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Innovations in Climate Action Planning: Oregon's "Roadmap to 2020"

Prepared for the West Coast Climate and Materials Management Forum

David Allaway
Oregon Department of Environmental Quality
Allaway.david@deq.state.or.us
503-229-5479

January 10, 2011

Overview

- Background/History
- Oregon's Global Warming Commission and the "Roadmap to 2020"
  - The process: joys and challenges
  - Recommendations of the Materials Management Committee
  - Feedback from the Commission
- Closing thoughts

Background/History

- 2004: Governor Kulongoski's Advisory Group on Global Warming
  - Technical Subcommittee on Waste and Materials
- 2006 - 2007: Climate Change Integration Group
- 2007: HB 3543
  - Established GHG reduction goals
    - By 2010, arrest growth in GHG emissions
    - By 2020, GHG emissions 10% below 1990 levels
    - By 2050, GHG emissions 75% below 1990 levels
  - Created the Oregon Global Warming Commission

Background/History, continued

- 2008 - 2010: New focus on materials management
  - 2008: DEQ begins work on consumption-based emissions inventory
  - 2008: Formation of West Coast Forum
  - 2009: EPA releases “foundation paper” (systems view of emissions)
  - 2009: Global Warming Commission Chair speaks at Association of Oregon Recyclers conference
  - 2009: Portland Climate Action Plan references systems-based view of emissions, materials life cycle, consumption
  - 2010: Ditto for Eugene
  - 2010: Metro releases a “systems-based” GHG inventory

Background/History, continued

- 2010: Election of a new Governor, Legislature
- 2010: GHG goal is achieved
- 2010: Global Warming Commission looks to 2020 and 2050
  - 2020 emissions 10% below 1990 levels: ~41% reduction per-capita
  - 2050 emissions 75% below 1990 levels: ~88% reduction per-capita

Roadmap to 2020

- Actions to achieve GHG reduction goal for 2020
  - Ideas, not mandates
- Setting the foundation for achieving GHG reduction goal for 2050
- Organized in 6 categories:
  - Energy (utilities)
  - Transportation and land use
  - Industrial emissions
  - Agriculture
  - Forestry
  - Materials management

Corresponds with 6 “technical committees”

Materials Management Committee: Advantages

- Chaired by Angus Duncan, Chair of the Global Warming Commission
- Support from DEQ management to staff the committee
- “Pragmatic” approach to trans-boundary emissions
- Diverse and committed committee members
- Direction to “be bold”
- Inclusion of a vision
- Availability of analytical tools

Materials Management Committee: Challenges

- Time! Time! Time!

START:

  - Meeting #1: July 16
  - Meetings #2 – #4: week of July 26
    - Upstream food
    - Upstream other
    - Downstream/discards management
  - Meeting #5 (final): September 8
  - Draft report: September 13

FINISH:

  - Final report (to Commission): September 16

Background
↓
ID Options (>100)
↓
Evaluate Options (43)
↓
Recommendations (38)

Materials Management Vision and Recommendations

- Available (as revised) at http://www.keeporegoncool.org/content/roadmap-2020

Materials Management Vision for 2050

- Oregon as a leader
- Both production- and consumption-based emissions reduced 88% per-capita (from 1990 levels)
- Shifts to low-carbon production and consumption
  - New incentives and regulations
  - Level playing field for Oregon producers
  - Clear information on product footprints
  - Full-cost accounting
  - “Net zero” buildings
  - Full producer responsibility (full life cycle)
  - Consumer shifts in favor of services, education, savings, investments, low-carbon goods
  - Optimized end-of-life management (reuse, recycling, etc.)
- Significant co-benefits

Key Action 1: Advocate for a carbon price signal across the life cycle of materials

- Emissions cap and/or carbon tax
  - Details not debated by committee
- Should include imports
  - Border adjustment mechanism/carbon tariff
- Potentially very large GHG reductions: 3.4 – 20.6 MMTCO2e in 2020 (not including direct use of fuels and electricity by consumers)

Key Action 2: Develop a consumption-based GHG inventory

- DEQ project currently underway
  - Draft methodology and results reviewed by a workgroup; hope to complete in spring 2011
- Recommended next steps:
  - Complete the DEQ project
  - Consider including consumption-based accounting in future State inventories
  - Additional research as needed into product categories identified as having high emissions, emissions intensity

Key Action 3: Easy-to-use life cycle metrics for different food types

- Food has large GHG impacts
- Develop and disseminate foundational data on industry-average “carbon footprints” of different food categories
  - Which categories are significant (and not)
  - Which life-cycle stages are significant (and not)
- Solid information enables voluntary actions by producers, retailers, and consumers
- GHG reductions of 0.1 – 0.7 MMTCO2e in 2020

Key Action 4: Carbon footprinting, labeling of products

- Footprinting only, or footprinting+labeling
- UK experience:
  - "we manage what we measure"
  - footprinting helps some companies quickly reduce GHG impacts 15 – 20%
- Standards, incentives, and/or mandates
- Opportunities to partner with federal government and/or Western Climate Initiative
- GHG reductions of 0.2 – 3.3 MMTCO2e in 2020

Key Action 5: Focus product stewardship upstream

- All parties involved in the design, production, sale and use of a product take responsibility for minimizing impact throughout all life cycle stages.
  - Greatest responsibility lies with whoever has the most ability to affect the life cycle environmental impacts.
- Current programs (E-Cycles, PaintCare) focus on end-of-life management.
- Much larger potential benefit if product stewardship can focus upstream.
- May focus on “upstream” emissions and/or “upstream” design
  - Design for appropriate durability, repairability, reusability, efficiency
- GHG reductions up to 0.4 MMTCO2e in 2020

Key Action 6: Establish higher standards for new buildings: “net zero” plus offset of materials

- Materials may contribute ~15% or more to the GHG footprint of buildings
- Materials choices also impact energy consumption during occupancy
- “Net zero” buildings produce all of the operational energy that they use
- Requiring an offset for materials would incent optimized design, incent lower-carbon materials
- GHG reductions of 7.2 MMTCO2e in 2020

Key Action 7: Consumer education, information, outreach

- Include materials management in outreach efforts
  - Consumption, waste prevention, low-GHG food choices
- Ideas: “carbon budgets”, social marketing approaches, carbon calculators, promotion of co-benefits
- GHG reductions up to 0.7 MMTCO2e in 2020

Key Action 8: Reduce waste of food at retail, consumer levels

- In 2003, Americans wasted ~1,400 kcal per person per day
  - 40% of available food supply (up from 30% in 1974)
  - Significant GHG impacts
- Need better understanding of causes of food waste
  - Research first
  - Develop programs, policies based on research findings
  - May run the gamut from education to federal farm policy
- GHG reductions of 0.1 – 1.1 MMTCO2e in 2020

Key Action 9: Conduct research on 2 downstream issues

- Highest/best use for organic wastes
  - Composting, anaerobic digestion, co-digestion
  - Consider GHG impacts and other criteria
  - Landfill disposal ban?
- GHG footprint of “conversion technologies” for wastes
  - Pyrolysis, gasification
  - Compare against traditional landfill disposal, mass burn, recycling

29 other Recommended Actions (Tier 2)

- Tax credits
- Achieve prevention/recovery goals
- Shift focus in solid waste planning to materials management
- Policies should treat externalities as internalized
- Low-carbon purchasing, green building
- “Do not mail” registry
- Packaging reduction
- Carbon footprint score for buildings
- Incentives for low-carbon building materials
- Change urban form
- Change code: larger homes must be more efficient
- Expand salvage of building materials

29 other Recommended Actions (Tier 2) (continued)

- Carbon-based metrics for measuring recycling
- Reduce MRF losses
- Expand product stewardship (downstream)
- Expand bottle bill
- Increase recycling outreach
- Require garbage/recycling service parity
- Develop compost markets
- Mandatory food waste collection
- Feed-in-tariff for anaerobic digestion
- Improved landfill research
- Require changes in landfill covers, gas collection
- Others

Commission Response

- Some confusion about materials management
- No silver bullet (except for a high price on carbon)
  - Lots of “eyedroppers”
- Some antipathy towards education, “social engineering”, “behavior modification” (unless done technologically)
- “Diet shifting” is a sensitive issue for some – description of one key action was changed
- Commission accepted committee’s recommended vision and actions for inclusion in “Interim Roadmap”
  - Public comment, revision in 2011

Closing Observations

- Implementation will be a challenge
  - Large list of options, prospect for new resources is dim
- No pushback over inclusion of trans-boundary/non-inventoried emissions
- Surprisingly, the Materials Management Committee (w/DEQ) conducted more analysis of emissions reduction potential than most other committees
  - But analysis still didn't go far enough
- A lot of power in a vision, done well
- Strong stakeholder support and good will to reduce emissions . . . to a point
- Solid mix of "discards management" and other "materials management" – good stretch of the proverbial envelope

Climate Change and Materials Management

Where have we come from,

where are we going

Materials Management

- **An approach to using and reusing resources most productively and sustainably throughout their life cycles,**
  - minimizing the amount of materials involved
  - minimizing associated environmental impacts.

