAP and how King County will continue to involve them in the development and implementation of its climate strategies.

Section One begins with an overview and update on progress towards King County's overarching **Greenhouse Gas Emissions Reduction Targets** at the countywide and government operations scales. This section includes a subsection, **Achieving GHG Emissions Targets,** which summarizes technical analysis done in support of the 2015 SCAP, about what it will take to achieve countywide and government operations targets. The section concludes by outlining GHG emissions Measurement and Reporting commitments.

Following information about the County's overarching GHG emissions reduction targets is the **Pilot Cost Effectiveness Assessment** section, which outlines the relative costs and GHG emissions reduction benefits of a selection of 2015 SCAP actions.

The plan then outlines details of the 2015 SCAP's five goal areas that reduce GHG emissions:

- **Goal Area 1:** Transportation and Land Use
- **Goal Area 2:** Buildings and Facilities Energy
- **Goal Area 3:** Green Building
- **Goal Area 4:** Consumption and Materials Management
- **Goal Area 5:** Forests and Agriculture

Within each of these five goal areas, actions are grouped according to:

- **County Services.** How King County will deliver services that support the reduction of countywide GHG emissions. Examples include public transportation, forest stewardship, and solid waste services.
- **County Operations.** How King County government will minimize the environmental footprint of its operations. Examples include increasing the efficiency of the County's fleets and facilities.

Each Goal Area follows a consistent format:

- **Key Takeaways:** A summary of the most important information for the goal area.
- **Introduction:** Background and context.
- **Current Actions and Programs:** Highlights of recent work.
- **Goals, Strategies, Measures, Targets:** Listed for County Services and County Operations in the following format:
  - ***King County-Cities Climate Collaboration Pathways (K4C)*** - Pathways that detail what it will take to get on track to countywide GHG emissions reduction targets.
  - ***Goal*** - a high-level statement of outcomes King County will strive to achieve in support of the K4C pathways.
  - ***Category*** – a grouping of strategies with shared characteristics.
  - ***Strategy*** - a method to help achieve the overall goal.
  - ***Measure*** - data that shows progress in support of SCAP goals.
  - ***Target*** - the desired level of performance for a measure.
  - ***Status*** – recent progress and current status of for each performance measure and target.
  - ***GHG Emissions Reduction*** – current or projected GHG emissions benefits of relevant targets.
- **Priority Actions:** Key climate actions that King County agencies will take through 2020.
- **Accountable Agencies:** King County agencies responsible for implementation.

Section Two: Preparing for Climate Change Impacts

Section Two is similarly organized, but includes more program-specific information. Section Two includes:

- **Key Takeaways:** A summary of the most important information.
- **Introduction:** Background and context, including an overview of the climate change impacts in King County.
- **Overview of Climate Change Impacts**
- **Goals and Strategies:** for County Services and County Operations.
- **Program-Specific Impacts, Ongoing Responses, Priority Actions and Long Term Direction** for 12 focus areas focused on the **Built Environment and Planning and Regional Services**
- **Summary of Priority Actions:** a compilation of the priority actions to be accomplished by 2020.

Throughout the document, these icons are repeated and indicate the following:

County Services. How King County will deliver services that support the reduction of countywide GHG emissions.

County Operations. How King County government will minimize the environmental footprint of its operations.

Aligns with commitments made in collaboration with the King County-Cities Climate Collaboration (K4C).

Quantifies a greenhouse gas (GHG) emissions reduction. All quantities are expressed in metric tons of carbon dioxide equivalent (MTCO2e). Driving a passenger car 25,000 miles results in about 10 MTCO2e.

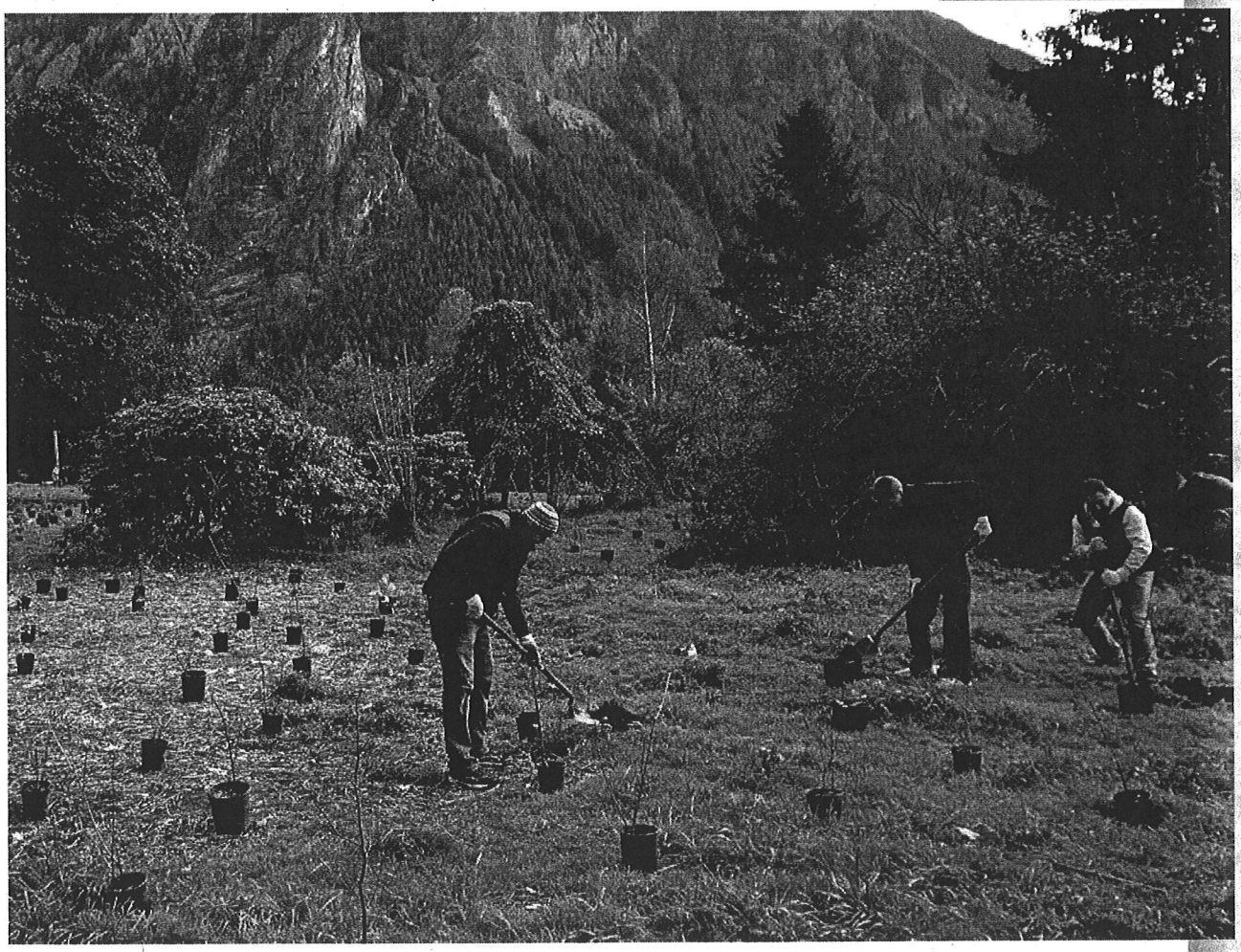
Responds to the King County Auditor's Office performance audit of the 2012 SCAP.

Advances with King County's commitment to equity and social justice.

Indicates partnership with local businesses.

Idenitifies commitments where there are pending or unmet resource implications.

the ACTION PLAN



OUTREACH AND ENGAGEMENT

Eco-charette participants show their support for green building design.

KEY TAKEAWAYS

- Combatting climate change requires an integrated, regional response that builds on the shared vision and leadership of the region's public, private and civic sectors, as well as the participation of all King County residents.
- King County has begun to build effective partnerships for joint action on climate change, but needs to invest in internal organizational capacity to expand and deepen its external engagement.
- The burdens and benefits of climate change will affect King County's current and future residents, communities, and businesses in different ways; equity and social justice are intrinsically linked to climate change, and climate solutions must reflect that dynamic.
- As a regional entity, King County is in a unique position to advance regional solutions to combatting climate change. The County commits to:
  - Create an inclusive, cross-sector (public, private, civic) approach to shared decision-making and leadership.
  - Establish forums for coordinated dialogue among County agencies to strengthen communications and share resources to implement climate strategies.
  - Integrate climate change considerations with the Equity and Social Justice Strategic Plan and build off that planning process to shape future engagement on climate.

INTRODUCTION

The challenges associated with preventing, responding to, and preparing for climate change demand an inclusive, integrated, communitywide response that goes far beyond what King County alone could accomplish. There are many organizations, governments and other stakeholders within the region already addressing working on climate action, from environmental education and activism, to carbon pricing and clean technologies, to research and regional preparedness. It is essential for the success of King County's climate change strategy for King County to cultivate the partnership of other governments, Tribes, businesses, philanthropic and community organizations, and King County residents through a collective regional climate vision, where decision-making, leadership and action are shared by all stakeholders. As described below, King County has focused on working with cities through the King County-Cities Climate Collaboration (K4C) and Sustainable Cities Roundtable to develop a shared climate goal and specific actions to achieve it, and share practical approaches for reducing GHG emissions. This work provides a model for broader engagement with the community.

Equity and Social Justice

Shared decision-making, leadership and action are especially important when considering the potential for climate change to have disproportionate impacts on different communities. Impacts of a changing climate will be experienced differently by King County residents, influenced by factors such as income, age, health, and where they live. For example, increased mortality from heat events has already been documented for the elderly, the very young, and those with existing health conditions like diabetes and respiratory disease. In some cases, lower cost housing is concentrated in flood hazard risk areas that potentially will see more severe and frequent flooding. At the same time, lower-income populations have limited capacity to adapt to conditions, such as increased frequency of heat events or flooding, through actions like flood proofing, home insulation, air conditioning, increasing tree canopy in lower income communities, or easily accessing a shady park or air conditioned community center. Limited English proficiency and cultural differences can also be a barrier to preparing for the impacts of a changing climate, which can be critical in times of disaster or extreme weather events. By working collaboratively to develop and implement strategies to prevent, respond to and prepare for climate change, King County has many opportunities to address broader inequities.

Internally, King County has taken the approach of integrating climate change considerations throughout its operations, from long-range planning to capital project management to community services. However, County agencies have varying levels of resources and expertise to carry out the types of internal and external communications, outreach and engagement for developing the necessary partnerships and stewarding a shared regional vision, including with respect to climate justice considerations. Establishing a dedicated position to serve as a central point of contact for coordinating climate communications, outreach and engagement among County agencies, including with the Office of Equity and Social Justice and collaborate with businesses and community organizations to develop climate solutions would strengthen the County's community engagement.

Policy Guidance for Enhancing Climate Outreach and Engagement

Both the King County Council and King County Auditor's Office have provided direction for King County to engage in collaborative solutions to climate change. The King County Strategic Plan calls for County agencies to "*promote robust public engagement that informs, involves, and empowers people and communities.*" The 2014 King County Auditor's Office

Performance Audit of the 2012 SCAP directed the Executive to "*ensure that the SCAP update and its subsequent implementation and monitoring are informed by input from a broad representation of community stakeholders in King County.*" The development of the 2015 SCAP has laid the groundwork for the County to pursue more inclusive, coordinated and sustained engagement, and moving forward, this approach will help the County advance regional solutions to combat climate change that are built on shared decision-making and action.

CURRENT COUNTY ACTIONS AND PROGRAMS

Engagement Since 2012

In implementing the 2012 SCAP over the last three years, King County has cultivated partnerships with public agencies and key influencers on climate solutions. These efforts, several of which are highlighted below, have advanced King County's progress on its climate commitments, provided models for engagement with other stakeholders, and informed the County's long-term vision for combatting climate change, including shaping the 2015 SCAP.

King County-Cities Climate Collaboration (K4C)

As of the summer of 2015, the King County-Cities Climate Collaboration (K4C) consists of King County and 13 cities, representing 75 percent of the county's population. Working collaboratively at the elected official and staff levels, the K4C has established a shared regional vision for climate action, the *Joint Letter of Commitment: Climate Change Actions in King County* (K4C commitments). To date, ten of the 13 K4C cities have adopted these commitments. K4C members have also implemented a shared funding mechanism, scaled to member jurisdictions' populations, with participating members determining how to use shared resources to support regional climate progress. The GHG emissions reduction pathways established by K4C frame each goal area of the 2015 SCAP. Many SCAP strategies and priority actions also mirror the K4C commitments.

Elected Officials from King County and many other cities gather after the June 2014 K4C Elected Officials Summit.

Regional Code Collaboration (RCC)

The Regional Code Collaboration (RCC), which evolved in 2012 from King County's Green Building Task Force and Sustainable Cities Roundtables, is made up of representatives from 13 King County jurisdictions and five other jurisdictions in the greater Puget Sound region. This group has been working to create a common vision for local codes that promote environmental success and for best practices informed by rating systems such as Leadership in Energy and Environment Design (LEED), BuiltGreen, and The Living Building Challenge. All participating jurisdictions have or are considering adoption of some or all of the code initiatives. The Cities of Issaquah, Seattle, and Shoreline have been leaders in adopting the developed codes. The RCC's guidance is reflected in **Goal Area 2: Buildings and Facilities Energy and Goal Area 3: Green Building**.

Safe Energy Leadership Alliance (SELA)

King County convened the Safe Energy Leadership Alliance (SELA) in 2014 to raise awareness of the health, safety, environmental, and economic impacts of proposed coal terminals in the Pacific Northwest and Canada, and the recent surge in transport of volatile Bakken Oil by rail and barge. As of the summer of 2015, SELA is a coalition of more than 160 local, tribal, and state elected leaders from across Washington, Oregon, Idaho, Montana, California, and British Columbia. SELA members have advocated for stronger federal oil car safety standards, testified for comprehensive oil transport safety legislation in Washington State, and pushed for thorough review of coal export terminal proposals on local economies, traffic, health, and tribal treaty rights.

Business Engagement

As demonstrated in the 2015 SCAP, King County has many opportunities to act directly on climate solutions, for example, by reducing the GHG emissions footprint of its own operations. However, the largest sources of GHG emissions in King County – transportation and energy use of the built environment – are affected by choices about how the region's businesses power their buildings and facilities and how their employees commute to work, making the collaboration of businesses critically important to the success of King County's climate strategies.

As such, King County been developing public-private partnerships to advance countywide climate solutions and support regional innovation in clean technologies. For example, as the title sponsor of the GoGreen Seattle Conference for the past three years, King County has helped grow this event, which in 2015 brought together more than 500 decision-makers from government and business to share knowledge and nurture cross-sector collaboration on regional issues, such as transportation, sustainability, and innovation. Successful implementation of K4C priorities for transportation and building energy will require strong partnerships of with businesses and non-profits. Many of the innovations in building energy efficiency, both design and operation, are coming from the private sector through alliances like Seattle 2030 District. Efforts by the building community to develop, adopt, and market green building standards like Built Green and LEED are essential to widespread adoption. In the transportation arena, employer incentives and support for commute trip reduction, like provision of Orca passes, support for electric vehicles and charging stations networks, and promotion of ride share programs are essential to meeting goals for reduction GHG emissions from transportation.

King County is also partnering with the private sector on the development of new approaches, innovation and cutting-edge clean energy technologies. For example, in early 2015, King County launched a two-year pilot project to monitor facility energy use at five County-owned facilities. In a partnership with Microsoft and local contracting firm MacDonald-Miller, the County will test the same energy tracking system Microsoft uses to reduce energy consumption and GHG emissions in the Executive's Office building, transit facilities, a solid waste transfer and recycling station, and at the Brightwater Education Center. King County's business engagement has helped shape the goals, actions, and strategies found throughout all sections of the 2015 SCAP.

King County staff talk with public about long-range transportation planning.

Additional Climate-Related Engagement

There are many other forums where King County engages regularly with other jurisdictions, businesses, non-profit organizations, and King County residents. Participation in the following committees, commissions, and work groups has informed King County's decision-making and progress on climate issues:

- Emergency Management Advisory Committee
- King County Transit Advisory Committee
- King County Service Guidelines Task Force
- King County Solid Waste Advisory Committee
- King County Rural Forest Commission
- Kitchen Cabinet (King County's Local Food Initiative Citizens Committee)
- Metropolitan Solid Waste Management Advisory Committee
- Growth Management Planning Council
- Puget Sound Regional Council – Regional Preparedness Work Group
- University of Washington Climate Impacts Group

Engagement directly related to development of the 2015 SCAP

To support development of the 2015 SCAP, King County engaged a variety of audiences to a) gain insight into stakeholders' perspectives and how they view King County's role in combatting climate change; and b) increase awareness about how climate change will affect the region and what King County government is doing to prevent, reduce, avoid, and respond to the challenge. This learning has informed the 2015 SCAP, shaping the strategies of the goal areas and laying the groundwork for the County to build alliances for a collaborative regional climate response.

Using electronic and direct engagement tools and techniques, King County implemented a three-pronged approach to reach out to and learn from stakeholders and community members. A summary of activities and findings is presented below.

1. **Subject Matter Expert Consultation**
   King County sought the guidance, input, and collaboration of subject matter experts to shape the 2015 SCAP goals, targets, and actions. King County strategized with sustainability staff from other jurisdictions and with local thought leaders from organizations such as Climate Solutions, University of Washington Climate Impacts Group, Puget Sound Energy, Seattle City Light, Puget Sound Clean Air Agency, Sightline, Sound Transit, Forterra, International Living Future Institute/Cascadia Green Building Council, Northwest Energy Efficiency Council, and Seattle 2030 District.

   In April 2015, King County hosted two formal group discussions, one in Seattle and one in Redmond, with participation from people representing ten public agencies and six non-profit organizations. These groups explored broad concepts of the SCAP and provided feedback on strategies and priorities for the update.

2. **Online Engagement**
   To interact with a broader audience, King County ran a "virtual town hall" in March and April 2015 using a tool called Mindmixer, which, unlike traditional surveys, allows participants to respond to questions, submit ideas, and interact with each other and King County staff.

There were 6,800 views of the questions over the five weeks the forum was open, with more than 100 responses and ideas submitted by participants and more than 80 interactions on those ideas.

King County used a variety of methods to disseminate and encourage participation in this online town hall, including Facebook ads that went out to both general audiences and targeted geographic areas of the county. The geographic-specific ads proved more effective, reaching 4,700 people to the general ad's 500. While not everyone who was reached by a Facebook ad participated in the Mindmixer forum, the ads themselves generated considerable conversations on social media.

3. **Direct Engagement**

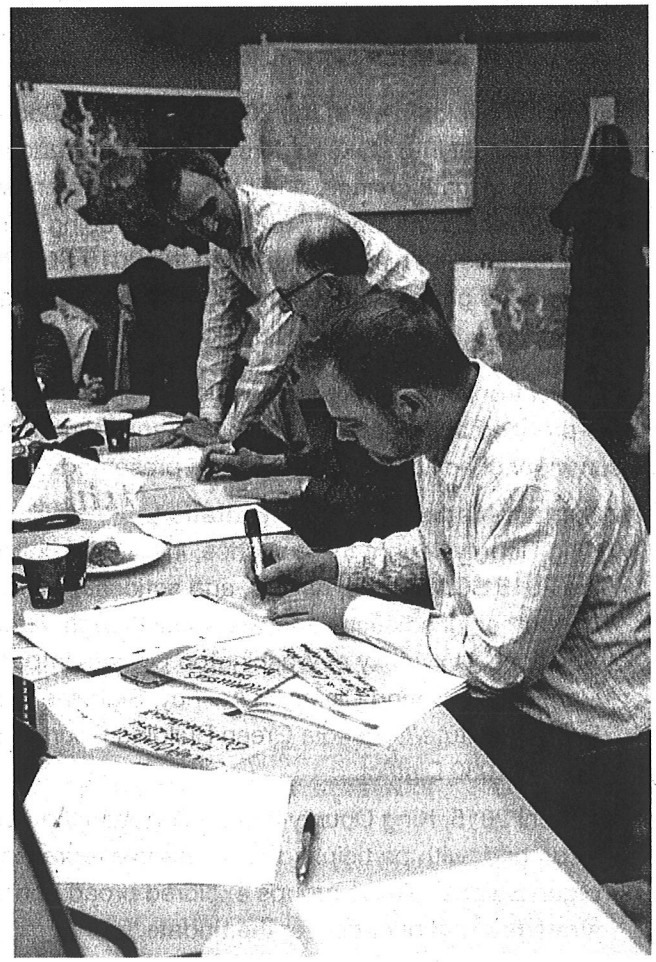
King County reached out beyond traditional environmental audiences and carried out small group discussions and informal interviews in April 2015. Working with multicultural outreach staff at the Environmental Coalition of South Seattle (ECOSS), King County conducted five small group discussions in Spanish, Vietnamese, Chinese, and Somali, which involved more than 60 people. King County also met with a group of youth and conducted interviews with a handful of residents from rural unincorporated communities.

Findings and Observations

King County's online and direct public engagement methods yielded several preliminary findings about public understanding of climate change impacts, actions to address climate change, and ideas for future engagement.

Climate Change Understanding

- Participants without familiarity of the topic expressed difficulty grasping the concepts of climate change, but most expressed an understanding of the connection between their daily lives and impacts from air and/or water pollution.
- Participants were generally positive about wanting to understand and learn more about the topic.
- Participants brought up snow most frequently – in the context of reduced mountain snowpack and extreme snow events - when talking about connecting climate change to their daily lives.



Participants work on emergency management planning.

Climate Change Actions

- Participants described multiple levels of responsibility in confronting climate change, from individuals to businesses to government.
- The cost of inaction should be considered alongside the costs/cost effectiveness of climate solutions.
- King County was identified as having a unique role in convening and cultivating regional alliances.

Engagement and Communications

- Participants from all audiences acknowledged the difficulty in communicating and engaging on climate change and suggested working through more tangible topics that result in climate benefits may prove more effective (e.g. transit, economic development, housing).
- There are many climate-related activities and initiatives underway in the region. Participants suggested that King County's engagement efforts could include King County employees, other jurisdictions and public sector actors, such as special districts, tribes, and state and federal agencies, as well as businesses, and philanthropic, civic and faith-based organizations.
- Participants suggested techniques, venues, and communications channels for interacting with them. Although there were some similarities, it was evident that effective engagement and education on climate change will require a more segmented, grassroots approach.

Goal: Building on engagement since the 2012 SCAP and directly related to the 2015 SCAP development, King County has developed a new climate change outreach and engagement goal:

- King County will cultivate an inclusive, shared regional vision for combatting climate change by working across County departments and through partnerships with other governments, Tribes, businesses, educational institutions, and philanthropic and community organizations.

prioritiyactionsby2020

To support progress towards this goal, three new priority actions are outlined:

✔ **Build cross-sector alliances.** Building off the success of models of regional collaboration like K4C and SELA, the County will deepen engagement with businesses, Tribes, educational institutions, and philanthropic and community organizations to develop climate solutions with co-benefits for public health, mobility, employment, and the economy. This will involve strengthening engagement with a broad representation of King County residents, including limited English proficiency populations and others who are most likely bear the negative impacts of a changing climate. The County should establish a dedicated position to support its climate related engagement, serving as a central point of contact coordinating climate communications, outreach and engagement among County agencies, collaborating on resources, and enhancing King County's effectiveness overall in communicating on climate solutions.

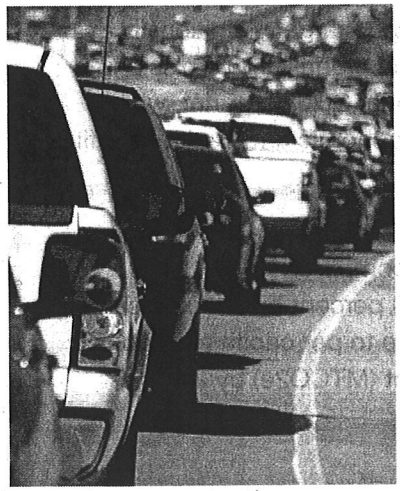
- ✔ **Strengthen internal agency collaboration on communications and engagement.** King County will establish regular dialogue across its departments' communications and outreach staff to better coordinate climate-related communications and engagement and to leverage resources.
- ✔ **Integrate climate change in the Equity and Social Justice Strategic Plan.** The County will integrate climate change considerations into the Equity and Social Justice Strategic Plan and planning process, which will help drive engagement on climate change issues and shape future decision-making on climate strategies.
- ✔ **Establish Partnerships Between K4C and the Private Sector:** As part of the K4C's 2016 shared work program, the County will work with K4C city partners to develop and pursue partnerships with businesses and non-profits to advance alternative transportation and building energy priorities.

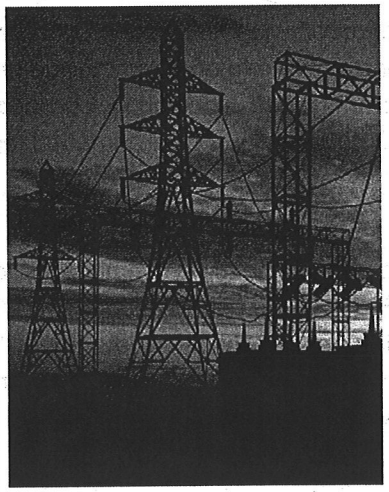
Accountable Agencies

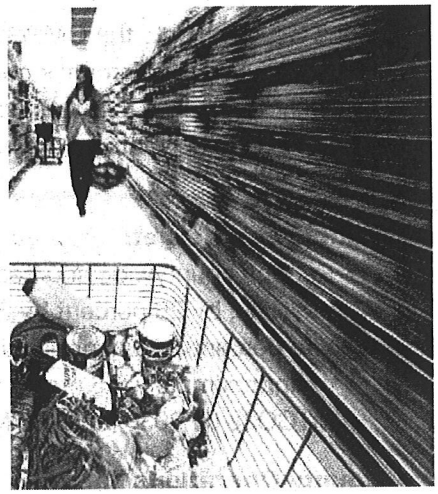
King County has taken the approach of integrating climate change considerations throughout its operations, so all agencies carry out some degree of communications, outreach and engagement on climate change. The agencies listed below have existing community-facing programs and initiatives that help educate King County residents about climate change and/or will be responsible for implementing the 2015 SCAP priority actions related to climate outreach and engagement.

- Department of Natural Resources and Parks
  - Solid Waste Division
  - Wastewater Treatment Division
  - Water and Land Resources Division
  - Parks and Recreation Division
  - Community Service Areas Program
- Department of Transportation
  - Metro Transit Division
  - Road Services Division
  - King County International Airport
  - Marine Division
- Department of Executive Services
  - Facilities Management Division
  - Office of Emergency Management
- Department of Permitting and Environmental Review
- Office of Equity and Social Justice
- Equity and Social Justice Inter-Branch Team
- Public Health – Seattle and King County

SECTION ONE:
Reducing Greenhouse Gas Emissions







GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

King County's Commitments

In 2014, King County and 39 King County cities came together to develop shared, countywide GHG emissions reduction targets. In July 2014, targets were unanimously adopted by the King County Growth Management Planning Council (GMPC), a regional planning body that develops countywide policies to help guide local comprehensive plans throughout King County. The formal adoption of a shared, community scale GHG target by local governments is relatively unusual, and provides a strong foundation and guidepost for community-scale efforts to reduce GHG emissions.

The shared targets are near- and long-term, ambitious and achievable, and consistent with what climate science says needs to be done in order to avoid the worst impacts of climate change. The adopted targets are significantly more ambitious than Washington State's GHG emissions reduction requirements (RCW 47.01.440).

The 2015 SCAP reflects the GMPC's recommendation for a countywide target. Additionally, while King County government's contributions to communitywide and global GHG emissions are relatively small, the County is committed to reducing its operational GHG footprint, while demonstrating that climate solutions have broader environmental, economic and health benefits.

Countywide Target:

- Reduce countywide sources of greenhouse gas emissions, compared to a 2007 baseline, by 25 percent by 2020, 50 percent by 2030, and 80 percent by 2050. Assuming one percent annual population growth, these targets translate to per capita emissions of approximately 8.5 metric tons of carbon dioxide equivalent (MTCO2e) by 2020, 5 MTCO2e by 2030, and 1.5 MTCO2e by 2050.

County Operations Targets:

- King County shall reduce total greenhouse gas emissions from government operations, compared to a 2007 baseline, by at least 15 percent by 2015, 25 percent by 2020, and 50 percent by 2030.
- King County's Department of Natural Resources and Parks, including the Wastewater Treatment Division, Solid Waste Division, Parks and Recreation Division, and Water and Land Resource Division, shall achieve net carbon neutrality for its operations by 2017.
- The Wastewater Treatment Division and Solid Waste Division shall each independently achieve carbon-neutral operations by 2025.

Progress to Date

Countywide Progress

King County's latest comprehensive assessment, Greenhouse Gas Emissions in King County (2012), documented a per person decline in core GHG emissions for the average King County resident, primarily because of declines in per person vehicle travel and building energy use. However, total GHG emissions in King County continued to increase, driven by population growth. While the trend in per capita emissions is moving in the right direction, the region is currently not on track to meet its long-term GHG emissions reduction targets.

County Operations Progress

King County has made significant progress in reducing GHG emissions from its buildings and facilities, reducing GHG emissions associated with operational energy use by 14 percent since 2007.

However, GHG emissions associated with operational vehicle use increased six percent between 2007 and 2014. This increase primarily resulted from: (1) decreased use of biodiesel in buses and trucks, which emits less GHG emissions than fossil fuel diesel, primarily to price differences, and (2) increased transit service and associated increased fuel use in Metro Transit buses – there was an eleven percent increase in transit ridership and a correlated but smaller increase in service between 2007 and 2014.

As documented in the **Goal Area 1: Transportation and Land Use,** when viewed at a community level, increasing transit service offsets the GHG emissions associated with transit operations by more than three times. These communitywide emissions reductions come by decreasing congestion, reducing car trips, and allowing more efficient land use.

Overall, total operational fossil fuel-related GHG emissions decreased 0.2 percent between 2007 and 2014. While it is unlikely that King County will achieve its near term 2015 GHG emissions reduction target, the next section on **Achieving GHG Emissions Reduction Targets** outlines what it will take to get the County on track by 2020.

Achieving GHG Emissions Reduction Targets

Countywide

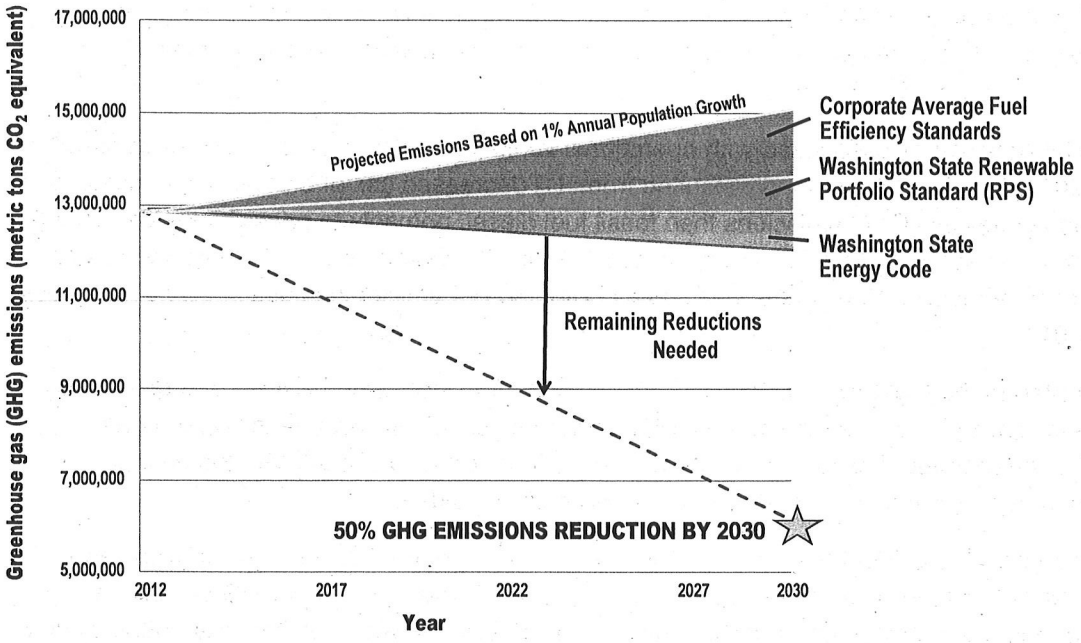
King County residents, businesses, and local governments are currently not on track to achieve the near- and long-term GHG emissions reduction targets adopted in 2014 by the Growth Management Planning Council.

However, analysis of changing policies and technologies by King County and K4C partners indicates that countywide targets are ambitious but achievable.

To understand what it would take to achieve adopted countywide GHG targets, King County and K4C partners collaborated with Climate Solutions' New Energy Cities Program in 2014 to establish specific, quantifiable pathways towards making a 50 percent reduction in GHG emissions by 2030, a key near-term milestone. This analysis began by assessing how existing major federal and state actions will contribute to local GHG emissions reductions over the next 15 years.

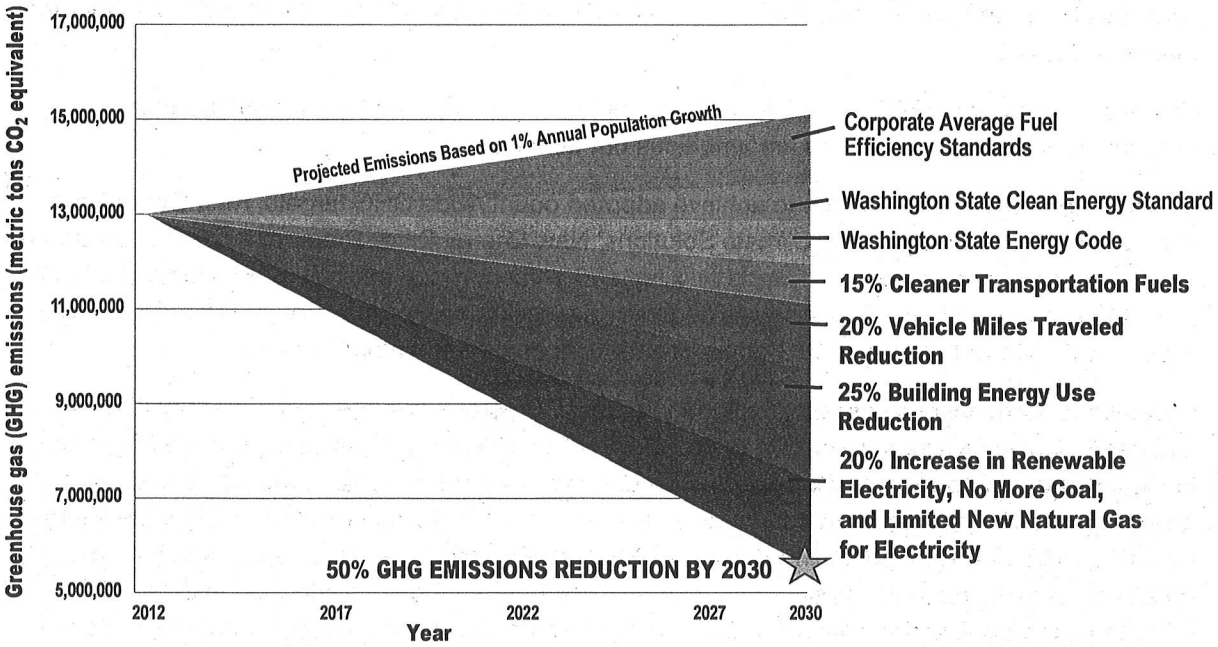
Federal and state actions assessed included: federal Corporate Average Fuel Efficiency (CAFE) standards, which require automakers to improve the fuel efficiency of vehicles produced for sale in the US; Washington State's Renewable Portfolio Standard (RPS), which requires all major energy utilities in Washington to source at least 15 percent of total fuel mix from renewable energy by 2020; and a state law governing Washington State's Energy Code, which specifies that new buildings constructed in 2031 use 70 percent less energy than those constructed in 2006. The following chart depicts the level of GHG emissions reductions associated with these three federal and state policies.

ACHIEVING COUNTYWIDE GHG EMISSIONS TARGETS-THE IMPACT OF FEDERAL AND STATE POLICIES



After assessing the impact of federal and state policies, the K4C and New Energy Cities analyzed a set of local pathways to close the remaining emissions reductions gap and get the region on track to a 50 percent reduction in GHG emissions by 2030. The following chart summarizes K4C pathways that would close the GHG emissions gap identified in the previous chart.

ACHIEVING COUNTYWIDE GHG EMISSIONS TARGETS-THE IMPACT OF K4C PATHWAYS



This chart outlines a set of sector specific pathways, developed in collaboration with K4C cities, that would close the remaining GHG emissions gap identified in the previous chart. Achieving these pathways would ensure that countywide GHG targets are achieved. These pathways are part of the "K4C Joint County-City Climate Commitments" and frame and inform each of the goal areas of the 2015 SCAP.

The pathways highlighted in the second previous chart frame the first five goal areas of the SCAP. They are also summarized here:

- **Goal Area 1: Transportation and Land Use:** For passenger vehicles and light trucks, (1) reduce vehicle miles traveled by 20 percent below 2012 levels by 2030 and (2) reduce the GHG emissions intensity of fuels by 15 percent below 2012 levels by 2030.
- **Goal Area 2: Buildings and Facilities Energy** (1) Reduce energy use in all existing buildings 25 percent below 2012 levels by 2030; (2) Increase countywide renewable electricity use 20 percentage points beyond 2012 levels by 2030 (with renewable electricity representing 90 percent of total countywide electricity consumption); phase out coal-fired electricity source by 2025; limit construction of new natural gas based electricity power plants; and support development of increasing amounts of renewable energy sources.
- **Goal Area 3: Green Building:** Achieve net-zero GHG emissions in new buildings by 2030.

The K4C and New Energy Cities analysis was focused on GHG emissions that physically occur within King County's geography, plus imported electricity-related sources. This excludes a large amount of consumption-based emissions – emissions that occur outside of King County's boundaries but are directly related to local decisions. That's why both the K4C pathways and the 2015 SCAP also include pathways to avoid new GHG emissions sources and also address consumption-based GHG emissions and sinks:

- **Goal Area 4: Consumption and Materials Management:** By 2020, achieve a 70 percent recycling rate countywide; by 2030, achieve zero waste of resources that have economic value for reuse, resale and recycling.
- **Goal Area 5: Forests and Agriculture:** Reduce sprawl and associated transportation related GHG emissions and sequester biological carbon by focusing growth in urban centers and protecting and restoring forests and farms.

While adopting the K4C pathways does not guarantee achievement of countywide GHG targets, the analysis shows that countywide targets are achievable with bold action.

Based on this analysis, K4C partners developed a set of shared actions known as the K4C Joint County-City Climate Commitments. These commitments highlight what King County and K4C partner cities will do to achieve the K4C pathways and also directly relate to the 2015 SCAP strategies and commitments. King County and ten cities, representing nearly 1.5 million residents - 70 percent of King County's population, have now formally adopted these commitments. King County and the ten K4C cities are working to encourage the remaining K4C cities and other cities in the County to consider adopting the commitments.

The 2015 SCAP is built upon the K4C pathways and commitments. The 2015 SCAP outlines County actions that will help achieve the K4C pathways and quantifies the GHG emissions reduction potential of those actions. While there is significant work needed to better quantify the GHG impact of County actions, the County now has a framework for how to get on track towards its GHG emissions reduction targets.

