



Interstate Technology Regulatory Council
Emerging Issues Workshop
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Control of Greenhouse Gas Emissions in Oregon

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Presentation Outline

- Climate change action in Oregon
 - Brief history
 - 2007 Legislative session
- Oregon's participation in the Western Climate Initiative (est. 2007)
- 2009 Oregon Legislative session
- New Directions: Life-Cycle Analysis



Fighting Climate Change in Oregon: A Brief History

Landmark GHG Reduction Measures:

1997: CO₂ emission standard offsets

2005: Clean tailpipe standards

Governor's Task Force Reports:

**2004: "Oregon Strategy for Greenhouse Gas
Reductions"**

**2008: "Framework for Addressing Rapid Climate
Change"**



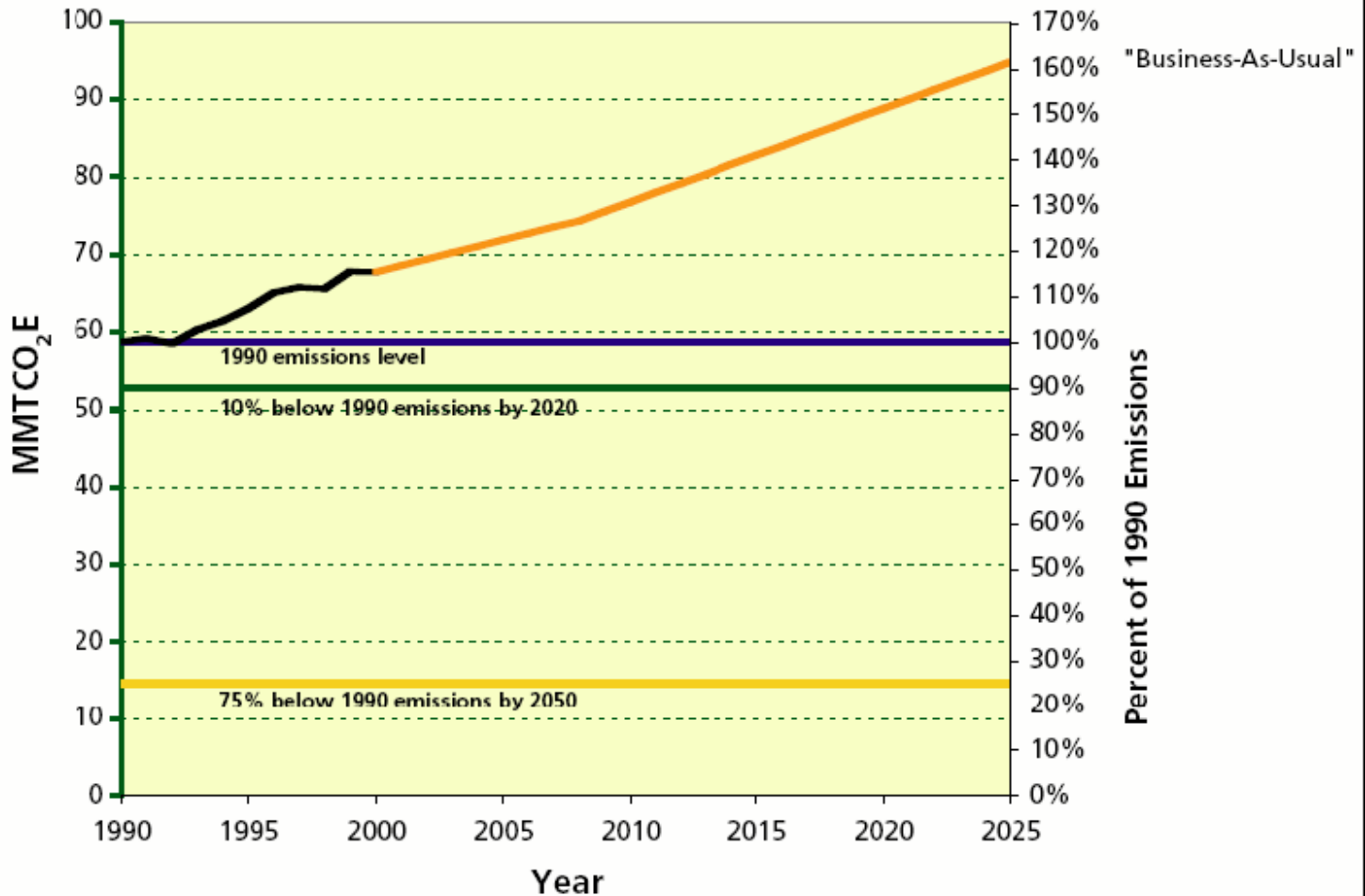
2007 Oregon GHG Legislation

- **Renewable Portfolio Standard**