- **Can result in significant GHG savings.**

Opportunity Knocks:

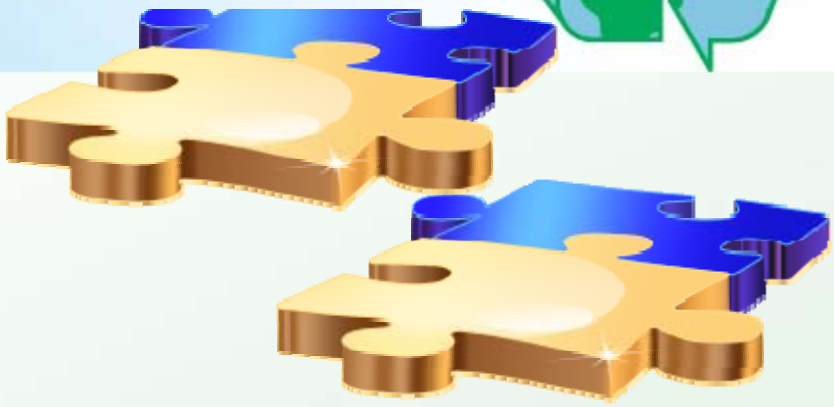
- **In 2006, the U.S. recycled over 80 million tons of municipal solid waste**
  - Equivalent to conserving 182 million metric tons of carbon dioxide equivalent (MMTCO2E).
  - Additional 300 MMTCO2E in unrealized opportunities.
    - Source: *Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices*. U.S. EPA, September 2009
    - 2009 numbers are similar

- **These opportunities are short term, high impact, lower cost and don't require huge changes in infrastructure.**

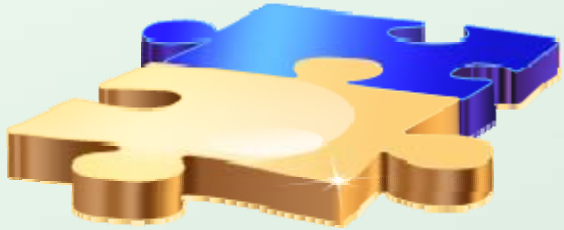
West Coast Climate and Materials Management Forum

Where have we come from,
where are we going

We decided:
Create Solutions Together



- **West Coast Government Reps**
- **Get Educated**
- **Make a Plan**
  - identify areas of collaborative effort and strategic actions to reduce greenhouse gas (GHG) emissions through improvements in ***waste prevention, recovery, and disposal***
- **Develop a Joint Statement**
  - 2008 and 2009 Joint Statement
  - 2010 Joint Statement to be developed at Forum Annual Meeting



- **Work together to develop solutions**

Timeline – a lot in 3 years

- June, July & August 2008: First Climate/Materials Management Webinars
- September, 2008: West Coast Forum Meeting in Seattle
  - Objectives Created
  - Workgroups on Materials Management, Inventory, Research, Communications & Product Stewardship formed
- July 2009: WARM Webinar
- December 2009 West Coast Forum Video Conference Meeting with sites in Seattle, Portland, & Sacramento
  - Consumption Workgroup added
- 2010 Climate Action Toolkit Wiki built
- 2010 Consumption retreat
- 2010 New Governments engaged
- January 2011: West Coast Forum Video Conference Meeting with sites in Seattle, Portland, Los Angeles and Sunnyvale, CA.
  - What are our accomplishments from these two days???

2010 Priorities
From the December 2009 Forum

- Identifying key opportunities to address the upstream GHG reduction inherent in **reducing and shifting consumption**. *(consumption workgroup)*
- Develop **communication tools and positive messaging** that reflects our work and reflects the thinking and work of others. *(outreach and communication workgroup)*
- Work towards the development of state, community and city level **inventories and action plans** that take a consumption based or systems based approach; *(inventory workgroup)*
- Engage in innovative and important **materials management projects**, such as carpet and organics management; *(materials management workgroup)*

2010 Priorities
From the December 2009 Forum

- Articulate the connection between strategies such as **product stewardship** and the GHG emissions reductions associated with waste prevention; *(materials management workgroup)*

- Develop, communicate and coordinate actions around the necessary **research agenda** to support the above priorities. *(research workgroup)*

- Provide **concrete actionable tools** for policymakers, program managers and elected officials to make informed choices, provide to information to the public, create immediate actions and communicate effectively; *(all)*

Thanks to our Workgroup Leads – without you – it wouldn't happen.

- **Research –**
  - Babe O'Sullivan, City of Eugene
- **Materials Management**
  - John Davis, Mojave Desert and Mountain Recycling Authority
  - Bill Smith, City of Tacoma
- **Communications**
  - Geoff Glenn – City of Spokane
  - Saskia Van Gendt – US EPA, Region 9
- **Consumption**
  - Viccy Salazar, US EPA, Region 10
- **Inventory**
  - David Allaway, Oregon Department of Environmental Quality
  - Shannon Davis, US EPA Region 9
- **Product Stewardship**
  - McKenna Morrigan, Fellow, US EPA Region 10

Materials Management is Not Limited to Climate Action Planning

- **A lifecycle approach to public policy and strategic planning**
  - Energy Efficiency Plans
  - Sustainability Plans
  - Solid Waste Plans

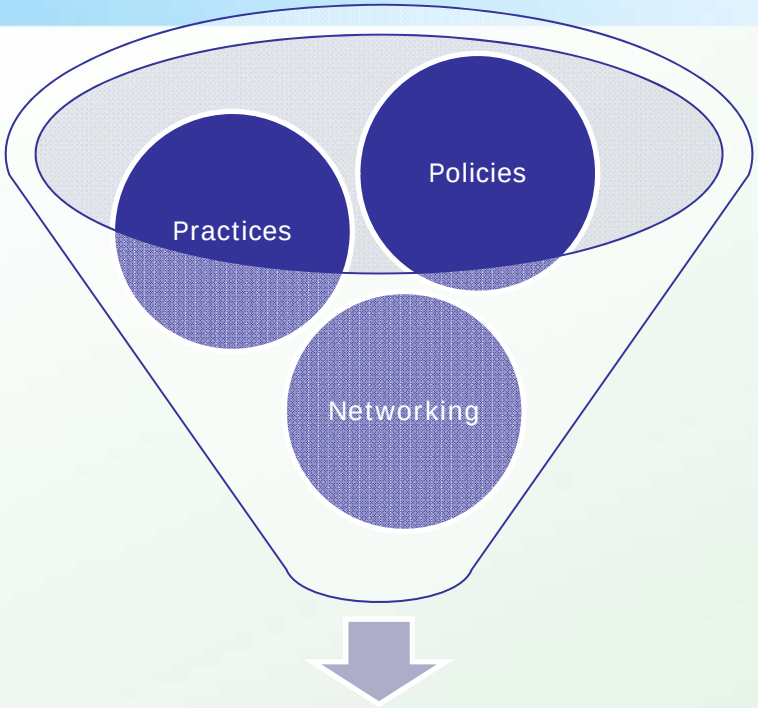
If Understanding Materials Management Were Easy……

Requires a Different Perspective

Demands New Thinking

Challenges Long Held Beliefs & Behaviors

Tell Us What You Need



GHG Reductions

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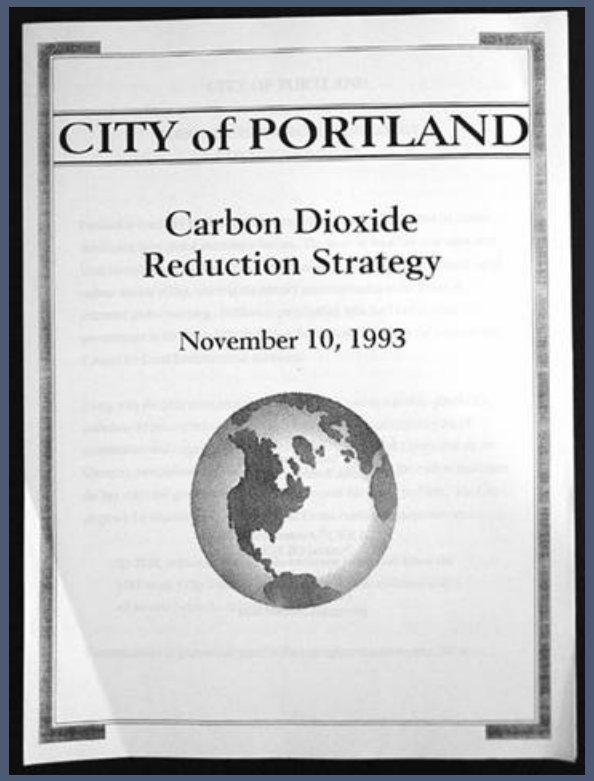
Climate Action in Portland

Michele Crim, City of Portland

Bureau of Planning and Sustainability
Innovation. Collaboration. Practical Solutions.