The K4C Joint County-City Climate Commitments also include shared policy statements that reflect that to achieve local GHG emissions reduction targets, action is necessary at other levels of government and in collaboration with other partners. Highlights of the K4C policy commitments include:

- **Climate Policy:** Advocate for comprehensive federal, regional and state science-based limits and a market-based price on carbon pollution and other greenhouse gas (GHG) emissions. A portion of revenue from these policies should support local GHG reduction efforts that align with these Joint County-City Climate Commitments, such as funding for transit service, energy efficiency projects, and forest protection and restoration initiatives.
- **Goal Area 1: Transportation and Land Use:** Partner to secure state authority for funding to sustain and grow transit service in King County.
- **Goal Area 3: Buildings and Facilities Energy:** Build on existing state renewable energy commitments including the Washington State Renewable Portfolio Standard (RPS) to partner with local utilities, state regulators and other stakeholders on a countywide commitment to renewable energy resources, including meeting energy demand through energy efficiency improvements and phasing out fossil fuels.

County Operations

To achieve King County's operational targets associated with GHG emissions from fossil fuels, King County developed a set of goal area-specific targets for the 2015 SCAP. The technical analysis that supported the development of these targets shows that to achieve the County's 2020 target of a 25 percent reduction in GHG emissions compared to a 2007 baseline, each of these goal area-specific targets must be met.

Maintaining a steady course towards achieving King County's 2030 targets will require progress beyond these near-term commitments and will be developed with the next SCAP update by 2020.

While many of the commitments in the 2015 SCAP will help reduce operational GHG emissions, the most important to ensure the County makes sufficient progress by 2020 include:

- Grow transit service through 2020 with no increase in GHG emissions.
- For vehicle operations, increase the percentage of alternative fuels in County fleets 10 percent by 2025, as compared to a 2014 baseline.
- By 2025, ensure all electricity supplied for King County government operations is GHG emissions neutral.
- Reduce normalized energy use in County-owned facilities five percent by 2020 and 10 percent by 2025, as compared to a 2014 baseline.

As illustrated in the introductory section of this plan, King County has significant additional GHG emissions sources associated with government operations, such as its purchasing and landfill-related methane emissions. The 2015 SCAP includes commitments to further quantify and reduce these GHG emissions sources.

Measurement and Reporting

Countywide

In July 2014, at the same time new countywide GHG emissions reduction targets were adopted, the King County Growth Management Planning Council (GMPC) also adopted new policies on countywide GHG emissions measurement and reporting:

> **Countywide Planning Policy Environment 18A**
> King County shall assess and report countywide greenhouse gas emissions associated with resident, business, and other local government buildings, on road vehicles and solid waste at least every two years. King County shall also update its comprehensive greenhouse gas emissions inventory that quantifies all direct local sources of greenhouse gas emissions as well as emissions associated with local consumption at least every five years.

This is consistent with King County's own Comprehensive Plan policy:

> **2012 King County Comprehensive Plan Policy E-202**
> Through reporting on its major environmental sustainability programs, King County shall assess and publicly report on: (b) Countywide greenhouse gas emissions associated with resident, business, and other local government activities; and (c) Countywide greenhouse gas inventories that quantify all direct local sources of greenhouse gas emissions as well as emissions associated with local consumption.

King County's role of leading countywide GHG emissions inventories meshes well with its role as a regional convener and partner with cities, businesses, and the public on climate action. Countywide GHG inventories are how King County plans to support the monitoring of progress towards countywide GHG emissions targets. For past inventories, the County has led this work, while sharing costs with diverse partners, including the Puget Sound Clean Air Agency, the City of Seattle, and the U.S. Department of Energy.

King County's next update is planned for fall 2015, reporting on calendar year 2014 emissions. Information from this assessment will be included in the first annual report on the 2015 SCAP.

County Operations

Since the 2012 SCAP, King County has published annual reports of progress in SCAP implementation. These annual updates will continue to be published, consistent with King County Council direction. King County's Comprehensive Plan also directs:

> **2012 King County Comprehensive Plan Policy E-202**
> Through reporting on its major environmental sustainability programs, King County shall assess and publicly report on: (a) its normalized and total energy usage and total greenhouse gas emissions associated with county operations

While many organizations that account for their operational GHG emissions focus on fossil fuel sources, King County is committed to be increasingly comprehensive in its accounting and reporting. For example, assessing and reducing GHG emissions associated with King County governments purchasing is an increasing focus of County climate action efforts.

PILOT COST EFFECTIVENESS ASSESSMENT

King County is committed to improving the quantification of the costs and benefits of climate action. At the same time, in considering cost and GHG emissions reduction assessments, it is important to highlight that there may be other primary objectives of many climate-related strategies that are not exclusively GHG emissions reductions, such as cleaner air and water quality, improved quality of life, improved regional mobility, and public health benefits.

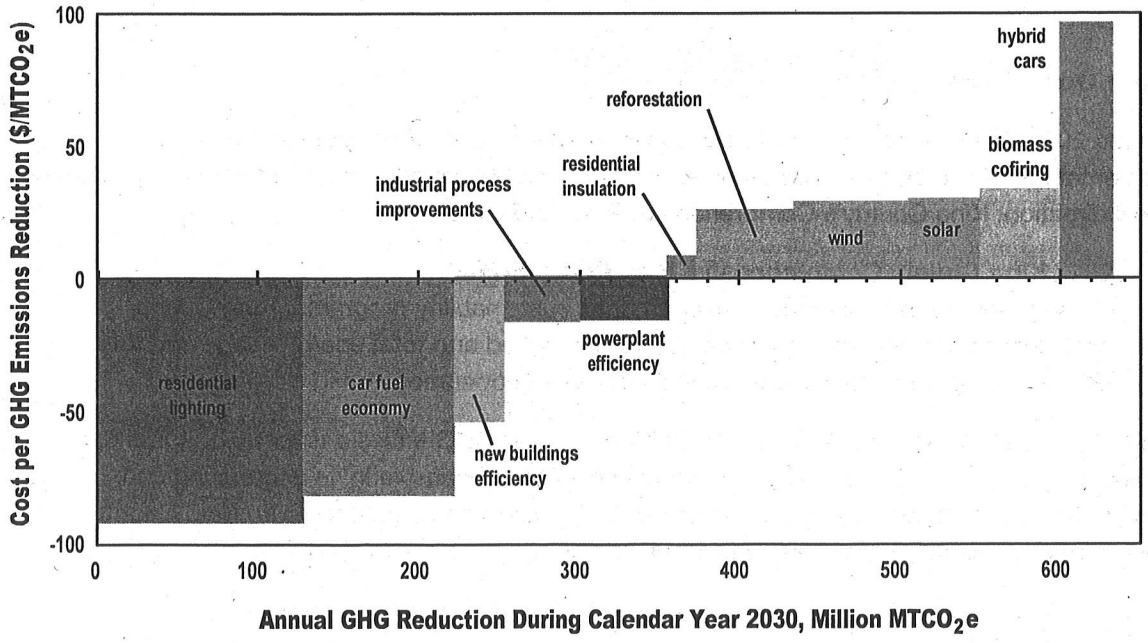
The 2015 SCAP introduces cost effectiveness information at a national scale, and then provides the results of a pilot assessment of 13 "County Services" related strategies, conducted as part of the 2015 SCAP. Additionally, this section outlines two new Priority Actions that will further the County's work to integrate cost effectiveness information into County climate action.

National Assessment

A common and useful tool for comparing GHG emissions reduction strategies is Marginal Abatement Cost Curves (MACC). The example MACC below, conducted in 2007 by McKinsey & Company, illustrates the cost effectiveness of a selection of GHG emissions reduction strategies in the United States.

In the MACC, the width of each bar is the emissions reduction – the wider the bar the greater the GHG emissions reduction. The height of each bar represents the "marginal abatement cost", or the cost of reduction per metric ton of carbon dioxide equivalent (MTCO2e)– the taller the bar, the higher the cost of each avoided metric ton of emissions. For example, the rightmost bar represents getting more hybrid cars into the U.S. vehicle fleet and has a width of about 32 million MTCO2e of emission reduction, at a price of $97 per MTCO2e. The bars are ordered from cheapest at the left, to most expensive at the right. At the left end of the chart are a number of reduction strategies that have negative costs – that is, they *save* money over the lifecycle of the strategy. These are mostly energy efficient strategies, where energy cost savings more than pay back the capital cost of the efficiency improvement.

ESTIMATE OF COST EFFECTIVENESS OF SELECT GHG EMISSIONS REDUCTIONS STRATEGIES IN THE U.S. (McKinsey & Company, 2007)



This national assessment can be useful in framing climate planning efforts such as the 2015 SCAP. For example, it highlights the cost effectiveness of many vehicle and energy efficiency improvements. However, the analysis is very broad and based on opportunities and cost implications at a national level. A MACC tailored to King County would show different results. For example, because local energy sources are cleaner and result in fewer GHG emissions compared to national averages, energy efficiency strategies would likely be more costly per increment of GHG emissions reduction.

It's important to keep in mind that a MACC evaluates each option *only* on the merits of GHG emissions reductions and does not evaluate non-climate benefits. For example, in the national analysis referenced above, solar power is among the more expensive options, but it also reduces air and water pollution from fossil fuels, providing health and water quality benefits unaccounted for in the MACC. This is especially important when considering transportation investments, which have other local benefits, such as access to jobs and other destinations, reduced congestion, and better air quality.

2015 SCAP Pilot Cost Effectiveness Assessment

As part of the 2015 SCAP, King County undertook a pilot cost effectiveness assessment of a selection of SCAP-related commitments. At least two actions from each of the County's five SCAP goal areas were assessed. All assessed actions are from the "County Services" portion of the 2015 SCAP, relating to reducing GHG emissions from communitywide sources, as opposed to those focused on County government operations. These actions were evaluated for their costs - both to King County government and at the community scale - and their GHG emissions reduction. The timeframe for assessing the impact was focused on the expected costs and benefits in 2030.

Due to time and data limitations, this pilot assessment has more uncertainty with potential costs and GHG emissions reduction for each action than McKinsey & Company's MACC assessment.

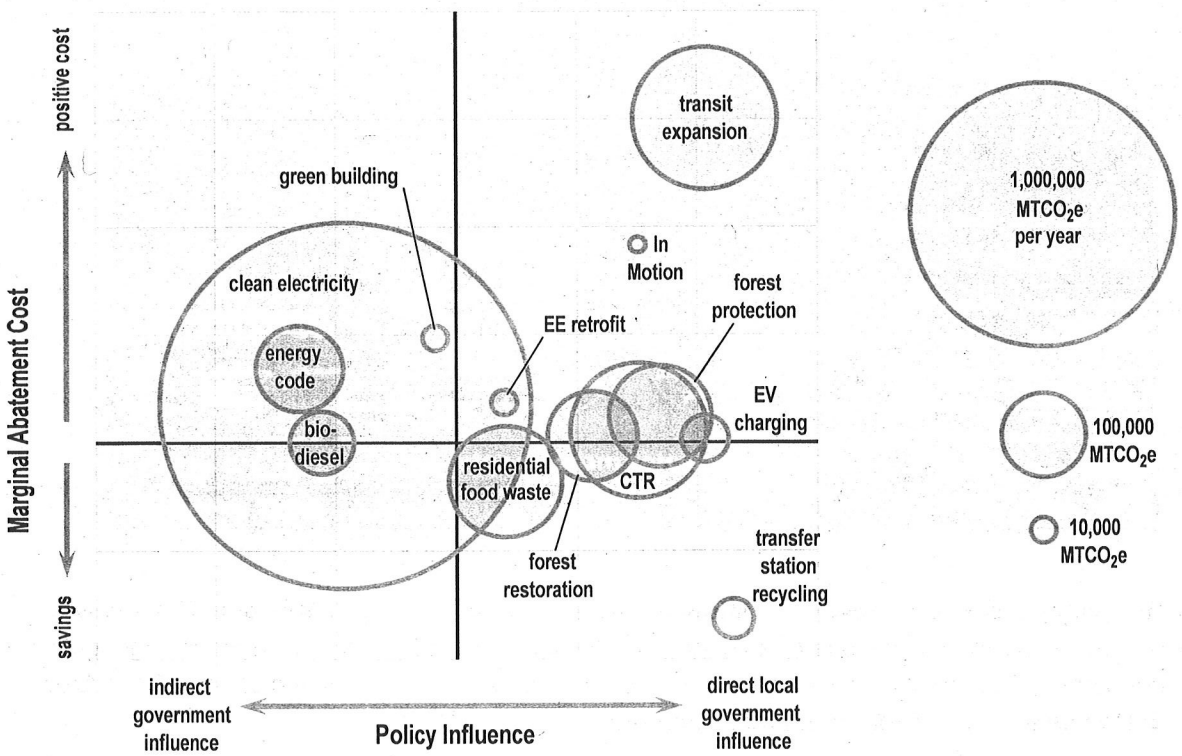
The table on the next page describes each of the actions that were evaluated in the pilot cost effectiveness assessment. Please note that these strategies are implemented to achieve multiple benefits. In many cases, these actions are being pursued primarily for reasons other than the GHG emissions reduction benefits.

Action name	Definition
Transit expansion	Increase Metro Transit ridership consistent with the regionally developed Puget Sound Regional Council's ***Transporatation 2040*** plan to double transit boardings by 2040.
CTR	Provide tools and assistance to increase employee participation in King County Metro's Transit's Commute Trip Reduction (CTR) program at CTR-mandated employers and encourage voluntary CTR participation among small employers to achieve an 18 percent reduction in commute-related GHG emissions.
EV charging	Partner with installers to add 40 publicly-accessible Level 3 Electric Vehicle charging stations to encourage electric vehicle adoption in King County.
In Motion	Increase participation by 50 percent in King County Metro Transit's In Motion program for encouraging travel alternatives.
Biodiesel at the pump	For all vehicle fuel use in King County, ensure two percent of diesel fuel dispensed at the pump is biodiesel.
EE retrofit	Stimulate an additional $5 million in annual consumer spending on cost-effective energy efficiency retrofits by providing a loan loss reserve to local banks and credit unions, encouraging efficiency measures during construction permitting, and advertising efficiency programs in County-controlled communications.
Clean electricity	Work with Puget Sound Energy to phase out coal-fired electric generation from its portfolio, increase renewable electricity use, and limit construction of new natural gas-fired power plants.
Energy code	Work with the State Building Code Council and King County cities to develop, adopt, and implement bold residential and commercial energy codes, reducing energy consumption in new buildings to net zero by 2030.
Green building	By 2030, 100 percent of new developments achieve Built Green Emerald Star, LEED Platinum or Living Building Challenge standards.
Transfer station recycling	Divert 75 percent of recyclable waste received at transfer stations from self-haul customers.
Residential food waste	Require separation of food waste for residential single-family homes.
Forest protection	Permanently protect 10,000 acres of forest from development by purchasing property, purchasing development rights, or offering property tax incentives.
Forest restoration	Improve the health of 12,300 acres of County-owned forests through replanting, thinning, and invasive species removal.

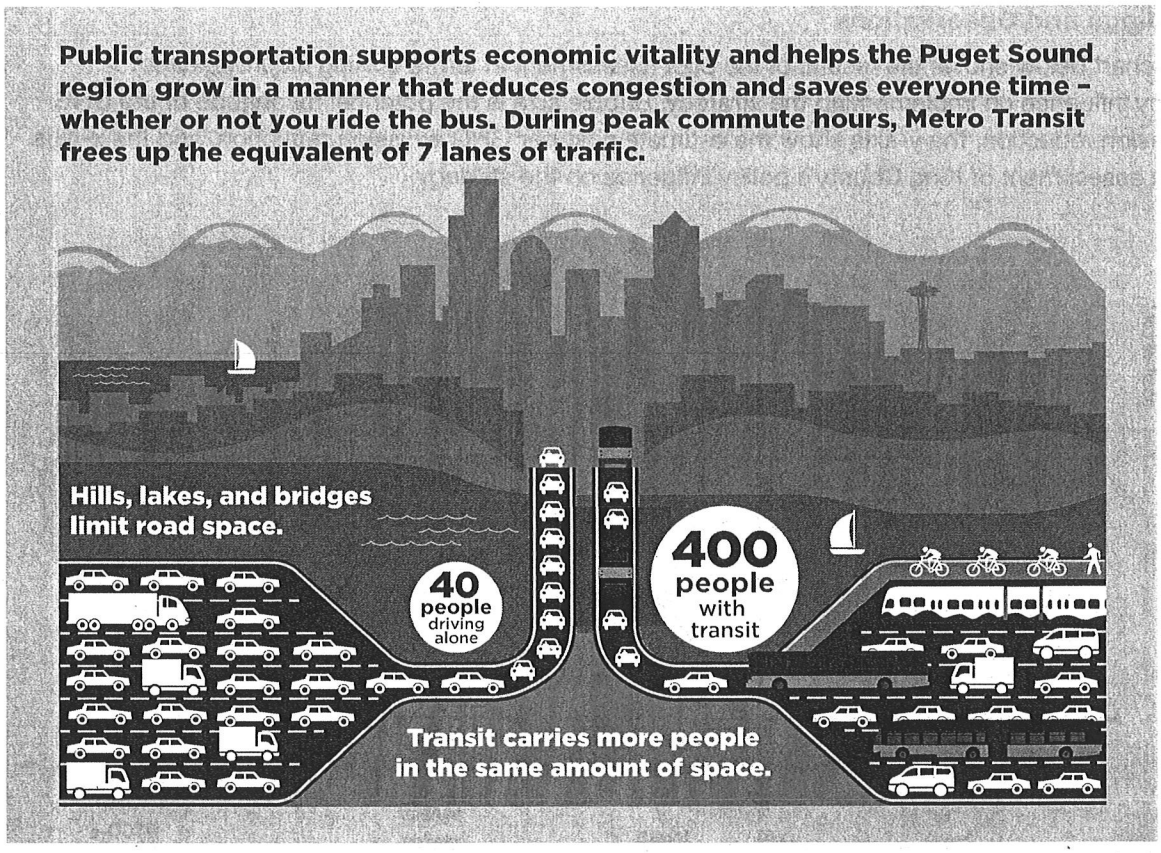
Findings and Observations

The chart below shows the results of the pilot assessment in terms of King County's direct policy influence on implementing the strategy. Bubble size is the potential magnitude of the GHG emission reduction, the y-axis show the estimate cost per GHG emission reduction, and the x-axis is an assessment of King County's policy influence on the strategy.

COST EFFECTIVENESS PILOT ASSESSMENT RESULTS - SELECT 2015 SCAP STRATEGIES



- Climate Cost Effectiveness Assessments do not capture all the benefits of an action or service. In addition to the GHG emissions reduction benefit of assessed actions, there are many policy drivers and co-benefits for these actions that are not captured in the bubble chart. The climate-related costs and benefits of these actions need to be considered in the context of multiple rationales and benefits of these programs. For example:
  - » Energy efficiency and green building strategies create local jobs, increase property values and employee productivity, and can improve the health and quality of life of residents and tenants. None of these benefits are reflected in the pilot assessment.
  - » Forest protection and restoration results in environmental benefits including cleaner air and water, improved wildlife habitat, and recreation opportunities.
  - » Increasing transit service produces more livable communities, better health outcomes, and connects us to the most important places in our lives – jobs, school, health care, family, and friends.



- **Recycling and waste prevention show potential cost savings and GHG benefits.** Analysis of transfer station recycling and residential food waste showed substantial cost savings and concurrent GHG emissions reductions. These commitments have been included in **Goal Area 5: Consumption and Materials Management.**
- **Phasing in clean electricity is critical, but requires partnerships.** Clean electricity showed the largest GHG emissions reduction potential, but King County has less policy influence in this area. There is also considerable uncertainty about cost, with estimates varying from positive to negative. However, if the full costs of continued coal power generation are included (for example, reflecting the costs of air pollution, health impacts coal ash disposal, groundwater impacts and GHG emissions), they would likely be greater than or equal to the cost of renewable energy alternatives. King County's commitments to partner with Puget Sound Energy and others to transition to a renewable energy future are highlighted in **Goal Area 2: Buildings and Facilities Energy.**
- **Forest protection has important carbon benefits at modest costs.** While not traditionally considered a climate action and historically pursued for other benefits such as recreation and habitat, forest protection has an important GHG benefit at modest costs. Related commitments are included in **Goal Area 5: Forests and Agriculture**.
- **Partnering with employers on commute trip reduction (CTR) programs has GHG emissions reduction potential.** Expanding CTR programs can make a substantial reduction in countywide emissions, thanks in part to the large proportion of local emissions coming from commuters' travel. Commitments related to CTR programs are included in **Goal Area 1: Transportation and Land Use**.
- **Reducing the costs of green building is important.** The relatively high costs per GHG emissions reduction estimated for the energy code and green building strategies are primarily

a result of the costs of building to high energy efficient standards. This highlights the need to reduce the costs of designing and building green. Related strategies are highlighted in **Goal Area 3: Green Building**.

Comparing the Costs of Action to Inaction

A recurring theme heard from stakeholders was that the costs of taking action to reduce GHG emissions must be compared to the costs of not taking action, i.e. the costs of climate change impacts.

It is challenging to quantify the diverse costs of climate change – for example from the costs of increasingly extreme weather or impacts to food production - but there are many assessments that attempt to do so. For example, the University of Washington and University of Oregon have estimated that in Washington, the costs of a changing climate, reflected in increased forest fires, public health impacts, and reduced salmon populations, for example, **will be $1,250 per year per household by 2020**, with higher costs in future years.

Another approach in considering climate-related costs and benefits looks at the social cost of carbon (SCC), an estimate of the economic costs associated with GHG emissions and an estimate of the economic benefit of avoided or reduced GHG emissions. The SCC is a comprehensive estimate of the global costs of climate change and includes, for example, changes in agricultural, human health, and property damages from increased flood risk. The U.S. government now uses the SCC to inform decision-making and rule-making, for example in determining the costs and benefits of federal fuel efficiency standards for cars and trucks.

The **most recent SCC values**, published in 2013 by the White House, are $39/MTCO2e in 2015 and $46/MTCO2e in 2020, increasing to $76/MTCO2e by 2050. These totals assume a three percent discount rate and the values are dollar-year and emissions-year specific.

One way for policy and decision makers to interpret the SCC estimates is that at an economy-wide, global scale, any action that costs below the SCC makes economic sense. However, this simplified interpretation ignores that effects of climate change vary by geography and over time. This approach also ignores the other benefits resulting from many GHG emissions reduction strategies. Nonetheless, it is useful to consider the relatively high value of the SCC compared to the costs of many GHG reduction strategies, such as illustrated by those published by McKinsey and Company and included in the introduction to this section.

As King County develops and implements an operational cost of carbon (see priority action below), the experience of the U.S. government and others in using a SCC to inform decision making will be important example to consider.

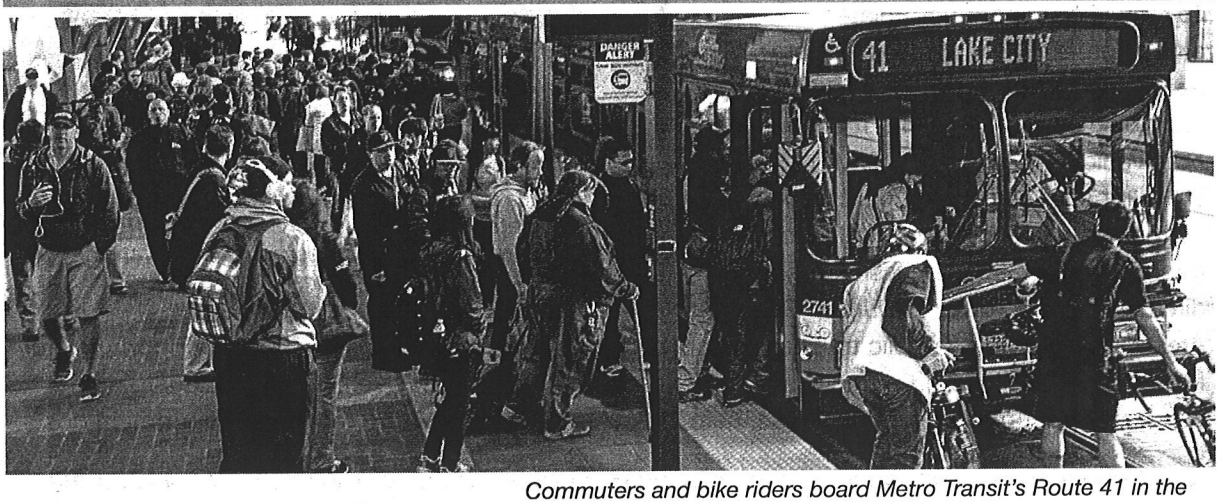
In addition to the direct economic costs associated with climate change impacts, there are other important but hard to quantify benefits of action that must be considered, such as opportunities for local economic development, health and quality of life improvements, and national security implications. For example, in 2014, the U.S. Department of Defense (DOD) declared that climate change is an immediate threat to national security, citing increased risks from terrorism, infectious disease, and economic impacts. The DOD also predicted increasing needs for military responses to weather and climate events across the globe from disasters such as Hurricane Katrina and Hurricane Sandy in the U.S. to drought and food shortages in Africa. Many of these increasing global risks are tied to climate change and weather impacts on food and water supplies, along with associated linkages with energy and GHG emissions. These impacts are part of what is identified by the United Nations as the "food, water, energy nexus".

prioritiyactionsby2020

This pilot cost effectiveness assessment helped inform the GHG emissions reduction policy decisions in the 2015 SCAP, and King County will apply this type of assessment more comprehensively in future climate related planning processes, including the next SCAP update. An important challenge will be balancing the quantified costs and GHG emissions reduction benefits with other important rationales and benefits of climate-related actions. To further its commitment to better integrate cost effectiveness considerations into its climate planning work, two new related priority actions are highlighted below:

- ✔ **Assess cost effectiveness of select County operations commitments in the 2015 SCAP.** Building on the pilot cost effectiveness assessment carried out to inform the 2015 SCAP, King County will pilot a cost effectiveness assessment for at least 12 "County Operations" commitments. This information will be provided as part of the first annual report on implementation of the 2015 SCAP and will inform future climate action planning.
- ✔ **Develop and implement an operational "Cost of Carbon".** In the absence of state and federal action to put a price on GHG emissions, it is difficult to integrate the environmental and economic costs associated with different decisions as they relate to GHG emissions. To address this gap in the near term, King County's Office of Performance, Strategy and Budget will collaborate with King County agencies to develop and propose an internal "cost of carbon" by the end of 2017. This cost of carbon will be used in life-cycle assessments and decision making related to County operations, including for purchase of clean vehicles and alternative fuels, for facility construction and resource efficiency projects, and for related technology investments. King County will also pursue using the cost of carbon to inform broader County planning and decision making.

Goal Area 1: TRANSPORTATION AND LAND USE



Commuters and bike riders board Metro Transit's Route 41 in the downtown Seattle transit tunnel.

KEY TAKEAWAYS

- Transportation is the region's largest source of GHG emissions, accounting for nearly half of all GHG emissions.
- King County is home to 2 million people and 1.3 million jobs; it is one of the fastest growing large counties in the U.S.
- King County is Washington's economic hub; public transportation helps connect people with job centers across the region while also reducing air pollution, improving the health of our communities, and increasing access for all residents.
- Per capita GHG emissions associated with transportation have started to decline.
- Land use and transportation decisions are critically linked and together can have significant impacts on both improving community health and reducing GHG emissions.
- King County plays critical roles related to transportation and land use, and this goal area outlines key commitments to:
  - Focus almost all new residential construction in urban areas.
  - Double transit ridership by 2040.
  - Grow transit service thru 2020 with no increase in GHG emissions.
  - As it relates to government operations, increase the use of alternative fuels and decrease their carbon intensity.

INTRODUCTION

Transportation is the largest source of GHG emissions in King County, accounting for nearly half of all GHG emissions that occur within King County's geography. In the region, GHG emissions from transportation result from burning gasoline, diesel, natural gas, and other types of fossil fuels.

King County has grown rapidly in recent years, with a net increase of 280,000 new residents between 2000 and 2014. Current projections by the Puget Sound Regional Council estimate King County's population increasing by an additional 444,000 by 2040 for a total expected population of 2.4 million people. As the County continues to grow, demand for transportation and mobility services will also grow.

This hybrid service truck supports field preventive maintenance on fleet vehicles and equipment. The truck uses the hybrid battery to operate the air compressor and 12 volt/110 volt electrical systems making it unnecessary to run the engine when carrying out service operations.

To reduce transportation-related emissions, a variety of measures are needed to reduce fuel use, deploy cleaner technologies and fuels, and reduce both vehicle miles traveled (VMT) and the number of single occupant vehicles on roadways. King County influences transportation-related emissions by directing growth within the Urban Growth Area (UGA), providing public transit, vanpool and ridesharing services, and creating opportunities for walking and bicycling —choices that eliminate single occupancy vehicle trips, mitigate traffic congestion, support efficient land use, help improve public health, and reduce transportation costs.

King County plays an important role in reducing GHG emissions by providing public transportation options, helping to make communities more compact, active, and pedestrian oriented, supporting non-motorized travel through the Regional Trails System, and reducing operational emissions through use of lower-carbon fuels and innovative fleet technologies. King County is continually working to improve vehicle technology, phase in cleaner fuels, and reduce emissions through thoughtful operating practices for both Metro Transit and an extensive vehicle fleet that supports government functions.

King County is also responsible for growth management and land-use regulations that encourage efficient land-use patterns by encouraging density and appropriate land uses within the UGA. The County has been a leader in adopting smart growth strategies that have concentrated the growth of population, employment, and development within the designated UGA.

The ability to safely and efficiently move about King County is critical for creating an environment for people to thrive. Public transportation connects people with access to jobs, schools, community services and recreation, increasing equity and access for all. Regional trails provide space for recreation and can serve to mobilize people by connecting trails to key areas of opportunity. Developing transit, biking, and pedestrian friendly communities – especially with affordable housing elements – can help address social equity, public health and climate change challenges as well.

County actions to improve transportation fuels and technologies – coupled with the results of decades of changes in land use policies – have led to a slight decline in per-person transportation-related emissions in King County from 2007 to 2014. King County continues efforts to reduce transportation-related emissions with a focus on priority actions for both County services and operations.

CURRENT COUNTY ACTIONS AND PROGRAMS

County Services

Transportation Choices

- **Transportation Choices.** Metro Transit offers a range of public transportation services including local bus transit, RapidRide bus-rapid transit, Dial-a-Ride transit, VanPool and VanShare, paratransit service through its Access program, and other alternative services. It provided nearly 119 million bus passenger trips and more than three million vanpool passenger trips in 2014. Demand continues to grow for transit services. Recent estimates indicate that 15 percent more service is needed just to meet existing ridership demand. This is evident through the record ridership, increased congestion, buses that are passing riders up because they are too full, and park and ride lots that are at capacity.

Metro Transit offers VanPool and VanShare services to make it easy for commuters to travel without driving alone.

- **Increasing Transit Access for Low-Income Populations.** In March 2015, Metro Transit launched the new ORCA LIFT program which makes riding the bus more affordable for those who meet the eligibility requirement of 200 percent below the federal poverty line. With the ORCA LIFT card, income-qualified riders can save up to 50 percent or more on Metro Transit buses, Kitsap Transit buses, Sound Transit Link light rail, King County Water Taxi and the Seattle Streetcar. ORCA LIFT provides more people and communities with transportation choices, while reducing transportation costs and GHG emissions.
- **Piloting Alternative Services.** The 2015-16 budget includes $12 million to pilot alternative transportation services to a) address bus service reductions in 2014, b) complete implementation of the 2012 Alternative Services Plan and c) explore alternative services as a complement to the fixed route bus system.

Alternative Vehicles, Fuels and Technologies

- **Transportation Technology and Strategies.** King County continues to be a leader in supporting and demonstrating new transportation technologies. Metro Transit was the first large transit agency to equip the entire bus fleet with bicycle racks. All Metro Transit commuter vans also have the option of bike racks. More recently, Metro Transit led the development of a right-sized parking web tool to help jurisdictions and developers better understand their actual parking needs in urban and suburban areas. Metro Transit also developed a model to estimate the potential transit benefit of various improvements to the non-motorized network connecting to major transit stations.
- **Rideshare Online.** Metro Transit (Rideshare Operations) administers an online system that enables employers, jurisdictions, schools, social services and other groups to easily organize biking, carpools, vanpools and transit connections. This system provides calendar tracking of trips estimating cost savings and GHG reductions, comprehensive administrator tools to track and report commute trip reductions, and web-based fulfillment of incentive rewards. In 2014 there were 30,130 new registrations in the system and users logged a reduction of 65,881,000 VMT.

Land Use and Community Design

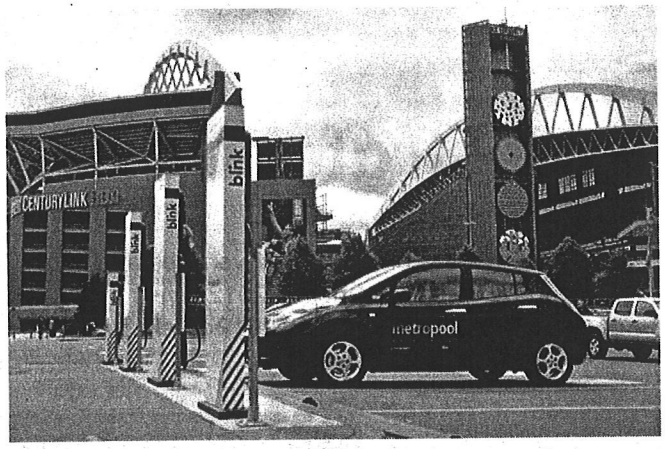
- **Regional Planning.** King County provides long-range planning services consistent with its dual roles as 1) the countywide government responsible for maintaining the UGA, directing growth to urban areas and away from rural and resource lands; and 2) the local land use authority for unincorporated areas. Since the County's first comprehensive plan was adopted under the State Growth Management Act in 1994, there have been minimal expansions of the UGA, many of which have been mitigated by offsetting, permanent open space designations. By working with city partners to maintain the UGA, King County is directing growth into the urban areas where facilities and services can more easily be provided while reducing the need to travel long distances.
- **Planning Policies.** Through the King County Countywide Planning Policies, King County promotes equitable transit-oriented development policies that support efficient use of land within the UGA. These policies improve urban density, access and connections, transportation options, and healthy living, while preserving green space and natural resources. The Regional Trails System, for example, supports more than 12 million annual bicycle and walking trips, including an estimated 5 million trips along the 175 miles of trails managed by King County. The County works with school districts to help address safety concerns regarding safe access to schools and is implementing programs such as the Transfer of Development Rights program which preserves land and steers development growth away from rural and resource lands into King County's UGA.
- **Transit-Oriented Development.** King County continues to promote Transit Oriented Development (TOD) in numerous locations around the County. Most recently, a TOD project at the South Kirkland Park and Ride combined 58 affordable housing units with 180 market rate units. King County was a partner in creating an acquisition fund – the Regional Equitable Development Initiative (REDI) Fund – to acquire land for affordable housing and community development near high capacity transit nodes before the land is too expensive to acquire. Metro Transit also implemented a pilot program making a multi-family Passport product available to property managers of apartment buildings, supporting efforts to reduce parking supply and increase transit access for residents of apartments in transit rich environments.

County Operations

Alternative Vehicles, Fuels, and Technologies

- **Fleet Improvements.** Metro Transit has been a leader in deploying fleet vehicles that utilize new technologies and reduce fuel use. Metro Transit operates one of only five electric trolley systems in the U.S., and in 2015, began updating its trolley fleet with vehicles designed to travel "off-wire" for limited distances with regenerative braking and improved energy efficiency. In 2014, Metro Transit began purchasing new hybrid buses with all electric drive components and accessories, enhanced fuel efficiency and the ability to completely cut off the engine when there is no need for power. Metro Transit was also the first transit agency in the nation to invest in articulated hybrid buses and all-electric zero-emission cars for the *metropool* commuter van program.
- **Promoting Low Carbon Fuel Use.** King County fleet managers hold monthly meetings that provide a forum to share their experiences about the performance of low-carbon fuels in various applications. Fleet managers have the opportunity to evaluate the performance of pilot projects, such as the introduction of 25 electric vehicles into the commuter pool fleet, and 20

liquid petroleum gas (LPG, or propane) pickups and vans into operations for Roads and the Department of Natural Resources and Parks. These exchanges help inform decisions of other fleet managers, such as the conversion of 78 Access vehicles from gasoline to LPG – an effort designed to reduce GHG emissions and save money.



The metropool program has 25 all-electric, zero-emission Leaf vehicles that saved more than 30,000 gallons of gas and eliminated more than 300 metric tons of emissions in 2014.

- **Balancing Clean Fuels and Costs.** King County has an agreement with its fuel provider to utilize B-5 (five percent) biodiesel for bulk fuel delivery for Metro Transit and Fleet Administration if the biodiesel fuel price is equal to or less than regular diesel fuel. The Marine Division is currently using a B-10 blend for water taxi operations.

Fleet Efficiencies

- **Travel Planning**. Many agencies have implemented business practices in order to reduce costs and GHG emissions. For example, the Department of Assessments has located vehicles at remote locations, such as Shoreline District Court. Employees can reserve the vehicle online and gain access to the vehicle with their assigned key fob. By avoiding travel time to and from downtown, the Assessment employee can be in the field for a longer period of time and reduce fuel consumption, emissions and vehicle miles traveled. The Department of Public Health focuses on efficient dispatching practices enabling their health professionals to maximize the ratio of patient services provided per VMT.

goals strategies measures & targets

K4C Pathway: For passenger vehicles and light trucks, reduce vehicle miles traveled by 20 percent below 2012 levels by 2030 and GHG emissions intensity of fuels by 15 percent below 2012 levels by 2030.

County Services

Goal: King County will reduce the need for driving and provide and facilitate the use of sustainable transportation choices such as public transit, alternative technology vehicles, ridesharing, walking, and bicycling.

CATEGORY	STRATEGIES
Transportation Choices ▸▸	**Strategy A:** Provide and expand public transit service.
	Strategy B: Improve the reliability and efficiency of transit.
	Strategy C: Expand King County's partnerships with employers to reduce transportation-related GHG emissions.
	Strategy D: Implement new transportation products in rural and suburban areas not well suited to fixed-route transit service.
	Strategy E: Expand pedestrian connectivity and bicycle parking at transit stations and park-and-ride lots to increase access to transit.
Alternative Vehicles, Fuels and Technologies ▸▸	**Strategy A:** Collaborate with private industry, community groups, utilities, and other agencies to build demand/markets and infrastructure for alternative vehicles, fuels and technologies.
	Strategy B: Partner in pilot projects that help improve the viability of alternative vehicles, fuels, and technologies.
Land Use and Community Design ▸▸	**Strategy A:** Focus development within the Urban Growth Area and reduce development pressure on rural and natural resource lands.
	Strategy B: Use incentives, land-use designations, urban design, comprehensive plans, and zoning to create development and community design that meets the needs and preferences of transit users, pedestrians, and bicyclists.
	Strategy C: Maintain and expand the Regional Trails System.