- **Renewable Fuels Standards**
- **Biomass & biofuels tax credit**
- **Energy efficiency tax credits expanded**
- **State Global Warming Commission**
- **State GHG Reduction Goals**





Oregon GHG Reduction Goals





Oregon GHG Reporting Rules

- **Adopted 2008**
- **Annual Reporting**
- **Emissions Reporting Threshold: 2500 metric tons of CO₂e per year**
- **Emissions of 6 major GHGs**



GHG Reporting Phase-In

2010 Reporters: Businesses with air quality permits

- Title V Permits
- Subset of ACDPs



2011 Reporters: Businesses without air quality permits

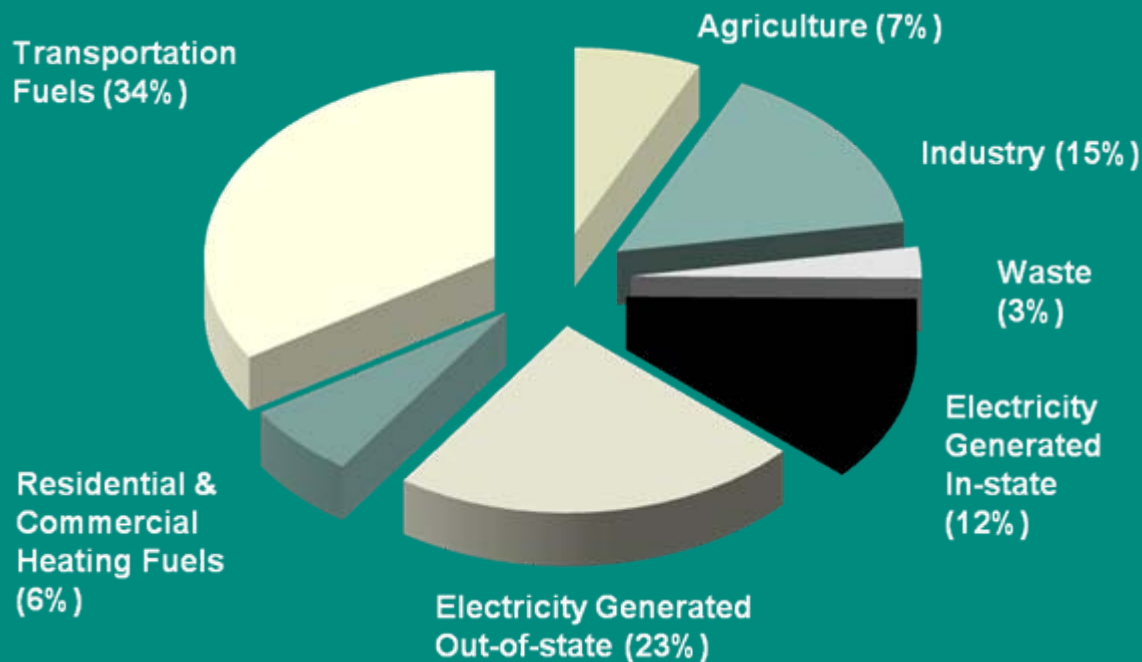
- Wastewater treatment
- Landfills
- Electric generating units, and
- Electricity & natural gas transmission and distribution lines





2009 Legislature Expanded Reporting Authority

- Added electricity importers and fuel suppliers
- Currently in rulemaking process