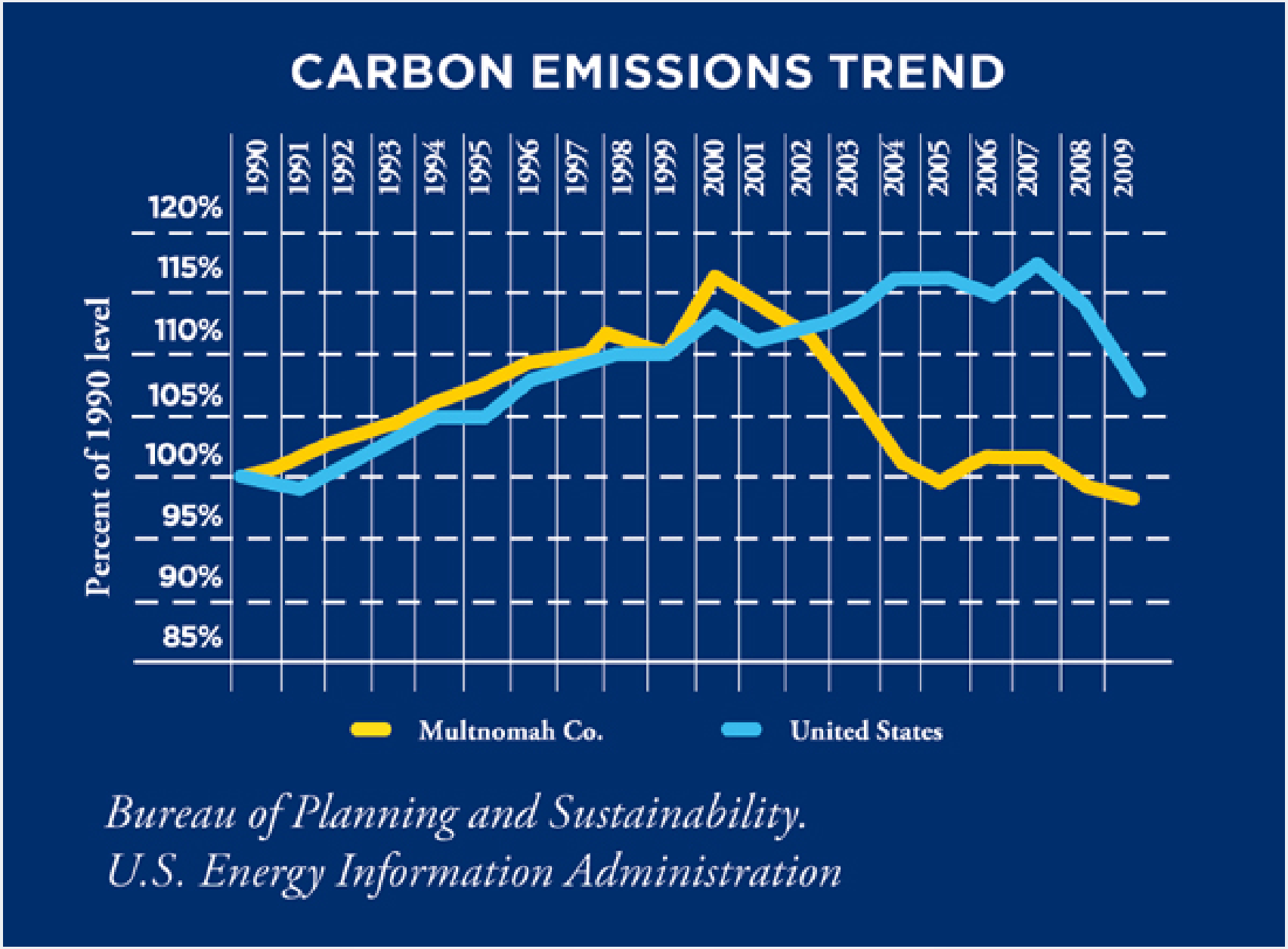
Prior Climate Plans

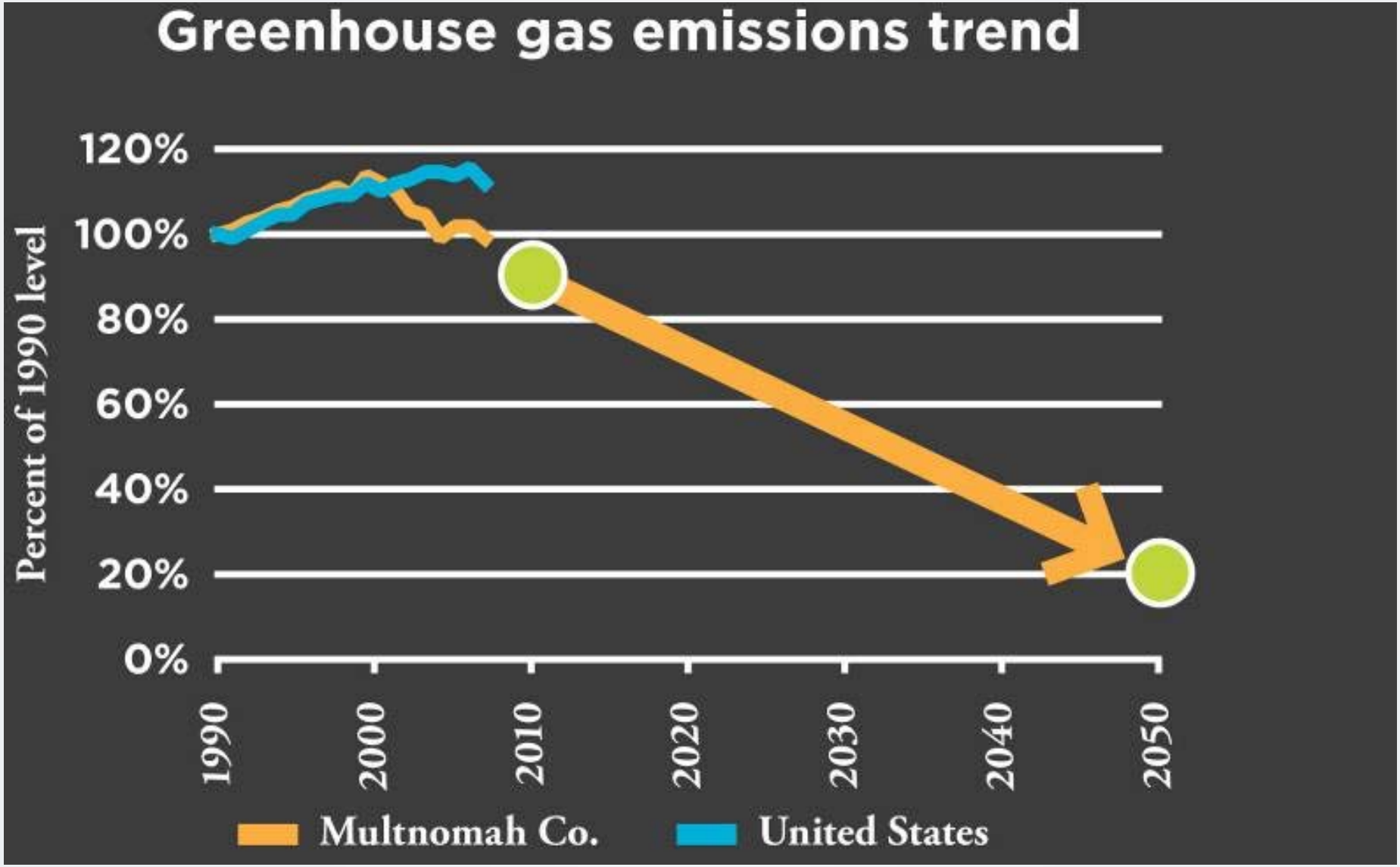
1993



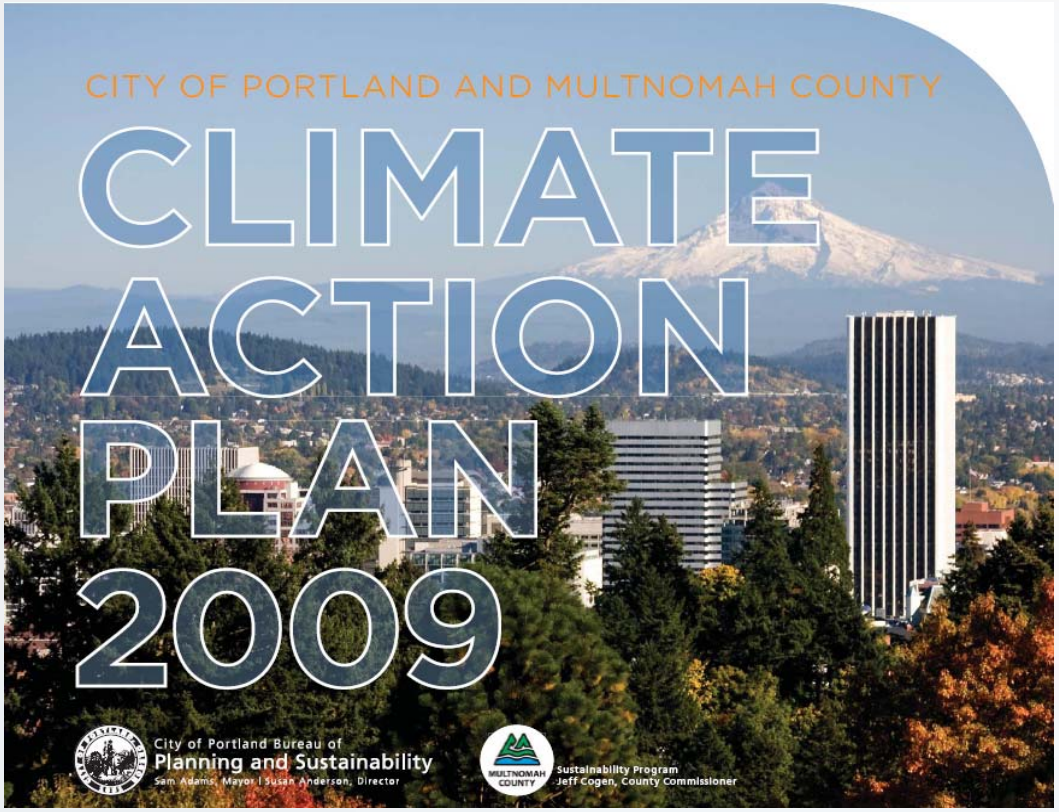
2001

10% Below 1990 by 2010


CARBON EMISSIONS TREND
Percent of 1990 level
120%
115%
110%
105%
100%
95%
90%
85%
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Multnomah Co.
United States
Bureau of Planning and Sustainability.
U.S. Energy Information Administration


Greenhouse gas emissions trend
120%
100%
80%
60%
40%
20%
0%
Percent of 1990 level
1990
2000
2010
2020
2030
2040
2050
Multnomah Co.
United States

Climate Action Plan



2050 Goal:
80% emissions reduction

2030 Interim Goal:
40% emissions reduction

2030 Objectives

2012 Actions

Eight Climate Action Areas

3 CONSUMPTION AND SOLID WASTE

- Reduce total solid waste generated by 25% by 2030
  - Encourage durable, repairable, reusable
  - Reduce materials go to waste, including food
  - Reduce consumption of carbon-intensive consumer goods

3 CONSUMPTION AND SOLID WASTE

- Recover 90% of all waste generated
  - Mandatory commercial food waste collection
  - Assist 1,000 businesses
  - Construction and demolition debris, with priority for salvage and reuse
  - Public place recycling

3 CONSUMPTION AND SOLID WASTE

- Reduce carbon impacts of collection system
  - Weekly curbside collection of food scraps, compost and recycling
  - Every-other week garbage collection
  - Diesel particulate filters on hauling trucks

6 COMMUNITY ENGAGEMENT

PortlandClimateAction.org

6 COMMUNITY ENGAGEMENT

Home | What We Do | News and Events | Library | About Us | Intranet

Planning | **Sustainability**

POL → Government → Bureaus & Offices → Planning & Sustainability → What We Do → Sustainability → Garbage and Recycling → **Be Resourceful**

Be Resourceful

In the Kitchen
Learn actions Portlanders are taking at home.

Share Your Story
What creative ways are you being resourceful?