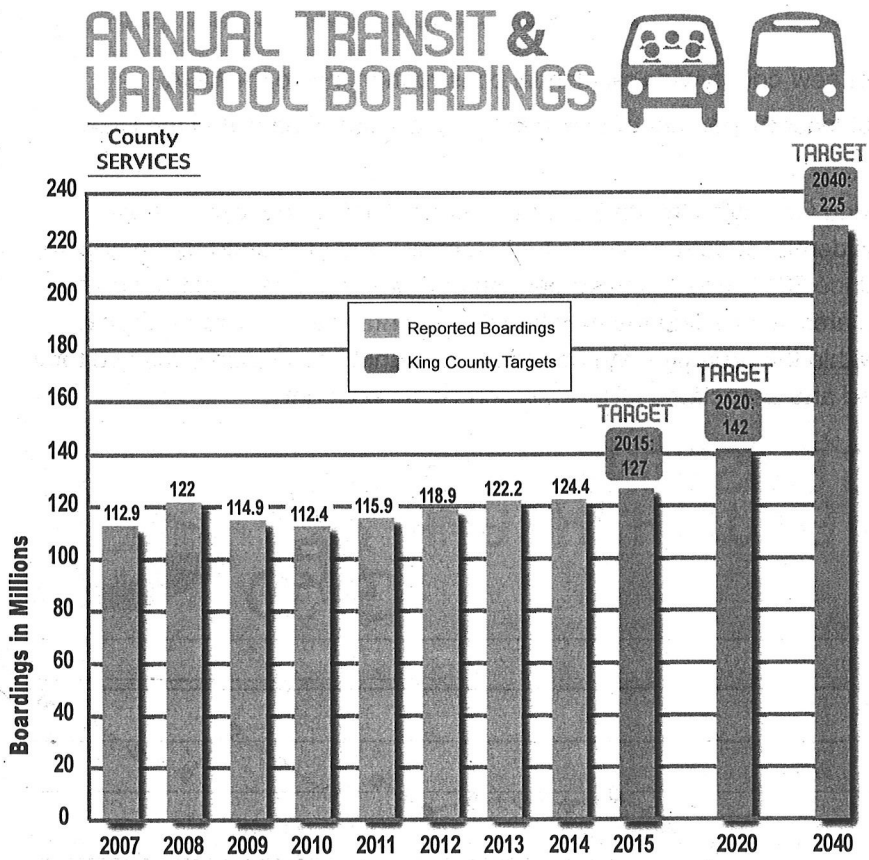
➤ **Measure 1:** Annual passenger boardings on Metro Transit services.

★ **Target 1:** Consistent with the Puget Sound Regional Council's *Transportation 2040* regional transportation plan's projection that boardings on transit services in the region will double by 2040, Metro Transit will strive to achieve the following targets:

- 127 million passenger boardings by 2015.
- 142 million passenger boardings by 2020.
- 225 million passenger boardings by 2040.

○ **Status**

There were more than 124 million passenger boardings in 2014, an all-time record. The 2020 and 2040 ridership targets appear to be achievable, provided necessary funding is available.



GHG Emissions Reduction: In 2020, with an achieved ridership of 142 million, Metro Transit will reduce annual GHG emissions in King County by approximately 828,000 MTCO2e, via mode-shift, congestion relief, and facilitation of improved land use planning and development that supports transit service. In 2040, with an achieved ridership of 225 million, Metro Transit will reduce annual GHG emissions by approximately 1,272,000 MTCO2e.

➤ **Measure 2:** Percentage of King County commuters using transportation modes including driving alone, transit, water taxi, biking and walking, as measured by the Washington State Commute Trip Reduction (CTR) survey.

★ **Target 2:** Achieve a six percentage point increase in non-drive-alone travel for CTR affected worksites by 2020 compared to the 2007 baseline and measured by the sum of activity among all jurisdictions in King County.

❍ **Status**

Between 2007 and 2013, there was a two percent increase in the non-drive-alone rate. In 2013, transit service represented 20 percent of all commuter trips.

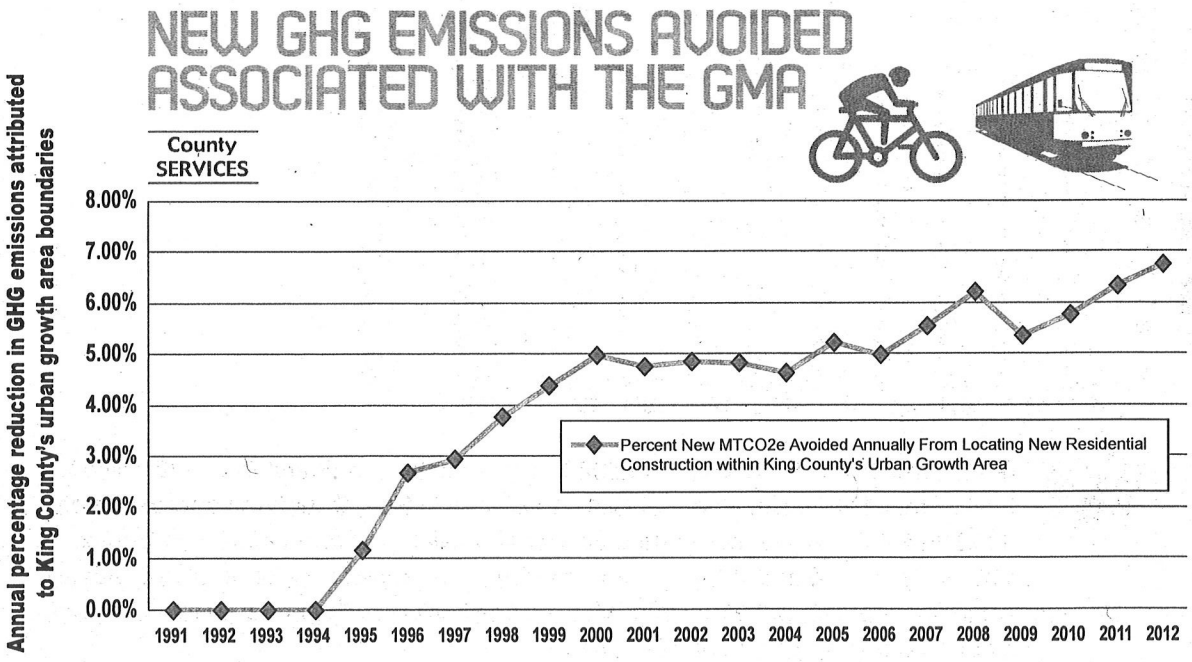
GHG Emissions Reduction: With approximately 3.9 million passenger miles traveled by CTR employees each year – and assuming the majority of CTR affected employees in King County commute by bus – approximately 1,250 MTCO2e emissions are avoided each year. A six percentage point increase in non-drive-alone travel for CTR affected worksites by 2020 will provide additional GHG benefits.

➤ **Measure 3:** Percentage of new countywide residential construction inside the UGA.

★ **Target 3:** Maintain at least 97 percent of new residential construction within the UGA.

❍ **Status**

Since 1994, when King County's Growth Management Act (GMA) boundaries were established, new residential construction has been focused within defined urban growth areas. As a result, since 2011, less than two percent of new residential construction has occurred in the rural area, exceeding the new target of maintaining 97 percent of new residential growth within the urban growth boundary. This shift has helped decrease total vehicle miles traveled and associated GHG emissions in King County.



Since 1994, when King County's Growth Management Act (GMA) boundaries were established, new residential construction has been focused within defined urban growth areas. This shift has helped decrease total vehicle miles traveled and associated GHG emissions in King County.

GHG Emissions Reduction: The chart above shows the annual percentage reduction in transportation related GHG emissions associated with new residential development attributed to King County's UGA boundary. The quantity of the GHG

emission reduction varies depending on how much new development there is each year; for 2012, the estimated GHG reduction was 4,700 MTCO2e. The GHG benefit quantified is estimated based on reductions in vehicle miles traveled resulting from the shift to more compact and efficient land use patterns.

➢ **Measure 4:** Number of new regional trail miles constructed or in final stages of engineering design.

★ **Target 4:** Construct 15 miles of additional regional trails by 2020.

○ **Status**

As of 2014, 189 miles of regional trails are constructed and open or in final stages of construction, engineering or design.

GHG Emissions Reduction: An interconnected network of regional trails offers an alternative to driving, helping reduce the number of vehicles on roadways and reducing vehicle-related GHG emissions. An estimated 12 million bicycle and pedestrian trips are made on the regional trails in King County annually. In 2015, King County's Eastside Rail Corridor (ERC) connectivity analysis will identify and quantify the GHG emissions reduction benefits of an interconnected network of bike and pedestrian routes for this corridor.

County Operations

Goal: King County will increase the efficiency of its vehicle fleets and minimize their greenhouse gas emissions.

CATEGORY	STRATEGIES
Alternative Vehicles, Fuels and Technologies ▸▸	**Strategy A:** Use a life-cycle cost assessment, including a cost of carbon pollution, to integrate more fuel efficient vehicles and technologies into County vehicle fleets.
	Strategy B: Use proven alternative fuels that lower GHG emissions, where cost effective, with a priority focus on renewable energy or lower carbon intensity fuels.
	Strategy C: Pilot new alternative fuel programs and projects with a greater potential for reducing carbon intensity, especially when they provide opportunities to stimulate market growth.
	Strategy D: Develop a priority list of alternative fuels with the best GHG benefits and lowest carbon intensity for reference by fleet managers during life-cycle cost assessments.
Fleet Efficiencies ▸▸	**Strategy A:** Leverage technology to maximize efficient vehicle use and implement operational strategies, such as anti-idling, fuel-saving driving techniques, car sharing, and vehicle right-sizing to reduce emissions.
	Strategy B: Conduct a countywide campaign encouraging employees to use alternative transportation, drive efficiently, and minimize resource consumption and energy use at work.

➢ **Measure 1:** Energy use by County vehicles.

★ **Target 1:** In its vehicle operations (excluding Metro Transit fleet vehicles), King County will reduce normalized net energy use by at least 10 percent by 2020, compared to a 2014 baseline.

❍ **Status**

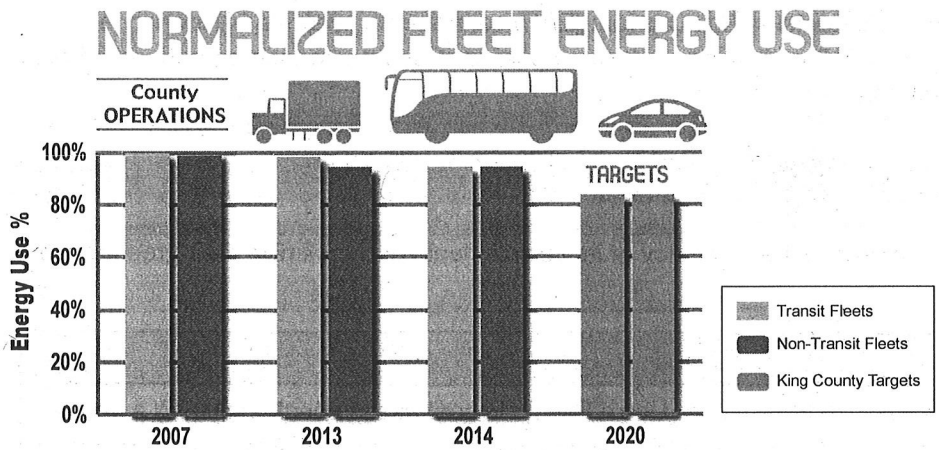
In 2014, normalized energy use for non-Transit fleets – such as Sheriff, Roads, Solid Waste and Wastewater Division vehicles – was down six percent compared to 2007.

GHG Emissions Reduction: Achieving the 2020 target will yield a GHG emissions reduction of approximately 2,700 MTCO2e/year.

★ **Target 2:** In Metro Transit's vehicle operations, King County will reduce normalized energy use by at least ten percent by 2020, compared to a 2014 baseline.

❍ **Status**

In 2014, normalized energy use for Transit fleets was down six percent compared to 2007.



GHG Emissions Reduction: Achieving the 2020 target will yield a GHG emissions reduction of approximately 13,300 MTCO2e/year.

★ **Target 3**: Across all vehicle operations, King County will increase the usage percentage of alternative fuels in its fleets by ten percent by 2025, compared to a 2014 baseline. Alternative fuels include electricity, biofuels, compressed natural gas, liquefied natural gas, hybrid, plug-in hybrid, battery drive, or propane.

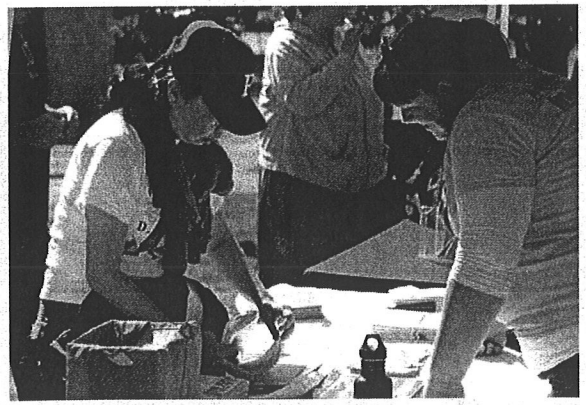
❍ **Status**

In 2014, alternative fuels comprised approximately five percent, by volume, of total King County fleet fuel purchases.

GHG Emissions Reduction: Achieving the 2025 target will yield a GHG emissions reduction of approximately 16,400 MTCO2e/year.

Transportation Choices

- ✔ **Grow transit service without increasing GHG emissions.** Metro Transit will strive to grow transit service through 2020 without increasing operational GHG emissions via advancements in fleet fuel efficiency and the transition to an all-electric or hybrid motorbus fleet by 2018. As of March 2015, almost 70 percent of Metro Transit's motorbus fleet was hybrid or electric.
- ✔ **Revise transit service to be more productive and attractive.** Consistent with the ***Metro Transit Strategic Plan for Public Transportation***, Metro Transit will place high priority on transit service to employment and residential centers while also ensuring social equity and geographic value.
- ✔ **Implement the Community Mobility Contract Program.** Metro Transit will implement the new Community Mobility Contract Program in the City of Seattle and continue to promote this program with other jurisdictions. The City of Seattle was the first jurisdiction to enter into a Community Mobility Contract and has contracted for 223,000 hours of additional transit service in 2015. This program is available to any jurisdiction within King County interested in purchasing additional transit service from Metro Transit.
- ✔ **Expand access to the transit system.** Metro Transit will complete at least two projects improving bicycle access to the transit system, such as high-capacity bicycle parking at the Redmond Transit Center parking garage and expanded bicycle parking at some RapidRide stations. The County continues to increase transit ridership by working with local jurisdictions to identify and develop partnerships for projects that improve non-motorized access to the transit system. Metro Transit will also examine methods of more effectively managing existing park-and-rides and the potential for shared use parking to increase access to transit services.
- ✔ **Expand community partnerships to encourage use of alternative modes.** Metro Transit will partner with local jurisdictions to implement education and incentive programs to encourage the use of non-drive-alone travel. Upcoming efforts will focus on the Alaskan Way Viaduct corridor, South Lake Union, downtown Seattle, the I-405 corridor, and other activity centers throughout King County.
- ✔ **Expand Alternative Services program.** Metro Transit will work with jurisdictions throughout the county to plan and implement Alternative Services. Alternative Services include vanpools and Dial-a-Ride Transit, along with new products, such as community shuttles and vans and flexible ridesharing. These services



A North Seattle Shoreline In Motion participant learns about alternative travel options at the 2014 Transportation Resource Fair.

will be offered in areas not well suited to fixed-route transit and will be designed to meet the needs and characteristics of each community. Priorities for implementation include those areas affected by service reductions in Fall 2014, as well as the rural areas of southeast King County and Vashon Island.

- ✔ **Promote and expand RideshareOnline.** Metro Transit will continue to manage RideshareOnline and promote it as a tool to expand carpool and vanpool opportunities throughout King County. This effort will have an impact on reducing single occupancy vehicle travel and eliminating GHG emissions.
- ✔ **Expand and maintain regional trails.** DNRP will continue to develop and manage an interconnected network of regional trails and routes connecting trails to urban centers, transit, and employment. Near-term projects focus on extending existing regional trails and developing major new routes, especially in historically underserved areas, and include the Lake to Sound Trail through five south county cities, East Lake Sammamish Trail, Green-to-Cedar Rivers Trail, Foothills Trail, Green River Trail, and the Eastside Rail Corridor Trail.
- ✔ **Address GHG goals in Metro Transit's Long Range Plan.** A comprehensive update to Metro Transit's long range public transportation plan will be completed in the fall of 2016 and will evaluate energy use and emissions per passenger mile traveled for different service options. This planning effort will also evaluate fleet mix by propulsion type and associated infrastructure needs to meet priorities identified in the SCAP to minimize GHG emissions even as transit expands to meet the projected growth and mobility needs of the county.

Land Use and Community Design

- ✔ **Maintain the UGA.** The County will continue to maintain the UGA and to direct growth into developed areas where facilities and services can be efficiently provided and where travel distances are reduced.
- ✔ **Promote transit-oriented development.** The County will participate in continuing efforts related to the regional Growing Transit Communities initiative, prioritizing investments in affordable housing and eligible community development projects near high capacity transit, including high capacity bus routes, bus rapid transit and light rail. Future light rail lines will be completed by 2023 serving East King County, North King County, and South King County.

The South Kirkland Park-and-Ride Transit Oriented Development project transformed an existing surface park and ride lot into a large mixed use residential and retail sustainable development community. The expanded park-and-ride lot contains bike racks and charging stations for electric vehicles, and the housing development includes 58 affordable housing units.

Alternative Vehicles, Fuels and Technologies

✔ **Deploy low GHG emissions fleet technologies at Metro Transit.** Metro Transit will deploy two zero-emission technologies and begin the conversion of its Access fleet to alternative fuels in 2015. The trolley fleet will be updated with more energy-efficient vehicles with regenerative braking and the ability to travel "off-wire" for limited distances. Metro Transit will also launch a zero-emission, all-electric battery-powered bus pilot – with fast-charge stations – and liquid petroleum gas (propane)-fueled Access vans in 2015-2016. Fleet Administration and DNRP are also seeking and implementing new low GHG technologies, and Rideshare Operations is evaluating the potential to acquire the Chrysler plug-in hybrid minivan (due for release in 2016) which could drastically cut fuel use and GHG emissions for the commuter van fleet.

New 40-foot trolley with enhanced energy efficiency, regenerative braking and the ability to travel limited distances on a battery.

✔ **Pursue adoption of a Clean Fuels Executive Order to include a cost of carbon.** DOT and DNRP staff will continue to work with the Executive's Office to formally adopt a clean fuels policy and to collaborate to integrate a cost of carbon into decision making about clean fuels. A draft clean fuels executive order was developed in 2014 to guide fleet managers in making procurement decisions for clean vehicles and alternative fuels in alignment with County goals to reduce GHG emissions, and directs fleet managers to include a cost of carbon in life-cycle cost analyses.

✔ **Use alternative fuels in the County's new ferry vessels.** DOT will implement the use of B-10 in two new passenger ferries being delivered in 2015. The Marine Division worked with its fuel supplier to implement the necessary blending equipment at its Harbor Island marine fuel pier. The use of a biodiesel blend reduces GHG and sulfur dioxide emissions and diesel particulate pollution. This initiative, along with the new EPA Tier 3 marine diesel engines, allows the County's vessels to meet the strictest EPA emission standards.

King County water taxis use B-10 biodiesel and accommodate bike passengers.

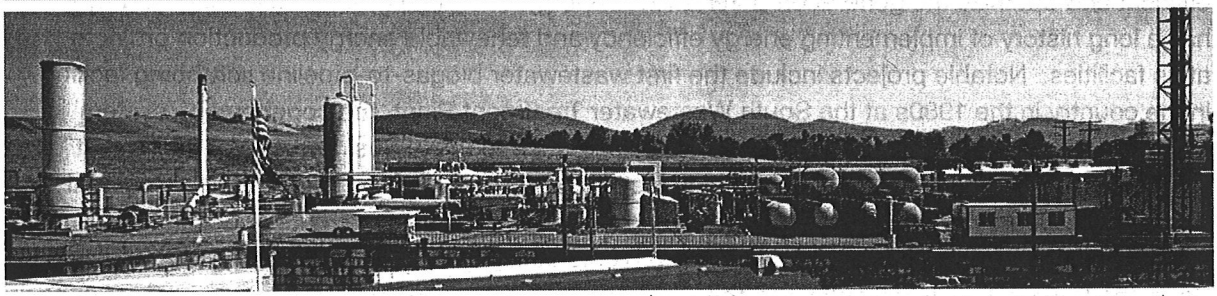
Fleet Efficiencies

- ✔ **Continue green fleet operational strategies and initiatives.** King County's fleets will continue to implement strategies, such as anti-idling, eco-driving, car sharing and vehicle right-sizing, and will phase in more-efficient, lower-emissions hybrid and electric vehicles as funding and technologies allow. Fleet Administration developed an eco-driver training module for SkillSoft which will be rolled out in the summer of 2015.
- ✔ **Consider options for the sale and reinvestment of environmental attributes.** Metro Transit is exploring options to monetize the use and savings of fuel resources to operate our fleets, such as selling credits from the use of renewable or low carbon fuels, or reduced emissions from our transit fleet. Metro Transit will explore options to reinvest funds in operations or services that continue to reduce climate impacts. At the state level, King County will advocate for a statewide cap-and-trade program that credits the transit system for the implementing low-carbon fuels and zero-emissions technologies.

ACCOUNTABLE AGENCIES

The Department of Transportation is the overall lead for this goal area. The Metro Transit Division is responsible for strategies related to transit services including bus transit, vanpool, low income fares, ride matching and commute trip reduction efforts. The Fleet Administration Division is the lead for efforts related to government fleet vehicles, including alternative transportation vehicles and technologies, and chairs a Fleet Managers Group that includes representatives from the Airport, Solid Waste, Transit and Wastewater Treatment Divisions. Other Department of Transportation divisions which play important roles include the Airport, Marine, and Road Services Divisions. Strategies related to the Regional Trails System are led by the Department of Natural Resources and Parks, Parks and Recreation Division. The Office of Performance, Strategy and Budget is responsible for long-range comprehensive and regional planning, and the Department of Permitting and Environmental Review is responsible for subarea planning, permitting and development regulations in unincorporated areas. The Department of Public Health is an active participant in the development of transportation and land use policies that support public health goals of King County.

Goal Area 2: BUILDINGS AND FACILITIES ENERGY



The BioEnergy Washington (BEW) renewable natural gas facility at the Cedar Hills Regional Landfill is a unique partnership between King County, BEW and Puget Sound Energy.

KEY TAKEAWAYS

- Building and facility energy use is the region's second largest source of GHG emissions.
- King County has taken significant action to conserve energy in day-to-day operations of county government, reducing energy use in County buildings and facilities by 15 percent compared to 2007, resulting in savings of more than $3 million per year since 2010.
- King County has developed and generates significant renewable energy sources from its operations – primarily at the Cedar Hills Regional Landfill, South Wastewater Treatment Plant, and at the West Point Wastewater Treatment Plant - an amount that in total is equivalent to more than half of the County's operational energy needs.
- King County is partnering with utilities and others to phase in cleaner fuel sources and support expanded energy efficiency and renewable energy production, including a commitment among K4C partners to pursue energy efficiencies and renewable energy sources.
- King County is pioneering approaches for capturing cost savings from investments in energy efficiency and renewable energy and using them to finance further work.
- King County is collaborating with businesses to test new energy technologies and demonstrate solutions.
- This goal area outlines ambitious commitments to:
  - Reduce government operational energy use in County buildings and facilities by an additional 10 percent in the next decade
  - Produce the equivalent amount of renewable energy as is used to run King County government's facilities and non-Transit vehicles.
  - Increase the amount of renewable energy used by facilities to 85 percent by 2025.
  - Commit to use 100 percent GHG-neutral electricity for operations by 2025.

INTRODUCTION

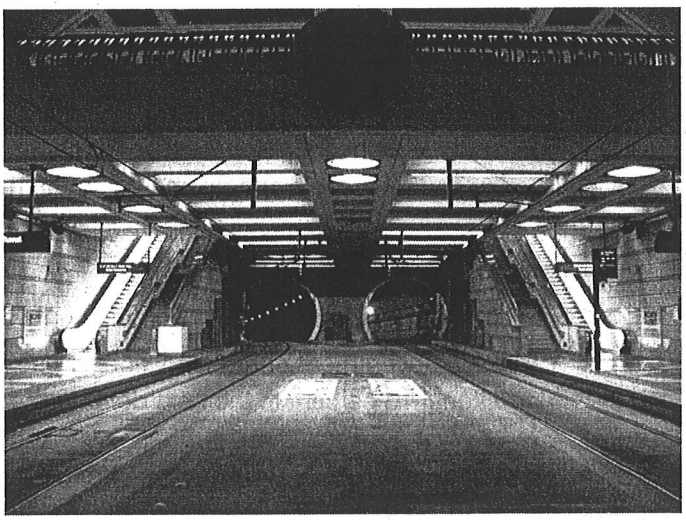
In King County, energy use in buildings and industrial facilities accounts for nearly half of GHG emissions that occur within King County's geography. Since a significant percentage of energy consumed in the county is derived from fossil fuel-based sources, the region will need to reduce facility energy use and develop cleaner sources of energy to achieve ambitious GHG emissions reduction targets. King County has set aggressive energy conservation targets and renewable energy goals to guide County government operations. King County is also committed to be a leader in promoting energy conservation throughout the community and helping facilitate the region's transition to a clean energy economy by working with cities, energy utilities, businesses and residents.

King County has cost-effectively invested millions of dollars to ensure its operations are resource efficient and optimize the generation of renewable energy from waste resources. King County has a long history of implementing energy efficiency and renewable energy production projects at its facilities. Notable projects include the first wastewater biogas-to-pipeline scrubbing facility in the country in the 1980s at the South Wastewater Treatment Plant, the cogeneration system at the West Point Wastewater Treatment Plant dating back to the 1960s, and one of the largest landfill gas-to-pipeline renewable natural gas facilities in the country at the Cedar Hills Regional Landfill. The County's energy efficiency work has ranged from lighting retrofits at dozens of County buildings to comprehensive energy efficiency projects at large facilities, such as the North Transit Base, the Regional Justice Center and the Weyerhaeuser King County Aquatic Center. Continued progress in these areas is needed to meet short- and long-term GHG reduction goals. The County will continue and expand its operational efforts, while supporting and helping guide the community's efficiency and clean energy efforts.

CURRENT COUNTY ACTIONS AND PROGRAMS

Energy accomplishments are the result of County government cross-agency efforts to identify and capture energy savings opportunities through equipment replacement and operational efficiencies. The County will continue to create and use tools to support its energy efforts, such as the Resource Life Cycle Cost Analysis (rLCCA) calculator and the Fund to Reduce Energy Demand (FRED) loan program.

When considering investments in energy efficiency and renewable energy, the County considers the energy efficiency of equipment, the potential to reduce GHG emissions, and life-cycle cost effectiveness. The County will continue to seek opportunities to optimize energy efficiency, reduce GHG emissions, and produce and consume renewable energy in new and existing facilities. The County's efforts are a continuous improvement process, as County agencies examine energy consumption data in existing buildings to target future investment opportunities and as



Over the past three years, Metro Transit has installed LED lights in the downtown Seattle transit tunnel that have reduced energy use by 21% compared to 2009, saving over $130,000 in energy costs per year.

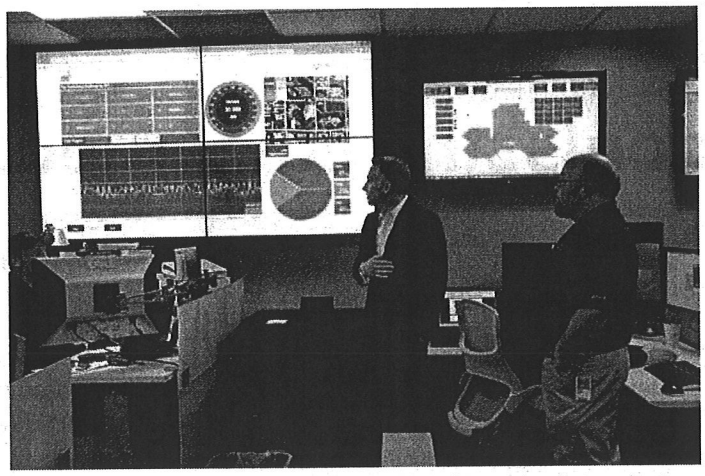
technological improvements continue to present new efficiency and renewable energy generation opportunities.

The 2010 Energy Plan is updated and replaced by the 2015 SCAP. In addition to the work outlined in **Goal Area 2: Buildings and Facilities Energy, Appendix C: Energy Strategy Details** at the end of this document highlights a number of additional, specific strategies the County will pursue through both its internal operations and external work.

County Services

King County is collaborating through the K4C to have a greater presence in the community. Moving forward, King County government will have a much stronger role in guiding and helping provide the community with tools that encourage resource efficiency and renewable energy generation in county homes and businesses. This will occur by developing and articulating a clear vision for a clean energy future, developing and promoting state and federal incentives, and developing critical how-to information for residents and businesses to support implementation of energy efficiency and renewable energy projects.

King County is also partnering with the private sector on the development of new approaches, innovation and cutting-edge clean energy technologies. For example, in early 2015, King County launched a two-year pilot project to monitor facility energy use at five County-owned facilities. In a partnership with Microsoft and local contracting firm MacDonald-Miller, the County will test the same energy tracking system Microsoft uses to reduce energy consumption and GHG emissions in the Executive's Office building, transit facilities, a solid waste transfer and recycling station, and at the Brightwater Education Center.



Executive Constantine helps explain King County's pilot project with MacDonald-Miller and Microsoft to monitor and reduce energy usage at five County-owned facilities.

County Operations

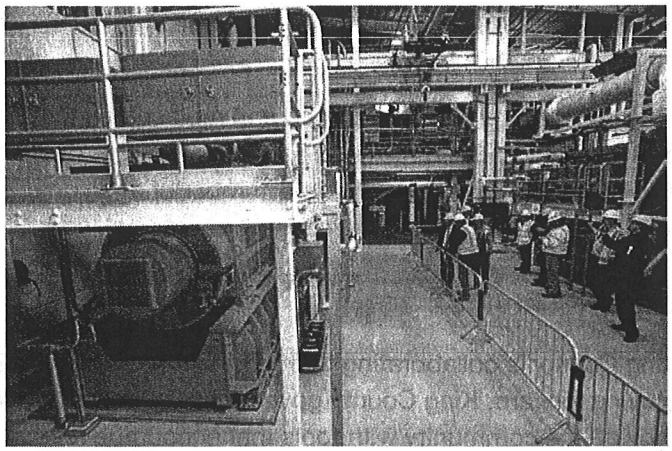
County Facilities

- **Government Facility Energy Use.** Direct energy use in King County government facilities, including energy used by buildings and to treat wastewater, resulted in approximately 70,000 MTCO2e of emissions in 2014. The County has made numerous operational changes and investments in recent years that have resulted in significant energy reductions and savings of more than $3 million annually. The County has had specific energy conservation targets in place since 2007, and those targets are being updated in this plan.

Renewable Energy and Waste-to-Energy Production

- **Landfill and Wastewater Renewable Energy Projects.** King County has been successfully turning waste products into resources, including energy, for many years. Since 2013, King County has been exceeding its goal of using, buying or generating renewable energy equivalent to 50 percent of total County government energy use, which has been accomplished primarily through generation of renewable energy sources at the County's own facilities. Notable

contributors to the County's renewable energy generation portfolio are the renewable electricity production cogeneration system at the West Point Wastewater Treatment Plant, the South Wastewater Treatment Plant's renewable natural gas (RNG) from digester gas production facility, and the BioEnergy Washington (BEW) landfill gas-to-pipeline RNG energy facility at the Cedar Hills Regional Landfill. The Cedar Hills biogas project is one of the largest landfill RNG production facilities in North America. In 2014, the Solid Waste Division made improvements to the facility, effectively increasing captured landfill gas by four percent.



The cogeneration facility at the West Point Wastewater Treatment Plant turns digester gas generated during the treatment process into electricity, which is sold as green energy in partnership with Seattle City Light, and heat energy, which is used onsite.

goals strategies measures & targets

K4C Pathway: Reduce energy use in all existing buildings 25 percent below 2012 levels by 2030.

K4C Pathway: Increase countywide renewable electricity use 20 percent beyond 2012 levels by 2030; phase out coal-fired electricity source by 2025; limit construction of new natural gas based electricity power plants; support development of increasing amounts of renewable energy sources.

County Services

Goal: King County will encourage and assist residents and businesses with energy efficiency and renewable energy projects, in collaboration with energy utilities and other partners.

CATEGORY	STRATEGIES
Utility Partnerships ▸▸	**Strategy A:** Work with one or more local financial institutions to create a program to offer advantageous project loan financing rates.
	Strategy B: Increase marketing for utility efficiency programs, such as through bus advertising.
	Strategy C: Develop relationships with external stakeholders for the delivery of whole-home resource efficiency programs.
	Strategy D: Research and support grant and other external funding opportunities that provide incentives for residents to complete energy efficiency and renewable energy projects, including tax and other financial incentives.
Renewable Energy ▸▸	**Strategy A:** Support Washington State renewable energy production incentives that encourage the development of residential and commercial solar and other distributed generation and storage projects, without additional metering fees or other disincentives.
	Strategy B: Develop relationships, programs, and marketing efforts with local utilities for the distributed production of solar and other renewable electricity.
	Strategy C: Create a consolidated guide on how to implement renewable energy projects for residences and businesses.

➤ **Measure 1:** Countywide energy use in existing buildings.

★ **Target 1:** Reduce energy use in all existing buildings 25 percent below 2012 levels by 2030.

○ **Status**

This is a new target. Progress will be reported in future annual reports.

GHG Emissions Reduction: The estimated GHG emissions reduction of achieving the 2030 target is 2,153,000 MTCO2e per year.

➤ **Measure 2:** Increased solar energy generation by residents and businesses.

★ **Target 2:** Increase countywide renewable electricity use 20 percent beyond 2012 levels by 2030; phase out coal-fired electricity source by 2025; limit construction of new natural gas-based electricity power plants; support development of increasing amounts of renewable energy sources.

❍ **Status**

This is a new target. Progress will be reported in future annual reports.

GHG Emissions Reduction: The estimated GHG emissions reduction of achieving the 2030 target is 1,745,000 MTCO2e per year.

County Operations

Goal: King County will reduce energy use in County facilities and operations and will produce and consume more renewable energy.

CATEGORY	STRATEGIES
County Facilities ▸▸	**Strategy A:** County agencies shall identify and implement cost effective energy efficiency projects in existing buildings and new construction projects.
	Strategy B: For all projects installing over $250,000 of energy-using equipment (total construction cost), perform a resource life-cycle cost analysis on at least two technologies that can meet the programmatic need, and choose the option with the highest net present value, per Ordinance 16927.
	Strategy C: Report quarterly on energy reduction and renewable energy progress for communication to county staff.
	Strategy D: Conduct an annual communications campaign that encourages County employees to minimize energy and other resource use at work and at home.
	Strategy E: Train staff on green operations and maintenance practices that focus on reducing energy and other resource usage.
	Strategy F: Meet the energy reduction requirements of the Federal Department of Energy Better Buildings Challenge.

Renewable Energy and Waste-to-Energy Production ▸▸	**Strategy A:** Increase renewable biogas production at the wastewater treatment plants and Cedar Hills Regional Landfill as a percentage of total available biogas, prioritizing opportunities that reduce GHG emissions and maximize effective utilization of the biogas.
	Strategy B: All new facilities over 200 square feet shall be designed in a manner that considers, and as appropriate installs, the basic infrastructure for the future integration of on-site solar power production and storage.
	Strategy C: Pursue outside grants and other funding opportunities that support integrating renewable energy generation into construction projects, where life-cycle cost-effective.
	Strategy D: Encourage and support community renewable energy projects on County property that are in the best interest of the public and reduce community energy use.
Renewable and GHG-Neutral Energy Consumption ▸▸	**Strategy A:** Work with local energy utilities and solar energy project developers to increase the generation of County-consumed electricity derived from renewable sources. Create a framework with Puget Sound Energy and Snohomish PUD for the electricity supplied to King County facilities to be carbon neutral.
	Strategy B: In coordination with local energy utilities, cities and community partners, pursue County development of small (kilowatt scale) and large (megawatt scale) County-owned off-site renewable energy generation projects, where life-cycle cost-effective.
	Strategy C: Pursue power supply agreements for the consumption of renewable electricity by County government, when cost effective.
	Strategy D: Pursue progress toward the renewable energy consumption target in the following order of priority: 1) energy efficiency projects; 2) cost-effective renewable energy generation projects and 3) renewable and carbon reduction offset purchases.

➤ **Measure 1:** Normalized* energy use at County facilities, measured in millions of British Thermal Units (MMBTU)

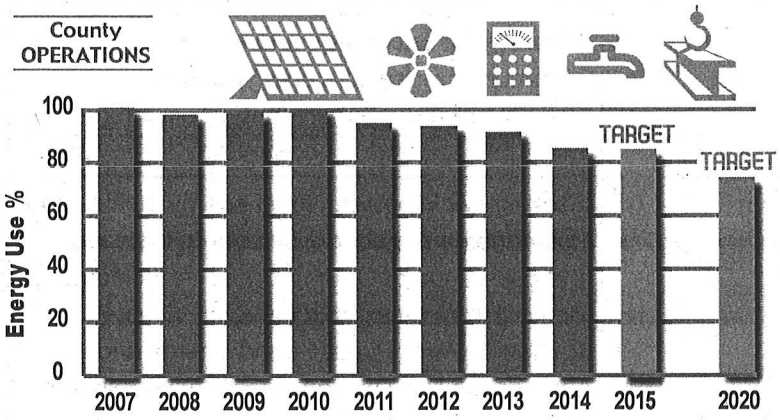
★ **Target 1:** King County will reduce normalized energy use in County owned facilities by at least five percent by 2020 and 10 percent by 2025, as compared to a baseline year of 2014.

* For all use outside of wastewater, to be measured on an energy use per square foot basis, using an Energy Use Index of BTU/sq. ft./degree day. The Wastewater Treatment Division will be normalized for consumed energy, adjusted for weather and wastewater flow.

❍ **Status**

Since setting energy reduction goals in 2007, the County has reduced its normalized facility energy use in impacted facilities by more than 15 percent, meeting both its 2012 and 2015 energy reduction goals laid out in the 2010 King County Energy Plan and 2012 SCAP. As of 2015, these efforts are resulting in a financial savings of over $3 million per year, with a corresponding estimated reduction of GHG emissions of 27,700 MTCO2e per year.

NORMALIZED ENERGY USE IN FACILITIES



Starting in 2015, King County's facility energy use baseline will be updated to add new facilities built since 2007, including the Brightwater Wastewater Treatment Plant.

GHG Emissions Reduction: 2014 GHG emissions associated with King County's government facility energy consumption were 81,900 MTCO2e. Meeting the energy efficiency, renewable energy consumption, and GHG neutral electricity targets (Targets 1, 4 and 5) in this goal area would reduce GHG emissions reduction by an estimated 70,600 MTCO2e to approximately 11,300 MTCO2e per year, a reduction of more than 85 percent.

➤ **Measure 2:** Building energy performance, as measured by the Energy Star Portfolio Manager Tool

★ **Target 2:** By December 31, 2020, all King County government buildings* over 20,000 square feet shall be Energy Star certified.

* Excluding Transit bases, Wastewater Treatment Division facilities, and facilities for which there is not an Energy Star category.

All County agencies that operate buildings not meeting Energy Star performance requirements by December 31, 2016 shall develop a written plan outlining steps for the facility to meet Energy Star certification requirements, including identifying all energy

efficiency projects with a ten year or less simple payback, using the county's resource Life Cycle Cost Analysis tool. At such buildings, all identified energy efficiency projects with a ten year or less simple payback must be completed by December 31, 2020. Buildings that complete all energy efficiency projects with a ten year or less simple payback, but which do not meet Energy Star criteria, are not required to become Energy Star eligible, but shall continue to identify and implement cost-effective conservation projects. For other 20,000 square foot and larger buildings for which Energy Star categories do not exist, facility per-square-foot energy use will be established, along with energy reduction goals, by December 31, 2016.