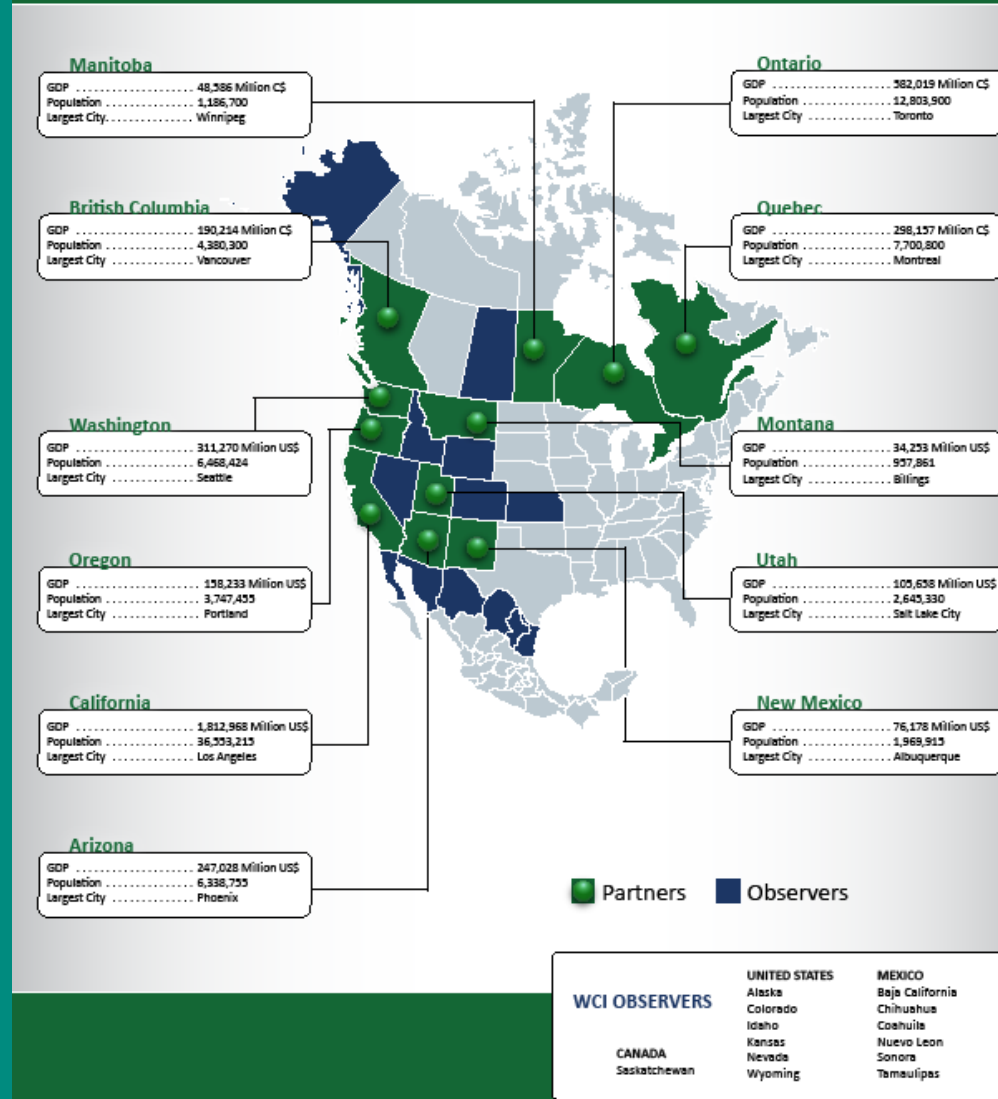




WCI: Overview

- Established 2007, MOU between Western governors
- Oregon a founding member
- Published design recommendations in September 2008

Western Climate Initiative



WCI Region

	7 States	4 Provinces	11-Partner Region
Population (million)	59	26	85
	19% of U.S.	79% of Canada	25% of both
GDP (\$ billion)	2,329	\$1,010	\$3,339
	20%	76%	26%
Greenhouse Gas Emissions (MMT _{CO₂e})	928	377	1,305
	13%	50%	17%



This slide from Dick Pedersen was added after the meeting.