Portland Stories

Find Local Resources
Local places to share, fix, reuse and experience.

In the News

In the news

Help the planet: Stop wasting food - Los Angeles Times

Get trendy with a reusable bag in every color, pattern and logo, just don't go overboard with too many bags - The Oregonian

From Farm to Fridge to Garbage Can - The New York Times

The Conscious Consumer Blog - A step-by-step guide to wasting less food

Where to practice being resourceful

Local places to share, fix, reuse and experience.

Learn more »

Share your story

What creative ideas have helped your family get more of the good stuff?

Submit your story »

Be resourceful... in the Kitchen

Ten actions Portlanders are taking at home.

Learn more »

portlandonline.com/bps/BeResourceful.com

portlandonline.com/bps/climate

Michele.Crim@portlandoregon.gov

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Eugene Climate and Energy Action Plan

Today's Outline

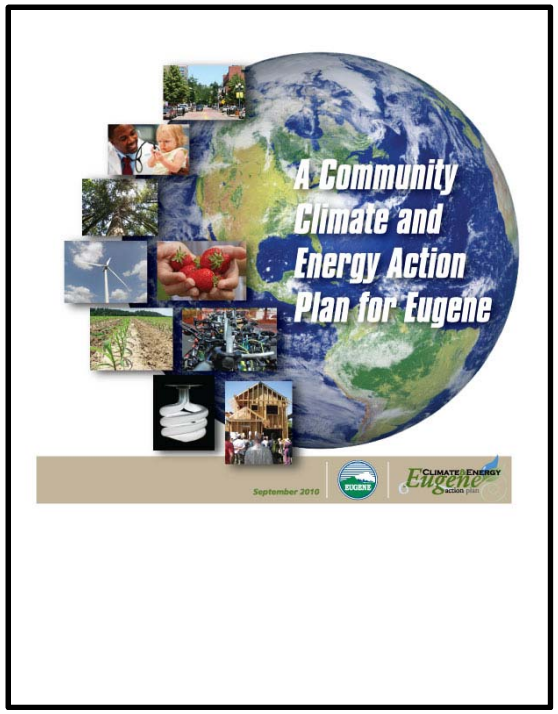
- A bit about Eugene
- Eugene's Climate and Energy Action Plan
- Systems GHG inventories
- Eugene's CEAP recommendations
- Signs of progress

Eugene, Oregon

Population:154,000

Size: 40.5 square miles

Eugene Climate and Energy Action Plan



Eugene's first CEAP approved by City Council in September 2010

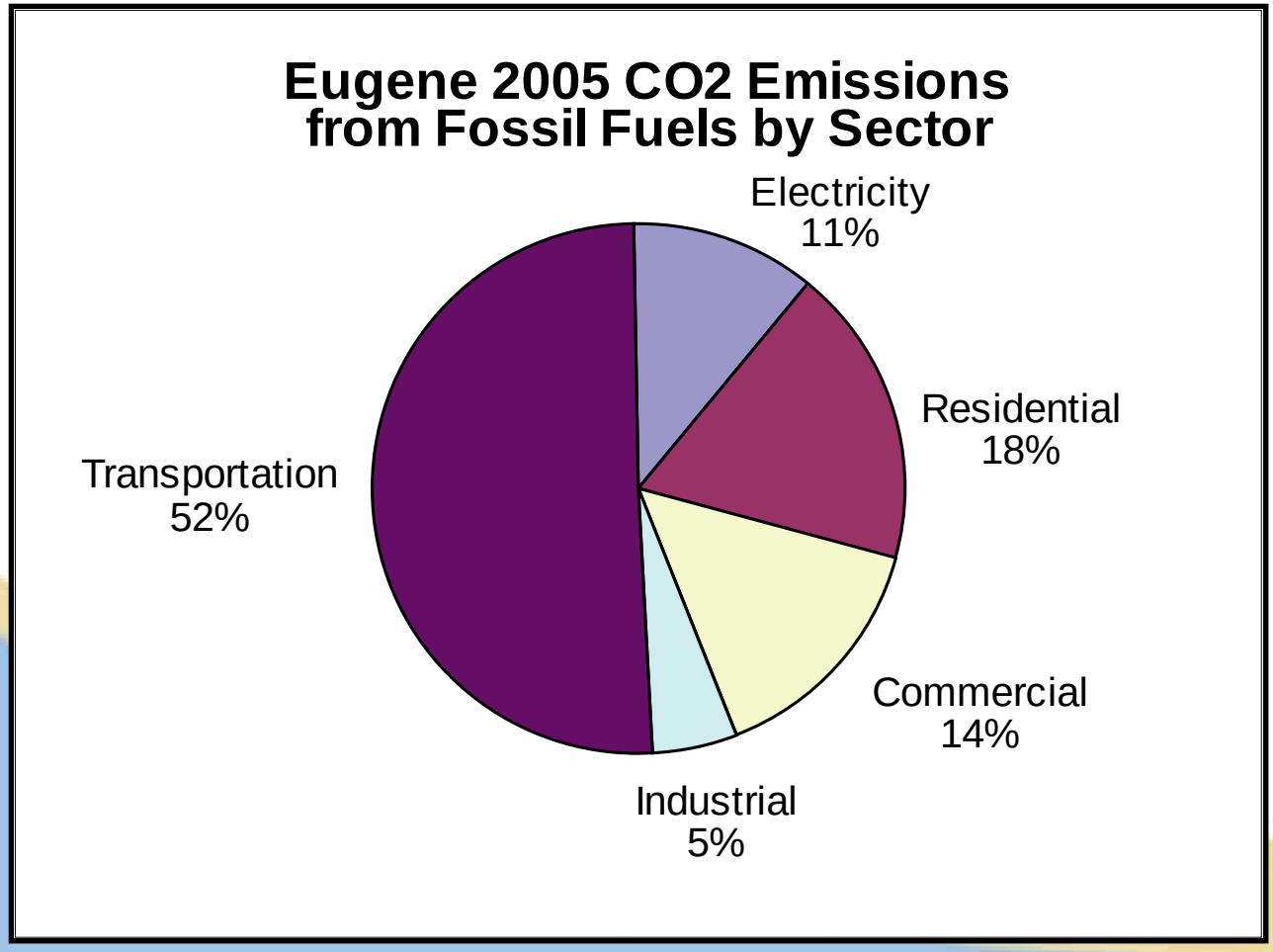
Eugene Climate and Energy Action Plan

Plan goals:

- Reduce GHGs
- Adapt to climate change
- Reduce exposure to rising and volatile fuel prices

Eugene Climate and Energy Action Plan

Eugene Sector-based GHG inventory (2007)



Eugene Climate and Energy Action Plan

- Question: How do we accommodate our growing understanding of the influence of materials and consumption?

- Leave the door open on plan format

and

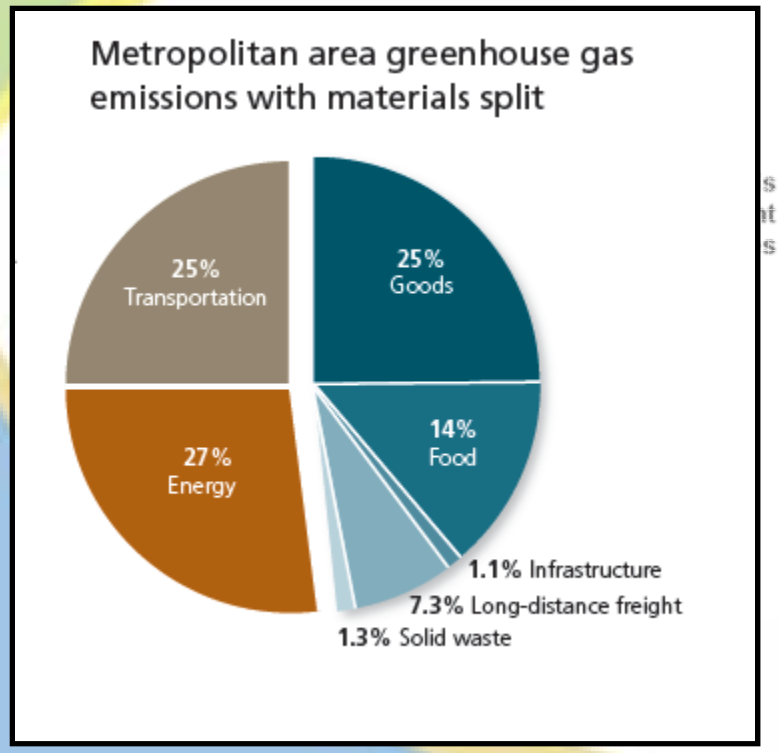
- Include *Consumption and Waste* as one of six sections of our plan.