- **Status**

  King County government is benchmarking its facilities that are over 20,000 square feet to meet the City of Seattle Benchmarking requirement and to help guide internal energy management work.

➤ **Measure 3:** Amount of renewable and GHG neutral energy produced and consumed as part of government operations.

★ **Target 3:** ***Renewable Energy Production*** - Produce renewable energy equal to 100 percent of total County government net energy requirements by 2017 and each year thereafter, excluding the public Transit fleet.

- **Status**

  King County continues to exceed its 2012 goal to produce, use, and/or procure the equivalent of 50 percent of its government energy use from renewable sources. While King County uses some of the renewable energy it generates within its operations, a significant amount of the renewable energy is exported and sold to other partners, for economic reasons and to ensure the best and full utilization of the resources. In 2014, the County was at approximately 57 percent renewable energy production vs. energy consumed (including the Transit fleet), exceeding the 2012 50 percent production goal.

GHG Emissions Reduction: Producing renewable energy equal to 100 percent of total County government net energy requirements by 2017 is estimated to reduce annual communitywide GHG emissions by at least 102,000 MTCO2e, primarily through displacing fossil fuel natural gas use with the County's biogas that is produced and sold to third parties.

★ **Target 4:** ***Renewable energy consumption*** - King County government shall consume renewable energy equal to 70 percent of government operation facility energy consumption by 2020 and 85 percent by 2025.

- **Status**

  In 2014, King County government consumed 64 percent renewable energy, including hydropower and biogas, versus the amount of energy consumed in its facilities.

GHG Emissions Reduction: See the combined GHG emissions reduction benefit of achieving Target 1, 4 and 5 as described after Target 1.

★ **Target 5:** ***Greenhouse gas neutral electricity*** - By 2025, King County shall ensure all electricity supplied for its government operations is greenhouse gas neutral.

○ **Status**

In 2014, approximately 71 percent of the electricity consumed by King County government was greenhouse gas neutral.

GHG Emissions Reduction: See the combined GHG emissions reduction benefit of achieving Target 1, 4 and 5 as described after Target 1.

priorityactionsby2020

County Services

Utility Partnerships

✔ **Build utility and other external partnerships.**

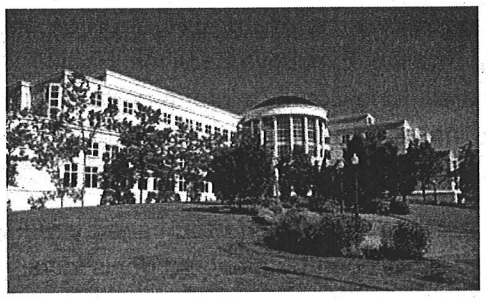
- ✔ Work with local utilities non-profit organizations and private partners to leverage and support existing programs, create new programs, build partnerships, and enhance marketing efforts that increase residential and commercial resource efficiency and renewable energy production activity for existing buildings.
- ✔ Partner with local utilities and other stakeholders on a countywide commitment to renewable energy resources, including meeting electricity needs while phasing out fossil fuels.

✔ **Support stronger commercial energy codes.** Work with the Regional Code Collaboration (RCC), the City of Seattle Department of Planning and Development, and K4C cities to support stronger state residential and commercial energy codes. Work with the K4C cities to enact commercial energy codes that get the county on track to net zero energy buildings by 2030.

✔ **Expand community efficiency and renewable energy efforts.** The County will expand and build relationships with utilities and other community partners to develop marketing, technical assistance, and financial tools to help citizens and businesses implement resource efficiency projects and generate renewable energy. The County should establish a dedicated position to support community efficiency and renewable energy efforts outlined in this goal area.

✔ **Expand resource efficiency programs for low income residents.** Work through the Department of Community and Human Services and other local housing repair programs to expand the installation of energy and water efficient fixtures and equipment that help reduce utility bills for low income customers. Work with the Washington State Housing Finance Commission to ensure that low-to-moderate income residents in King County are offered programs to make energy and water efficiency improvements to their homes.

- ✔ **Broaden the EnviroStars program.** The County will support broadening the EnviroStars program to become a Regional Green Business program that provides support for recognizes businesses that have made strides in sustainability such as energy efficiency, purchasing green power, and addressing climate change.
- ✔ **Reduce the costs of resource efficiency and renewable energy.** Engage with utilities, renewable energy providers, and state elected officials to renew solar production incentives. Work with financial institutions and other external stakeholders to develop loans, legislative action, and financial tools that reduce the costs of implementing resource efficiency and renewable energy projects, such as develop a King County-supported loan program that will be available for King County cities to complete resource efficiency projects in their facilities.



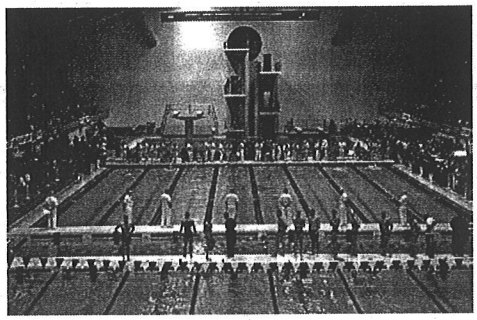
King County's internal Fund to Reduce Energy Demand (FRED) program is providing loans to county agencies for energy projects. For example, the FRED program will allow the Facilities Management Division (FMD) to invest more than $1.4 million in projects during 2015 and 2016, including at the pictured Maleng Regional Justice Center. These projects have also received more than $560,000 in grant funding from outside partners and will save an estimated $120,000 annually in utility costs.

- ✔ **Create a building energy disclosure ordinance framework.** In coordination with the K4C cities, set a preferred framework for building energy disclosure ordinances in the county's unincorporated areas and incorporated cities, similar to the City of Seattle's energy disclosure ordinance. This framework shall include marketing to align facilities with information about utility incentives and other resources to improve energy performance.

County Operations

County Facilities

- ✔ **Benchmark County energy performance.** By the end of 2016, King County will benchmark and publish energy performance and GHG emissions of its government facilities. This effort will be completed through use of the Environmental Protection Agency Portfolio Manager tool or other benchmarking appropriate to the facility type.
- ✔ **Maximize energy efficiency in new King County facility projects.** All King County government capital projects with energy-consuming equipment shall meet the equivalent energy performance of the city with the most stringent energy code in the county. Minimize energy use in buildings during capital projects through the consistent implementation of Green Building and Sustainable Development policy, Ordinance 17709.



The Weyerhaeuser King County Aquatic Center leveraged more than $1.3 million in external funding for energy efficiency upgrades.

Renewable and GHG-Neutral Energy Consumption

✔ **Greenhouse gas neutral electricity for government operations.** By 2025, ensure the electricity consumed by King County government's operations is 100 percent greenhouse gas neutral.

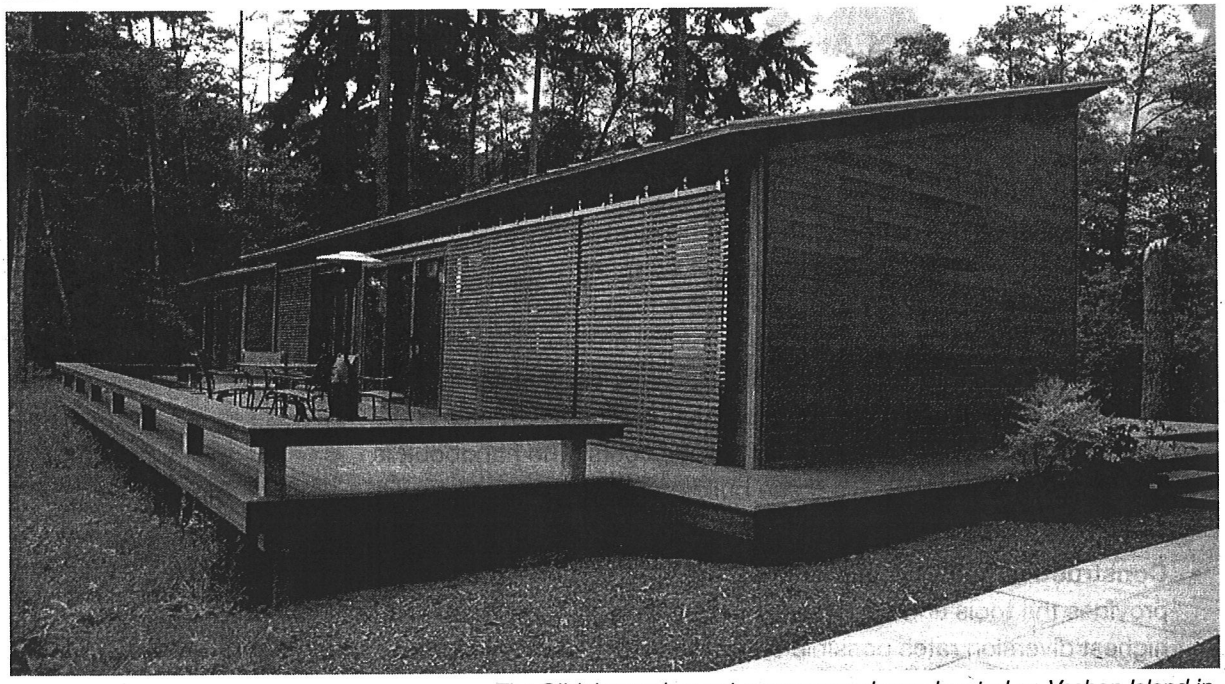
ACCOUNTABLE AGENCIES

The Department of Natural Resources and Parks, the Department of Transportation, and the Department of Executive Services, Facilities Management Division are the overall leads for this goal area. King County's interdepartmental Energy Task Force and Energy Strategy Team play a coordinating and oversight role in guiding and implementing county government energy strategies, activities, and investments.

To meet the County's long-term energy reduction goals, every County agency must play a role. Yet, agencies will contribute toward goals in varying degrees because of disparate opportunities that may be the result of significant or deficient past investments, impending expenditures or capital investments, regulatory requirements, and the resource intensity of operations. Staff will continue to collaborate on energy efficiency activities to help highlight the best opportunities and to learn from past endeavors.

For renewable energy, the Solid Waste and Wastewater Treatment Divisions will continue to be the major generators of renewable energy from county government waste resources, with contributions from other agencies.

Goal Area 3: GREEN BUILDING



The Glidehouse is a net-zero energy home located on Vashon Island in unincorporated King County.

KEY TAKEAWAYS

- Building and facility energy use is the region's second largest source of GHG emissions.
- Roughly two-thirds of all of King County's built environment in 2050 is expected to be constructed between 2007 and 2050; this redevelopment offers a critical opportunity for GHG emissions reductions.
- Local green building efforts build on decades of leadership, including recent projects that demonstrate how to meet the County's long-term climate targets, such as the Bullitt Center, a Living Building commercial office building located in Seattle, and the net zero energy Glidehouse, a single family home in unincorporated King County on Vashon Island.
- This goal area outlines King County's commitment to:
  - Partner with cities and the building community to achieve net zero GHG emissions in new buildings by 2030.
  - Support King County's permit customers to inform them about and encourage the inclusion of green building strategies
  - Implement the highest green building and sustainable development standards and strategies for King County-owned buildings and infrastructure.

INTRODUCTION

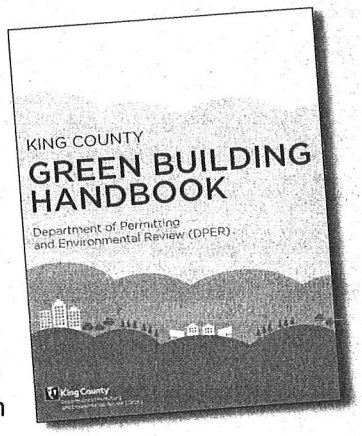
Goal Area 3: Green Building is a new section of the 2015 SCAP. It builds on and complements **Goal Area 2: Buildings and Facilities Energy** which is focused on increasing the efficiency and reducing GHG emissions of existing King County government buildings and throughout King County.

This chapter includes King County's green building and sustainable development commitments at three scales: (1) for new construction, additions, retrofits and remodels built by customers, businesses and residents in unincorporated King County; (2) for regional green building collaborative actions; and (3) for building and infrastructure projects owned and operated by the County.

CURRENT COUNTY ACTIONS AND PROGRAMS

County Services

Education and Partnerships

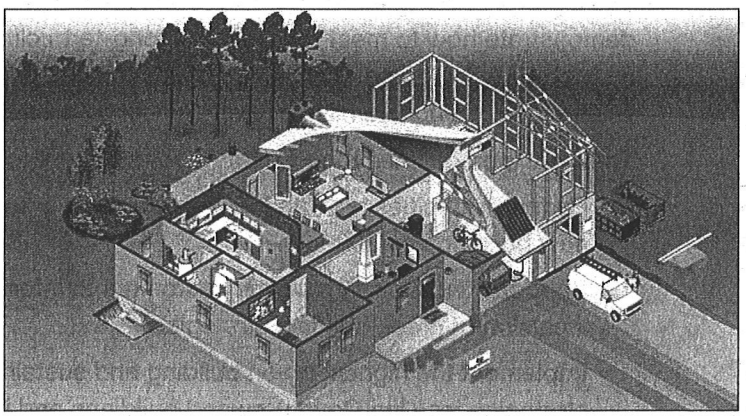


DPER Green Building handbook is a guide to inform King County customers about using green building techniques.

- **Green Building Education with Unincorporated Area Customers.** In 2014, the Department of Permitting and Environmental Review (DPER) published a new Green Building handbook, which is a helpful guide to inform unincorporated area customers about using green building techniques. The handbook and associated green sheets encourage customers to make decisions that will save energy and reduce costs. The handbook is a key component of DPER's green building educational efforts with customers and unincorporated area residents.
- **Construction and Demolition Program (C&D).** King County provides the tools and assistance needed to help obtain the highest diversion rates possible on construction, demolition, and deconstruction projects. Tools available include jobsite waste guidelines, waste management plan and report templates, sample waste recycling specifications, directory of local construction waste recyclers, and more. Available assistance includes presentations to jobsite workers on building material reuse, salvage, and recycling; site visits to assess diversion options; and research on recycling options for hard to recycle commodities.

Development Codes and Certification Programs

- **Regional Code Collaboration and Partnerships with King County Cities.** The Solid Waste Division's GreenTools Program supports and provides resources to the cities within King County through the Sustainable



The award winning EcoCool Remodel Tool is a free green building resource available to all cities and residents.

Cities program and the Regional Code Collaboration (RCC). The Sustainable Cities program consists of a free, web-based network of tools, and resources, as well as a monthly peer-to-peer Roundtable forum to support a municipality's role in making green building a priority and a reality. This program also helps to bridge the gap by providing education specifically regarding third party ratings systems to cities that may not have the capacity to do so on their own.

- **Support Third Party Development and Green Building Programs.** King County supports diverse third party green building certification programs to increase the value of green buildings, to help build regional capacity to implement green building programs, and to support verification of the environmental benefits of such programs. Promotion and support is delivered in the form of technical assistance to and in partnership with: community forums, conference participation, code development, training development, pilot projects, research and sponsorships of programming. These programs and certifications include LEED, Built Green, the Living Building Challenge, Evergreen Sustainable Development Standard (ESDS), Salmon Safe, Sustainable Sites Initiative and Envision in partnership with the Master Builders Association, Cascadia Green Building Council, International Living Future Institute, WA State Department of Commerce, and the Northwest EcoBuilding Guild.

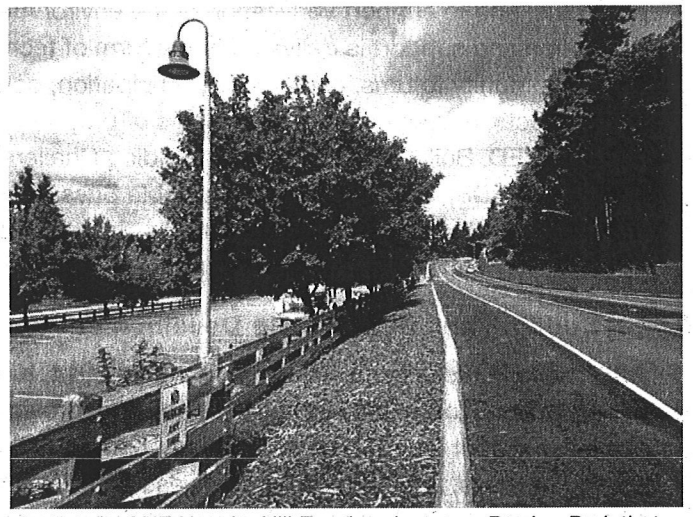
Green Building and Sustainable Development Standards

- **Affordable Housing and Green Building.** In 2014, King County committed $6.4 million to build more than 400 units of housing, providing equitable access to sustainably-built housing serving seniors, people with disabilities, homeless young adults, veterans, and chronically homeless people. These units will meet the green building requirements of the Evergreen Sustainable Development Standards, which emphasize energy and water efficiency, tenant health, and long-term sustainability resulting in GHG emission reductions.
- **Community Development.** The King County Community Development Program supports sustainable development in the projects it funds, such as replacing inadequate sidewalks in neighborhoods, rehabilitating deteriorated buildings, and replacing crumbling water lines. This results in increasing walkability and encouraging climate-friendly forms of transportation, extending the useful life of buildings and preserving embodied energy, and saving water. These investments not only serve underrepresented populations but also contribute to reducing community emissions.

The South Kirkland Park and Ride (SKPR) Transit Oriented Development (TOD) embodies green building and sustainable development. It includes Velocity, 58 affordable housing units (building on right), Polygon mixed use development with 183 market rate housing and commercial space (middle building), and 530 stall garage and transit facility (not pictured).

County Operations

- **Green Operations and Maintenance.** The King County Green Operations and Maintenance Guidelines Handbook provides a standard level of sustainable operations and maintenance for all County facilities. It serves as resource for existing facilities to improve on energy and water efficiency, recycling, and environmentally preferable products.
- **Green Building Ordinance.** King County is committed to achieving the highest standards of green building and sustainable development for its facilities. A key purpose of the Green Building Ordinance 17709 (GBO) is to ensure that the planning, design, construction, remodeling, renovation, maintenance and operation of any King County-owned and financed capital project is consistent with the highest green building and sustainable development practices. It includes high performance goals to achieve a Platinum level rating for LEED or Sustainable Infrastructure Scorecard projects. King County is the second jurisdiction in the country to legislate this high standard. The GBO also established minimum performance requirements for the County's own capital projects that include meeting the energy and climate goals and performance requirements as directed in the SCAP. Other minimum performance requirements are to meet the King County Surface Water Design Manual Standards and to meet the targeted diversion rates for construction and demolition materials.



A stretch of NE Novelty Hill Road project near Perrigo Park that includes porous asphalt shoulders and Low Impact Development strategies.

  Recommendations from the 2014 King County Auditor's GBO Performance Audit are being implemented. This includes establishing standardized units for reporting requirements that align with the County's SCAP and other sustainability plans, updating guidelines to advance sustainability goals, ensuring resource life cycle cost analysis model follows best practices, and clarifying definitions and cost limits for LEED certification. In addition, a system for collecting, verifying, analyzing and communicating data reported is underway. Performance related to the 2014 implementation of the GBO is presented in Appendix D.
- **Local Government Staff Training.** Solid Waste Division's GreenTools Program continues to conduct trainings and Roundtables covering a wide variety of cutting edge green building topics: such as the 5th Anniversary of Sustainable Cities, the updated GBO, Sustainable Infrastructure Scorecard, annual green building reporting, ecocharrettes and Integrative Process, Resource Life Cycle Cost Analysis, greenhouse gas emissions calculation and mitigation, and construction and demolition materials diversion. These trainings were available to King County and cities staff at no cost and were attended by more than 900 employees in 2014.

goals strategies measures &targets

K4C Pathway: Achieve net zero GHG emissions in new buildings by 2030.

County Services

Goal: Reduce energy use and GHG emissions associated with new construction and renovations in commercial and residential buildings built in King County.

CATEGORY	STRATEGIES
Education and Partnerships ▸▸	**Strategy A:** Provide educational programs and materials to unincorporated area customers on green building and sustainable development practices and resources.
	Strategy B: Provide training to King County and city permitting staff to enable them to better educate their customers about green building, retrofit, and remodel strategies and certifications and to achieve smooth implementation of updates to energy, water, C&D diversion, and other green building codes.
	Strategy C: Support education programs related to green building, retrofit and remodel-related strategies and certification programs to architecture, engineering, and construction industries.
	Strategy D: Develop partnerships with financial and real estate communities to inform them about green certified buildings and to increase funding for and enhance values of certified green building projects.
Development Codes and Certification Programs ▸▸	**Strategy A:** Support state and federal green building-related code development and improvements through forums such as the Washington State Building Code Council.
	Strategy B: Support and increase the rigor of local, regional, statewide, and national voluntary green building programs and certifications.
	Strategy C: In unincorporated areas, adopt or update and implement energy, water, C&D diversion, and other green building codes that are appropriate, ambitious, and achievable.[1]
	Strategy D: Participate and help support the RCC leading the way to "net zero carbon" buildings through innovation in King County-owned facilities and partnerships with cities, recognizing that the County will adopt appropriately tailored codes for the unincorporated areas.

[1] Under current state law, King County may not amend state energy codes addressing single-family residential or multifamily of 4 or less units.

CATEGORY	STRATEGIES
Development Codes and Certification Programs ▸▸	**Strategy E:** Affordable housing projects fully or partially funded by King County will utilize the Evergreen Sustainable Development Standard.
	Strategy F: Develop and use, as appropriate, requirements and incentives to incorporate green building standards into County leases and permits for construction on land leased by the County to others.

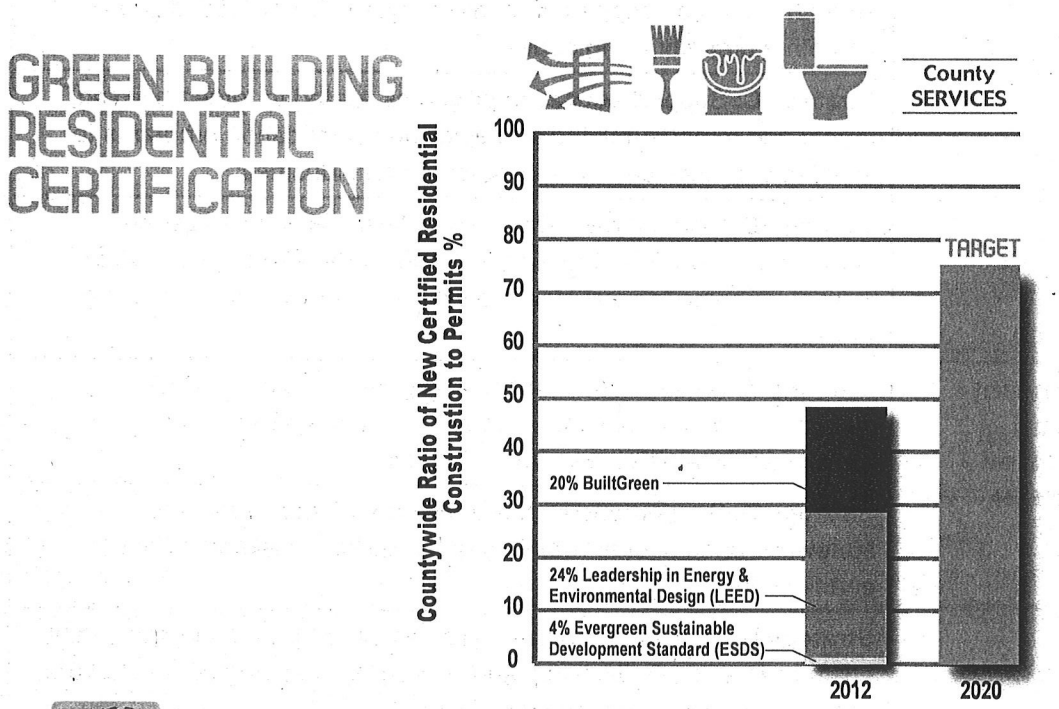
➤ **Measure 1:** Percent of new single and multi-family residential homes in all King County certified by local green building standards.

★ **Target 1:** By 2020, 75 percent of new developments achieve: Built Green 3 Star or better, Living Building Challenge, high level Evergreen Sustainable Development Standard, LEED Silver, or equivalent green building certification or development code.

★ **Target 2:** By 2030, 100 percent of new developments achieve Built Green Emerald Star, LEED Platinum, Living Building Challenge, or equivalent green building certification or development code that achieves net zero GHG emissions, consistent with the K4C Pathway to achieve net zero GHG emissions in new buildings by 2030.

○ **Status**

In 2014, 48% of new residential development in King County achieved Built Green, LEED for Home, or Evergreen Sustainable Development Standard (ESDS) certifications.



GHG Emissions Reduction: Quantifying the GHG emission reduction benefits from green building certified projects is identified as a 2015 SCAP Priority Action moving forward. In King County, the built environment is associated with roughly 35 percent of geographic-based GHG emissions. Buildings certified to LEED Gold or higher standards reduce energy-related GHG emissions by at least 18 percent to 39 percent.

Note: Goal Area 2: Buildings and Facilities Energy includes a countywide measure and target focused on reducing energy use in existing buildings by 25 percent below 2012 levels by 2030.

County Operations

Goal: King County-owned buildings and infrastructure will be built, maintained and operated consistent with the highest green building and sustainable development practices.

CATEGORY	STRATEGIES
Green Building and Sustainable Development Standards ▸▸	**Strategy A:** For all capital projects, evaluate and strive for a Platinum level using the LEED Rating System, Sustainable Infrastructure Scorecard, or approved alternative rating system, consistent with the Green Building Ordinance.
	Strategy B: Achieve performance requirements for energy, GHG emissions, stormwater management, and C&D materials diversion.
	Strategy C: All divisions utilize the Green Operations and Maintenance Guidelines Handbook to achieve a standard level of green operations and maintenance in existing capital assets.
	Strategy D: Provide training and technical assistance to projects, project managers, and County staff on green building strategies and certifications, operations, maintenance, C&D diversion, and reporting requirements.
	Strategy E: Develop and institutionalize a reporting system for early project review and post project verification, and track green building achievements and environmental benefits such as GHG, energy, water, and resource material savings.
Net positive County buildings and infrastructure ▸▸	**Strategy A:** All County capital programs are required to evaluate their project portfolios for opportunities to achieve net zero GHG emissions through programs such as the Living Building Challenge, Living Communities Challenge, Net Zero Energy, Envision, or EcoDistrict.
	Strategy B: Increase water efficiency and conservation, and reduce purchased water consumption through appropriate reuse of wastewater effluent, reclaimed water, stormwater, and harvested rainwater.

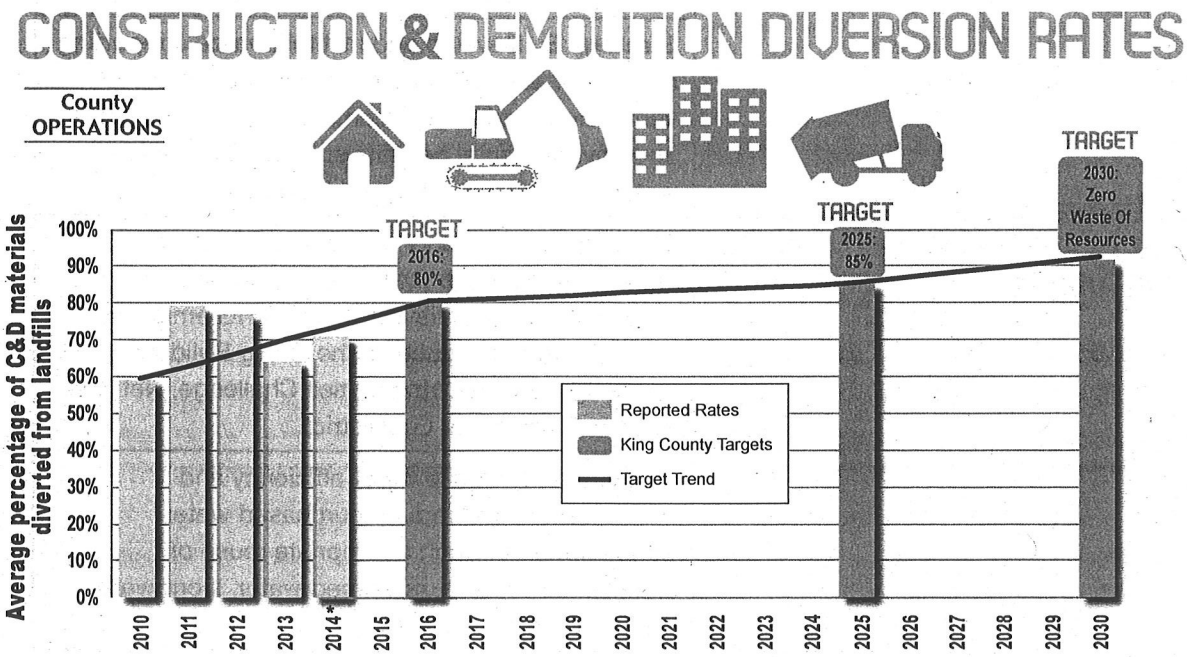
- **Measure 1:** Percentage of King County-owned capital projects achieving a Platinum level certification using LEED, the Sustainable Infrastructure Scorecard, or an alternative green building rating system that demonstrates the same performance.
  - ★ **Target 1:** By 2020, 100 percent of King County projects achieve Platinum certification or better.
  - ★ **Target 2:** By 2030, 100 percent of King County projects achieve certifications that demonstrate a net zero GHG emissions footprint for new facilities and infrastructure.
  - ○ **Status**

    In 2014, 22 percent of King County owned completed capital projects achieved either LEED or Sustainable Infrastructure Scorecard Platinum certifications. The majority of projects completed in 2014 were designed before King County's new Platinum certification goal became a requirement in August 2014.

GHG Emissions Reduction: Quantifying the GHG emission reduction benefits from green building certified projects is identified as one of the SCAP priority actions. Buildings certified to LEED Gold or higher standards reduce energy related GHG emissions by at least 18 percent to 39 percent.

- **Measure 2:** Average percentage of C&D materials diverted from landfills from County capital projects.
  - ★ **Target 3:** 80 percent C&D diversion rate by 2016, 85 percent C&D diversion by 2025, 92 percent (Zero Waste of Resources with Economic Value) by 2030.
  - ○ **Status**

    For the completed projects in 2014 that reported on C&D diversion information, the average C&D diversion rate was 71 percent; the total amount diverted was 33,267 tons.



*2014 data reflects diversion rates for completed projects, while 2010-2013 reflect average diversion rates from projects that were either completed or in progress.

GHG Emissions Reduction: In 2014, C&D diversion, from projects that reported, reduced GHG emissions by approximately 800 MTCO2e.

prioritiyactionsby2020

County Services

Education and Partnerships

✔ **Engage with unincorporated customers.** The Department of Permitting and Environmental Review (DPER) will develop an on-going, free educational program promoting green building and sustainable practices and offering resources to new construction and remodeling customers in unincorporated King County.

✔ **Partner through the RCC.** In partnership with cities and counties from across Puget Sound, lead and participate in the RCC to develop stronger and more consistent development codes for green building, which include: solar readiness, water efficiency, construction and demolition, Low Impact Development, and in support of the Living Building Challenge, Living Communities Challenge and EcoDistricts. Additionally, partner through the RCC to collaborate, recommend and advocate for stronger state energy codes.

Executive Dow Constantine presenting City of Shoreline representatives with Green Building Award at 5th Anniversary of Sustainable Cities Roundtable.

✔ **Quantify the GHG impacts of commercial and residential rating systems.** King County will create research opportunities with community partners to quantify the GHG emissions reduction benefits of building to various green building standards, including Built Green, LEED, Envision, King County's Sustainable Infrastructure Scorecard, and Evergreen Sustainable Development Standards. King County will also develop an education and outreach strategy for sharing the results of this work communitywide.

Development Codes and Certification Programs

✔ **Propose strong green building codes where King County has jurisdiction.** By the end of 2017, for unincorporated areas,[2] DPER will prepare proposed code updates, informed by RCC recommendations, for solar readiness, construction and demolition, and energy efficiency, and prepare a demonstration ordinance for Living Building Challenge certification, with appropriate tailoring for the kinds of new development and major redevelopment occurring in unincorporated King County. Pending King County Council approval, DPER will implement these updated codes.

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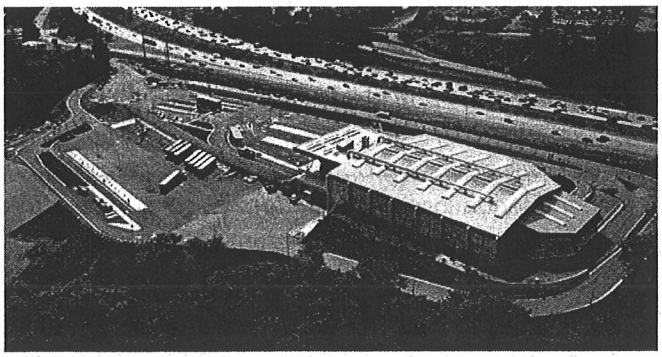
2 About 250,000 residents live in unincorporated areas of the county, for whom King County is their local government service provider. DPER issues permits for properties located in these unincorporated areas and enforces County land use and building codes.

- ✔ **Update C&D recycling requirements.** Pending King County Council approval of a proposed C&D ordinance, projects in unincorporated King County will be required to meet C&D diversion performance requirements by the end of 2017. Proposed requirements include the submission of a C&D materials diversion report, C&D material going from job sites to designated C&D facilities, and jobsites having a minimum of two bins on-site (one for recyclable materials and one for non-recyclable waste).
- ✔ **Redevelop System for Managing Construction and Demolition Waste.** Propose an ordinance that promotes recycling of construction and demolition (C&D) materials, while ensuring waste is managed in an environmentally sound manner. The legislation will continue the current practice of contracting with private sector facilities for managing C&D debris generated within the service area and implements bans on readily recyclable materials.
- ✔ **Develop pre-approved code packages.** DPER will identify, research, and develop three pre-approved packages of green building techniques and sustainable materials that make it easier for unincorporated area customers, who are mostly residential and small commercial property owners, to pursue energy efficiency and green building. The three pre-approved packages will address energy, building, and exterior/site work. These packages will improve customer convenience, reduce customer costs, speed permit processing, and can help diversify and broaden the use of green building techniques among residents. One pre-approved package will be ready for use starting in 2016, one in 2017 and one in 2018; DPER will also track use of pre-approved packages on an annual basis.

County Operations

Green Building and Sustainable Development Standards

- ✔ **Implement the King County Green Building Ordinance.** Require all County capital projects to strive for a Platinum level using the LEED rating system, King County's Sustainable Infrastructure Scorecard, or an approved alternative rating system.
- ✔ **Incorporate sustainability in operations and maintenance (O&M).** By 2017, King County will incorporate new green O&M practices in each division's line of business by implementing King County's Green Operations and Maintenance Guidelines Handbook.



Solid Waste Division's Bow Lake Recycling and Transfer Station located in Tukwila achieved a LEED Platinum level certification featuring renewable energy, water reclamation and reuse system, and Forest Stewardship Council (FSC) certified wood.

- ✔ **Reduce County water use.** King County will establish a water use baseline and reduction target for County facilities and operations that are currently monitored for water usage by the end of 2015 and will obtain comprehensive water data and set reduction targets for County accounts and facilities not currently monitored by end of 2020. To meet these water use reduction targets, each King County division will develop water conservation plans, including considering use of non-potable water supplies, by end of 2017.
- ✔ **Research and Develop Green Leasing Recommendations:** The County will research private and public sector models for "Green Leasing" incentives, standards, and requirements and make recommendations for provisions that could be tailored for application to leases for long-term tenants of King County-owned properties and facilities. The intent of these provisions is to improve energy efficiency, reduce GHG emissions, and reduce water use by tenants of County-owned buildings and property.

Net Positive County buildings and infrastructure

- ✔ **Develop net zero energy and Living Building challenge projects.** By 2020, King County will identify and will make substantial progress in the design, construction or certification process for at least 10 new County construction or retrofit projects that will achieve Net Zero Energy or Living Building Challenge certification.
- ✔ **Research tools to increase net positive and Living Building challenge projects.** Local buildings built to the highest green building levels such as Net Zero and Living Building projects are rare. The RCC will research cost barriers and incentive opportunities to increase the number of projects that perform to these highest standards. As part of its leadership of the RCC, King County will work with K4C and other cities on their adoption of codes allowing these kinds of projects.

PHOTO COURTESY OF NIC LEHOUX

The Bullitt Center located in Seattle is a certified Living Building Challenge project and the greenest commercial office building in the world, producing energy and water needs and stormwater management onsite resulting in GHG emissions reductions. The GreenTools Program, Public Health Seattle-King County, and the Wastewater Treatment Division worked with the project members on water, wastewater and permit related issues.

ACCOUNTABLE AGENCIES

The Department of Permitting and Environmental Review (DPER) is responsible for promoting and permitting green building and sustainable techniques used by builders in unincorporated King County. Included in this work is a strong education program, such as DPER's Green Building Handbook, for unincorporated property owners as well as work to develop and implement strengthening code amendments, as adopted by the King County Council. Seattle-King County Public Health works with builders and residents to reduce water usage throughout the County.

The Department of Natural Resources and Parks' Solid Waste Division (SWD) hosts the GreenTools Program which supports and provides resources to 38 cities within King County through the Sustainable Cities program and the Regional Code Collaboration. It offers the Eco-Cool Remodel Tool as an interactive internet tool for countywide residents and builders to explore using green building techniques.

King County's interdepartmental Green Building Team plays a coordinating and oversight role in guiding and implementing the Green Building Ordinance as it relates to county government operations and communitywide green building efforts. Every county agency that manages county capital assets and/or has an impact on county owned or communitywide built environment, must play a role. Yet, agencies will contribute toward goals in varying degrees because of disparate opportunities that may be the result of: significant or deficient past investments, impending expenditures or capital investments, regulatory requirements, and the resource intensity of operations. Staff will continue to collaborate on green building and sustainable development activities to help highlight the best opportunities and to learn from past endeavors.

The Department of Executive Services' Facilities Management Division (FMD), Department of Transportation (DOT), and Department of Natural Resources and Parks (DNRP) integrates sustainability and green building techniques to reduce GHG emissions and energy usage in County-owned facilities on an ongoing basis. The Department of Executive Services' Finance and Business Operations Division supports green building practices through its Environmental Purchasing Program and Procurement Services. The Department of Community and Human Services implements the Green Building Ordinance requirements for affordable housing projects, and other capital projects funded by the County.