“There were questions during my presentation about how much GHG emissions were coming from WCI jurisdictions. The questions were related to the impact of reducing GHG emissions through product management relative to overall emissions. The reality is that is quite low probably far below 10%. The States and Province shown in blue are observers of WCI and not included in the table. “



WCI Program Elements

- Covers electric generation & industry (2012) and transportation & heating fuels (2015)
- Goal: reduce emissions 15% below 2005 by 2020
- Auctions: minimum 10% of allowances, increasing to 25% in 2020
- Offsets limited to 49% of entity's reductions
- Auction revenue for consumer protection, adaptation





What does it mean for Oregon to be part of WCI?

- State agency staff participate in technical and policy committees
- Legislation needed to establish a state program
- Components that need to harmonize with WCI design:
 - Reporting requirements
 - Sectors covered
 - Basic framework: compliance periods, auctions, offset criteria
 - Participate in regional organization
 - Linkages to other states





Key Provisions of RGGI & MGGA



- First auction Sept. 2008
- Electric generation only
- Nearly all allowances auctioned
- Proceeds used by states for energy efficiency
- Draft recommendations June 2009
- Electric generation, industry, transportation and heating fuels
- Hybrid distribution: auctions, free and fee
- Proceeds for easing & accelerating transition to low carbon economy



2009 Oregon GHG Legislation

- **Expanded greenhouse gas reporting**
- **Established a low-carbon fuel standard**
- **Strengthened green building codes**
- **Ensured no new conventional coal power**
- **Provided energy efficiency financing**
- **Created pilot solar feed-in tariff**
- **Implemented biodiesel blending requirement**



Low Carbon Fuel Standard

- Reduce average carbon intensity of fuels over time
- Avoid picking winners
- Flexible implementation





How does a Low Carbon Fuel Standard work?

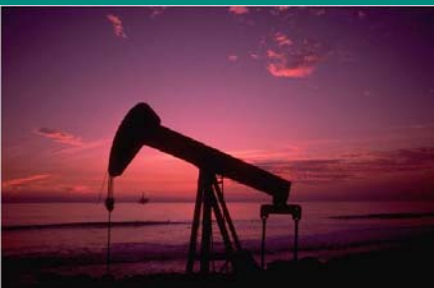
- Set baseline standard equal to carbon intensity of 2010 gasoline and diesel
- Providers of fuels must achieve standard, averaged across all fuel they sell
- 10 percent reduction from 2010 to 2020
- Required reductions are gradual, weighted toward later compliance years



Fuel Lifecycle - Gasoline

7 g/MJ

Oil Well



1 g/MJ
Transportation



14 g/MJ

Refinery



1 g/MJ
Transportation



73 g/MJ

Vehicle



Gasoline
96 g/MJ

Source: California Air Resources Board estimates for California fuels



Fuel Lifecycle – Corn Ethanol

36 g/MJ

Corn Field



2 g/MJ

Transportation



38 g/MJ

Bio-Refinery



3 g/MJ

Transportation



0 g/MJ

Vehicle



Land Use
Change



30 g/MJ



Co-products

-12 g/MJ

**Corn Ethanol
97 g/MJ**

Source: California Air Resources Board estimates for California fuels



Impact on Fuels

- **Increase use of:**
 - Low carbon corn or sugarcane ethanol
 - Cellulosic ethanol
 - Renewable diesel and biodiesel
 - Electricity, hydrogen and natural gas
- **Decrease the use of:**
 - Petroleum
 - High carbon biofuels



New Directions: Application of Life-cycle Analysis

- **DEQ's Solid Waste program is pursuing several projects as part of Oregon's State Waste Prevention Strategy**
- **Applying life-cycle analysis in creative ways that will help Oregonians make informed decisions**