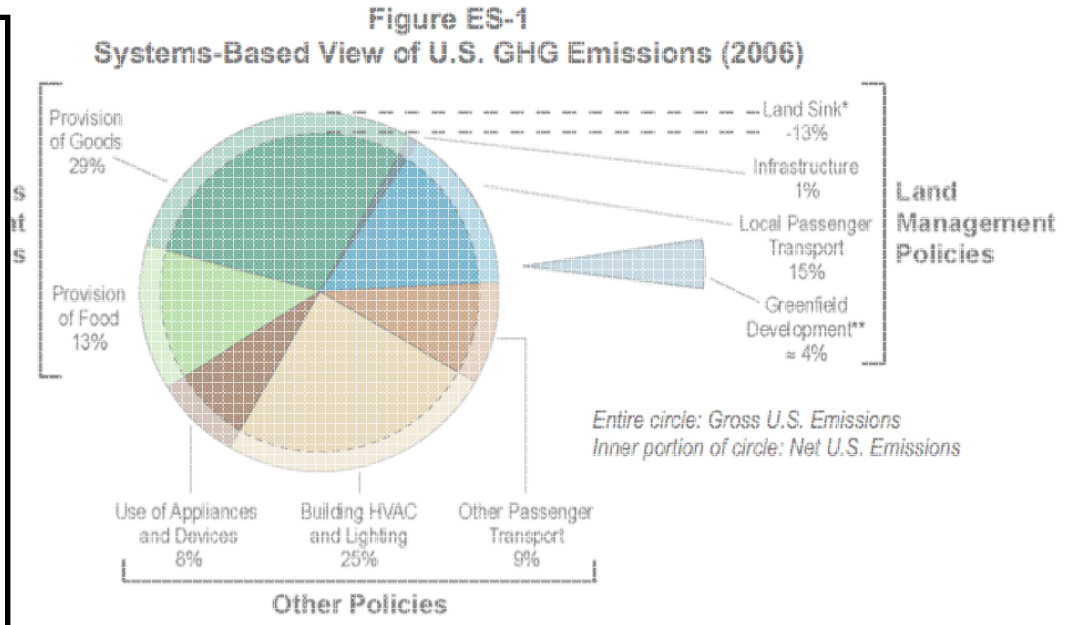
Eugene Climate and Energy Action Plan

Plan broken into six sections:

- Buildings and Energy
- Food and Agriculture
- Land use and Transportation
- **Consumption and Waste**
- Health and Social Services
- Urban Natural Resources

Systems-based GHG inventories: The “bleeding edge”





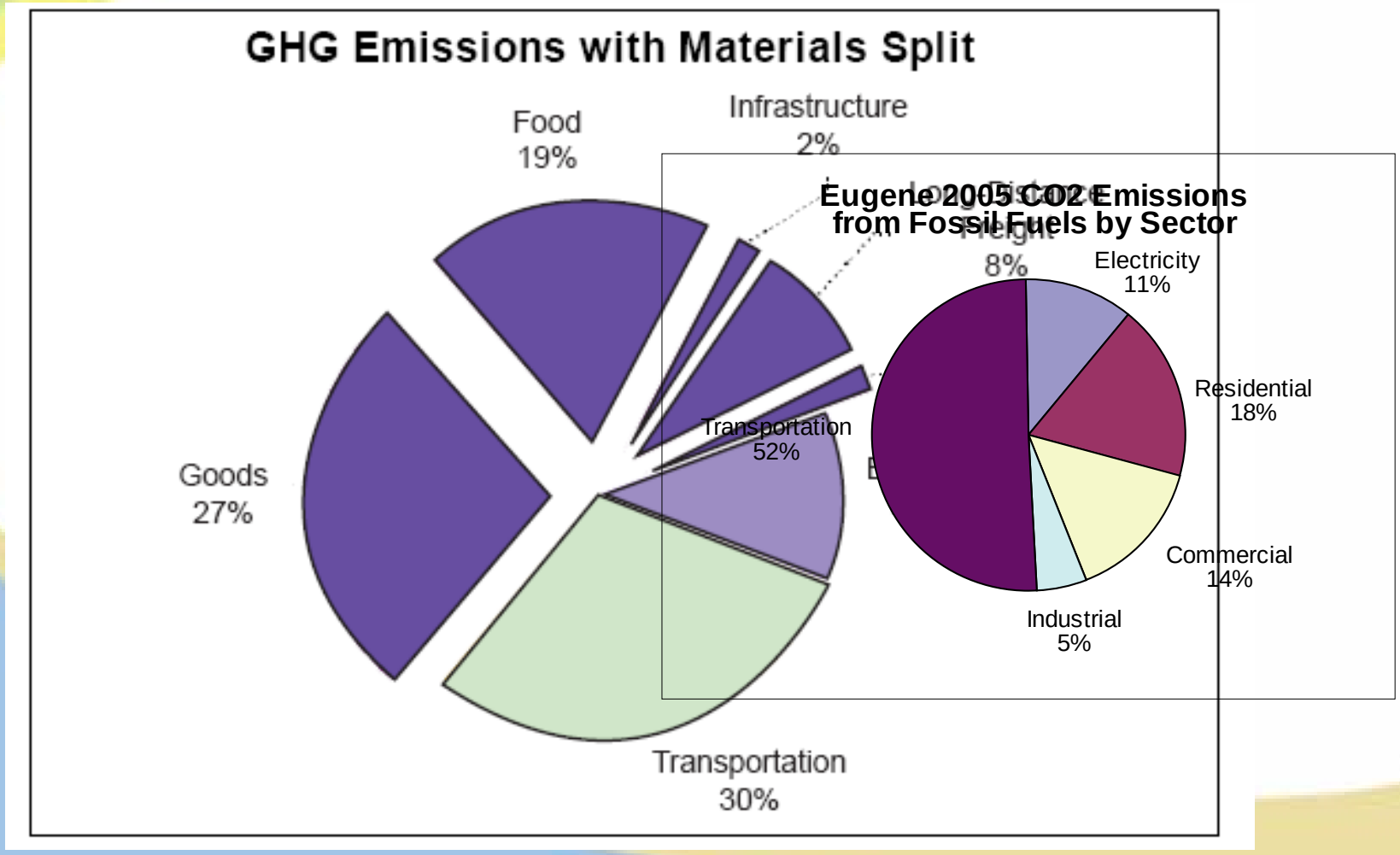
Telling the story

- The timing was good:

  Portland's CAP calls out consumption but doesn't rely on a systems based inventory.

- Lane Council of Governments (LCOG) working on Eugene/Springfield regional systems based GHG inventory.....

LCOG regional systems based inventory



Specific recommendations:

Specific recommendations:

Consumption and Behavior change

- Lobby at the state level for better product labeling including GHG emissions labeling.

POWER CONTENT LABEL

ENERGY RESOURCES	PRODUCT NAME* (projected)	2007 CA POWER MIX** (for comparison)
Eligible Renewable	**55%**	**10%**
-- Biomass & waste	10%	<1%
-- Geothermal	11%	2%
-- Small hydroelectric	13%	6%
-- Solar	10%	<1%
-- Wind	11%	2%
Coal	**16%**	**32%**
Large Hydroelectric	**12%**	**24%**
Natural Gas	**16%**	**31%**
Nuclear	**1%**	**3%**
Other	**<1%**	**0%**
TOTAL	**100%**	**100%**

* 50% of this product is specifically purchased from individual suppliers.

** Percentages are estimate annually by the California Energy Commission based on electricity sold to California consumers during the previous year.

For specific information about this electricity product, contact Company Name. For general information about the Power Content Label, contact the California Energy Commission at 1-800-555-7794 or www.energy.ca.gov/consumer

Specific recommendations:

Consumption and Behavior change

- Educate businesses and residents about the role of consumption in GHG emissions.

Specific recommendations:

Improve Commercial Sector Recycling

- Enact a local ordinance to increase waste recovery rates from *commercial* and *multi-family* buildings.

Specific recommendations:

Improve Commercial Sector Recycling

- Enact an ordinance requiring all construction and demolition waste be sorted for reusable or recyclable materials.

Specific recommendations:

Establish organics collection and processing program

- Establish a composting facility that can accept food wastes.
- Develop a food waste collection program and rate structure.

Specific recommendations:

Establish organics collection and processing program

- Conduct a pilot project at the municipal wastewater treatment plant to co-digest food waste and biosolids to generate electricity.

Specific recommendations:

Target carbon intensity

Follow research and incorporate findings from:

1) EPA West Coast Forum on Climate Change and Materials Management

2) Recommendations from the Oregon Governor's Global Warming Committee's Roadmap 2020 plan (Materials Management subcommittee).

3) Oregon DEQ systems-based GHG inventory.

Specific recommendations:

Consumption and recycling in city facilities

- *Set targets* and *create measurements* to increase the effectiveness of current sustainable purchasing policies

Specific recommendations:

Consumption and recycling in city facilities

- Reduce public agency purchase of greenhouse gas-intensive goods by 2014.

Progress

Composting commercial food waste

- One local commercial composting facility has a permit to accept food waste - and expects to begin accepting all types of food waste in June 2011.

Progress

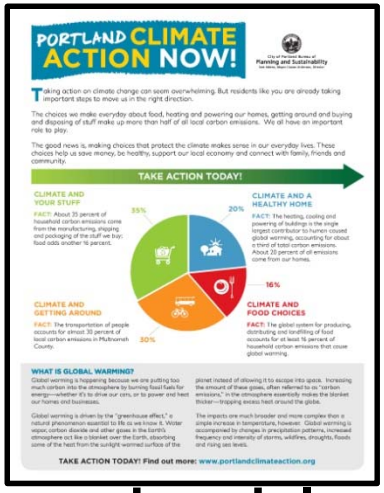
Toward internal zero waste

- Completing internal operations zero waste plan.

Progress

Preparing an education campaign

Drawing on the work of others:

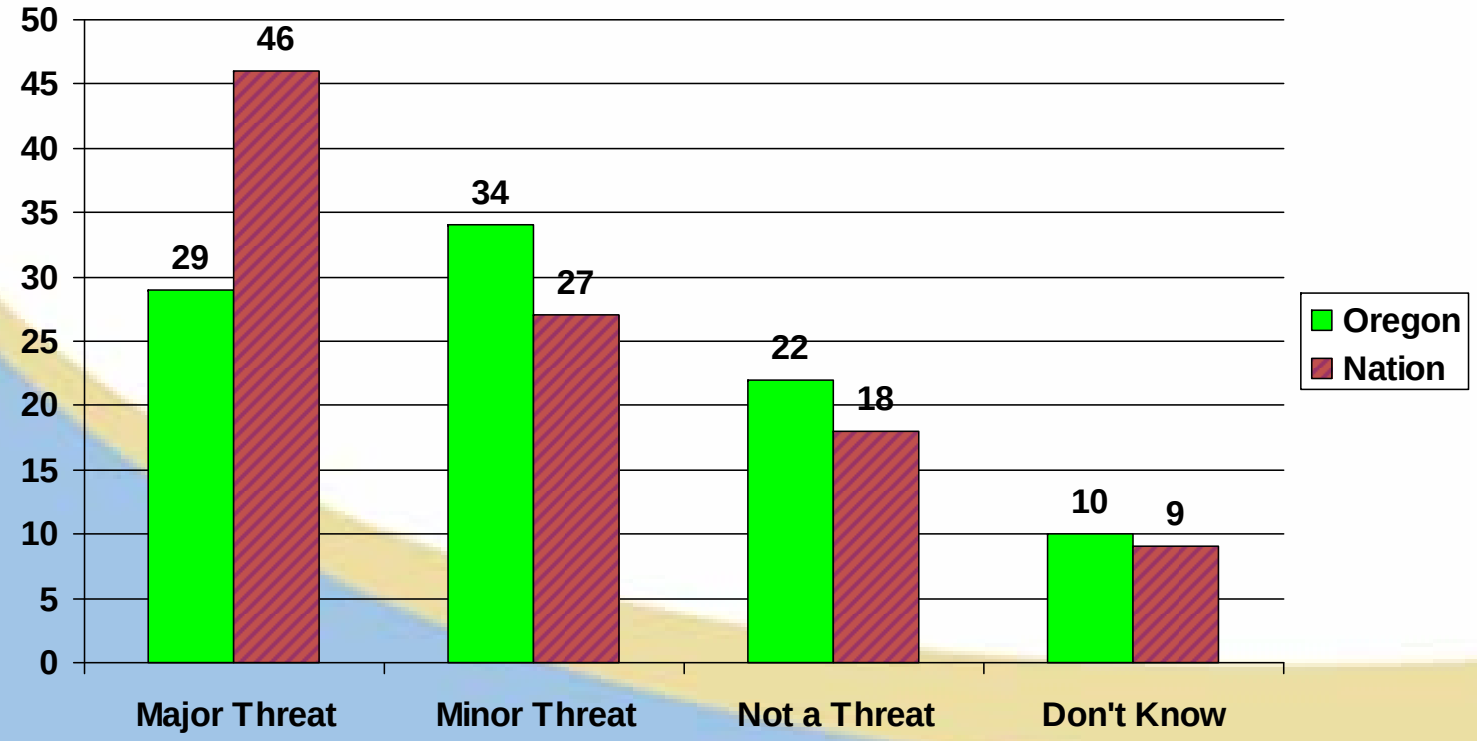


- Portland campaigns:
  - *Climate Action Now*
  - *Be Resourceful*
- EPA pilot project on sustainable consumption outreach
- Policy Interactive

Progress....and food for thought

"Looking ahead 50 years from today, do you think global warming will be a major threat to human life on earth, a minor threat, or not a threat?"
(Oregon & USA Compared)

PI in various solid colors April 2008 n=400; Hatched Bars From Princeton Research Assoc. Aug 1 2007 USA n=1002

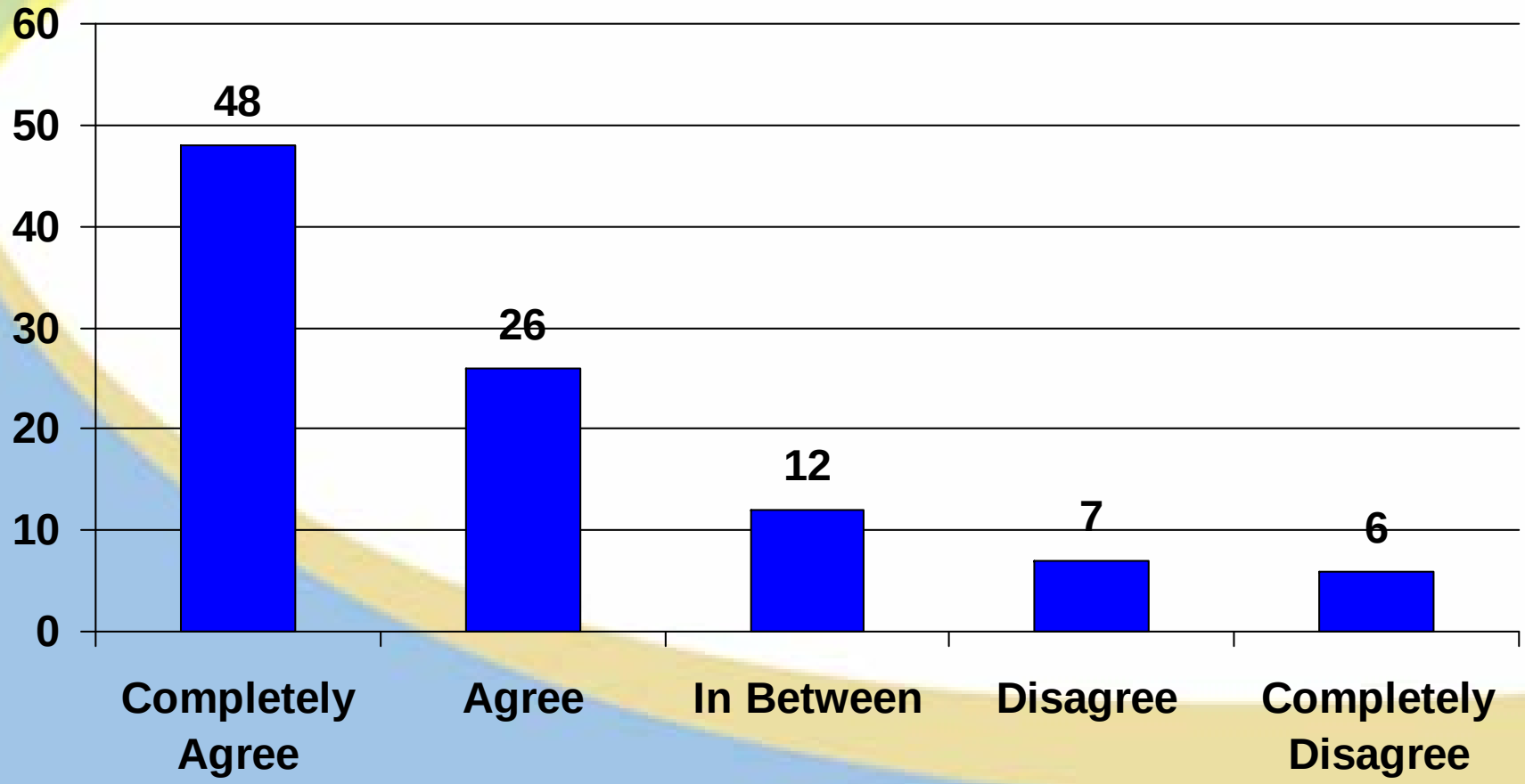


Source: PolicyInteractive public opinion research - www.policyinteractive.org

Progress....and food for thought

"Our country would be a better place if we all consumed less."

(V1A) (PI November 2008 n=400)

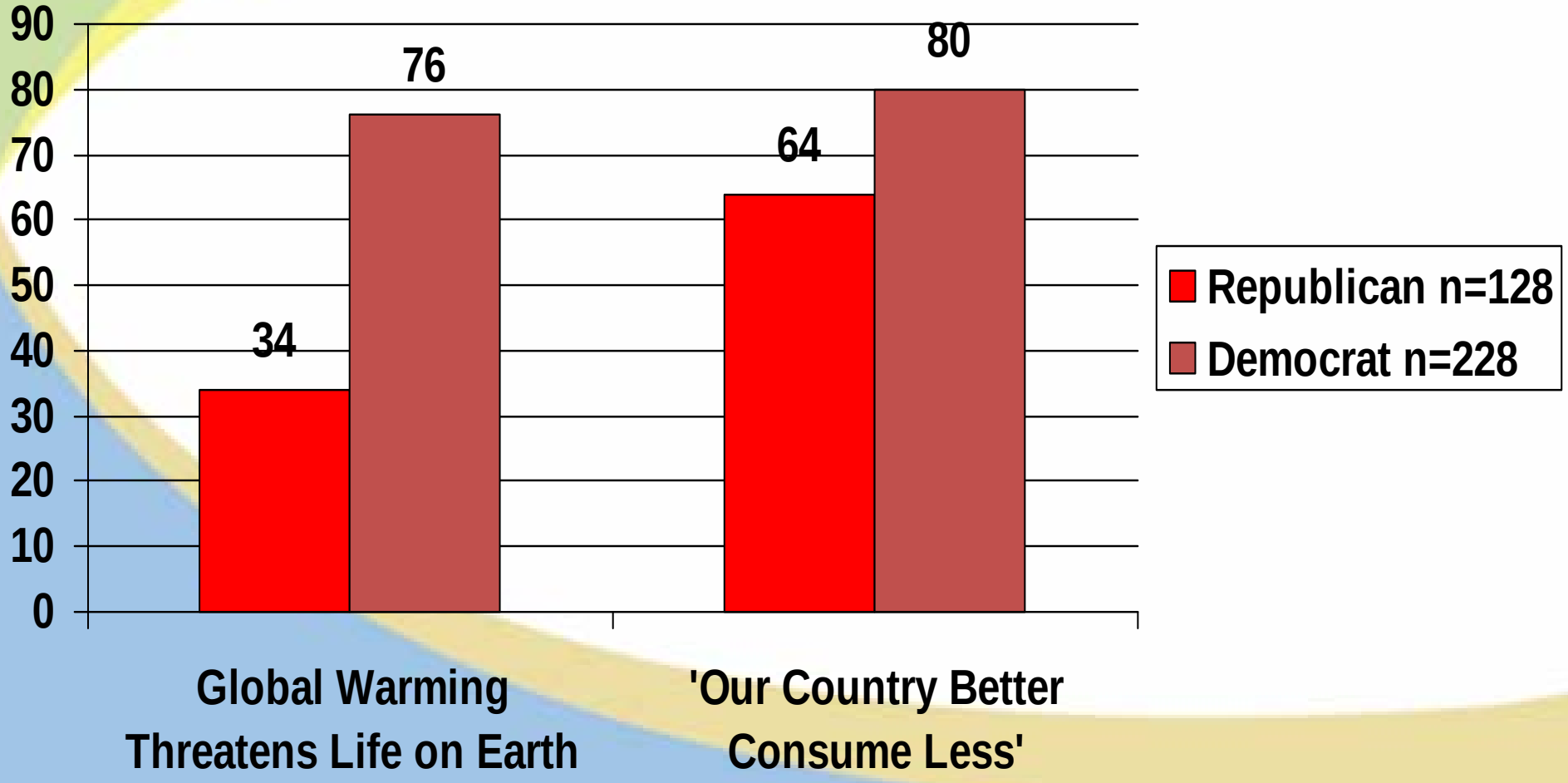


Source: PolicyInteractive public opinion research - www.policyinteractive.org

Progress....and food for thought

Political Party Ideology Comparison
Compare Global Warming / Consume less

PI November 2008 n=400 V4A/V1A (expressed as % Agreement of Sector)