Goal Area 4: CONSUMPTION AND MATERIALS MANAGEMENT

KEY TAKEAWAYS

- GHG emissions associated with local consumption, including from the production, transport, use and disposal of goods, food and services, are more than twice the total GHG emissions that physically occur inside King County's geographic borders. This underscores the importance that sustainable purchasing, reducing waste, reusing goods, and recycling after use can have on reducing GHG emissions.
- At a county services scale, this goal area presents ambitious commitments to prevent waste and recycle more. King County aims to increase the countywide recycling rate from 53 percent to 70 percent by 2020, which will require King County and all its regional partners to improve their efforts:
  - The Solid Waste Division (SWD) will support development of frequency and separation policies for curbside collection of garbage, recyclables and organics in the unincorporated area.
  - The SWD will develop a zero-waste competitive grant and explore development of an incentive-based tip fee disposal policy that rewards jurisdictions who are on track to reach the 70 percent recycling rate.
  - The SWD will consider the safety and effectiveness of banning recyclable materials from transfer stations and the Cedar Hills Regional Landfill.
- As it relates to government operations, GHG emissions associated with County purchases of goods and services, including construction services, are the single largest source of GHG emissions; GHG emissions associated with fugitive methane emissions at the Cedar Hills Regional Landfill and King County-owned closed landfills are also significant.
- At the government operations scale, this goal area outlines the County's commitments to:
  - Update the County's Environmental Purchasing Policy to address GHG emissions reductions in purchases.
  - Buy energy-efficient computers and servers.
  - Ban self-haul disposal at transfer stations of key materials that are readily recyclable.
  - Pursue best-in-industry standards and initiatives that improve landfill gas collection efficiencies, reduce landfill gas fugitive methane emissions, and maximize renewable energy potential of landfill biogas.

INTRODUCTION

The purchase, use, and disposal of goods and services by King County residents, businesses, and governments are associated with significant GHG emissions. These emissions can occur at all stages of a product's life cycle, from resource extraction, farming, manufacturing, processing, transportation, sale, use, and disposal.

In 2012, the County published two complementary GHG emissions inventories: one focused on emissions produced within the geographic boundaries of the County, and one measuring emissions from goods and services consumed within the County. The latter, a 'consumption- based inventory', showed annual emissions of more than double the total of the 'geographic-based inventory'.

As a major employer and service provider in the region, King County government is also a major consumer. Purchased goods and services, especially construction-related services, account for roughly 45 percent of the County's operations-related GHG emissions. GHG emissions from the Cedar Hills Regional Landfill and King County owned closed landfills contribute an additional 10 percent of the operational GHG emissions.

King County is including many county operations strategies in this update that will ensure that our purchasing practices will help us to minimize GHG emissions. These strategies include updating the internal environmentally preferable purchasing policy, recommending that workstation purchases are consuming the least amount of energy while meeting business needs, and maximizing the transition from individual computer servers to standard virtual environments (SVE) and increasing use of Cloud environments.

CURRENT ACTIONS AND RECENT ACCOMPLISHMENTS

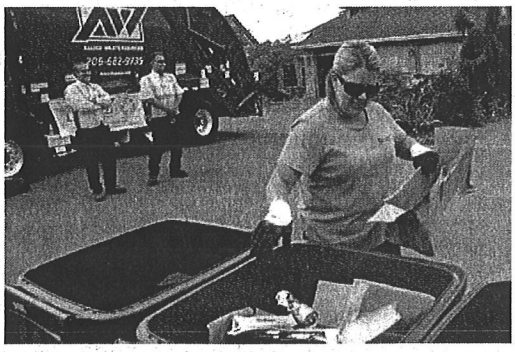
Residents, businesses, and governments can reduce GHG emissions associated with goods and services by choosing sustainable options, reducing the amount they purchase, reusing goods when possible, and recycling after use.

The Solid Waste Division (SWD) plays important roles related to solid waste, recyclables and organics collection, transfer, and disposal. The SWD also implements a number of waste prevention and recycling programs. Separately, through its Environmental Purchasing Program, King County is also working to reduce the impacts of its operations by purchasing recycled content, resource efficient, and more durable products.

County Services

Community Waste, Reuse, and Recycling

- **Communitywide Curbside Recycling.** Solid Waste Division is responsible for ensuring curbside recycling services are provided in the unincorporated areas and for providing regional education and outreach to support curbside recycling efforts throughout the county with the exception of the City of Seattle. The Solid Waste Division worked with one of its haulers that services the unincorporated areas to place educational tags

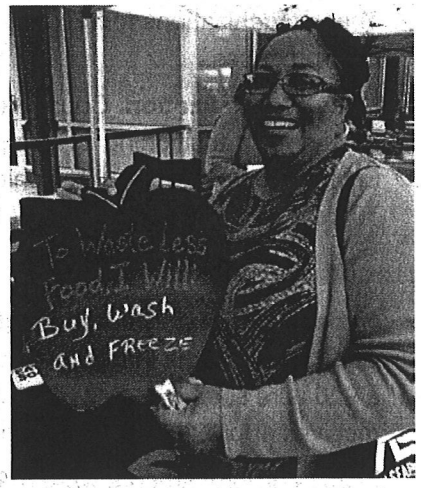


Residents compete to recycle more than their neighbors in their curbside carts.

on curbside carts to remind customers how to properly sort recyclables, food and yard waste. The result was a marked increase in recycling on the routes where carts were tagged. In 2014, 280,000 tons of recyclable materials were collected by private hauling companies at the curb, and the single- and multi-family recycling rate in unincorporated King County increased from 43.9 percent in 2013 to 44.5 percent in 2014.

- **Recycling Infrastructure.**
  The Solid Waste Division provides recycling collection at its transfer stations. There were significant increases in transfer station recycling in 2014 due in part to a pilot resource recovery effort at the Shoreline Recycling and Transfer Station, which resulted in an additional 1,533 combined tons of cardboard (196 tons), metal (596 tons), and clean wood (741 tons) recycled, an increase of two and half times year over year.

- **Waste Prevention Outreach.** The average single-family household in King County throws away 390 pounds of edible food each year. Due in part to the high GHG emissions impact of food production, a recent major focus of the Solid Waste Division's educational efforts has been focused on reducing food waste. In 2014, the **Food: Too Good to Waste** program recruited residents to take part in a four-week challenge to reduce wasted food. The challenge involved reducing and tracking food waste each week. Participants achieved a 37 percent reduction in their food waste.



Resident committing to reduce food waste as part of the Solid Waste Division's Food Too Good To Waste program.

- **Developing Markets for Reuse and Recycling.**
  The Solid Waste Division's LinkUp program has facilitated the development of the market for recycled asphalt shingles (RAS). Four agencies in Washington are now using hot mix asphalt containing RAS, including King County Road Services Division and Solid Waste Division, the City of Bellevue, and WSDOT. Recently WSDOT made the use of RAS a standard specification, so the use of the material is approved for any WSDOT project, and any other public or private projects that use WSDOT's specifications.

- **Construction and Demolition Diversion.** The C&D program, which provided technical assistance and best management practices training, aims to divert C&D materials from building projects from the landfill at a rate of 80 percent by 2016, 85 percent by 2025 and 92 percent by 2030. Seventy-one percent of C&D materials were diverted in 2014. Refer to the Goal Area 3: Green Building for measures and targets associated with C&D.

County Operations

Purchasing

- **Environmentally Preferable Purchasing.** The Environmentally Purchasing Program provides County personnel with information and technical assistance to help them identify, evaluate, and purchase economical and effective environmentally preferable products and services.

  In 2014, King County's Environmental Purchasing Program played leadership roles in EPA West Coast Climate and Materials Management Forum's development of a "Climate-Friendly Toolkit" and in the Sustainable Purchasing Leadership Council's "Guidance in Leadership for Sustainable Purchasing" version 1.0 document, by serving on technical advisory committees. These organizations focus on advancing sustainable purchasing efforts broadly and sharing best practices.

- **Server Virtualization.** County agencies led by the **Department of Information Technology** have been transitioning its computer servers from stand-alone to Standard Virtual Environments. The County achieved significant progress in 2014 and is on target to reach the 70 percent target by the end of 2015.

Landfill Biogas

- **Cedar Hills Regional Landfill (CHRLF).** The Solid Waste Division owns and operates the CHRLF, one of the largest municipal solid waste landfills in the Pacific Northwest, located within a 920 acre site. It serves 37 of the 39 cities in King County, (except Seattle and Milton), and receives approximately 2,500 tons of refuse every day.

  In 2014, improvements were made to the already advanced landfill gas capture system in Areas 5 and 6 of the landfill. New liner was installed on top of the deposited refuse, using 4,400 feet of additional gas pipelines and 125,000 cubic yards of compacted soil to seal and expedite settlement. These improvements have been effective in increasing the captured landfill gas by 4 percent, which equals 400 additional cubic feet per minute.

Compacting garbage at the Cedar Hills Regional Landfill

goals strategies measures & targets

K4C Pathway: By 2020, achieve a 70 percent recycling rate countywide; by 2030, achieve zero waste of resources that have economic value for reuse, resale and recycling.

County Services

Goal: King County will encourage and support behaviors, purchasing, and waste management strategies that minimize the life-cycle impacts of consumption and materials by the community.

CATEGORY	STRATEGIES
Waste Prevention, Reuse, and Recycling ▸▸	**Strategy A:** Conduct an outreach campaign and provide incentives and support to increase communitywide recycling and composting.
	Strategy B: Partner with haulers and recycling and composting businesses to increase productive reuse and recycling of materials.
	Strategy C: Develop a zero waste of resources grant program to incentivize reuse and recycling.
	Strategy D: Develop, expand, and support markets for reused and recycled products and for County-produced renewable resources.
	Strategy E: Provide tools and support to King County schools and other partners to improve waste prevention, resource conservation and efficiency efforts.
	Strategy F: Provide every-other-week garbage collection, require separation of garbage, recyclables and organics, including the cost of organics collection for all customers.
Recycling and Transfer Stations ▸▸	**Strategy A:** Implement self-haul disposal bans of specified materials at transfer stations that provide recycling collection. Materials include wood, metal, cardboard, paper and yard waste.
	Strategy B: Engage customers at Recycling and Transfer Stations through enhanced customer assistance and signage.
	Strategy C: Add collection at Recycling and Transfer Stations of additional materials not widely available for collection elsewhere such as expanded polystyrene, plastic film, tires and mattresses.

➢ **Measure 1:** Recycling rates in King County's solid waste service area (all cities in King County except Seattle and Milton).

★ **Target 1:** By 2030, zero waste of resources that have economic value for reuse or recycling.

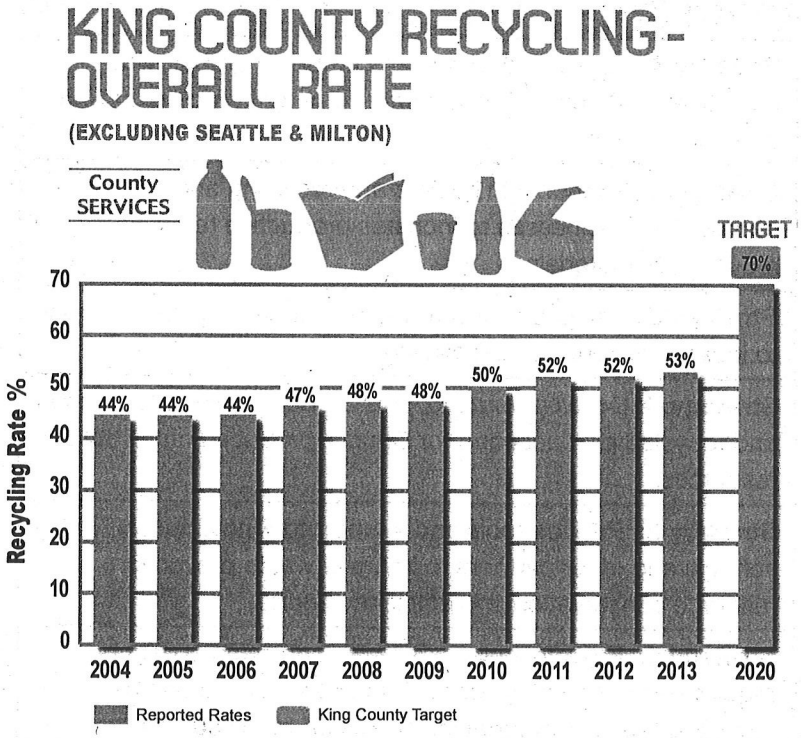
○ **Status**

Sixty-three percent of material disposed at the Cedar Hills Regional Landfill in 2013 was readily recyclable. Programmatic efforts continued on these materials including food waste, traditional curbside recyclables, metal, wood, and yard waste.

GHG Emissions Reduction: Reaching the 2030 target of zero waste of resources would result in a GHG emissions reduction of approximately 2.1 million MTCO2e annually.

★ **Target 2:** By 2020, 70 percent recycling rate of materials collected in King County.

○ **Status**



GHG Emissions Reduction: The 2013 recycling rate represented more than 945,000 tons of recycling collected from residents and business resulting in a GHG emissions reduction of 1.5 million MTCO2E when compared to no recycling. Achieving the target would reduce GHG emission by approximately 1,332,400 MTCO2e in 2020.

➢ **Measure 2:** Tons recycled at King County solid waste transfer stations.

★ **Target 3:** By 2020, recycle 60,000 tons of key materials including yard and wood waste, metal, cardboard and paper.

○ **Status**

In 2014, 13,700 tons of materials were recycled, a 44 percent increase from 2013. This

is due to the opening of Bow Lake Recycling and Transfer Station, new policies in scrap metal recycling, and a resource recovery pilot at Shoreline.

GHG Emissions Reduction: Recycling at transfer stations resulted in GHG emissions reductions of approximately 12,000 MTCO2e in 2014.

County Operations

Goal: King County will minimize operational resource use, maximize reuse and recycling, and choose products and services with low environmental impacts.

CATEGORY	STRATEGIES
Waste Prevention, Reuse, and Recycling ▸▸	**Strategy A:** Minimize the use of resources such as water, office supplies, and building materials.
	Strategy B: Maximize the reuse and repurposing of government operations byproducts.
	Strategy C: Maximize recycling and composting of materials from County facilities.
	Strategy D: Maximize the energy efficiency and resource reduction of computer workstations and servers.
Sustainable Purchasing ▸▸	**Strategy A:** Buy and promote use of recycled and other environmentally-preferable products and services whenever practicable.
	Strategy B: Require contractors and consultants to use recycled and other environmentally preferable products and services whenever practicable.
	Strategy C: Engage in the development of sustainable product and services standards, certifications and labeling.
Landfill Gas ▸▸	**Strategy A:** Maintain and improve best-in-industry standards for landfill gas collection systems.
	Strategy B: Maximize renewable energy potential of landfill biogas at the Cedar Hills Regional Landfill and closed landfills.

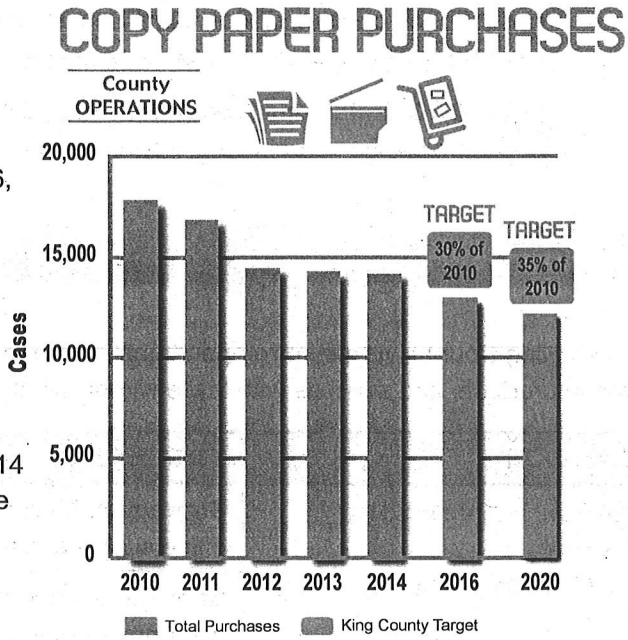
➤ **Measure 1:** Total amount of copy paper purchased.

★ **Target 1:** Compared to 2010 levels, reduce copy paper usage by 20 percent by 2013, 30 percent by 2016, and by at least 35 percent by 2020.

○ **Status**

The County is currently achieving a rate of 22 percent below 2010 levels in copy paper usage.

GHG Emissions Reduction: 225 MTCO2e reduction for 2014 compared to the 2010 baseline



➤ **Measure 2:** Server Virtualization.

★ **Target 2:** Convert 70 percent of individual servers to Standard Virtual Environments (SVEs) by the end of 2015.

○ **Status**

A 2012 budget proviso required the County to transition its computer servers from stand-alone to SVEs. The County achieved significant progress in 2014 and is on target to reach the 70 percent target in a timely manner.

➤ **Measure 3:** Landfill gas collection efficiency at the Cedar Hills Regional Landfill.

★ **Target 1:** Increase landfill gas (LFG) collection efficiency at Cedar Hills to at least 98 percent by 2020.

○ **Status**

CHRL is currently achieving a 95.77 percent LFG collection efficiency.

GHG Emissions Reduction: Each one percent increase in LFG collection efficiency reduces fugitive GHG emissions by about 12,000 MTCO2e. Achieving the 2020 target would reduce emissions by approximately 25,000 MTCO2e per year by 2020.

priorityactionsby2020

County Services

Waste Prevention, Reuse, and Recycling

✔ **Encourage collection polices in unincorporated areas.** The Solid Waste Division will explore garbage collection frequency, including the cost of organics collection for all customers, and requirements for separation of garbage, recyclables and organics. Cities will need to take similar action to meet countywide recycling goals and maximize the capacity (lifespan) of the landfill. Discussion of these policies is part of the 2017 Comprehensive Solid Waste Management Plan process.

✔ **Reduce GHG impacts from food production and consumption.** Food waste is a significant contributor to climate change. The County will implement initiatives to a) develop a toolkit for food businesses to increase efficiencies and reduce food waste, b) raise public awareness and institutional knowledge about the value of imperfect food and its role in preventing waste, and c) examine food waste recycling processing options such as anaerobic digestion and composting.

Tools and information to help residents reduce food waste.

✔ **Update and expand recycling grant programs.** The Solid Waste Division will develop new criteria for fund disbursement to cities for efforts that support Zero Waste of Resources 2030 initiatives through the existing $1 million Waste Reduction and Recycling Grant and create a new competitive zero waste of resources grant program targeting non-profits, community groups, and others with creative waste prevention, reuse and recycling strategies.

Recycling and Transfer Stations

✔ **Expand recycling infrastructure.** King County will continue modernization of its 1960s-era network of transfer stations, which will improve recycling opportunities for all residents and businesses. For example, at the newly rebuilt Shoreline and Bow Lake stations, recyclable materials can be harvested from the tip floor through

Partnering with Bartell Drugs to educate consumers about recycling.

targeted sorting. Hard-to-recycle-at-the-curb materials, such as expanded polystyrene, mattresses and tires, can also be collected. When completed in 2017, the new Factoria Station will further increase the County's ability to recover more recyclables from transfer stations.

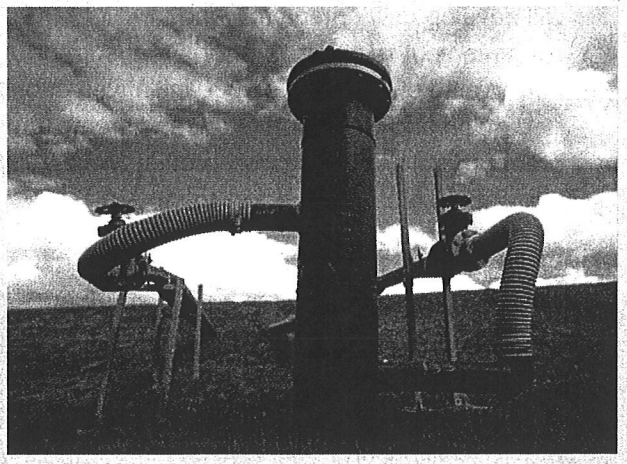
Scrap metal collection at a King County Transfer and Recycling Station.

- ✔ **Increased recycling of key materials at transfer stations.** To achieve recycling goals, the Solid Waste Division will explore implementing self-haul disposal bans of specified materials at transfer stations that provide recycling collection. Materials would include wood, metal, cardboard, paper and yard waste.
- ✔ **Explore incentive-based disposal tip fee.** The Solid Waste Division will explore development of an incentive-based tip fee disposal policy that rewards jurisdictions that are on track to reach the 70 percent recycling rate.

County Operations

Landfill Gas

- ✔ **Reduce landfill gas emissions.** King County will pursue several initiatives to improve collection efficiencies and reduce landfill gas emissions, including:
  - ✔ Install a biocover of compost, mulch and green waste over the surface of the Cedar Hills Regional Landfill. This will increase oxidation of landfill gas, which reduces carbon dioxide and methane emissions.
  - ✔ Enhance the landfill gas collection system, which makes the conversion of landfill gas to renewable energy more efficient.
  - ✔ Evaluate closed landfills to identify more landfill gas capture and treatment methods, such as improving the Cedar Falls Bioberm treatment system and replacing the Enumclaw landfill flare.



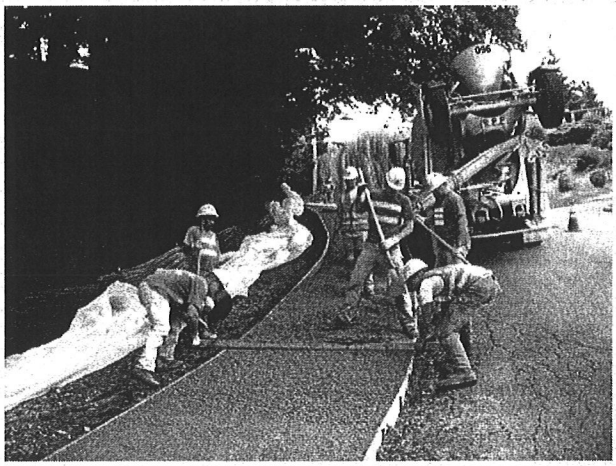
Part of the landfill gas collection system at the Cedar Hills Regional Landfill.

- ✔ **Evaluate and report back** as part of the SCAP annual report the effect on Cedar Hills of any changes in state or federal law or pending ballot initiatives related to regulating GHG emissions. Based on Council direction in Ordinance 17971, the Division is

currently in the process of a third-party evaluation of its methodology for assessing greenhouse gas emissions, including those from the Cedar Hills landfill; results are anticipated in early 2016. As the Division reviews its landfill gas emissions calculations methodology, the models utilized by European landfill managers will be among those analyzed and considered. A report to Council on GHG emissions from the Cedar Hills landfill will be transmitted by June 1, 2016. Among other criteria, the analysis shall consider: accuracy in assessing emissions; expense and ease of use; best available science; balancing industry standards with innovative technologies; and capacity to meet regulatory agency requirements.

Purchasing

- ✔ **Update King County's Environmental Purchasing Policy.** The County will update its Environmentally Preferable Product Procurement Ordinance (K.C.C. 18.20) by 2017 to include GHG emissions as a criterion in purchasing decisions and will support K4C member cities' sustainable procurement efforts.
- ✔ **Buy 100 percent recycled content copy paper.** The 2012 SCAP set a County operations target to procure 100 percent recycled content copy paper. The 2014 status was that 31 percent of copy paper purchases were 100 percent recycled content. Based on lessons learned over the last three years of implementation, King County will ensure by 2017 that the default option for office copy paper is 100 percent recycled content paper.
- ✔ **Target concrete use in construction.** The specification and use of alternative cement materials (i.e. fly ash and slag) lowers the embodied energy of concrete and offsets almost one ton of carbon emissions for every ton of Portland cement replaced. Beginning in 2016, King County will start tracking current use of cement and low-GHG cement alternatives, develop best practices/guidance on how and when to use alternatives, and by 2017 commit to set targets for use of low-GHG cement alternatives.



King County uses concrete for many types of projects and is exploring using low GHG emissions alternatives.

- ✔ **Purchases of Desktop Work Stations.** Beyond the building systems like HVAC and lighting, desktop work stations are typically the biggest source of energy use in King County's buildings. As these workstations are replaced, King County has a significant opportunity for energy savings. For example, a tablet uses roughly a quarter of energy needed to power a standard desktop. King County's Department of Information Technology will provide County departments with energy usage data for different types of work stations (e.g., tablet, laptop, desktop) to inform purchasing decisions, and departments will choose the most energy efficient options to meet the business needs for programs and employees.

Waste Prevention, Reuse, and Recycling

✔ **Server virtualization.** King County is in the process of moving backups to the "cloud" and piloting other uses where different services, such as servers, storage, and applications, are delivered to computers and devices through the Internet. As the County sees results from pilot projects, it will develop a target for transition of these functions to the cloud by 2020.

ACCOUNTABLE AGENCIES

The Department of Natural Resources and Parks' Solid Waste Division (SWD) and the Department of Executive Services' Procurement and Payables Section (P&P) are the overall leads for this goal area. Strategies related to waste prevention, recycling, reuse and partnering with schools, businesses and others on related efforts are led by the Solid Waste Division's Recycling and Environmental Services section. Strategies related to transfer stations and operation of King County owned landfills are the responsibility of the SWD's Engineering Services and Operations sections.

Strategies related to sustainable consumption, purchasing, and reducing waste are led internally by P&P's Environmental Purchasing Program and the Solid Waste Division's GreenTools Program. The Department of Information Technology leads the effort to standardize computers and servers. The Wastewater Treatment Division is the lead for efforts related to reuse and repurposing of byproducts of government operations through its Resource Recovery Program.

Goal Area 5: FORESTS AND AGRICULTURE

King County owns and stewards more than 25,000 acres of forest lands.

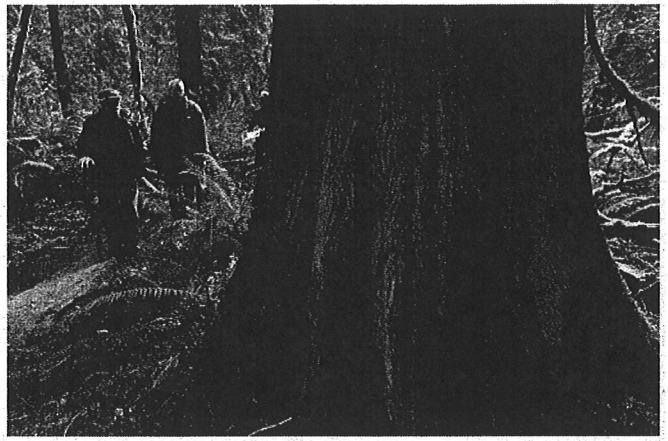
KEY TAKEAWAYS

- Due to local forest types and a temperate climate, forests in King County store more carbon than forests almost anywhere in the world.
- Forests and farms create a "green wall against sprawl" that helps minimize the region's transportation-related GHG emissions.
- Farms are a source of local food supply, which helps reduce the region's reliance on food imported from regions that may be more affected by climate change.
- Forests and farms in King County are vulnerable to projected climate change impacts, such as flooding, wildfire, drought, and pests.
- Among other things, this goal area describes King County's commitments to:
  - Permanently conserve remaining high-priority farm, forest, and other open spaces throughout King County within 30 years.
  - In cooperation with public and private partners, plant at least one million trees in King County over the next five years and develop a 30-year plan to re-tree King County to the maximum extent practical while accommodating population growth and multiple land uses.
  - Steward and restore more than 25,000 acres of existing King County-owned forestland.
  - Provide incentives and technical assistance to private landowners to support forestry and agriculture while encouraging integration of climate issues into management decisions.

INTRODUCTION

There are substantial carbon and climate benefits to maintaining, protecting, restoring, and expanding forests and farms in King County.

Forests and farms absorb and store carbon dioxide in trees and soils. As trees grow, they absorb carbon dioxide from the air and convert it into carbon, which is stored in tree trunks, roots, foliage and soil. Due to local forest types and a temperate climate, forests in the King County store more carbon than almost anywhere else in the world. There are more than 800,000 acres of forest land in King County, and approximately 800,000 to 900,000 additional MTCO2e were sequestered and stored over the last decade by new local forest growth. This total does not include all the rural residential and urban forests, which also contain significant carbon. Agricultural soils also store significant amounts of carbon, especially if treated with soil amendments such as compost or biosolids that add nutrients and organic matter.



Conifer trees like this giant cedar in King County's Grand Ridge Park store more carbon than almost anywhere else in the world.

Farming can result in GHG emissions associated with managing soils, using manufactured fertilizers, managing manure, operating farm equipment, transporting products, and animal digestive processes. Sustainable farming practices can minimize these emissions. Additionally, some crops, including many fruits and vegetables, results in fewer GHG emissions compared to other foods.

Protecting rural forests and farms from development also eliminates the risk of those lands converting to uses, such as housing or commercial development. By helping to limit sprawl, future increases in transportation-related GHG emissions associated with new development are avoided.

Producing more locally-grown food can also help offset potential climate change impacts on food production. For example, as California's central valley becomes hotter and drier, it likely will produce less food, which affects food prices and availability. Although California's central valley covers about ten times as much land as King County, maintaining and increasing local sources of food can help offset the loss of agriculture production elsewhere.

Maintaining healthy forests and farms in King County also will require adapting to the local impacts of climate change. Likely climate change which may affect King County's forests and farms include:

- Higher temperatures may cause a northward shift in optimum growing conditions for local tree species, an increase in invasive species and pests, and increased agricultural irrigation needs.
- More frequent summer droughts may result in increased risks of forest fires and increased irrigation needs.
- Increased large storm and wind events may cause more tree damage, especially on steep slopes when the soil is saturated.

- Increased flood sizes and frequencies might affect farm structures, animals, crops, and equipment, which would decrease farm incomes and increase risks to farm viability.

Increased temperatures may also have some positive impacts on local agriculture. For example, the growing season in King County could lengthen and specialty crops not feasible in King County's current climate could be grown in the future. Refer to Section Two: Preparing for Climate Change Impacts, for more information about local climate change impacts.

CURRENT COUNTY ACTIONS AND PROGRAMS

King County has taken significant action to protect forest and agricultural land and to practice and encourage careful stewardship. To date, more than 200,000 acres of large acreage private forest land has been protected through acquisition of conservation easements and development rights, 161,000 acres of small acreage private forest and farmland have been protected through tax incentives and implementation of stewardship plans, and 14,000 acres of farmland have been protected through the Farmland Preservation Program.

Protecting forest land and managing forests for health and resilience can increase the quantity of carbon stored on these lands. These actions can also reduce the risk of catastrophic loss of carbon through wildfire, windfall, and mortality caused by insects or pathogens. Sustainable farming techniques can enhance soil health, reduce use of fossil fuel-based resources, and add carbon to agricultural lands. In addition, the production of some types of food, such as fruits and vegetables, results in fewer GHG emissions than the production of other crops. Efforts to increase access to and availability of these locally produced low-impact foods can help reduce GHG emissions associated with food consumption. Local forests and farms are vulnerable to local climate change impacts, so developing and incorporating forest and farm adaptation strategies into existing programs is essential to ensure the long-term economic viability of forestry and agriculture in King County.

County Services

Sustainable Agriculture and Forestry Practices

- **Local Food Initiative.** Launched in 2014, King County's Local Food Initiative is taking bold steps to support the local food economy, including to (1) better connect local farms to consumers, (2) increase access to healthy, affordable foods in underserved areas, (3) support farmers and protect farmland, and (4) create a sustainable farm-to-plate pipeline more resilient to the effects of climate change. In early 2015, 20 priority actions were identified for implementation in King County Local Food Economy final report.
- **Assist forest owners.** The Water and Land Resources Division's Forestry Program promotes healthy forests and forest stewardship and supports private forest landowners through forest stewardship planning courses and workshops and on-site forest management assistance to non-industrial private forest landowners. The Forestry

King County's Local Food Initiative is supporting a sustainable and resilient local food economy.

Program also works with communities and fire districts on community Firewise plans to reduce the risk of wildfire. The County also offers property tax incentives that support privately-owned forests.

- **Assist farmers.** The Water and Land Resources Division's Agriculture Program provides technical assistance and cost sharing to support sustainable farming practices and promotes local production of and access to fruits and vegetables. The County also offers property tax incentives that support privately-owned farms. The Wastewater Treatment Division will work with farmers who need water to provide recycled water where distribution is possible.

- **Improve soils.** The Wastewater Treatment Division uses its soil amendment Loop® biosolids on private and state-managed forests in King County to increase tree growth, store carbon in forest soils, and replace use of fossil fuel-based fertilizers. The Wastewater Treatment Division is pursuing opportunities to increase use of Loop biosolids within King County, thereby improving the local ecosystem and limiting GHG emissions from transportation of the material beyond the county. The Wastewater Treatment Division is planning projects with private land owners to restore areas of mined or degraded soils to forestland using Loop biosolids or compost. King County is pursuing opportunities for soil management and restoration projects on King County-owned forest and agricultural lands, including using biosolids, compost, and other organic materials that are byproducts of County operations.

Carbon stored from the use of Loop® biosolids across the state reduced GHG emissions by 39,000 MTCO2e.

Protection of Agriculture and Forest Lands

- **Preserve farmlands.** King County has protected farmland through the designation and zoning of 42,000 acres in Agricultural Production Districts and has ensured long-term conservation of more than 14,000 acres in the Farmland Preservation Program. Since 2011, the County has augmented its farmland preservation efforts by expanding its Transfer of Development Rights program with a focus on protecting additional farmland.
- **Reduce flood impacts to farms.** King County offers technical assistance and logistical support for the construction of farm pads in the Snoqualmie Valley Agricultural Production District. Farm pads are elevated areas where livestock, farm machinery and other agricultural equipment and supplies can be stored safely during a flood. Properly designed farm pads and other elevated flood refuges can help mitigate flood damages to farming operations.

As the service provider for the King County Flood Control District, King County supports the construction of farm pads like this one, near a flooded Snoqualmie River in 2009, which protects farm equipment and animals.

County Operations

Sustainable Agriculture and Forestry Practices

- **Restore King County-owned forests and parks.** Between 2010 and 2012, the Parks Division completed an initial assessment of the forest types on all 25,000 forested acres it owns and manages. The Parks Division has developed Forest Stewardship Plans for 5,796 forested acres at 11 sites that are 200 acres or larger, and in recent years, has conducted nine harvests for long-term forest health. By 2020, the division will develop or update Forest Stewardship Plans for at least ten Parks-owned sites. The Parks and Water and Land Resources Divisions will also continue to develop opportunities for volunteers to plant native trees and shrubs and remove invasive species from County-owned lands.

goals strategies measures &targets

K4C Pathway: Reduce sprawl and associated transportation-related GHG emissions and sequester biological carbon by focusing growth in urban centers and protecting and restoring forests and farms.

County Services

Goal: King County will protect and support healthy, productive farms and privately-owned forests that maximize biological carbon storage, promote public health, and are resilient to changing climate conditions.

CATEGORY	STRATEGIES
Protect Agriculture and Forest Lands	**Strategy A:** Protect and conserve agriculture and forest lands through zoning and land use planning and regulations.
	Strategy B: Protect and conserve remaining high-priority forest, agriculture, and other open space lands through strategies such as transfer of development rights to urban areas, purchase of development rights, conservation easements, and covenants, consistent with any policies adopted in the 2016 Comprehensive Plan.
Sustainable Agriculture and Forestry Practices	**Strategy A:** Provide forestry and agricultural-related technical assistance and incentives to private landowners to support and enhance sustainable farming and forestry, including information about increasing carbon sequestration and preparing for local climate change impacts.
	Strategy B: Coordinate and streamline forestry and agricultural support services between King County, state and federal agencies, universities, and the King Conservation District.

➤ **Measure 1:** Privately-owned rural acreage that has stewardship plans or is enrolled in Open Space (RCW 84.34) and Forest Land (RCW 84.33)-designated current use taxation incentive programs.

★ **Target 1:** 500 additional acres per year of privately owned rural acreage that has stewardship plans or is enrolled in current use taxation incentive programs.

○ **Status**

In 2014, 660 new acres were enrolled in Open Space- and Forest Land-designated current use taxation incentive programs or completed stewardship plans, exceeding the annual target. At the end of 2014, there were approximately 161,000 privately-owned rural acres enrolled in these programs, which provide significant property tax incentives to encourage landowners to voluntarily conserve, protect and manage open space and forestland.

GHG Emissions Reduction: By 2020, King County will develop an approach for quantifying increased carbon sequestration associated with enrollment in current use taxation incentive programs and for estimating the amount of carbon sequestration associated with the completion and implementation of stewardship plans.

➤ **Measure 2:** Privately-owned forest lands permanently conserved through easements that remove the development rights.

★ **Target 2:** Permanently protect and conserve remaining unprotected high-priority forest, agriculture, and other open space lands within 30 years. A specific target will be developed in close coordination with the Council and consistent with the King County Comprehensive Plan and anticipated 2016 updates.

○ **Status**

In 2014, King County, in cooperation with the Muckleshoot Tribe, achieved the 2012 SCAP target to permanently protect more than 200,000 acres of forestland through transfers of development rights, purchase of conservation easements, or purchases in fee. The Conservation Futures Tax Levy was an important funding source for achieving this target. Significant acres of high-priority farm, forest, and other open space lands in King County remain unprotected and are at risk of future development or conversion to other land uses, a risk that is expected to increase with future population growth.

GHG Emissions Reduction: In 2011, King County and the Sightline Institute estimated the expected annual GHG emission reductions associated with its Transfer of Development Rights program. This analysis showed that the transfer every rural housing unit to downtown Seattle results in about 272 metric tons of GHG emission reduction over 30 years. Using a similar approach, it is estimated that preserving the remaining high value conservation lands in rural King County from additional development would reduce GHG emissions by over one million MTCO2e over a 30 year time frame.

➤ **Measure 3:** Additional acres of agricultural land in food production.

★ **Target 3:** Through the Local Food Economy Initiative, King County set a target of adding 400 net new acres in food production per year through 2024.

○ **Status**

In 2013, King County purchased the former Tall Chief Golf Course, with the aim of restoring food production to this 191 acre site. Efforts to expand the amount of acreage in food production will increase in 2015 and 2016.

GHG Emissions Reduction: Purchase of the Tall Chief Golf Course by King County avoided the proposed construction of 18 homes on the property. Based on the analysis of GHG emission reduction for the Transfer of Development Rights program, this would result in about 5,000 MTCO2e of GHG emissions reduction over 30 years. Conversion of the property to farm land will also increase local food production.

- **Measure 4:** Number of farms in the 100-year floodplain with raised agricultural structures and farm pads for protection of animals and equipment during flood events.
  - ★ **Target 4:** King County currently anticipates completing five or more projects per year to elevate agricultural structures or support the construction of farm pads.
  - ○ **Status**

    Between 2007 and 2013, King County elevated three agricultural structures and supported the construction of 26 farm pads in the Snoqualmie Valley. In 2014, King County supported the construction of four additional farm pads in the Snoqualmie Valley.

GHG Emissions Reduction: Construction of farm pads and elevation of farm structures helps ensure the long-term economic sustainability of an agricultural economy in King County. This has multiple climate benefits, including providing a source of local food production and helping to limit sprawl into rural areas, which helps reduce GHG emissions. However, the GHG benefit is hard to quantify.

County Operations

Goal: King County will manage and restore its parks and other natural lands in ways that maximize biological carbon storage and increase resilience to changing climate conditions.

CATEGORY	STRATEGIES
King County-owned forest, agriculture, and other conservation lands	**Strategy A:** Assess, maintain, enhance, and restore forests and soils on King County-owned lands, including developing and implementing Forest Stewardship Plans for forested sites.

- **Measure 1:** Percentage of forested sites larger than 200 acres managed by the Parks Division that have Forest Stewardship Plans.
  - ★ **Target 1:** 100 percent by 2025.
  - ○ **Status**

    The Parks Division has 33 forested sites that are at least 200 acres in size. Through 2014, 11 of these sites, representing 28 percent of the area, had developed and implemented Forest Stewardship Plans.

GHG Emissions Reduction: By 2020, King County will develop an approach for quantifying increased carbon sequestration associated with implementation of Forest Stewardship Plans, including estimating the amount of carbon sequestered.

➤ **Measure 2:** Number of native trees planted by King County and public and private partners.