Example #1 Consumption Based Emissions Inventory

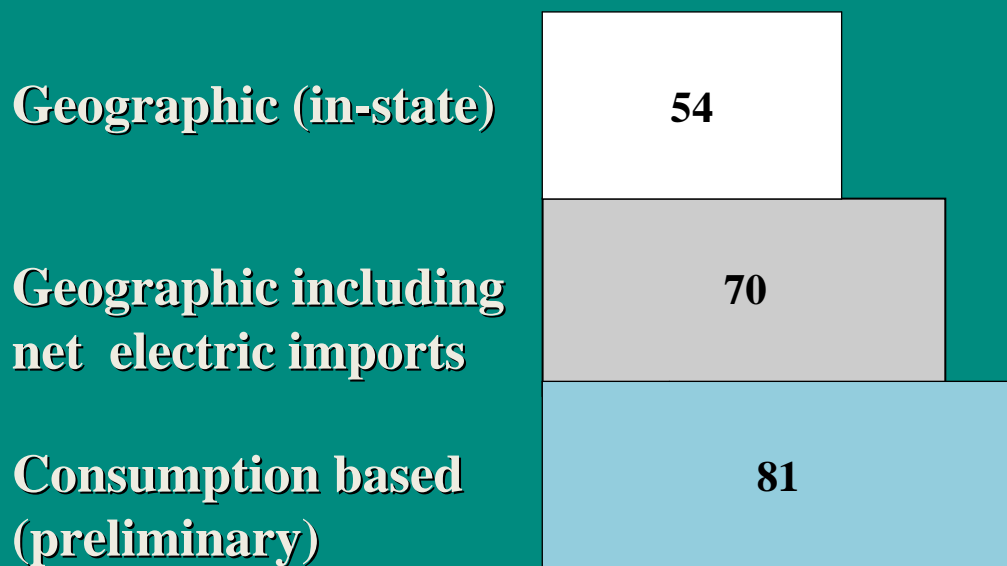
- Production-based inventory: based upon geographic perspective, i.e. where emissions are produced
- Consumption-based inventory: estimates GHG emissions from consumption by Oregonians of goods and services, regardless of where they were produced
- Two inventories complement each other





Production vs. Consumption: Comparison

Oregon 2005 GHG Emissions (MMT CO₂e)



Consumption categories

- Appliances
- Clothing
- Construction
- Electronics
- Food and Beverages
- Fuel and Utilities
- Healthcare
- Media
- Services
- Transportation Services
- Vehicles and Parts



Desired Outcomes of Project

Ultimate Goal = To provide information that helps DEQ, Oregonians, and others take effective actions to reduce emissions

- Enable state agencies to identify and evaluate effective policies and programs
- Enable Oregonians to reduce their contributions to climate change
- Enable businesses to reduce emissions in their production processes and supply chains
- Avoid negative “rebound” effects



Example #2

Residential Buildings: An Evaluation of Waste Prevention Practices Using Lifecycle Analysis

- Construction & demolition debris make up 20-30% of Oregon's waste
- Operation of buildings, manufacture of construction materials have significant environmental impact





Base Case: Average New Home in Oregon

- 2262 sq.ft
- 3 bedrooms, 2 baths
- 2 car garage
- Stem wall foundation
- Post and Beam floor system
- 16 inch stud spacing
- Vinyl windows
- Asphalt roof
- Gas furnace, no A/C
- Designed to 2008 Oregon energy code
- Energy use modeled for Portland, OR climate





Practices with Largest GHG Reduction Benefit

- **Smaller Homes**
- **Multifamily Housing**
- **Design using Salvaged Materials**
- **Strawbale w/ timber frame**
- **Insulating Concrete Forms**
- **Structural Insulated Panels**
- **Durable roofing, siding and flooring**
- **Adaptability: Utility Chase**
- **Deconstruction**
- **Advanced Framing (w/ drywall clips)**
- **Adaptability: Design for Disassembly**
- **Restoration**
- **Single-story Homes**
- **Dematerializing and Design for Simplicity**
- **Adaptability: Reduced Remodeling**
- **Advanced Floor Framing**
- **Intermediate Framing**
- **Offsite Prefabricated Components**
- **Homeowner Maintenance Training**
- **Proper Installation**
- **Flashing and Rain-screening**
- **Reusable Packaging**
- **Reduced Packaging**
- **Detailed Framing Cut List**
- **Thermal Curtains**



For more information, please visit
Oregon DEQ's website:
www.oregon.gov/DEQ/