Source: PolicyInteractive public opinion research - www.policyinteractive.org

Eugene Climate and Energy Action Plan

King County
Climate Change Solutions

Website: http://www.kingcounty.gov/climate

Email: climatechange@kingcounty.gov

Matt Kuharic, Department of Natural Resources and Parks Director's Office

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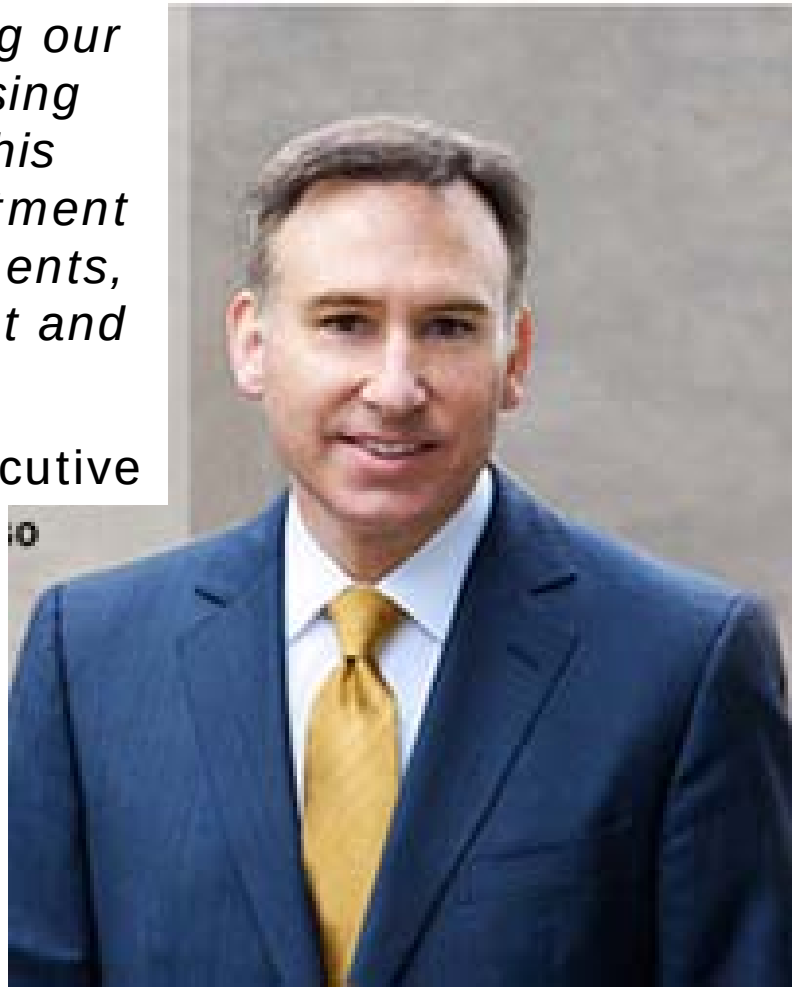
Message from the Executive

Climate change is already affecting our community and will have increasing impacts in the coming years. This website reflects my strong commitment to making county actions, investments, and performance more transparent and accessible to the public…

Dow Constantine, King County Executive



King County
CLIMATE CHANGE

Key Policies and Targets

King County Comprehensive Plan

- Collaborate to reduce regional climate pollution by at least 80% below 2007 levels by 2050

King County Strategic Plan

- Reduce climate pollution and prepare for the effects of climate change on the environment, human health, and the economy

Numerous specific efforts and policies on:

- Green building and sustainable development, flood protection, electric vehicles, energy efficiency and renewable energy…

Why is the County Taking Action?

New Revenue Sources

National Security

Risk Management

The Climate Imperative

Equity and Social Justice

Public Health

Puget Sound Protection

New Jobs

Leadership

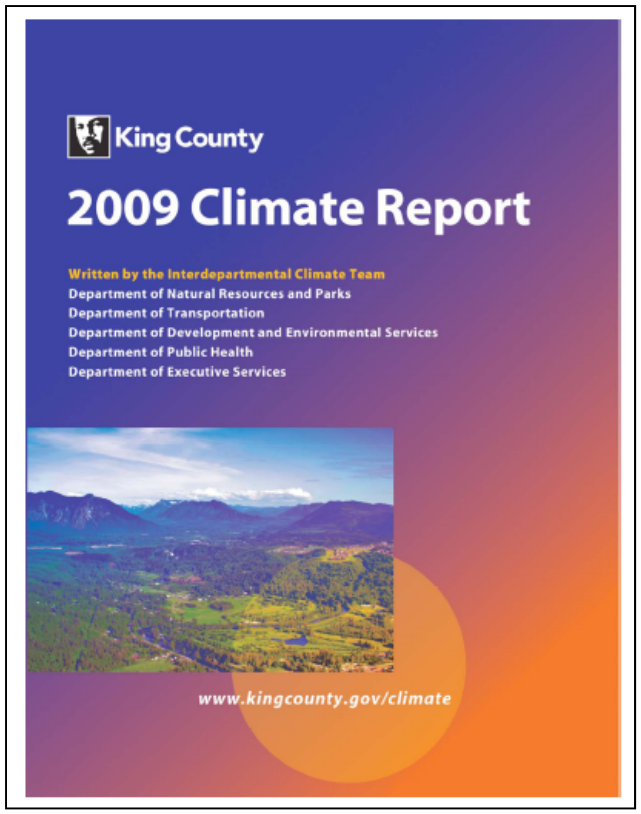
Economic Development

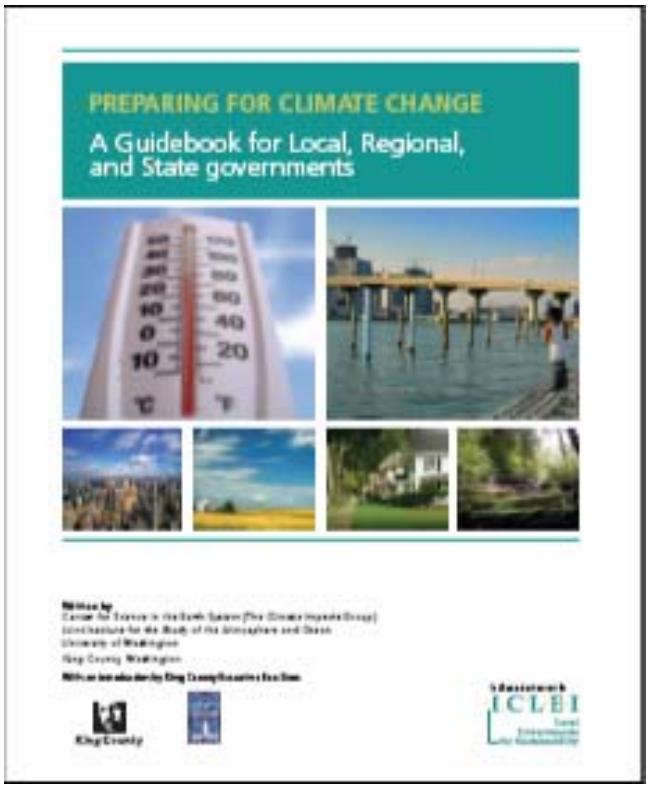
Reducing Energy Costs

King County Climate Solutions Highlights

- 2000
  - First greenhouse gas emissions inventory
- 2005
  - “The Future Ain’t What it Used To Be” climate conference
- 2006
  - Joined the Chicago Climate Exchange
- 2007
  - Developed a King County Climate Plan & an Energy Plan
  - Co-authored with UW the Climate Adaptation Guidebook
  - Flood Control District created
- 2008
  - Updated Green Building and Sustainable Development Policy
  - Transit Now!; Evergreen Fleet Initiative
- 2009
  - Completion of the Cedar Hills Landfill renewable project
- 2010
  - Implementation of $6 million to support electric vehicles
  - 2010 King County Energy Plan
  - **Focus on integrating climate lens into all decision making**