★ **Target 2:** Plant one million native trees between 2015 and 2020 and develop a sustainable 30-year plan to maintain and enhance tree cover countywide that identifies specific approaches, including public and private partnerships, geographic focus areas, and number of trees.

○ **Status**

In 2013, King County, in part through the Parks Division's Volunteer Program, planted more than 67,000 trees and more than 118,000 shrubs. In 2014, King County staff and volunteers planted about 83,200 trees and 74,500 shrubs. Starting in 2015, King County will begin tracking the number of trees and shrubs planted by its partners.

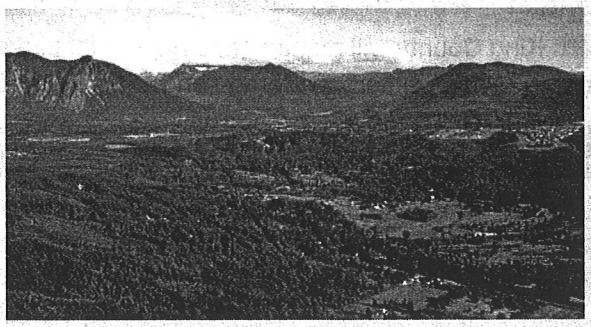
GHG Emissions Reduction: King County uses conservative assumptions on tree survival rates and tree carbon content when estimating the expected amount of carbon to be sequestered by tree-planting activities. King County estimates that trees planted in 2014 are likely to sequester about 231,000 MTCO2e during their lifetimes.

priorityactionsby2020

County Services

Protect Agriculture and Forest Lands

✔ **Protect open space.** Develop a plan to permanently conserve remaining high-priority but unprotected farm, forest, and other open space throughout King County within 30 years. Building on a history of protecting forest and farm lands, including permanent protection of more than 200,000 acres of forest land and 14,000 acres of farm land, King County will develop a 30-year plan to permanently preserve the remaining high-priority unprotected conservation lands throughout the county, including agriculture land, forestland, and other open space lands, such as land protected for habitat or land for regional trails. This land is currently unprotected and at risk of future development or conversion to other land uses, a risk that is expected to increase with future population growth. Protecting this land will have significant climate benefits, through carbon sequestration, focusing development and reducing sprawl, and helping to reduce local climate change impacts, such as flooding.



The 90,000 acre Snoqualmie Tree Farm near North Bend is an example of how King County has successfully permanently protected more than 200,000 acres to date of private forest land.

Sustainable Agriculture and Forestry Practices

✔ **ReTree King County.** As part of a new initiative called ReTree King County, King County and partners, such as city, state and federal agencies, Tribes, non-profit organizations, businesses, and the public, will collectively plant at least one million new native trees between 2015 and 2020 across King County in both

urban and rural areas. Restoration projects that plant native trees and shrubs on previously cleared, non-agricultural land have multiple benefits, including wildlife habitat, reduced stream temperatures due to increased shade, and increased carbon sequestration. To maximize these multiple benefits, plantings along river and stream corridors will be prioritized for the next five years. In order to facilitate collaboration on tree planting, by 2020, King County will work with multiple partners to develop a detailed 30-year plan for maximizing the percent of tree cover in both urban and rural King County while accommodating population and economic growth and meeting goals and needs for local agriculture and food production, wildfire prevention, and working forests. The plan will include methods to identify the number of trees needed, track progress, map locations for tree planting, monitor tree survival, achieve multiple benefits, and coordinate extensive public outreach and engagement on the initiative. The plan will also evaluate the appropriate type of trees to be planted, including consideration of impacts to pollen allergies.

King County will help plant one million new native trees throughout the county in the next five years with the help of partners and volunteers.

✔ **Streamline support for forests and agriculture.** King County will coordinate with federal, state and local agencies and university researchers to implement "one-stop shopping" for forestry and agricultural assistance and incentives to streamline and simplify technical assistance and regulatory processes. For agriculture, this will focus on assistance with production, marketing and business planning, which will make it easier for farmers to spend more time growing food rather than navigating the complex regulatory environment.

✔ **Expand the local food economy and address the food, energy, water nexus.** King County and its public and private partners will expand the local food economy by implementing the recommendations of Executive's Local Food Initiative Kitchen Cabinet.

These recommendations include agriculture support and incentives to increase the number of acres in food production by 4,000 acres by 2024, to increase the variety of crops grown in King County, to increase farm productivity, to expand the distribution system for locally-produced food, and

One way the Local Food Initiative is increasing access to healthy, sustainable, affordable food is by supporting markets such as the Burien Farmers Market.

to expand access to locally-produced food. In implementing practices that support sustainable agriculture, King County will consider and address the nexus between food, energy and water and how agricultural practices can minimize the use of fossil fuels and fossil based fertilizers that contribute to climate change.

- ✔ **Develop framework to provide greater certainty for irrigation while protecting instream flows for fish.** Water laws in Washington State, as with all western water law, are built on the concept of the allocation of water rights based on seniority of use. Many farmers irrigate their crops during summer months, and climate change is likely to result in increased irrigation needs due to warmer summers and increased incidence of droughts. However, some farmers have no or tenuous legal rights to the irrigation water they use. As irrigation needs increase, there is the potential that farmers may be prevented from irrigating if legal rights are not established. King County will support development of a framework in the Snoqualmie Valley to assist with the management of agriculture water rights and supplies and agricultural drainage.
- ✔ **Research the benefits of commercial compost on crops.** The Solid Waste Division is collaborating with Washington State University to demonstrate the benefits of commercial compost on crops in King County agricultural areas. Potential benefits include increased carbon sequestration in soils, increased water holding capacity, resistance to erosion, decreased use of synthetic fertilizers, and increased productivity. These benefits would contribute to increased agriculture resilience to the changing climate conditions predicted in King County. The project is working with six farms in King County over a three-year period, and is also conducting a cost-benefit analysis that will include farmers' ability to pay for compost and the composters' ability to sell compost.

ACCOUNTABLE AGENCIES

The Department of Natural Resources and Parks is the overall lead for this goal area. The Water and Land Resources Division is responsible for strategies focused on working with private forest and farm owners. This work is led by staff in the Forestry and Agriculture Programs. The Parks and Recreation Division leads efforts related to acquiring, managing and restoring County-owned parks, natural areas, and working forestlands. The Wastewater Treatment Division is responsible for producing Loop biosolids, and the Solid Waste Division supports the production of food waste and yard waste compost.

SECTION TWO:
Preparing for Climate Change Impacts

Flooding in the Snoqualmie Valley in January 2015.

KEY TAKEAWAYS

- Climate change impacts are here and now; in the last century, sea level in Seattle has risen by eight inches and average annual temperatures in the Pacific Northwest have increased 1.5 degrees Fahrenheit.
- While GHG emissions must be reduced to avoid the worst impacts of climate change, impacts are projected even if global and local GHG emissions are drastically cut.
- The County is integrating climate change preparedness into:
  - operations and maintenance of infrastructure, programs, and natural resources.
  - provision of public services.
  - partnerships with other local governments, community groups, and businesses.
- King County plays critical roles related to climate change preparedness, planning, and regional coordination, and this section of the 2015 SCAP outlines key commitments to:
  - Assess impacts of climate change on local rainfall patterns and flooding and integrate this information into a range of services.
  - Plan for climate change impacts on wastewater, stormwater, emergency management, public health, roads, flood risk reduction, and salmon recovery.
  - Improve regional coordination on climate change preparedness, including engaging partners and the public.

INTRODUCTION

Even if global and local GHG emissions decrease dramatically, many climate impacts are now inevitable and preparation for these changes is essential. King County has had a long-standing commitment to preparing for the impacts of climate change, from joint work with the University of Washington and ICLEI-Local Governments for Sustainability to develop Preparing for Climate Change: A Guidebook for Local, Regional and State Governments for local governments in 2007, to pioneering approaches to assess the impacts of sea level rise on wastewater conveyance and treatment facilities, to integrating climate resiliency recommendations into the County's Comprehensive Plan beginning in 2008. The 2015 SCAP strengthens and expands the County's climate preparedness commitments, focusing on assessing climate impacts and tailoring recommended actions to core County services, integrating an equity and social justice lens, and expanding regional coordination.

The remainder of **Section Two: Preparing for Climate Change Impacts** presents the following information:

- **Overview: Climate Change Impacts in King County**
- **Goals and Strategies**
- **Program-specific impacts, ongoing responses, priority actions and long term direction for twelve focus areas:**
  - Built Environment
    1. Wastewater Treatment and Conveyance
    2. Roads and Bridges in Unincorporated King County
    3. King County International Airport
    4. King County-Owned Buildings and Facilities
  - Planning and Regional Services
    5. Countywide and Regional Planning
    6. Public Health
    7. Stormwater
    8. Flood Risk Reduction and Floodplain Management
    9. Salmon Recovery and Other Rural Programs
    10. Public Transportation (including King County Metro Transit and Water Taxi)
    11. Environmental Science and Monitoring
    12. Emergency Management
- **Summary of Priority Actions by 2020**

OVERVIEW: CLIMATE CHANGE IMPACTS IN KING COUNTY

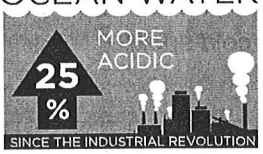
A wide range of climate change impacts are occurring or are projected to occur in King County; these are **similar to impacts across Washington State**. Because of the slow response of the climate system and the large increase in GHGs in the atmosphere since the start of the industrial revolution, these impacts are projected to occur to some degree regardless of future local and global efforts to reduce GHG emissions. Key climate impacts for King County are summarized below.

WHAT RELATED IMPACTS ARE HAPPENING IN OUR REGION?

CLIMATE CHANGE IS AFFECTING OUR ENVIRONMENT, ECONOMY AND HUMAN HEALTH.

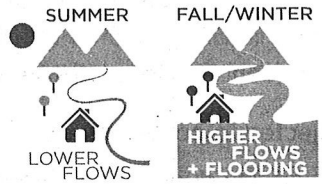
OCEANS

OCEAN WATER



PUGET SOUND

RIVERS



OVER **80%** OF STREAMS SURVEYED IN KING COUNTY EXCEEDED A SALMON-SAFE TEMPERATURE

FLOODING HAS CLOSED

MOUNTAINS

AVERAGE CASCADE SNOWPACK

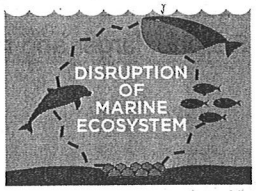
4-FOLD INCREASE IN WILDFIRES

6 TIMES THE FOREST AREA BURNED

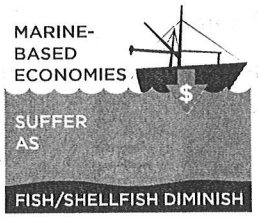
WHAT IS THE RISK FOR OUR REGION IN THE FUTURE?

IF WE DON'T ACT NOW, THE COSTS AND CONSEQUENCES WILL GROW.*

OCEANS

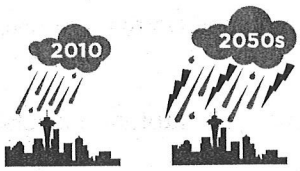


MARINE-BASED ECONOMIES



RIVERS & STORMS

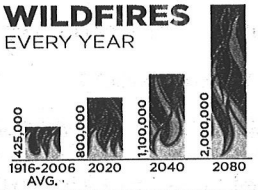
INCREASE IN SEVERE STORMS



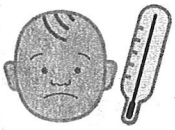
MOUNTAINS

AVERAGE WASHINGTON SNOWPACK

PNW ACRES BURNED BY **WILDFIRES** EVERY YEAR



OTHER IMPACTS ARE POSSIBLE.



INCREASE IN CHRONIC HEALTH PROBLEMS

IMPACTS IN FORESTS FROM INSECTS & DISEASE OUTBREAKS

INCREASE IN HOUSEHOLD COSTS

IMPACTS TO RECREATION AND QUALITY OF LIFE

IMPACTS TO SALMON AND WILDLIFE

* Over the coming decades, the severity of global and local climate change impacts is largely dependent on whether greenhouse gas emissions decline or continue to rise.

Warmer Air Temperatures

Average annual air temperatures across the Pacific Northwest are projected to increase by two degrees F to 8.5 degrees F by the 2050s, with a likely increase of 4.3 degrees F to 5.8 degrees F. This suggests that by mid-century, Washington State is likely to regularly experience average annual temperatures that exceed the warmest conditions observed in the 20th century. The range of potential temperature increases results from differences in future trends in GHG emissions and modeling uncertainties. Washington State is also expected to experience more frequent and more intense summer heat waves and less frequent and less intense winter cold spells.

These increased temperatures are projected to contribute to:

- Greater incidence of heat related mortality during more intense summer heat waves.
- More air pollution and health impacts during warm summer months.
- Higher summer energy use, especially from air conditioning.
- Warmer water temperatures in streams, rivers, lakes, and Puget Sound.
- Higher summer water demand with less accumulated snow pack, especially during more intense and longer summer droughts.
- Northward shift in vegetation patterns.
- Increased fire risk in forest lands and open space.
- More invasive species and loss of indigenous species.

Changing Rainfall Patterns

While the total annual amount of precipitation in the Puget Sound region is not projected to change, two key changes in precipitation patterns are likely. First, winter precipitation in the Cascade Mountains is projected to fall more frequently as rain instead of snow. Second, larger and more frequent storms are projected.

These changed rainfall patterns are projected to contribute to:

- A general shift to higher winter flows and lower summer flows in major rivers.
- Larger and more frequent river flooding, especially during winter months.
- Potentially increased flows in the combined portions of wastewater conveyance systems.
- More urban flooding.
- Increased landslide risk due to greater soil saturation levels.

Sea Level Rise and Ocean Acidification

In Seattle, the level of Puget Sound has risen about eight inches since 1900. In the Puget Sound region, additional sea level rise is expected of between six and 50 inches by 2100, depending on future global trends in GHG emissions and glacial melt rates. Ocean acidity is projected to increase by between 38 and 109 percent.

These changed conditions in Puget Sound are projected to contribute to:

- More coastal flooding on king tides and other high tides and during storm surges.
- Increased landslide risks along coastal bluffs.
- Changes to the Puget Sound food web, including potential impacts to both wild and commercially-grown shellfish.

Population Growth

King County has grown rapidly in recent years, with a net increase of 280,000 new residents between 2000 and 2014. Current projections by the Puget Sound Regional Council estimate King County's population increasing by an additional 444,000 by 2040 for a total expected population of 2.4 million people. This population growth is driven by migration to King County from across the United States and the world. Migration patterns are caused by a variety of factors, including economic opportunities, family, friends and support systems, and climate desirability, among others. It is possible that quality of life and economic vitality of some industries in the Puget Sound region could increase relative to elsewhere in the United States due to uneven climate impacts. For example, heat waves are likely to be less severe and water supply more stable in the Puget Sound region relative to some agricultural areas in the American Southwest. Varying impacts of climate change from one region to another may result in an increase in migration from other parts of the country or other parts of the world.

It is unknown to what degree, or even if, population growth rates will increase beyond official projections due to increased climate desirability relative to other areas. If King County's population growth rate increased substantially beyond what is planned for, government services could be strained, additional infrastructure could be needed, and the availability of affordable housing coiuld decrease.

Economic Impacts

Projected climate impacts in King County will likely bring economic impacts. A trend of decreasing snowpack and changing precipitation patterns create additional uncertainty for water supplies (impacts vary by supplier depending on their water source) and availability of water for irrigation of agriculture. Snow dependent industries like ski areas saw one of their worst years on record in 2015. Increasing stream temperatures put stress on migrating salmon that are relied upon by Treaty Tribes and commercial fishers. Nationally, more frequent and severe storms and flood disasters are leading businesses and insurers to take steps to mitigate risks, triggering changes in insurance costs and availability.

Disparate Impacts

Climate change is expected to have disproportionate impacts on some populations and can exacerbate pre-existing disparities in health, housing, or access to parks. For example, increased mortality from heat events is already being documented for the elderly, very young, and those with existing health conditions like diabetes and respiratory disease. Lower cost housing is in some cases concentrated in flood hazard risk areas that potentially will see more severe and frequent flooding. At the same time, lower income populations have the least resources to mitigate impacts like increased frequency of heat events and flooding, through actions like flood proofing, home insulation, air conditioning, or easily accessing a shady park or air conditioned community center. Language can also be a barrier to information on disaster preparedness. Fortunately, many of the climate solutions outlined in **Section One: Reducing Greenhouse Gas Emissions** can also serve as powerful opportunities to address broader inequities. For example, investments that better integrate transit and land use and expand commute options will increase access to work, education, and health care. Development and adoption of well-designed green building standards can make homes more comfortable during heat events, improve indoor air quality, and reduce utility and repair costs. Expanded open space protection and linking regional trails to transit expands access to healthy recreation options.

goals&strategies

County Services

Goal: King County will collaborate with local cities, residents, and other partners to prepare for the effects of climate change on the environment, human health, public safety, and the economy.

CATEGORY	STRATEGIES
Public Services and Education ▸▸	**Strategy A:** Integrate observed and projected climate change impacts, including severe weather, flooding, drought, fire, and landslides, into emergency management planning and programs.
	Strategy B: Develop funding strategies to strengthen programs for King County residents, including vulnerable sub-populations, to address public health issues associated with heat waves, large storms and flooding, vector-borne and infectious diseases, mental stress, and respiratory effects.
	Strategy C: Evaluate climate change impacts on King County's natural resources, such as forests, fisheries, productive farmland, water resources, and assess and improve the efficacy of King County's programs to protect these resources.
	Strategy D: Apply the Equity Impact Review process to help prioritize investments in making infrastructure, natural resources, and communities more resilient to the impacts of climate change.
Coordination with Partners ▸▸	**Strategy A:** Collaborate with the scientific community, state and federal agencies, and other jurisdictions to develop detailed, science-based estimates of the magnitude and timing of climate change impacts on air temperatures and heat waves, rainfall patterns and severe weather, river flooding, sea level rise, fish and wildlife, and ocean acidification in King County.
	Strategy B: Share information on climate change impacts and collaborate on approaches to improving resiliency of infrastructure, disaster preparedness, and public engagement with local cities and other partners to make the best use of limited resources and more effectively engage King County residents.
	Strategy C: Building on work by the Water and Land Resources Division to implement a high-precision pH monitoring program in Puget Sound, King County will collaborate with the Puget Sound Partnership (PSP) and other state and federal agencies to identify how King County can most effectively work to reduce the harmful effects of ocean acidification. This includes working to address potential impacts to both wild and commercially grown shellfish, as reflected in the PSP's "Shellfish" Strategic Initiative.

County Operations

Goal: King County will plan and prepare for the likely impacts of climate change on County-owned facilities, infrastructure, and natural resources.

CATEGORY	STRATEGIES
County Infrastructure and Operations ▸▸	**Strategy A:** Implement infrastructure operation and maintenance programs that consider full life-cycle costs and climate change impacts in asset management.
	Strategy B: Integrate estimates of the magnitude and timing of climate change impacts into capital project planning, siting, design, and construction.
	Strategy C: Train and educate staff to develop skills and expertise in preparing for climate change impacts.

PROGRAM-SPECIFIC OVERVIEW: IMPACTS, ONGOING RESPONSES, AND PRIORITY ACTIONS AND LONG-TERM DIRECTION

Introduction

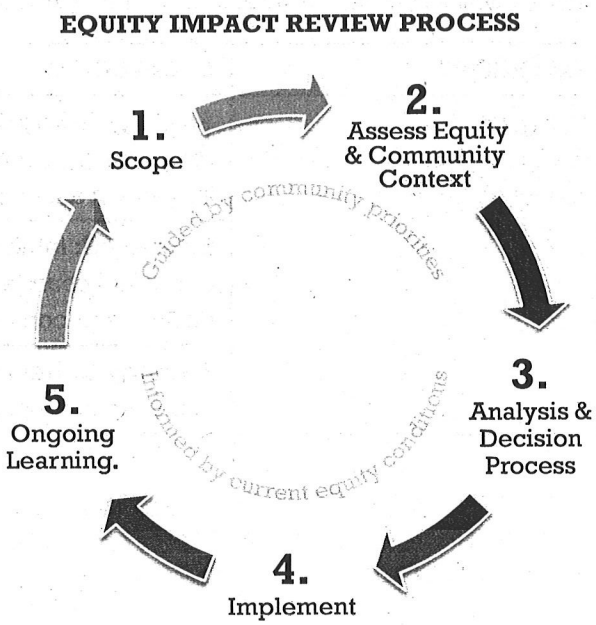
Climate change will have a range of impacts on County services and facilities and must be woven into long-range planning, capital project planning and design, emergency response, and other services. Rather than establishing a stand-alone climate preparedness program, King County is integrating assessment and consideration of climate impacts throughout its operations.

The following section outlines likely climate change impacts, ongoing responses, and priority actions and long-term direction for twelve focus areas.

- Built Environment
  1. Wastewater Treatment and Conveyance
  2. Roads and Bridges in Unincorporated King County
  3. King County International Airport
  4. King County-Owned Buildings and Facilities
- Planning and Regional Services
  5. Countywide and Regional Planning
  6. Public Health
  7. Stormwater
  8. Flood Risk Reduction and Floodplain Management
  9. Salmon Recovery and Other Rural Programs
  10. Public Transportation (including King County Metro Transit and Water Taxi)
  11. Environmental Science and Monitoring
  12. Emergency Management

As noted earlier in this section, it is anticipated that climate change will have disproportionate impacts on some communities, including low income populations and those with existing health issues. King County's Equity and Social Justice Ordinance requires the use of the Equity Impact Review process in the development of major program and project proposals. As County departments and divisions embed climate change impact considerations throughout their services and capital projects, their decision-making will be shaped by the equity frameworks outlined in the Equity Impact Review tool:

- **Process Equity:** Inclusive, open, and fair access by all stakeholders to decision processes that impact sustainable community outcomes.
- **Distributional Equity:** Fair and just distribution of benefits and burdens to all residents across the community landscape, with little imbalance based on geography, gender, race/ethnicity, or income levels of households.
- **Cross-generational Equity:** Effects of today's actions on the fair distribution of benefits and burdens to future generations and communities.



King County's Equity Impact Review process will help guide agencies' decision-making on climate change.

Built Environment

1. Wastewater Treatment and Conveyance

King County operates the regional wastewater collection and treatment system for the greater Seattle metropolitan area, serving as a wholesaler to local sewer districts, and also provides treatment for portions of Vashon Island and the City of Carnation. Wastewater districts outside of King County's service area in southwest and south King County provide their own treatment.

Impacts

Climate change impacts could affect the wastewater treatment system in five primary ways:

- Sea level rise could result in greater and more frequent flooding for shoreline facilities.
- Sea level rise could increase salt water intrusion into the conveyance system in low-lying areas.
- Increased river flooding could result in greater and more frequent flooding for facilities in floodplains.
- More frequent and larger storms could increase flows in the wastewater conveyance system, especially in the combined system within the City of Seattle.
- Warmer summer temperatures and increased probabilities of droughts could increase demand for reclaimed water.

Ongoing Response

The Wastewater Treatment Division maintains a robust asset management program for its wastewater conveyance and treatment system. The Regional Wastewater Services Plan prioritizes

investments to maintain the integrity of the system and protect public health. The division has begun preparing for the changing climate in several ways:

- In 2008, the Wastewater Treatment Division completed an analysis of facilities along the Puget Sound shoreline and has since incorporated sea level rise into facility siting and design.
- The Wastewater Treatment Division and Seattle Public Utilities are investigating the potential increase of saltwater intrusion into the conveyance system and have begun modifying the conveyance system and outfalls to reduce or eliminate intrusions, even during high tides. Preparations for limiting saltwater intrusion may include installing flap gates, raising weirs, or other similar controls.
- The Wastewater Treatment Division has reviewed all of its facilities within the Federal Emergency Management Agency's (FEMA) 100-year floodplains and is identifying steps to ensure all facilities are protected from current flood risks. This work will be updated when information on climate change impacts on floodplains is available.
- The Wastewater Treatment Division has developed a reclaimed water program from Brightwater to the Sammamish River valley and near the South and Carnation Treatment Plants. Major infrastructure for delivering reclaimed water to the valley has been constructed and reclaimed water use has begun. Not only can reclaimed water reduce Puget Sound discharges, it can replace irrigation water withdrawals from the Sammamish River valley during low-flow summer months.

Priority Actions and Long-Term Direction

In 2015, the Wastewater Treatment Division is beginning an investigation, in cooperation with the Water and Land Resources Division and the University of Washington, into the likely degree and timing of change in precipitation patterns in King County. The Wastewater Treatment Division will use this research to assess climate change impacts on the conveyance and treatment system and develop appropriate responses.

The Wastewater Treatment Division will expand its reclaimed water program in the Sammamish River valley and near the South and West Treatment Plants to reduce reliance on Puget Sound for the discharge of treated effluent. Nonpotable, reclaimed water can be used for agricultural irrigation and groundwater recharge, which in the Sammamish River valley would likely reduce the amount of locally-sourced water used for irrigation. This would help improve summer stream flows and water temperatures in the Sammamish River.

2. Roads and Bridges in Unincorporated King County

The King County Road Services Division manages all roads, bridges, and related infrastructure in unincorporated King County and also provides services to some cities by contract. The division manages 1,500 miles of County roads and 180 bridges that carry more than 1 million trips per day. The 250,000 residents of unincorporated areas receive roadway, drainage, shoulder, and right of way maintenance and operations services directly from King County. These systems are aged and deteriorating. The current capital improvement program has shrunk significantly and now funds only a very small portion of needed maintenance and preservation of the road system.

The Road Services Division is focusing on immediate operational safety issues and compliance with regulatory and legal mandates.

Impacts

Climate change is likely to have several substantial effects on roads and bridges in unincorporated King County:

- More frequent and larger rain events and more intense storms may increase urban and river flooding, which may:
  - Increase travel delays and road closures.
  - Increase risk of landslides, roadway washouts and erosion and scouring around bridge supports.
  - Overwhelm the drainage networks (culverts, pipes and open ditches) along roads, causing more local flooding issues.
  - Overtop and block roads and bridges in river floodplains.
- Sea level rise will cause more coastal flooding on king tides, high tides, and during storm surges, including along three road segments on Vashon Island. These roads are the only coastal County roads in the unincorporated area. Currently, they flood at least once per year and will likely flood more often in the future.
- More high wind events would require:
  - Increased emergency response to downed power lines and trees on roads and bridges.
  - More coordination with utility companies for downed utilities and trees in wires.
  - Additional maintenance response to protect the safety of the traveling public.
- Higher temperatures with more heat waves may increase rutting and concrete cracking in roadway pavement, requiring increased maintenance, changes to roadway construction materials and methods, and reduced durability of asphalt.

Ongoing Response

A structural funding problem constrains the ability of the Road Services Division to maintain road infrastructure. Within budget constraints, the division aims to maintain and repair roads, bridges, and ancillary infrastructure and to respond to events in a timely manner.

Maintaining Transportation Infrastructure. The Road Services Division maintains roads, bridges, culverts and other related infrastructure in unincorporated King County.

Assessing Infrastructure Condition. The Road Services Division has started assessing the County's transportation infrastructure conditions, as part of a comprehensive asset and maintenance management program. This program utilizes Geographic Information Systems (GIS) tools and supports a data-driven asset management approach, employing new information technology to analyze asset conditions and make data-driven decisions about service and investment priorities. The asset categories include roadways, bridges, and drainage (catch basins, pipes and open ditches), as well as traffic control devices and roadside

Dockton Road SW, located on Vashon Island in unincorporated King County, is protected by a 100-year old seawall that is vulnerable to storm surges and sea level rise.

features, such as guardrail and sidewalks. In addition, as required by the WAC 136-20-060, the Road Services Division produces the "Annual Bridge Report," which provides the findings of bridge inspections. Both of these assessments will help support efforts to adapt to the prospect of long-term changes in climate.

Emergency Response to Large Storms, Windstorms, and Floods. The Road Services Division responds to large rain events, windstorms and floods by closing roads as needed, cleaning debris after the event, and coordinating with utility companies to address downed utility lines or trees in lines. Design modifications to respond to larger storms are needed.

Emergency Repairs Due to Flooding. Emergency repairs are typically needed annually on three coastal road segments on Vashon Island due to coastal flooding. No funding is currently available to move these coastal roads to higher elevations. Emergency repairs are conducted on roads and bridges damaged by river flooding, except when the damage is beyond budgetary capacity. Funding for redesigning and replacing roads and bridges to avoid river floods or reduce flood risk is not currently available.

Priority Actions and Long-Term Direction

With current funding levels, the Road Services Division will focus on immediate operational safety and emergency response needs. The Road Services Division will incorporate information about changes in future flooding, storm sizes and frequencies, and landslide risks into roads maintenance and preservation programs and projects for unincorporated King County to the extent feasible under available funding and/or as required by permitting agencies. King County will continue to evaluate and seek out options for additional funding to operate and maintain the road system. Such additional funds could help the Road Services Division be able to respond to weather impacts and storm events, to the extent that such response is consistent with strategic priorities of life safety and regulatory requirements.

3. King County International Airport

King County owns and operations the King County International Airport/Boeing Field (KCIA), which is located in the Duwamish River floodplain near sea level.

Impacts

Climate change is likely to have two key effects on the King County International Airport (KCIA):

- More frequent and larger rain events may exceed the drainage network at the KCIA, causing more standing water issues. This would require additional emergency response during rain events and additional debris clean up post-event.
- The KCIA is in the Duwamish Estuary floodplain and protected by a levee network. Sea level rise projections suggest that levees along the Lower Duwamish Waterway could be overtopped during king tides, high tides, and storm surges by the end of the century, which would inundate low-lying land along the Duwamish Waterway, including a portion of the KCIA.

King County International Airport

Ongoing Response

KCIA has taken steps to mitigate drainage issues associated with large storm events and address flood related issues, including rising sea levels and large river floods. These steps include:

Backup power supply for stormwater pumps. Large electric pumps are installed at two of the three stormwater outlets from the KCIA to the Duwamish River. KCIA's two diesel-powered electric backup generators can power the stormwater pumps should the KCIA lose power during a storm. The backup generators were purchased as part of the response to the increased flood risk associated with the Howard Hanson Dam structural integrity issues. At the third outfall, a diesel-powered backup pump would be rented should that system's gravity system be overwhelmed. These pumps are capable of pumping more than the expected amount of stormwater runoff at the airport and can pump regardless of tidal/river flood stage.

Stormwater outfall flap gates and backflow preventers. KCIA has several methods for preventing high tides or river flows from causing flooding upstream of the pump stations. The two stormwater outfalls with pump stations have backflow preventers in their outlet flumes. The KCIA is considering additional backflow preventers for each location to prevent the Duwamish River from backing up all of the way to the pump stations. The third outfall has a flap gate at the Duwamish River. The flap gate and backflow preventers work in conjunction with the levee system to ensure that the KCIA is protected from flows and tides several feet higher than the current high tide and 100-year flood event.

Enhanced drainage along runways. Edge drains were installed along runways to ensure proper drainage during large storm events. This enhanced drainage improves airport safety by ensuring that soils along the runways are not saturated and thus are safe for airplanes, in case an airplane veers off the tarmac. Edge drains were installed using Federal Aviation Administration grant funding.

Priority Actions and Long-Term Direction

The KCIA is completing a comprehensive inventory, digital survey, and evaluation of the airport stormwater system. It is a closed system and where repairs, improvements, and additions are identified, they will be completed as part of the Capital Improvement Program for the airfield. Long-term concerns about sea level rise and increased flood sizes will be addressed over the next several decades as the Lower Duwamish Waterway levee network is maintained.

4. King County-Owned Buildings and Facilities

King County owns and manages buildings and other infrastructure throughout the county to house government operations.

Impacts

Larger and more frequent storms are likely to cause more stormwater runoff from all County-owned properties and buildings, which may overwhelm the stormwater management system. Buildings in floodplains and along the coast will have a higher risk of flooding. All buildings may also have increased cooling needs during summer heat events.

Ongoing Response

King County's buildings all meet or exceed all required state and federal stormwater and flood protection requirements.

Priority Actions and Long-Term Direction

Long-term concerns about managing increased stormwater runoff from rain events will be addressed in future updates of the Surface Water Design Manual. Long-term concerns about increasing flood sizes and frequencies will be reassessed following research on climate change impacts on flooding.

Planning and Regional Services

5. Countywide and Regional Planning

King County complies with all requirements of the GMA, which includes adoption and periodic updates of the King County Comprehensive Plan and Countywide Planning Policies and participation in development and maintenance of Multicounty Planning Policies. The GMA contains the primary state-level mandates to identify and protect critical areas, with special consideration given to areas that support salmonids, and to identify and protect resource lands of long-term significance. King County uses Washington State Office of Financial Management and Puget Sound Regional Council (PSRC) growth projections for planning purposes.

Impacts

A core focus of GMA and the County's Comprehensive Plan is ensuring that designated urban growth areas and planned infrastructure improvements are adequate for anticipated population growth. According to current estimates, the population of the central Puget Sound region is projected to increase from about 3.69 million people in 2010 to nearly five million people in 2040. However, some areas of the United States are projected to face substantial drought and heat impacts from the changing climate, which could shift migration patterns towards areas less impacted by climate change, such as the Puget Sound region. Current growth projections used by PSRC do not account for increased migration due to climate disruption. Increased population growth beyond what is planned would strain services and infrastructure and could result in political pressure to expand the urban growth boundary.

Ongoing Response

King County conducts major updates to its Comprehensive Plan on a four-year cycle. Beginning with the major update in 2008, the County added policy and program recommendations for climate change mitigation and preparedness. King County is currently developing the 2016 update and will review and update climate change-related information and policy recommendations in the Comprehensive Plan. King County also engages continually in countywide and multicounty planning at the Growth Management Planning Council and Puget Sound Regional Council.

Priority Actions and Long-Term Direction

King County will coordinate with Washington state agencies, PSRC, GMPC, other jurisdictions, and university researchers to evaluate potential population growth increases beyond current projections due to migration from climate disruption. King County may contribute funding to a shared research effort on this topic. Information on the likelihood, magnitude, and timing of potential increases in population growth rates will be used by the Wastewater Treatment and Transit Divisions in future updates to their respective service plans.

6. Public Health

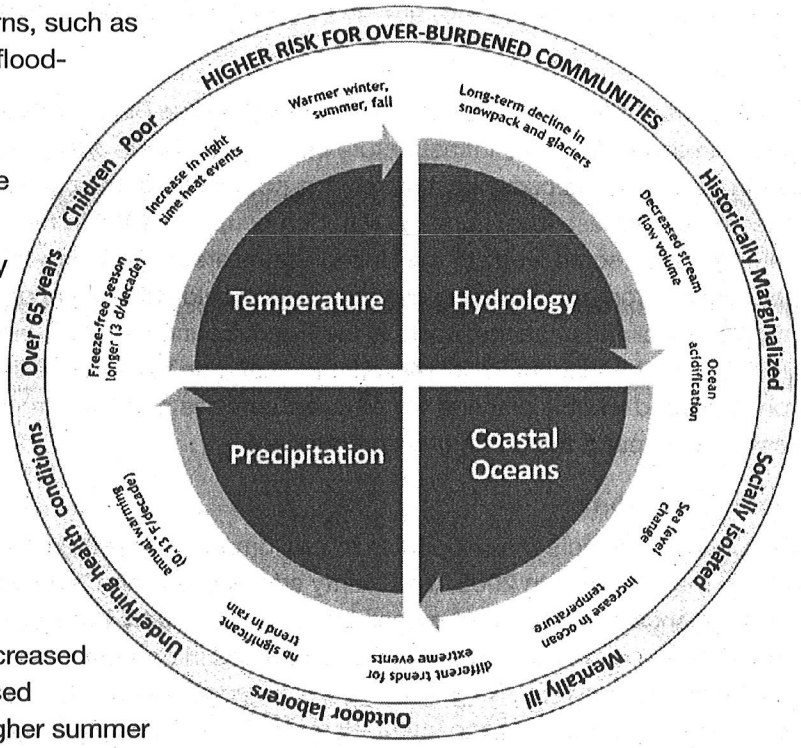
Public Health – Seattle and King County (Public Health) provides a wide range of services to protect and improve the health and well-being of all people in King County. Public Health protects the public from health threats, promotes better health, and helps ensure accessible, quality health

care for the public. Health promotion includes leading efforts to encourage healthy living and prevent chronic conditions and injuries. Health protection functions include tracking and preventing disease and other threats, preparing for and responding to emergencies that impact health, and ensuring the safety of food, water, and air.

Impacts

Although in general, the health impacts are under-studied and widely diverse, climate change is expected to affect both physical and mental health of people in King County. Some populations are more vulnerable to impacts on their health from a changing climate, such as children, people over age 65, economically disadvantaged individuals, socially isolated individuals, and people with existing mental or health conditions. Climate change impacts such as extreme weather events, flooding, sea-level rise, and increased temperatures may lead to significant health impacts, which can include:

- Heat-related illness, such as heat stroke and other cardiorespiratory illness.
- Flooding damage to potable water and wastewater systems and disease concerns, such as bacterial growth or mold, in flood-impacted structures.
- Wildfire impacts, such as respiratory illness and smoke inhalation or burn injuries.
- Disruption to the food supply affecting local agriculture and seafood harvests.
- An increase in the number and range of vector-borne diseases, such as Lyme disease and West Nile virus, and water-borne diseases, such as E. Coli and Vibrio parahaemolyticus.
- Respiratory impacts from increased urban air pollution or increased allergens associated with higher summer temperatures.



Health impacts of a changing climate will be experienced differently by King County residents, influenced by factors such as income, age, health, and where they live.

Ongoing Response

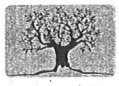
Public Health responds regularly to severe weather events including winter storms, drought, and high heat, leveraging departmental expertise and programs such as Environmental Health, Emergency Medical Services, Communicable Disease Epidemiology, Public Health Preparedness, and Communications. Future and ongoing response to increased severe weather events and other impacts identified above are constrained because of a structural funding problem across the department. Community partnerships are critical in response efforts, and Public Health actively partners with local emergency management, healthcare, and community and faith-based organizations. Monitoring the situation, developing and disseminating life-saving information, and conducting outreach are key focus areas during severe weather events.

Public Health responds to severe weather through the following activities:

- Activates the Health and Medical Area Command (incident command structure) to coordinate "Emergency Support Function 8" response activities.
- Monitors disease surveillance data and requests hospitals and healthcare providers report cases of carbon monoxide poisoning during times of widespread power outages.
- Monitors King County Medic One response calls for reports of illness or medical issues, such as heat-stroke and carbon monoxide poisoning.
- Coordinates messaging with governmental and healthcare partners through public information officers and joint information centers.
- Partners with the Northwest Healthcare Response Network to monitor impacts to hospitals, health systems and long-term care facilities, assuring that service capacity is maintained and systems are operational.
- In partnership with the Office of Emergency Management, activates the Winter Weather Transportation plan to provide transportation for individuals needing life-saving treatment for acute or chronic health conditions that require regular intervention (such as chemotherapy or dialysis) and have already explored all other options.
- Activates the Community Communication Network to provide outreach and education to communities at risk for carbon monoxide poisoning due to power outages and cold temperatures, heat safety messages for those vulnerable due to medications, age, and environment, as well as other life-safety messages.
- The Vulnerable Populations Action Team's (VPAT) Community Communication Network (CCN) is a way to exchange information with community and faith-based organizations and community leaders to ensure essential emergency and emergency health-related information reaches vulnerable residents of King County.3 There are currently over 400 agencies are enrolled in the CCN totaling over 700 individuals.
- Leverages community partnerships developed by VPAT to help service providers get prepared, stay prepared, and be ready to respond to their clients' needs during times of disaster. Systems and tools developed for emergency-related events can be leveraged to help agencies be better prepared to withstand impacts caused by climate change.
- Conducts outreach to communities that may be disproportionally impacted by disasters through partnerships developed through VPAT including the Somali Health Board, Homeless Stakeholder Group, and Vietnamese Community Communication Project.

Vulnerabilities before, during, and after emergencies are rooted in structural and systemic barriers; crisis exacerbates the damaging effects of these factors. Those that need the most help, the most vulnerable, are often the ones who fall through gaps in access to information, services, and resources.

Priority Actions and Long-Term Direction



Public Health is operating in an austere budget environment. The current projected deficit in the Public Health fund presents a challenge in taking on new work as Public Health has substantially lower staffing levels and lower levels of service than in the past. For example, the budget for preparedness work is comprised

3 The Vulnerable Populations Steering Committee defines a vulnerable population as: "Any individual, group, or community whose circumstances present barriers to obtaining or understanding information, and/or to access and use the resources offered before, during and after a disaster event. Circumstances that may present barriers include, but are not limited to age; physical, mental, emotional, or cognitive status; culture; ethnicity; religion; language; citizenship; location; or socioeconomic status."

entirely of federal grants, which are limited in scope and have been cut in recent years. In addition, the Environmental Health section is funded primarily by fees, which are restricted for program activities that generate those fees. Without additional funds, Public Health will capitalize on existing outreach efforts to conduct stakeholder engagement to inform the climate change work going forward and will seek to identify additional funding to support implementation of the identified actions.

By 2020, Public Health will:

- Develop and implement a stakeholder engagement strategy to gauge perceptions of climate impacts on human health and to inform policy changes to prepare for climate change. First, Public Health will partner with the Office of Emergency Management to implement a survey of local emergency managers. Other potential stakeholders include Public Health employees and community partner organizations.
- Use engagement and survey results to develop strategy and potential policy changes to address and prepare for climate change.
- Develop a funding strategy for a comprehensive public health and climate change program to include:
  - Implementing a data surveillance system to monitor and report human effects of climate change, particularly for vulnerable populations.
  - Conducting community and stakeholder engagement, education, and outreach, with an emphasis on historically marginalized and overburdened communities.
  - Establishing systems to detect and respond to current and emerging health threats.
  - Preventing and adapting to current and anticipated human health impacts.
- Secure the assistance of an intern or practicum student to help identify key components, develop a program framework, and pursue a strategy to secure funding required for implementation.

7. Stormwater

King County and the local cities have stormwater management programs with several functions, including ensuring new stormwater facilities have adequate flow control and water quality treatment, operating and maintaining stormwater facilities, and responding to emergencies to maintain stormwater facilities and limit urban flooding.

Impacts

Stormwater conveyance and treatment systems in unincorporated King County have been designed to accommodate runoff generated by historical rainfall patterns. As climate change is projected to shift rainfall patterns to more frequent and larger storms, it is possible that some of the stormwater systems may be undersized for future conditions, which would result in more urban flooding and increased emergency response and maintenance needs before and after storms.

Ongoing Response

The Water and Land Resources Division is in the process of developing a comprehensive asset management plan for its stormwater conveyance and treatment assets. King County maintains a stormwater design manual and meets all requirements of its municipal stormwater permit issued by the Washington State Department of Ecology under the National Pollutant Discharge Elimination System for stormwater management in unincorporated King County. The manual is also used by

multiple cities within King County. The Water and Land Resources Division reviews development plans and designs to ensure stormwater infrastructure built in unincorporated King County meets flow control and water quality treatment requirements. The Water and Land Resources Division is also designing and constructing additional facilities in the Evans Creek basin and the May Creek basin to address stormwater management issues and has submitted a grant proposal to the Washington State Department of Ecology to assess climate change impacts on stormwater facility design.

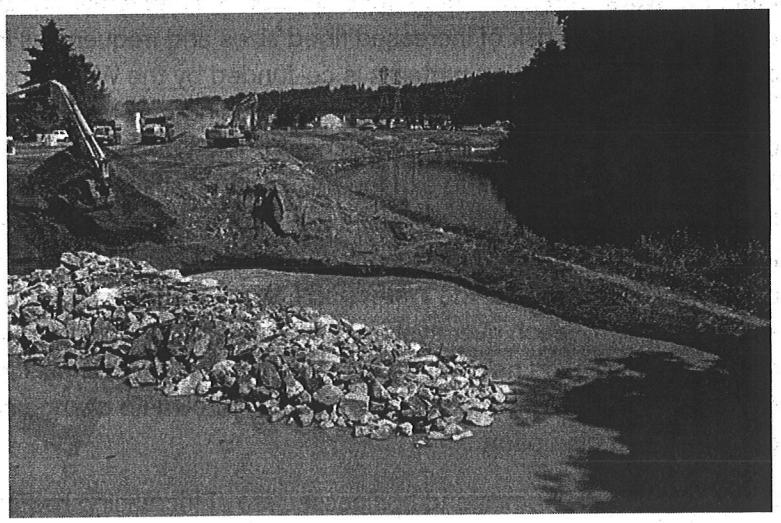
Proper design, asset management, construction and maintenance of stormwater infrastructure preserves water quality and limits harmful stormflows; this provides the resiliency of the system as storm patterns change.

Priority Actions and Long-Term Direction

The Water and Land Resources Division has been selected to receive grant funding from the Washington State Department of Ecology to assess the impacts of climate change on precipitation patterns and stormwater infrastructure sizing requirements. This project is being co-funded by the Wastewater Treatment Division and will be conducted by researchers at the University of Washington. Pending the final funding availability in Washington State's next biennial budget, the project will develop recommendations for updating King County's Surface Water Design Manual to account for climate change impacts on precipitation patterns. The findings will be incorporated into the design manual's 2019 update, which would then be used by developers and County agencies when building new stormwater infrastructure and for maintaining, replacing or upgrading existing stormwater infrastructure. Following this effort, future evaluations may focus on assessing the impacts of changing precipitation patterns on operations and maintenance costs and on emergency response costs.

8. Flood Risk Reduction and Floodplain Management

The Water and Land Resources Division implements flood risk reduction activities under contract from the King County Flood Control District, which was established by the King County Council in 2007 to protect public health and safety, regional economic centers, public and private properties, and transportation corridors. The Flood Control District, under direction from the King County Flood District Board of Supervisors, is addressing the backlog of maintenance and repairs to levees and revetments, acquiring repetitive loss properties and other at-risk floodplain properties, and improving countywide flood warning and flood prediction capacity.



The creation of the Flood Control District has resulted in a substantial increase in local funding for flood risk reduction activities, with 2015 tax revenues of $52.8 million. Pictured here is the Reddington Levee setback project along the Green River in the City of Auburn.

Impacts

Researchers at the University of Washington and elsewhere have completed multiple studies that project increased size and frequency of river flooding throughout the Pacific Northwest due to climate change, although river-specific estimates have not yet been determined for King County watersheds. In addition, climate change-driven sea level rise is likely to cause more frequent and larger coastal flooding during king tides and storm surges. Flood risk reduction is also likely to be affected by the increased landslide risk on steep slopes along river valleys. Finally, as flood size and frequency increases, emergency response activities would increase accordingly.

Ongoing Response

The Flood Control District is addressing a backlog of maintenance and repairs to levees and revetments, acquiring frequently-flooded properties in river floodplains and other at-risk river floodplain properties, assisting with risk reduction activities on properties at risk of river flooding, and improving countywide flood warning and flood prediction capacity. Overarching countywide strategies and objectives include:

- Improving levee protection through major commercial, industrial and residential areas.
- Improving flood water conveyance and capacity.
- Reducing risk by removing or elevating flood- and erosion- prone residential structures, elevating farm structures, and assisting with the construction of farm pads.
- Coordinating, communicating, and implementing responses to flood emergencies with other agencies, jurisdictions, and the public.
- Providing safe access to homes and businesses by protecting key transportation routes.
- Minimizing creation of new risks to public safety from development pressure.

Priority Actions and Long-Term Direction

In addition to ongoing work to reduce flood risk in King County, three key new work items will be completed to address the potential impacts of climate change.

First, the Water and Land Resources Division will use research results on changing local rainfall patterns to assess risk of increased flood sizes and frequencies in King County rivers. The study on changing precipitation patterns is co-funded by the Water and Land Resources and Wastewater Treatment Divisions and a grant from the Washington State Department of Ecology and will be conducted by the University of Washington. The Water and Land Resources Division will seek funding in 2016 and 2017 to expand this study to assess impacts on flooding size and frequency. If funding is secured, projections of impacts on flood sizes and frequencies in King County will be incorporated into future updates to King County's **Flood Hazard Management Plan**. Until this assessment is complete, the Water and Land Resources Division will complete the development of corridor plans for each river system. If warranted, the corridor plans will incorporate a higher level of protection to flood risk reduction projects to account for existing uncertainties and community risk reduction interests, including uncertainty of climate change impacts on flood size, frequency, damages, and disruption.

Second, shoreline homes and businesses are at increasing risk of coastal flooding and erosion during king tides and/or storm surges due to sea level rise. During the process to update FEMA's 100-year floodplain maps for the coast, King County previously mapped changes in coastal flooding due to a two-foot sea level rise. Beyond requiring a three foot elevation above the 100-year flood level for new construction and major remodels in unincorporated King County, which also

applies to coastal floodplains, King County does not currently have a comprehensive strategy for reducing future flood risks to Puget Sound shoreline homes and businesses under its jurisdiction in the unincorporated area of Vashon-Maury Island. The cities of Shoreline, Seattle, Burien, Normandy Park, Des Moines, and Federal Way also face potential impacts from sea-level rise.

The first step for developing an approach to address coastal flooding risks would be to conduct an analysis of the magnitude and economic impacts of the current risks, and the timing and magnitude of the increase over time. This analysis would build on a previous effort to map changes in coastal flooding due to sea level rise. Potential approaches for addressing risks might include improved sea-walls, structure elevation, structure purchase and demolition, incentive programs, new permitting requirements, and enhanced insurance requirements. King County will seek funding to develop a comprehensive approach to reduce risks to Puget Sound shoreline homes and businesses at increasing risk of flooding and coastal erosion due to sea level rise.

Third, the Water and Land Resources Division, with funding from the Flood Control District, and Department of Permitting and Environmental Review are updating landslide hazard analyses and mapping along major river corridors and on Vashon Island. Larger and more frequent storm events, which are projected to occur under climate change conditions, increase the risks of landslides due to increased soil saturation. The landslide hazard mapping along river corridors and on Vashon Island is scheduled to be completed in 2016. The Water and Land Resources Division will seek funding to update the landslide hazard analysis and mapping for the rest of King County by 2020.

Following completion of the three new actions, several long-term climate change preparation activities are recommended related to flood risk reduction:

- Depending on the magnitude of the projected timing and changes of flood size and frequency, further assessment of climate change impacts on the depth and extent of flood inundation, or on the increased economic impacts, could be warranted. It is possible that future development of FEMA 100-year floodplain maps may allow for incorporation of climate change impacts on flood size and frequency.
- Funding will be sought to implement the comprehensive strategy for reducing future coastal flood risks to shoreline residents and businesses.
- Following the updates to the landslide risk mapping along river corridors, policies related to reducing landslide risks may be reviewed and updated.

9. Salmon Recovery

Puget Sound Chinook salmon and bull trout were listed as threatened under the Endangered Species Act in 1999, and steelhead were listed as threatened in 2007. The Water and Land Resources Division maintains interlocal agreements with 39 cities to provide watershed planning and habitat protection and restoration services in support of the salmon recovery plans. The interlocal agreements are scheduled to be renewed for the 2016-2025 time period.

Lake Sammamish native kokanee salmon population is declining precipitously. The kokanee spend their entire lifecycle in freshwater, migrating to Lake Sammamish as inch-long fry and spending three to four years in Lake Sammamish before spawning in their natal streams. Since 2007, King County has worked with other local jurisdictions, state and federal agencies, tribes, community groups, and kokanee advocates in the watershed as part of the Lake Sammamish Kokanee Work Group to reverse the decline.

Impacts

Salmon populations and salmon habitat are likely to be impacted by climate change in several ways:

- Increased water temperatures will stress salmon populations, affecting stream-rearing juveniles, adult salmon returning to spawn in the fall, and kokanee salmon in Lake Sammamish.
- Changes in peak flows from spring to winter may result in shifts in migration patterns or food availability for young fish.
- Increased flood frequency and severity may result in increased scouring of river bottoms, which can destroy salmon redds (nests).
- Decreased spring and summer flows in major rivers may limit habitat available for spawning and rearing.

Ongoing Response

King County is implementing salmon recovery plans in the King County portion of Water Resources Inventory Areas (WRIAs) 7, 8, 9, and 10. These 50-year plans and the associated interlocal agreement for coordination and funding are scheduled for updating in 2015. The goal of the salmon recovery plans is to improve salmon habitat for long-term population resiliency. To achieve these goals, the plans focus on habitat restoration projects to restore watershed processes and habitat that support Chinook salmon and other salmonids in each WRIA. This goal applies under climate change conditions.

An analysis by the University of Washington and the National Oceanic and Atmospheric Administration of climate change impacts on salmon recovery efforts indicated that the Salmon Recovery Plan would need to increase its level of effort to outpace the impacts of climate change and achieve positive net gains in habitat.

Priority Actions and Long-Term Direction

Two new actions to adapt the salmon recovery programs to climate change impacts will be completed within the next five years.

First, King County will expand its efforts to maintain minimum flows in rivers during summer months. This will include working with water purveyors and the U.S. Army Corps of Engineers to ensure dam operations allow for minimum flow targets to be met or exceeded in low-snowpack years. The County will also work with water purveyors and farmers to expand water conservation efforts and minimize withdrawals from already overtaxed watersheds. These activities might include tightening plumbing and landscape code conservation requirements, enhancing programs to reduce urban outdoor water use, and expanding the use of reclaimed water.

Second, King County will seek grant funding to assess climate change impacts on salmon recovery plans and to update the plans for climate resiliency. The salmon recovery plans currently focus on projects to protect habitat and restore habitat-forming processes, increase populations, and enhance long-term resiliency. However, these plans have not yet been analyzed in detail for future performance under climate change conditions. High priority salmon recovery actions, such as reconnecting floodplains, protecting forest cover, and restoring riparian areas, will also help offset projected climate change impacts. Nevertheless, further review of the plans to ensure resiliency

under climate change conditions is critical to long-term survival of Chinook salmon and other salmon in King County.

10. Public Transportation (including King County Metro Transit and Water Taxi)

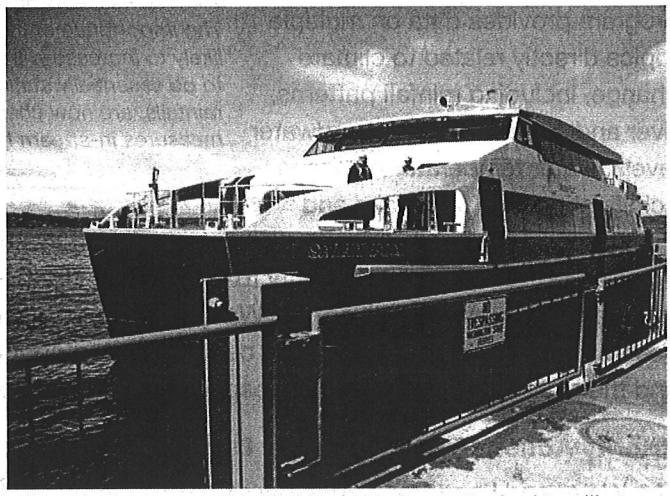
The King County Water Taxi provides safe, reliable, efficient, environmentally sound, customer-friendly, and fiscally responsible passenger-only ferry services to the public and establishes waterborne transportation as a viable alternative mode of transportation in support of regional mobility and a high quality of life in King County. The Water Taxi operates passenger ferries between downtown Seattle and West Seattle and downtown Seattle and Vashon Island.

Impacts

Sea level rise could cause higher tides or storm surges that exceed the designed capabilities of the floating docks and/or gangways.

Ongoing Response

The floating dock and gangway in West Seattle that is utilized by the Water Taxi was replaced in 2010 with a new floating dock and gangway, which are able to accommodate several feet of sea level rise. The dock used by the Water Taxi in downtown Seattle is owned and maintained by the Washington State Department of Transportation. Replacement of this dock is currently scheduled for 2017, and will include accommodation of several feet of sea level rise. The Vashon Island dock is also owned and maintained by the Washington State Department of Transportation and is scheduled for seismic upgrades in the second half of 2015. King County coordinates with Washington State Department of Transportation to ensure that sea level rise is accounted for in their projects.



Floating docks used by the Water Taxi are attached to pilings, with floating gangways attached to neighboring fixed docks.

Priority Actions and Long-Term Direction

Long-term concerns about sea level rise will be addressed over the next several decades as ferry terminals are reconstructed by Washington State Department of Transportation.

11. Environmental Science and Monitoring

The Water and Land Division conducts ongoing monitoring of environmental conditions in King County to track long-term trends and identify if conditions are improving or declining over time. The monitoring team also conducts permit-required monitoring for multiple agencies, provides scientific and environmental support to capital projects, and provides scientific input and review to various King County policies and regulations.

Impacts

The importance of monitoring changes in environmental conditions is likely to increase with a changing climate, as conditions once believed to be essentially static, such as average temperatures and average rainfalls, are now changing over time.

The importance of monitoring changes in environmental conditions is likely to increase with a changing climate, as conditions once believed to be essentially static, such as average temperatures and average rainfalls, are now changing over time. Pictured here, King County staff measures in-stream flows in Taylor Creek.

Ongoing Response

The Water and Land Resources Division will maintain its water quality monitoring program as one method for tracking climate change impacts. Among other parameters, this program provides data on multiple topics directly related to climate change, including rainfall patterns, river and stream flows, groundwater levels, water temperatures, ocean acidification, and large lake and Puget Sound food webs. These data, and collaborative modeling efforts with the University of Washington, allow for King County to ensure that impacts are understood and accounted for in plans and policies. In addition, the Water and Land Resources Division recently began monitoring ocean acidity of the Puget Sound's central basin in cooperation with the University of Washington and the National Oceanic and Atmospheric Administration.

Priority Actions and Long-Term Direction

The Water and Land Resources Division will continue to track changes in hydrology, water quality, habitat, and biota and pursue funding to better understand impacts of change patterns of precipitation on stormwater runoff and major river flooding.

As noted earlier in this chapter, the County has taken the approach of embedding climate change considerations throughout its diverse programs and services. Climate science is continuously progressing, with new and refined projections on timing and magnitudes of changes getting published each year. County agencies have varying levels of technical expertise and resources to monitor and apply new findings to their operations and capital programs. The County should establish a dedicated climate change preparedness staff position to support the work of departments, act as a central point of contact for developing research and funding proposals, and develop partnerships with other local governments, universities, and non-profit organizations.

12. Emergency Management

The Office of Emergency Management provides leadership and support throughout King County. The Office of Emergency Management works in partnership with cities, counties, state and federal agencies, tribes, special purpose districts, non-profit organizations, community groups, and businesses to develop a regional approach to emergency planning, response, and recovery. These collaborative partnerships are essential for effective coordination of information, resources, and services throughout the region.

King County supports a number of programs aimed at preparing for, responding to, and recovering from regional disasters and local emergencies. The five phases of emergency management - Mitigation, Prevention, Preparedness, Response, and Recovery - drive the Office of Emergency Management's work to:

- Coordinate regional emergency planning, response, and recovery activities through partner agency engagement.
- Manage resources and information sharing before, during, and after a disaster.
- Facilitate trainings and exercises to test regional emergency capabilities and interagency communications.
- Recommend policies, strategies, and standards.
- Fund and maintain regional technology tools that provide situation awareness, alert, warning, and notifications for emergencies.

Impacts

Climate change is projected to increase the frequency and severity of certain types of emergencies that will require a coordinated response. Severe weather, flood events, heat waves, fires, and landslides are all likely to increase in severity and frequency in the future. This increase will require additional and expanded emergency response.

Ongoing Response

As the impact of climate change on hazards becomes more evident, emergency management capabilities must become more robust. The Office of Emergency Management has four major focal points in addressing climate change impacts:

Regional Hazard Mitigation Plan (RHMP): Hazard mitigation is the use of long-term and short-term policies, programs, projects, and other activities to alleviate the death, injury, and property damage that can result from a disaster. King County and a partnership of local governments within the county have developed and maintained a regional hazard mitigation plan to reduce risks from natural disasters. In particular, the RHMP helps to identify and mitigate the impacts of disasters and creates a community more resilient to natural, technological and societal hazards, including the impacts of a changing climate. The 2014 RHMP includes 28 mitigation actions addressing all hazards, including climate change. These actions include infrastructure improvements to critical facilities and ongoing planning initiatives.

Response Planning: Emergency plans are developed in collaboration with jurisdictions, businesses, and other emergency response partners to be consistent with Federal and State laws, as well as local ordinances. The plans describe roles and responsibilities before, during, or after an emergency. They also address likely hazards, develop a context for when a plan might be used, and describe responsibilities, actions, and related timelines. Response plans include:

- **Comprehensive Emergency Management Plan (CEMP)** is used by elected and appointed King County officials to mitigate, prepare for, respond to, and recover from disasters. The CEMP is the basis for how the Emergency Coordination Center will operate in the event of an incident or disaster.
- **King County Continuity of Operations Plan (COOP)** addresses the continuation of essential services (delivered by government during normal business conditions) when emergencies occur.

- **Regional Coordination Framework (Disaster Plan)** is a unique "mutual aid agreement" that establishes the framework to allow public, private and nonprofit organizations an avenue to efficiently assist one another during a disaster.
- **Disaster Debris Management Plan** is a jurisdiction-specific process for how disaster debris may be collected and managed, including personal belongings.
- **King County UASI Evacuation Template** aids jurisdictions in preparing an evacuation annex to their Comprehensive Emergency Management Plan (CEMP) or to serve as a stand-alone plan for a specific hazard. The template presents evacuation planning concepts that are applicable across all scales and scopes of evacuations.
- **Business Emergency Operations Center (BEOC)** – used as a model to increase business preparedness and collaboration between public and private partners. The BEOC will be staffed as a branch under the Operations Section of the Regional Communications and Emergency Coordination Center and will foster face-to-face interactions between private sector, King County Government, and emergency response agencies. The BEOC will be asked to problem solve and collaborate regarding response operations, resources, and capabilities. The BEOC also serves as a mechanism to provide first-hand situational awareness to the private sector in order to facilitate the continuity of operations.

Resilient King County Initiative/Recovery Planning: To be completed by the end of 2015, King County's recovery framework will describe how the six Recovery Support Functions identified within the National Disaster Recovery Framework will operate within King County. The framework will establish a process for both short and long-term recovery, including how to manage the transition from the Regional Communications and Emergency Coordination Center to a Long-term Recovery Task Force. Key elements of King County's recovery strategy include:

- Establish "one voice" King County – ensure communication with public is clear, consistent, and uses multiple methods to communicate.
- Determine regional recovery strategy, task forces, and the path(s) forward for collaborative decision making and coordination.
- Convene key stakeholders (all levels of government, private sector, community groups) to participate as leads and subject matter experts in recovery organizational structure.

Climate change is projected to increase the frequency and severity of certain types of emergencies that will require a coordinated response. Severe weather, flood events, heat waves, fires, and landslides are all likely to increase in severity and frequency in the future. This increase will require additional and expanded emergency response. Pictured here, King County Executive Dow Constantine and regional leaders and emergency managers gather as part of the Resilient King County initiative.

- Act as a broker of additional resources from state and federal partners.
- Assist with cross-jurisdictional issues and identify gaps that need attention.

The Resilient King County initiative seeks to establish a recovery framework to assist individuals, families, businesses, and government to recover from an emergency in a manner that sustains the physical, emotional, social, and economic well-being of the community.

Public Education: The Office of Emergency Management's community outreach program is intended to manage all efforts to get the community personally prepared and informed about all hazards in the community, including climate change. Public education is provided through the following mechanisms:

- Paid and earned media events focused on preparedness, leveraged through the Make it Through and Take Winter by Storm campaigns.
- Education of community groups, employers, schools, and other organizations.
- Community events, including safety fairs, farmers markets, town halls, etc.
- Development of resources for limited-English proficiency populations.

Priority Actions and Long-Term Direction

The Office of Emergency Management has identified three new actions to be completed over the next five years. First, The Office of Emergency Management will be responsible for producing an annual report based on the status of mitigation actions and strategies identified in the RHMP. Each planning partner will be required to assess whether the mitigation actions and strategies identified for their jurisdictions should be modified based on current and changing conditions, including climate change risks and impacts. This assessment will help better inform emergency planning and response.

Secondly, based on the most recent assessments of climate change impacts, information on climate change will be integrated into the Office of Emergency Management's ongoing public education presentations and campaigns.

Finally, as the Office of Emergency Management continues to complete periodic activations, drills, and exercises, it will test a heat wave scenario for emergency response coordination in the next five years.

prioritiyactionsby2020

The following information compiles and summarizes the near-term priority actions presented in the programmatic overview above. As outlined in the Environmental Science and Monitoring programmatic overview, the County should establish a dedicated climate change preparedness staff position to support the work of departments, act as a central point of contact for developing research and funding proposals, and develop partnerships with other local governments, universities, and non-profit organizations.

Science and Research

- **Assess climate impacts on rainfall patterns.** The Water and Land Resources Division, in cooperation with the Wastewater Treatment Division, and partially supported by a grant from the Washington State Department of Ecology, will implement a study in collaboration with the University of Washington to assess climate change impacts on local rainfall patterns. Building on results from this research, King County will:
  - **Update stormwater design requirements.** The Water and Land Resources Division will apply the research findings to stormwater facility design and sizing requirements. Results of this research will be incorporated into future updates of the King County Surface Water Design Manual.
  - **Assess impacts on wastewater conveyance and treatment.** The Wastewater Treatment Division will use the results of the research to assess potential impacts on wastewater conveyance and treatment. Results will be incorporated into future updates of the Regional Wastewater Services Plan and the King County Combined Sewer Overflow Control Plan.
- **Assess climate impacts on flood sizes and frequencies.** The Water and Land Resources Division will build on local rainfall research to model river flows under climate change conditions. This effort will quantify likely impacts of climate change on flood sizes and frequencies in King County rivers. Results from this study will be incorporated into future updates of the King County Flood Hazard Mitigation Plan.
- **Assess climate impacts on population growth rates.** The Department of Natural Resources and Parks and the Executive's Office will coordinate with Washington State, the Puget Sound Regional Council, local researchers, and other local jurisdictions to evaluate potential increases in population growth beyond current projections due to increased migration resulting from climate change and potential implications for regional infrastructure and services.
- **Survey and engage stakeholders on health and climate change.** Public Health will develop and implement a stakeholder engagement strategy to gauge perceptions of climate impacts on public health.
- **Assess Food-Water-Energy Dynamic:** In collaboration with universities and local governments, the County will research, assess, and characterize the United Nation's food-water-energy dynamic and the regional climate impacts and risks at Pacific Northwest regional scale.

Planning and Implementation

- **Expand use of reclaimed water.** The Wastewater Treatment Division will further develop and expand its reclaimed water program in the Sammamish River valley and near the South Treatment Plant to reduce reliance on Puget Sound for the discharge of treated effluent and provide a water source for agricultural irrigation and groundwater recharge.
- **Water Supply:** Review research by the Water Supply Forum, Seattle Public Utilities, and other water suppliers, and universities on how regional climate change impacts will impact local water supply. King County will use this information to report to the Council by June 2017 on how new information on local water supply will impact how King County implements its responsibilities under the Growth Management Act, such as its review of Water Comprehensive Plans. The report to Council will address how recycled water can be used to address water supply concerns.
- **Preserve road safety and maintenance.** The Road Services Division will focus on immediate operational safety and emergency response needs. To the extent feasible under available funding and/or as required by permitting agencies, it will incorporate information about changes in future flooding, storm sizes and frequencies, and landslide risks into roads maintenance and preservation programs and projects for unincorporated King County.
- **Conduct hazard mapping.** The Water and Land Resources Division and the Department of Permitting and Environmental Review will complete the update to King County's landslide hazard analyses and mapping along major river corridors and on Vashon Island. When funding is available, they will also conduct an update to King County's landslide hazard analyses and mapping elsewhere in King County.
- **Plan for sea level rise impacts on coastal zones.** The Water and Land Resources Division will prepare a comprehensive strategy to reduce risks to Puget Sound shoreline homes and businesses at increasing risk of flooding and coastal erosion due to sea level rise.
- **Plan for salmon recovery.** The Water and Land Resources Division will seek grant funding to assess climate change impacts on salmon recovery plans and to ensure the plans are resilient in the face of climate change.
- **Expand and fund public health preparedness and responses.** Public Health will seek new funding to implement a comprehensive public health and climate change program.
- **Further integrate climate change impacts into emergency management and planning.** Building on recent integration of climate change into King County's 2014 Regional Hazard Mitigation Plan, the Office of Emergency Management will:
  - **Evaluate emergency preparedness mitigation strategies.** The Office of Emergency Management will require that each planning partner assess whether the emergency preparedness mitigation actions and strategies identified for their jurisdictions should be modified or updated due to projected climate change impacts.
  - **Provide emergency preparedness climate education.** The Office of Emergency Management will integrate information about climate change in ongoing campaigns that provide public education about emergency preparedness.
  - **Conduct a heat wave emergency response drill.** The Office of Emergency

Management will conduct an emergency response drill to evaluate preparedness for a major heat wave.

Partnerships

- **Plan for low stream flows.** The Water and Land Resources and Wastewater Treatment Divisions will work with water purveyors and the U.S. Army Corp of Engineers to help ensure minimum river flows for fish and agriculture during low flow seasons and work with water purveyors and farmers to expand water conservation efforts and use of reclaimed water.
- **Work Regionally to Prepare for Climate Impacts.** Counties and cities across Central Puget Sound are at various stages of assessing climate impacts on their communities, identifying vulnerabilities, and mapping out climate preparedness actions. Employment opportunities, transportation networks, and disaster recovery planning efforts span jurisdictions boundaries. With upcoming updates to local comprehensive plans, regional transportation plans, and emergency plans, there is an opportunity to pool expertise and resources and coordinate regionally. Regional coordination will allow for more efficient and strategic use of resources for research on local climate impacts, support more effective and consistent communication with the public, and support better integration across planning disciplines. King County, PSRC, neighboring counties and cities in Central Puget Sound, non-profit organizations, and businesses have had preliminary discussions about establishing a Central Puget Sound Climate Preparedness Partnership, and King County will actively partner to scope and establish this partnership.

ACCOUNTABLE AGENCIES

Strategies for addressing climate change impacts on natural resources are primarily the responsibility of the Department of Natural Resources and Parks, including the Water and Land Resources and the Parks and Recreation Divisions. Strategies related to flooding are the responsibility of the King County Flood Control District, which is a special purpose government created to provide funding and policy oversight for flood protection projects and programs in King County. The Flood Control District's Board is composed of the members of the King County Council. The Water and Land Resources Division of the King County Department of Natural Resources and Parks carries out the approved flood protection projects and programs under an interlocal agreement.

Strategies related to transportation are the responsibility of the Department of Transportation, including the Metro Transit Division, Road Services Division, King County International Airport, and the Water Taxi.

Strategies for emergency management are the responsibility of the Office of Emergency Management. Strategies related to planning for and addressing the impacts of climate change on public health are the responsibility of Public Health – Seattle and King County.

Strategies for preparing for impacts to infrastructure and operations are the responsibility of all King County agencies listed above, as well as DNRP's Solid Waste Division and Wastewater Treatment Division and the Department of Executive Services' Facilities Management Division.

The Department of Natural Resources and Parks' Climate Team plays a coordinating and oversight role and is accountable for strategies related to staff training and education. The Climate Leadership Team, which includes Department Directors from four County departments and staff from the Executive's Office, provides a forum for coordinating climate preparedness actions and resources.

APPENDICES

- **APPENDIX A:** Coordination with Other County Plans
- **APPENDIX B:** Response to King County Council Motion 14349
- **APPENDIX C:** Energy Strategy Details
- **APPENDIX D:** Green Building Reporting
- **APPENDIX E:** Climate Program Costs and Benefits

APPENDIX A:
Coordination with Other County Plans

APPENDIX A: Coordination with Other Plans

Appendix A: Coordination with Other County Plans

PLANS	SEE THIS GOAL AREA /SECTION					
	Transp. & Land Use	Energy	Green Building	Consump. & Mater. Mgmt.	Forests & Ag.	Preparing for Impacts
King County Comprehensive Plan	■	■	■	■	■	■
King County Strategic Plan	■	■	■	■	■	■
King County Comprehensive Solid Waste Management Plan			■	■		
King County Consortium Consolidated Housing and Community Development Plan	■	■	■			■
King County Equity and Social Justice Strategic Plan (in development)	■	■	■	■	■	■
King County FARMS Report - Future of Agriculture Realizing Meaningful Solutions	■				■	■
King County Flood Hazard Management Plan	■				■	■
King County International Airport – Airport Master Plan	■	■				
King County Marine Division Strategic Plan	■	■				
King County Metro Transit Long Range Plan (in development)	■	■				■
King County Metro Transit Strategic Plan for Public Transportation	■	■				■
King County Open Space Plan: Parks, Trails, and Natural Areas					■	■
King County Parks and Recreation Division Forest Stewardship Plans					■	■
King County Regional Hazard Mitigation Plan						■
King County Regional Trails Inventory and Implementation Guidelines	■					
King County Regional Wastewater Services Plan		■		■		■
King County Stormwater Management Program Plan	■		■			
King County Strategic Plan for Road Services	■					■
Public Health Seattle and King County Environmental Health Services Strategic Plan	■		■			■
PROGRAMS AND LEGISLATION						
King County Critical Areas Ordinance	■				■	■
King County Conservation Futures Program	■				■	■
King County Current Use Taxation Program					■	
King County Environmentally Preferable Purchasing and Practices Ordinance		■		■		
King County Equity and Social Justice Ordinance	■	■	■	■	■	■
King County Farmland Preservation Program					■	■
King County Green Building and Sustainable Development Ordinance		■	■			
King County Local Food Initiative					■	■
King County Transfer of Development Rights Program	■				■	
Resilient King County Initiative						■

APPENDIX B:
Response to King County Council Motion 14349

APPENDIX B: Response to King County Council Motion 14349

Appendix B: Response to King County Council Motion 14349

King County Council Motion 14349, adopted in May 2015, provided the County Executive a list of selected climate-related activities and policies from other jurisdictions to consider in development of the 2015 SCAP.

The table below presents that list organized by 2015 SCAP goal area or section. A green square in the "Status" column represents suggestions that are addressed in the 2015 SCAP and/or already exist as a County program or policy. A yellow square in the "Status" column represents suggestions that are not directly included in the 2015 SCAP. This could be due to factors such as local environmental conditions, the role and authority of King County government, cost effectiveness, existing programs or policies in other jurisdictions or organizations, or other reasons as described in the responses in the table.

Suggestion from Motion 14349	Status	Response to Suggestion
SCAP Plan Development: Outreach and Engagement *See the Outreach and Engagement section for more information.*		
Public workshops and a website survey which provide a forum for public participation in climate action plan development. (City of Berkeley)		King County utilized multiple tools for reaching out to a variety of audiences: • online forum using Mindmixer • in-person focus groups in multiple languages • individual and small group interviews • ongoing discussions with stakeholders and subject matter experts This engagement was an important step in starting to cultivate relationships with community-based organization and others that will advance King County's climate strategy moving forward.
Partner with an outside non-profit to create and develop the plan. (City of Berkeley)		During the creation and development of the 2015 SCAP, multiple non-profit organizations served as subject matter experts and provided technical assistance. Some examples include Climate Solutions, Environmental Coalition of South Seattle (ECOSS), International Living Futures Institute/Cascadia Green Building Council, and the Northwest Energy Efficiency Council.
Involve technical advisory groups (TAG) of sector experts to provide recommendations. (City of Seattle)		King County has been working on an ongoing basis with technical experts, who have advised different King County agencies about specific targets and strategies. The County also convened two focus groups involving subject matter experts to provide input about the 2015 SCAP.
Create a Green Ribbon Commission of community, environmental, and business leaders to consider draft of Strategic Climate Action Plan and refine it. (City of		In implementing the 2012 SCAP, King County has worked closely with a variety of technical experts on its climate strategy and this ongoing collaboration directly shaped the strategies, actions, and targets included in the 2015 SCAP. For example, the King County-Cities Climate Collaboration (K4C) and Regional Code Collaboration have both functioned as a de facto green ribbon commission, where participants have shared their expertise, insight and ideas and have forged partnerships for regional collaboration. As noted under Priority Actions by

Seattle)		2020 of the Outreach and Engagement description, King County will continue with these partnerships and will cultivate relationships with a broader range of stakeholders moving forward.
Use the media to inform residents of ways to reduce GHG emissions. (Skagit County)		In implementing the 2012 SCAP, King County has used traditional and electronic media tools to communicate with residents about ways to reduce GHG emissions, and King County has multiple programs that educate and assist individuals, businesses, and other types of audiences to reduce their carbon footprints. Examples include the *It's Easy Being Green* campaign, the *Recycle More* campaign, and Metro Transit's transportation and transit outreach and engagement. With respect to the 2015 SCAP, King County has committed to improving internal coordination on climate change communications and engagement to enhance the impact of its many project and educational programs, which will result in coordinated external communications on GHG emissions reduction efforts and other climate change information.
Goal Area 1: Transportation and Land Use		
Enact anti-idling laws and enforce; expand public education on idling. (City of Boston; Miami-Dade County)		The Washington Department of Ecology and the Puget Sound Clean Air Agency currently have robust public education programs on anti-idling. King County maintains a public education website on anti-idling and works closely with partner agencies to share their information on anti-idling programs. Although King County provides some regional services, anti-idling laws enacted by King County would only apply in unincorporated areas, where there is generally less idling of vehicles related to congestion or vehicle destinations. However, idling freight vehicles waiting for access to the Port of Seattle is a concern in unincorporated King County. Internally, King County has an anti-idling policy that outlines that non-revenue vehicles and off-road equipment in King County Executive agencies may not idle for more than 3 minutes in a 60 minute period.
Enact bicycle parking requirements for businesses that also mandates showers and lockers for employees. (Miami-Dade County)		To comply with the state's Commute Trip Reduction (CTR) law and locally adopted ordinances in cities and unincorporated King County, a large portion of major employers in the region already provide showers, lockers, and bicycle storage. King County Metro Transit works to provide options that support transit commute options that link with bicycle and pedestrian facilities in the region. The current state CTR law requires major employers to make a good faith effort to develop and implement a CTR program that will encourage its employees to reduce Vehicle Miles Traveled (VMT) per employee and drive-alone commute trips. Local jurisdictions (cities and counties) have implemented ordinances to define how the law would apply to worksites in their areas and consider a menu of different commute options that fit their local needs. Local jurisdictions are required to provide training and technical assistance for employers.