Leadership; Mitigation; Adaptation; Assessment



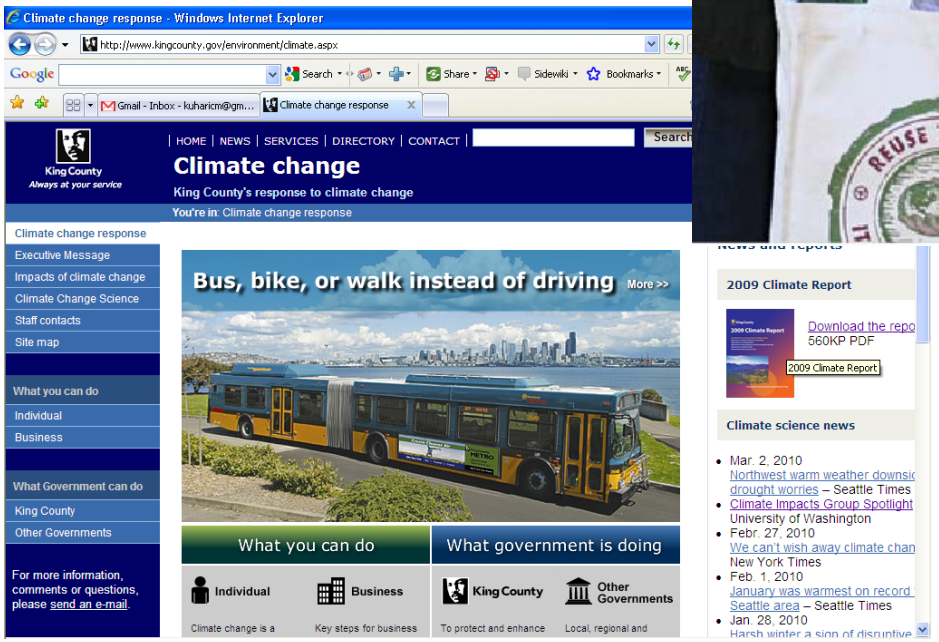


See www.kingcounty.gov/climate for the latest

Leadership

COLLABORATION

OUTREACH AND EDUCATION



ADVOCACY

Mitigation

CLEAN MOBILITY

Mitigation

WASTE TO RESOURCES AND ENERGY

ENERGY AND RESOURCE EFFICIENCY

King County Solid Waste Division Efforts…

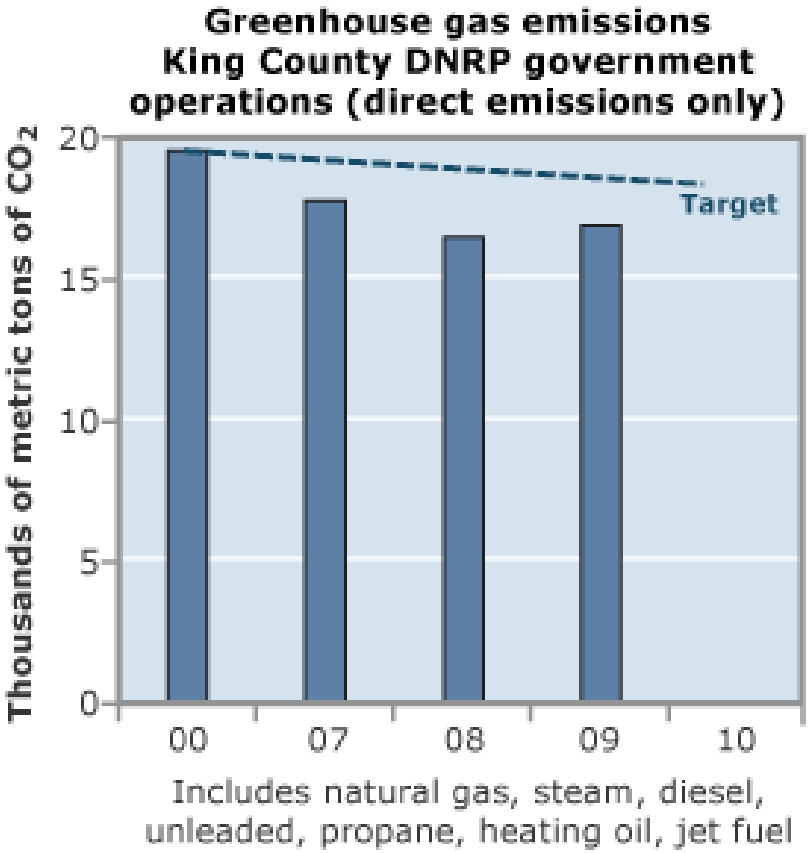
Adaptation

BUILT ENVIRONMENT

NATURAL ENVIRONMENT

Assessment

OPERATIONAL GOALS



COMMUNITY GOALS

Community Inventories and Measurement Framework Project – focus of 1/11 presentation

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Seattle's Climate Action Plan Update

Presented to:

West Coast Climate and Materials Management Forum

January 10, 2010

Carbon Neutral Seattle

Process

- **Phase 1: Building the Foundation**
  - Develop the analytical framework for understanding the emission reduction challenge ahead.
  - Fall 2010 – Spring 2011

- **Phase 2: Update the Action Plan**
  - Produce next generation plan with five year actions and strategic framework for ongoing decision making.
  - Spring 2011 – Spring 2012

Building the Foundation

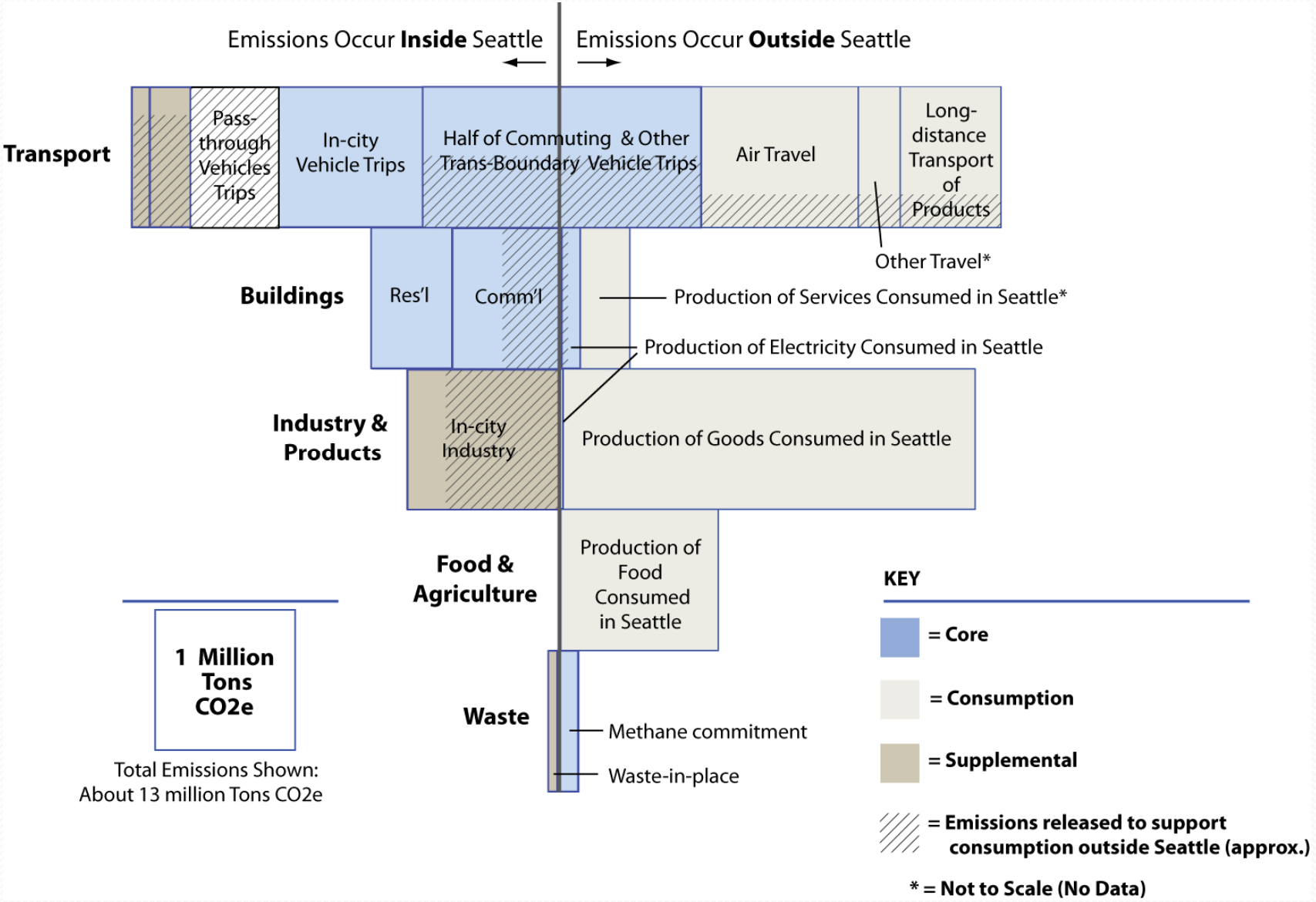
- **Updating the goal**
  - How far and how fast?
  - What emissions sources to count, and how to count them?
- **Establishing the baseline**
  - Where are we headed with existing actions
  - Where are we headed with or without federal action?
- **Sectoral analysis**
  - Opportunities and barriers for emissions reductions?
  - Emission sources can local communities more directly impact?
- **Scenario analysis**
  - What's possible with maximum effort?

Seattle's Climate Protection Goal

- **Carbon Neutral Emissions Goal**
  - Zero net greenhouse gas emissions by 2050

- **Carbon Neutral Community Goal**
  - What will Seattle look like if it's "carbon neutral."
    - % decrease in per capital VMT
    - % increase in Seattle vehicle fuel efficiency
    - Mode split targets
    - % decrease in per capita energy use
    - % of residents living in Urban Village/Urban Centers

Seattle GHG Emissions by Scope



Carbon Neutral Accounting Framework

- **Core Emissions Framework** based on a modified geographic inventory of sources over which the City has significant influence, like transportation and building energy. (Core emissions)

- **Household Emissions Framework** based on the life cycle emissions of goods and services consumed in Seattle to help residents take meaningful action to reduce their carbon footprint (Core + Consumption emissions)

Scenario Design

- **Baseline:** Business-as-usual perspective, accounts for expected developments and existing federal and state policies

- **Carbon Neutral Scenario**: Assume "maximum deployment" of strategies and technologies based on plausible penetration rates and available technologies
  - Buildings
  - Transport
  - Electricity/fuel supply
  - Waste management

Seattle Carbon Neutral Scenario Strategies

Passenger Transportation	**Freight Transportation**
1. Mobility, reducing VMT, and shifting travel modes: a) Transit, b) Land Use & Compact Development, c) VMT Pricing, d) Pay as You Drive (PAYD) Insurance, e) Parking, f) Bicycle infrastructure, g) Pedestrian infrastructure, h) Employer-Based Commute Programs 2. Electrification 3. Fuel Economy 4. Biofuels	1. Reducing freight travel 2. Electrification 3. Fuel Economy 4. Biofuels
Residential Buildings	**Commercial Buildings**
1. New Building Design 2. Building Retrofit and Renovation 3. Electrification of Existing Buildings 4. Compact Neighborhoods	1. New Building Design 2. Building Retrofit and Renovation 3. Electrification of Existing Buildings

Next Steps

- Finalize the analytical work
  - Core emissions scenario
  - Consumption scenario – derived from King County work
- Climate Action Plan update
  - Community process to engage residents in action planning
  - Technical teams to develop action recommendations
  - Advisory body to vet recommendations
  - Strategic plan to guide City investment