Explore tax-incentives for bicycle commuting. (Miami-Dade County)		King County's Employee Transportation Program has used gift cards as an incentive mechanism to increase bicycle use for commuting. Additionally, Employer Transportation Coordinators at large businesses are responsible for developing commuter incentives and may be able to coordinate employer-paid financial incentives for bike commuters. King County's Commute Trip Reduction program actively helps employers identify alternative commute options, including exploring incentives for increased bicycle commuting. King County currently does not have a legal mechanism to reduce County-collected taxes based on mode of travel.
Implement "Safe Routes to School" program so kids can bike or walk to school. (Portland-Multnomah County)		Under state law, every new urban development is evaluated for safe walking routes and considered in part of the approval process for development. This can include providing safe walking routes directly to the school, or to locations to get on a school bus, depending on the needs of the school. This is dictated in state law per RCW 58.17.110. Public Health – Seattle and King County is working with partners through coalitions, workgroups and advisory boards to improve access to Safe Routes to School programs and resources. For example, Public Health participated in the Seattle Department of Transportation's efforts to develop the Seattle Pedestrian Master Plan. The Plan prioritizes pedestrian and safety improvements around schools. Public Health staff provides leadership to the Puget Sound Regional Council Bicycle Pedestrian Advisory Committee and participate on the Regional Staff Committee.
Goal Area 2: Buildings and Facilities Energy		
Install solar panels on all county buildings. (Miami-Dade County)		The 2015 SCAP sets direction and ambitious targets to increase renewable energy production and usage for King County operations and includes targets for renewable energy production and consumption. After using state solar production incentives, in Washington State, solar energy has a long payback (often 20+ years). For this reason, the County is prioritizing enhanced energy efficiency as the most cost effective energy strategy. With the hope and assumption that the County will continue to push the limits of energy efficiency and that solar energy cost effectiveness will improve, *Goal Area 2: Buildings and Facilities Energy* addresses making facilities "solar ready" for future integration of lower cost solar, and staff will be researching the potential to develop an offsite County-owned large-scale solar array, with the assumption that the cost efficiencies of larger scale systems could demonstrate to be life-cycle cost effective as an energy supply strategy for an aggregated group of multiple county facilities. In the short term, the County will take advantage of grant opportunities to fund solar projects, such as the 104 kW photovoltaic systems on the roofs of the King County Aquatic Center and Regional Justice Center for which the County received $525,000 and $475,000 grants.

Develop district, solar, and geothermal energy in the public right of way. (City of Seattle)		In Goal Area 2: Buildings and Facilities Energy, King County expresses support for community renewable energy projects on County-owned property that are in the best interest of the public and reduce community energy use. King County has been pursuing these strategies, including a 2012 agreement with Vashon Community Solar for an approximately 50 kW system, but the project did not break ground. Also in 2012, the Wastewater Treatment Division (WTD) issued a Request for Information to seek input on potential projects that would extract heat from the wastewater conveyance system. While no projects have yet to materialize, WTD continues to work with urban real estate developers to demonstrate how WTD can tap into this thermal energy asset. Currently several Seattle projects are considering tapping into King County lines to maximize this heat source.
Develop financing tools for property owners including loans for property owners who opt-in to finance energy efficiency or renewable energy projects; in California, authorized by AB811 (Financing Initiative for Renewable and Solar Technology). (Sonoma County)		In Goal Area 2: Buildings and Facilities Energy, one of the Priority Actions by 2020 commits King County to reducing the costs of resource efficiency and renewable energy for property owners, including cities. The County is currently looking into how to make its Fund to Reduce Energy Demand (FRED) available to other local governments.
Provide small businesses subsidies and assessment/advice for projects that reduce energy/light use. (City of Berkeley; City of Boulder)		Seattle City Light and Puget Sound Energy have robust energy efficiency programs that collectively spend over $130 million each year to encourage local businesses and residences to conserve energy. A critical piece of these programs is providing assessments and financial assistance to businesses of all sizes. The County will continue to partner with Seattle City Light and Puget Sound Energy to help market efficiency programs and connect businesses and residents with the utilities' financial and assessment programs. The SCAP includes the commitment to support broadening the EnviroStars program to a Regional Green Business program that provides support for and recognizes businesses that have made strides in sustainability such as energy efficiency, purchasing green power, and addressing climate change.
Establish an Energy Savings Account to pay for energy conservation modifications and renewable energy projects in county facilities; will be funded by dollars accumulated from energy savings and conservation measures. (Skagit County).		In 2014, King County set up the Fund to Reduce Energy Demand (FRED). Unlike a savings account, this internal loan program takes advantage of the County's good credit rating to secure funds for any efficiency program that has a ten year or better payback. It is believed that the FRED framework is better than a savings account, in that it does not set up a dollar limit, as would be the case with a savings account. The FRED framework is being investigated as an option for large scale solar investments by the County, possibly with a 20 to 30 year borrowing term.

Include a goal and a proposed timeline in the 2015 Strategic Climate Action Plan for eliminating coal power from the County's operational energy portfolio.		As noted in Goal Area 2: Buildings and Facilities Energy, King County has a priority action to ensure the electricity consumed by County operations is 100 percent GHG neutral by 2025. The County is also committed to partnering with utilities and other local partners on renewable energy resources, including meeting countywide electricity needs while phasing out fossil fuels.
Goal Area 3: Green Building		
Require publicly accessible energy efficiency ratings for buildings. (City of Boston; City of Seattle)		In Goal Area 2: Buildings and Facilities Energy, King County commits by the end of 2016 to benchmark and publish energy performance and GHG emissions data for County-owned facilities over 20,000 square feet, using the Energy Star Portfolio Manager tool or a methodology appropriate to the facility (e.g. wastewater treatment facility). The County will also work with K4C cities to standardize a benchmarking framework.
Require "cool roofs," light colored or vegetated roofs. (City of Boston)		The intent of cool roofs and the others mentioned is to reduce "heat islands" in urban areas from large commercial structures. This does not apply to the rural unincorporated areas where King County has jurisdiction, but the County will ensure this idea is discussed with the Regional Code Collaboration group for appropriate areas within the county.
Require "daylight harvesting" lighting controls which are tied into daylight coming in from outside a building. (Miami-Dade County)		While not in the 2015 SCAP, "daylighting control" is already in the Washington State Energy Code and implemented by DPER. For example, DPER's office building in Snoqualmie has daylight controlled lighting.
Goal Area 4: Consumption and Materials Management		
Pilot and consider changing to every other week garbage collection from single family homes. (City of Seattle)		In collaboration with the City of Renton and other stakeholders, the Solid Waste Division successfully piloted every-other-week garbage collection in 2008, and Renton implemented it as a result. The 2013 draft Comprehensive Solid Waste Management Plan encourages this collection frequency as part of the curbside collection standards. This strategy is being pursued in the unincorporated area and included in current Comprehensive Plan discussions with the Metropolitan Solid Waste Management Advisory Committee and the King County Solid Waste Advisory Committee.

Goal Area 5: Forests and Agriculture		
Include explicit statements about removing carbon from atmosphere, not just reducing GHG emissions. For example, assess opportunities for carbon sequestration projects on county property such as wetlands, salt ponds. (Alameda County)		The 2015 SCAP includes explicit statements about removing carbon from the atmosphere, specifically by enhancing soil carbon content in agricultural and forestry lands and by increasing carbon storage in trees on forest lands. King County supports strategies for carbon sequestration through the Loop Biosolids program and forest protection and restoration initiatives.
Section Two: Preparing for Climate Change Impacts		
Identify "hot spots," neighborhoods with especially elevated temperatures and risk of heat stroke; focus street tree planting efforts in those areas. (City of Chicago; City of Seattle)		Public Health has an effective outreach program for responding to heat waves, as addressed in Section Two: Preparing for Climate Change Impacts. While an increase in the number of urban trees may mitigate heat waves in specific neighborhoods, efforts to manage urban trees are managed by jurisdictions with local land use authority. In Goal Area 5: Forests and Agriculture, King County commits to working with public, non-profit and private partners throughout the county to collectively plant at least one million new trees by 2020.
Overall Policy		
Develop green workforce opportunities (City of Berkeley; City of Boston)		Although not addressed in the 2015 SCAP, the Department of Natural Resources and Parks has been active in promoting its green workforce opportunities by recruiting at a variety of job fairs and other venues throughout the county.
Send GHG reduction targets to voters for approval. (City of Berkeley)		The King County Growth Management Planning Council (GMPC) is a formal body that currently includes elected officials from King County, Seattle, Bellevue, other cities and towns in King County, special purpose districts, and the Port of Seattle. In July 2014, the GMPC unanimously adopted shared, countywide, near and long term GHG reduction targets. The Growth Management Planning Council, which includes elected leaders from cities and the Metropolitan King County Council, also created measurements and reporting commitments. See the *Greenhouse Gas Emissions Reduction Targets Section* for more detail about targets and measurement commitments.

Ensure that the costs and benefits of climate action are shared fairly throughout community and do not exacerbate existing inequalities. (City of Boston)		As noted throughout the 2015 SCAP, there is a deep connection between climate change and equity and social justice. The Equity and Social Justice Strategic Plan is currently under development, and climate change considerations will be an integral part of the conversation. The County recognizes that the consequences of different climate actions it chooses to pursue may be experienced differently by different King County communities, and moving forward, the County is committing to cultivating a more inclusive, cross-sector approach to shared decision-making and leadership on countywide solutions. *See the Outreach and Engagement Section for more information.*

APPENDIX C:
Energy Strategy Details

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Goal Area 2: Buildings and Facilities Energy supplants the County's 2010 Energy Plan. The County's 2010 plan and prior energy plans have been guiding documents for the County's internal energy efforts. As such, the plans have served as references for specific actions the County will undertake to meet energy related goals.

Given the breadth of information in the 2015 SCAP, the detail of past county energy plans, and the need for specific directions to guide much of the county's energy work, this Appendix has been developed to expand the goals included in the body of the SCAP. Where relevant to a specific topic, the specific actions and guidance provided in this appendix should be considered a roadmap of actions and work that guides County government agencies to advance their energy conservation efforts. This appendix focuses on energy work related to County facility energy use. Energy issues related to transportation fuels can be found in **Goal Area 1: Transportation and Land Use**.

Strategy A.1: Energy Plans

➤ All County agencies that consumed an average of 50,000 or greater MMBTU per year in buildings between 2012 and 2015 shall develop energy reduction plans by January 1, 2017. Such plans shall be no more than five years old and shall be updated at least every five years. As of 2015, this strategy impacts the Facilities Management, Transit and Wastewater Treatment Divisions. Energy Plans shall detail key actions, implementation strategies, barriers, and methods for how the agency will contribute to the County's 2025 energy reduction goal. Among other details, the Energy Plans shall include sections addressing site facility assessments/audits, as well as facility recommissioning, generally following the guidance in Strategies A.2 and A.3.

Strategy A.2: Energy Site Assessments

This strategy concerns County agencies that use less than 50,000 MMBTU of energy per year.

- By December 31, 2017, and no longer than every seven years thereafter, conduct and/or update investment grade (level III) energy efficiency audits of all County buildings and facilities that consumed more than 5,000 MMBTU annually, on average, between 2012 and 2015.
- The energy site assessments are to be used to guide future energy investments at energy intensive facilities and shall detail cost-effectiveness information for all identified efficiency actions in impacted facilities.
- Per Ordinance 16927, conduct a level II energy audit for facilities at which capital projects valued over $250,000 are planned that impact any portion of the mechanical or lighting system, if such an audit has not been completed within the previous seven years.

Strategy A.3: Energy Recommissioning

This strategy concerns County agencies that use less than 50,000 MMBTU of energy per year.

Recommissioning is a process that seeks to improve how an existing building's mechanical and electrical equipment and systems function together. The process can resolve problems that occurred during design or construction, or address problems that have developed throughout the building's life due to changes in the use or occupancy of the facility. Recommissioning improves a building's operations and maintenance (O&M) procedures to enhance overall building performance.

- Within two years after the completion of construction and no less frequent than every five years, King County will carry out an energy recommission of all facilities that use more than 5,000 MMBTU per year. Such recommissioning shall include comprehensive analysis of facility lighting, envelope, controls, heating/cooling equipment, operations and historical consumption data to ensure each impacted facility is operating efficiently.

- Facilities that use equal or less normalized energy than the previous comparison baseline (five years prior and previous year) and facilities with real-time energy monitoring are considered to have met this recommissioning requirement.

Strategy A.4: Source vs. Site Energy Use

Currently, King County monitors energy consumption of its facilities based upon a 'site energy use' approach. Such tracking does not take into consideration the full environmental impact of resource use, such as the inefficiencies of electricity generation at the source facility and through transmission system to the end use. For example, a 'site energy use' approach does not take into consideration the fuel needed to generate the electricity at a power plant (e.g. a coal or gas fired power plant), whereas a 'source energy' approach factors in generation energy input and transmission losses.

➤ Beginning in 2016, King County's energy tracking shall be calculated using a source energy approach to align with measurements in the EPA Portfolio Manager tool and the DOE Better Buildings Challenge.

Strategy A.5: Energy Investment Cost Effectiveness

Reducing energy use and expanding the generation of renewable energy will require continued investments. While technology exists today to reduce the County's energy use by 50 percent or more, it is essential to consider the cost-effectiveness of projects to ensure the County expends its limited financial resources wisely.

➤ By December 31, 2016, King County shall adopt cost effectiveness criteria for investments in resource-using and renewable energy generating equipment. The criteria shall provide guidance for when to make investments in replacement equipment for resource efficiency purposes, and when project managers and staff are expected to secure and expend additional dollars for capital projects, with a goal of minimizing resource-using equipment life cycle cost effectiveness to the County, using Ordinance 16927 as a guiding document.

Strategy A.6: Capital Project Energy Performance

In addition to meeting the County's requirements for the internal Sustainable Infrastructure Scorecard, Leadership in Energy and Environmental Design (LEED) or other green building requirements, all capital and major maintenance projects that trigger energy code requirements shall meet the prescriptive or modeled energy code requirements of the most stringent city energy code within the county. As of 2015, the most stringent energy code is the City of Seattle's code.

Strategy A.7: Prioritization of Energy Projects

Energy efficiency and renewable energy projects provide carbon reduction and other environmental benefits. While carbon reduction benefits are clear when electricity generation is carbon-based (e.g. coal or natural gas generation), there are also greenhouse benefits associated with reducing energy consumption from "greenhouse gas neutral utilities", such as Seattle City Light . Reducing electricity use in Seattle City Light's territory both "frees up" that resource to be sold to other utilities and/or reduces natural gas and coal power market purchases.

From the direct perspective of carbon attributed to County government operations, there is a distinct need to reduce the carbon intensity of the electricity consumed by King County government, in order to meet greenhouse gas reduction goals. Due to the carbon intensity of Puget Sound Energy's electricity generation portfolio, King County will:

➤ Prioritize electrical renewable energy projects in the service territory of buildings served by Puget Sound Energy, unless financially advantageous opportunities arise in other areas.

➤ Prioritize electric energy efficiency projects to be completed first in Puget Sound Energy's service territory, when a County agency does not have other prioritization for the completion of specific efficiency projects and has the need to prioritize projects.

Strategy A.8: Technologies to be avoided

Dictating the use of specific energy equipment technologies has the potential to limit creative design and potentially to create an unanticipated outcome of increased energy use, if newer technological advances do not fit the prescribed standards. However, advancing technological improvements are making some older or inefficient technologies obsolete or unattractive from a life-cycle perspective. As such, technologies to be avoided are listed, rather than technologies to be embraced. Construction and remodel projects shall:

- Not include any lighting with an efficacy of under 95 lumens per watt.
- Not include combustion heating systems with combustion efficiency of under 86 percent, as engineered for the reference project, or electric heating with a Coefficient of Performance of under 2.5, unless the total space to be heated with such equipment is under 400 square feet.
- Not waste available "waste energy" and shall have heat recovery of 50 percent or greater, for ventilated spaces with both over 5,000 cubic feet per minute (CFM) and 70 percent or greater outside air requirements, where allowed by code.
- Shall as appropriate integrate wording into construction and procurement documents to ensure these strategies are followed.

Strategy A.9: Energy Star Appliances

- All appliance purchases by King County government shall be Energy Star qualified appliances, if an Energy Star rating is available for the type of appliance.
- To ensure both safety and resource efficiency, employees are not allowed to bring, or accept for donation, heaters or other electrical appliances for use in County facilities, unless specifically approved by the county. When an energy-using device is deemed necessary for an employee's comfort or to perform his/her work, appliances will be purchased by County agencies and shall be Energy Star qualified, if an Energy Star category exists. The Procurement and Payable Section of the Department of Executive Services and the Department of Natural Resources and Parks will work to ensure compliance with this strategy.

Strategy A.10: Greenhouse Gas Emissions and Purchased Energy Use Cap

Replacement and/or upgrades of existing facilities and construction of new County facilities are large drivers of total County GHG emissions and energy use, offsetting some of the significant County government energy reductions that have been made in recent years.

- Remodeled or replaced facilities shall consider the former (baseline) facility as the total energy budget for the new facility, on a total GHG and BTU basis.
- Additional GHG emissions can be consumed for the new facility operation, if the outcome of the completed facility results in equal or a net reduction in GHG emissions on a regional basis (e.g. a more energy intensive transfer station that increases recycling and results in a net GHG emissions reduction from the materials recycled).
- Additional energy use, on a BTU basis, can be consumed if the facility project meets one of the following criteria:
    - Reduces total net County energy use on a BTU basis (e.g. a transfer station compactor that measurably reduces truck fuel consumption).

  - Pays for energy efficiency work equal to the additional energy use in other County facilities in the same division, on a BTU basis.
  - Does not purchase such additional power from an electricity provider and generates any additional power beyond the cap through onsite or through funding of other County-owned renewable energy generation.
  - Meets regulatory requirements for odor control.
  - If the energy per unit of work is equal to or less than the baseline (e.g. a wastewater pump station that has greater wastewater flow, but reduced energy per unit pumped).
- After the first year of operation, remodeled or replaced facilities that exceed the calculated GHG and/or energy use cap, after factoring in any efficiency work paid for by the project per the bullet above, shall either 1) pay for energy reduction projects that will provide an equal or greater reduction in energy use above the cap within that agency, or 2) purchase carbon neutral offsets for all GHG emissions above the cap.

Strategy A.11: Occupied Leased Facilities

- Beginning in 2017, when consistent with the operational needs of the function, King County shall seek to lease facilities, for leases of employee occupied space of longer than five years, which are certified through the LEED rating system level of silver or higher or are Energy Star Certified. Facilities that do not meet these standards can be leased by the County if plans and funding are in place at the time of signing that will enable a facility to meet this standard within 24 months of lease signing.

Strategy A.12: Renewable Energy Generation and Use

- King County will set renewable energy generation targets and track progress toward such targets at the Cedar Hills Regional Landfill and at the Wastewater Treatment Division's Brightwater, South and West Point Treatment Plants. These targets are to help optimize use of available biogas for the most beneficial uses. Two targets should be tracked for each facility: Percent of total gas sent to beneficial end use vs. percent sent to flares, and percent utilization of the energy content of the biogas toward beneficial uses, as measured by available input BTU vs. BTU output.

Strategy A.13: Utility Partnerships

- Work with Puget Sound Energy, Seattle City Light and other utility companies to develop marketing and other partnerships that help connect county residents and businesses to utility education and inventive programs.

Strategy A.14: Community Partnerships

- Work with the non-profit sector and other regional stakeholders to develop energy retrofit programs that target comprehensive energy efficiency actions in the residential and commercial sectors.

Strategy A.15: Computer Energy Management

Staff from the Department of Natural Resources and Parks and the Department of Information Technology shall work together to ensure computer energy management tools are optimized for energy efficiency on all County computers.

APPENDIX D:
Green Building Reporting

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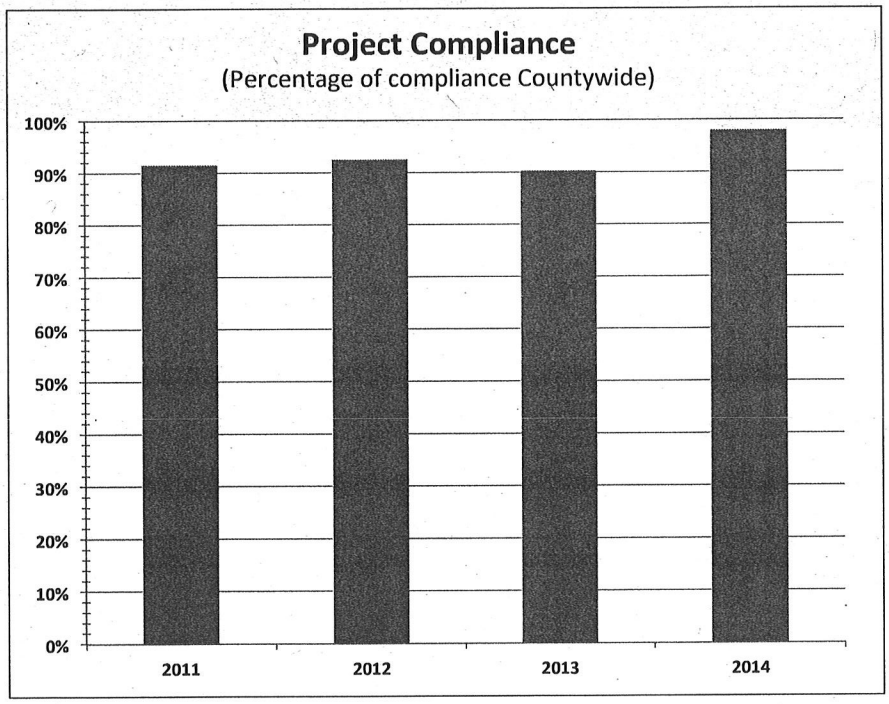
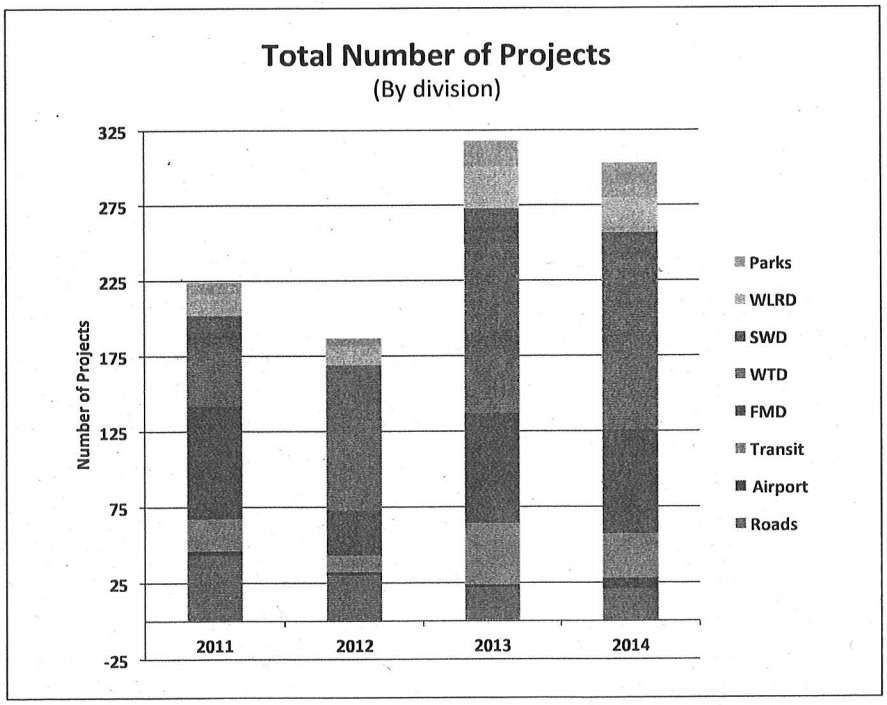
Appendix D: Green Building Reporting

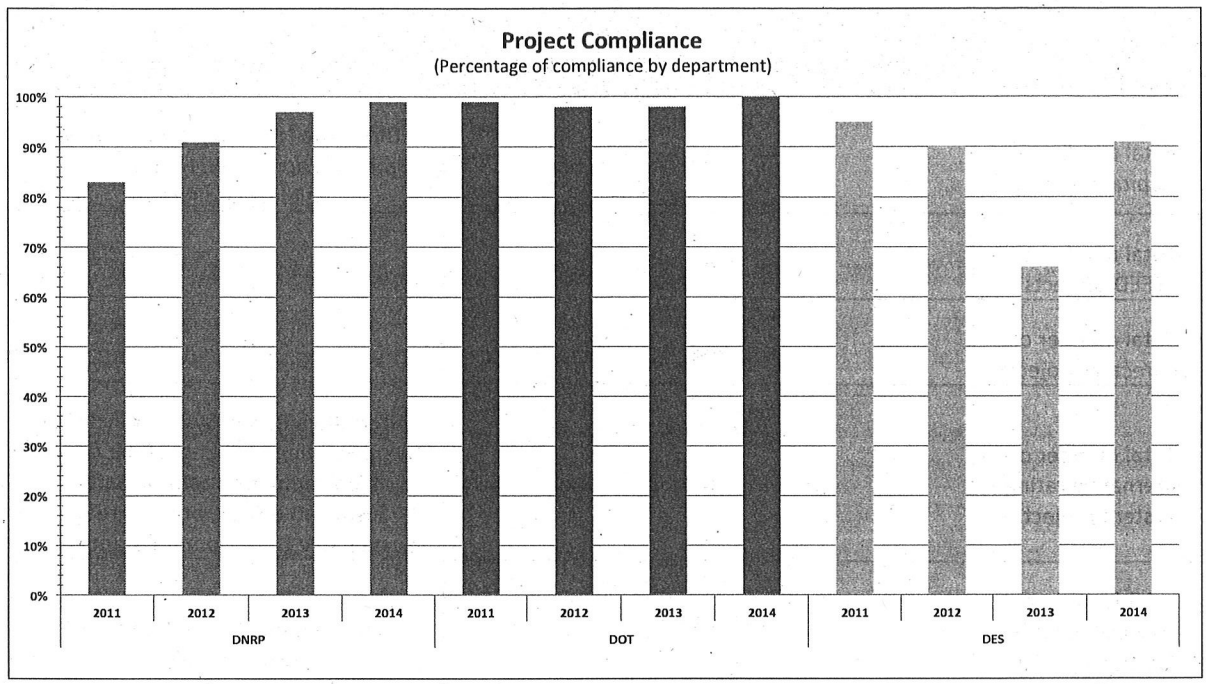
County-Owned Capital Projects

The King County Green Building Ordinance 17709 (GBO) includes annual reporting on County-owned capital projects, including buildings and infrastructure. Reporting on green building efforts has improved consistently every year, even with a limited reporting system. Historically, reporting had been done with a paper-based system that did not have efficient capabilities to roll up countywide data for every reporting criteria. Hence, reporting results were limited to project compliance with utilizing the Leadership in Energy and Environment Design (LEED) Rating System or the Sustainable Infrastructure Scorecard, construction and demolition material diversion, and project profiles highlighting green building strategies, cost or resource savings.

As illustrated by the graphs below, countywide compliance in utilizing LEED or the Sustainable Infrastructure Scorecard have improved from 90 percent in 2011 to 98 percent in 2014.

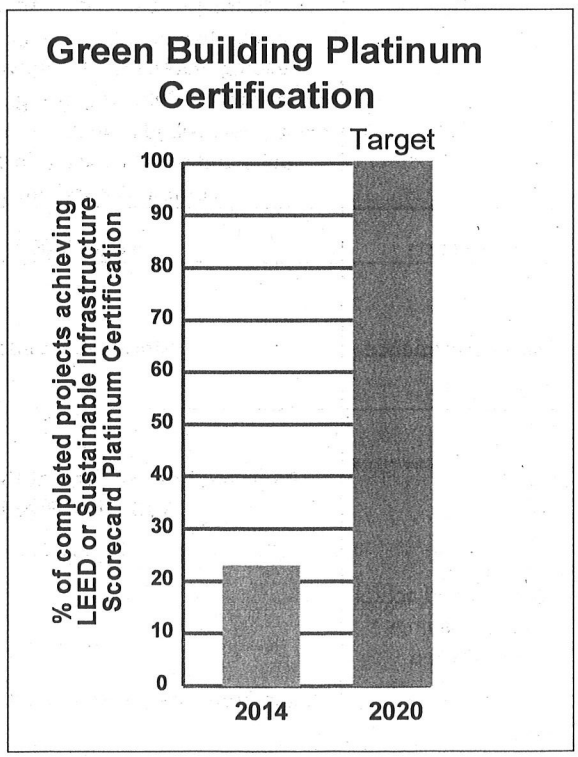






The percentage of completed projects that achieved LEED Platinum in 2014 was 22 percent, however the majority of projects completed in 2014 were designed before King County's new Platinum certification goal became a requirement in August 2014.

In preparation for the 2014 reporting cycle, annual reporting forms were improved to incorporate feedback from the Green Building Team and project managers to streamline reporting so it is less time consuming and more user friendly. Moving from a paper-based reporting form to an Excel/Access database enables for the rolling up countywide results for each reporting criteria referenced in the GBO. This is a significant accomplishment that allows for communicating quantitative data that was not available in previous years.



The matrix on the following page includes the 2014 Annual Green Building reporting results. Note that not all projects have water or energy related components, so it is understandable that some projects would not report on water or energy savings.

Refinements to the reporting system are ongoing. This is a temporary reporting system as efforts are underway to establish an institutional reporting system. With continued training and support to project managers, reporting data will steadily progress.

2013 GBO Reporting Criteria	2014 Green Building Reporting Results	Notes
Total number of capital projects	303	This is the total number of capital projects applicable to the Green Building Ordinance.
Total number of LEED projects	9	
Total number of Scorecard projects	294	
Total number of alternative rating system projects	0	Alternative Rating Systems include Living Building Challenge, Built Green 4 Star or higher, Salmon Safe, Sustainable Sites, or Evergreen Sustainable Development Standard.
Additional costs associated with achieving LEED certification	$738,000	Data from the 2 completed LEED projects only
Total number of projects using IP	179	IP is Integrative Process
Green Building strategies	Commissioning, high efficiency VRF System, sub-metering and measurement, low flow plumbing fixtures, LED lighting, C&D diversion, recycled content materials, regional materials, low emitting materials, green specifications, reused furniture, plant salvage, habitat restoration, integrative process, salvaged and reused building materials, alternative fuel use, LID, prefabricated elements, drought resistant native plants, heat island reduction, reused native soils, equity and social justice efforts that address community and education.	Strategies listed were included in one or multiple projects. Some projects could have implemented each of the strategies, but not all strategies listed were included in each project.
O&M costs	$14,400,000	53 out of 143 projects reported
Fiscal performance	More data needed	Some projects reported narrative explanation, financial cost, financial savings, so data reported could not be easily rolled up.
Projected and actual energy savings measured	Projected from 30 percent Design projects: 3,100,000 MMBTU	45 out of 143 projects between 30 percent Design and Project Completion Phases reported on projected energy savings.
	Actual from completed projects: 1,800 MMBTU	25 out of 102 completed projects reporting on actual energy savings Note: Projects reporting on projected savings are different from projects reporting on actual savings, so "Projected" results are not expected to be "Actual" results.

Projected and actual water savings	Projected from 30 percent Design projects: 3,005,000 gallons per year	32 out of 143 projects between 30 percent Design and Project Completion reporting on actual water savings
	Actual from completed projects: 10,000 gallons per year	48 out of 102 completed projects reporting on actual water savings Note: Projects reporting on projected savings are different from projects reporting on actual savings, so "Projected" results are not expected to be "Actual" results.
C&D diversion percentage and tonnage	For completed projects: 33,300 tons diverted. Average of 71 percent diversion rate.	Data is for completed projects only. 31 out of 102 completed projects reported on actual C&D diversion.
Actual EPP used	Low/No VOC paints, Low/No sealants and adhesives, high recycled content carpet, green cleaning products.	Strategies listed were included in one or multiple projects. Some projects could have implemented each of the strategies, but not all strategies listed were included in each project.
Project and actual GHG savings	Actual from completed projects: 800 MTCO2e	26 out of 102 completed projects reporting on actual emissions savings.

In 2014, 296 out of 303 county-owned capital projects, resulting in 98 percent, are using the LEED Rating System or the Sustainable Infrastructure Scorecard. These projects include both buildings and infrastructure that vary from equipment replacement, road overlay programs, trails, habitat restoration, wastewater pump stations, new transfer stations, building renovations, bus shelters, to hanger demolitions and more.

The latest green building practices are being implemented, including diverting 33,267 tons and an average of 71 percent of construction and demolition materials from going to landfills from completed projects. This equates to 800 MTCO2e in GHG emission savings which is equivalent to 90,000 gallons of gasoline consumed. Incorporating green building and sustainable development in our county projects result in increased energy and water efficiency, improved indoor air quality and stormwater management, better selection of sustainable local materials, reduction of waste and lower GHG emissions.

Below is a small sample of projects illustrating the diversity in the County's capital asset portfolio as well as environmental and community benefits.

Project Highlights

- The King County Metro **South Kirkland Park and Ride (SKPR) Transit Oriented Development (TOD)** project transformed an existing surface park and ride lot into a large mixed use residential and retail sustainable development community, innovatively using the King County Sustainable Infrastructure Scorecard, the Evergreen Sustainable Development Standards and the Built Green rating system to achieve green building efforts that reflect the diversity in building types. Multiple benefits include increased parking availability with a new

530 stall garage and a new transit facility; 58 affordable housing units, and 183 market rate housing units, open space areas, improved neighborhood pedestrian and bicycle connections, a 30 percent reduction of site lighting, and a 48 percent reduction in building lighting.

- The **Medic One Administration Relocation Project** is a tenant improvement of space for relocating Medic One Administration Offices in collaboration with Kent Fire Department Regional Fire Authority. The project used low or no VOC paints, high recycled content materials, environmentally preferable products, polished concrete slab, reused materials onsite, and diverted 98 percent Construction and Demolition materials. The NPV of this transaction, measured over ten years, was a positive $1,507,000.
- The **Regional Trail System Surface Repair Program** repairs deteriorating trail subgrade or asphalt as needed re-using crushed asphalt material on site and recycled asphalt pavement used in hot mix asphalt batches. The actual recycled waste diversion was 100 percent totaling 1,300 tons.
- The **Water and Land Stormwater Capital Monitoring and Maintenance Program** includes native revegetation, placement of large woody debris, monitoring and reporting as the key program elements. The sustainable strategies include use of hand crews with hand tools only instead of fuel based equipment to do maintenance of the monitoring sites; salvaged plants used on site; native plants used and maintained; no herbicides or pesticides used; whole crew carpooled in one vehicle to sites to reduce transportation impacts; and composting was done on site for onsite use. No irrigation systems were installed because no watering was needed for native drought tolerant plants, saving 10,000 gallons of water a year.
- The **Sunset/Heathfield Pump Station Replacement and Forcemain Upgrade Project** will help ensure that the Wastewater Treatment Division maintains the ability and capacity to convey South Lake Sammamish Planning Basin. Sustainability strategies include an equity and social justice plan, sustainable materials and waste management, energy efficiency in all systems, exemplary corrosion control for system longevity, potable water efficiency, green roof, habitat enhancement, interpretive signage, and climate change risk mitigation. This is the first of three projects to pilot using the Envision Rating System in combination with WTD Scorecard enhancing their green building efforts.
- The **Bridge Priority Maintenance Program** includes repair and maintenance of King County bridges, and certain city or other agency bridges under contract. The program includes cleaning, washing, replacement of superstructure and substructure elements, expansion joint repair, paving, overlay, and abutment and approach repairs. The sustainable strategies include implementing construction best management such as erosion and sediment control, recycling of construction materials, on-site re-use of materials, reduction of water use for dust control, use of sustainable materials, and applied water management.

APPENDIX E:
Climate Program Costs and Benefits

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Appendix E: Climate Program Costs and Benefits

The 2015 SCAP serves as and meets the requirements for King County's 2014 consolidated environmental report. Per King County Code 18.50, and consistent with King County Ordinance 17270, this appendix includes information about all expenses associated with the climate change program and a cost-benefit analysis of the program. Additionally, Section One of the 2015 SCAP includes the Pilot Cost Effectiveness Assessment which assessed the cost effectiveness of a selection of SCAP GHG emissions reduction strategies.

Approach and Cost of Climate Change Program

The King County Comprehensive Plan includes policies directing King County to reduce greenhouse gas (GHG) emissions, prepare for climate change impacts, measure this work, and collaborate with others on solutions. King County's Strategic Plan includes the objective to "reduce climate pollution and prepare for the impacts of climate change on the environment, human health, and economy."

The 2015 SCAP synthesizes and focuses King County's most critical goals, objectives, and strategies to reduce greenhouse gas emissions and prepare for the effects of climate change. The Comprehensive Plan, Strategic Plan, and SCAP guide King County's efforts as they relate to climate change.

The County's climate change efforts are led out of the Department of Natural Resources and Parks (DNRP). The 2014 expenditure for the two staff positions focused on climate change was approximately $220,000.

The actions needed to carry out climate-related Comprehensive Plan, Strategic Plan and SCAP goals and objectives intersect with the roles and work of multiple departments and divisions in King County. In order to integrate actions and pool technical resources across County agencies, the climate program staff works closely with several climate-focused teams supporting development and implementation of County directives related to climate change. These interdisciplinary teams bring together additional County staff focused on complementary tasks, such as those implementing the Energy Plan, the Green Building and Sustainable Development Program, the Waste Prevention and Recycling Program, the Environmental Purchasing Program, and those in Forestry and Agriculture programs.

The County also pools resources for climate-related technical assessments (e.g., GHG emissions inventories), public outreach, and program development with cities through the Sustainable Cities Roundtable, King County-Cities Climate Collaboration, and through professional associations such as Climate Communities and ICLEI-Local Governments for Sustainability. Membership in these types of organizations gives King County staff ready access to information on local government approaches to reducing climate pollution and preparing for climate changes, federal and state grant programs, and changing regulatory requirements. Dues for these organizations were approximately $25,000 in 2014.

Benefits of Climate Change Program

Supporting implementation of a climate change-related projects and programs, such as those highlighted in this report, have direct climate-related benefits, as well as other benefits, such as reducing water pollution, creating new local green jobs, and enhancing residents' quality of life. Specific financial benefits include:

- **Helping Secure Revenue to Support Related County Projects and Programs.** For example, King County was awarded a $6.2 million Energy Efficiency and Conservation Block Grant from the U.S. Department of Energy (completed in 2012) which prioritized projects that reduce GHG emissions. King County used the grant to support 23 projects, such as energy efficiency retrofits of County facilities, electric vehicle infrastructure installations and planning efforts, and paying for energy efficiency components of affordable housing projects. Climate program-related employees were directly responsible for helping secure, administer and implement these and other revenue and grant sources.
- **Increasing Efficiency of County Operations.** Significant cost savings and new revenue sources have been achieved through climate related projects that reduce GHG emissions by minimizing energy, waste and resource expenditures and by creating new resources such as renewable energy. For example, King County has reduced energy use in government-owned facilities by more than 15 percent between 2010 and 2014, and in doing so has reduced operational resource costs by approximately $3 million annually through related projects.
- **Mitigating Future Climate Change Impacts.** A key benefit relates to minimizing and avoiding climate change risks by integrating climate change science into the planning and design of diverse projects and programs. For example, the Wastewater Treatment Division has been integrating data about sea level rise into wastewater infrastructure design and operations. While it is hard to quantify the financial value of making these forward-looking decisions, it is likely significant. For example, the Washington State Department of Ecology's "Impacts of Climate Change on Washington's Economy" concluded that if GHG emissions are not reduced and proactive steps to minimize impacts are not taken, the annual Washington state price tag of climate change impacts will be at least $3.8 billion by 2020.

There are other, less-quantifiable benefits related to climate solutions: County Council and Executive leadership on the issue, improving relations with King County cities through regional collaboration, improving the quality of life and health of our residents, helping residents and businesses save money on energy and resource costs, supporting community and business environmental and climate efforts, and achieving other environmental sustainability-related objectives.