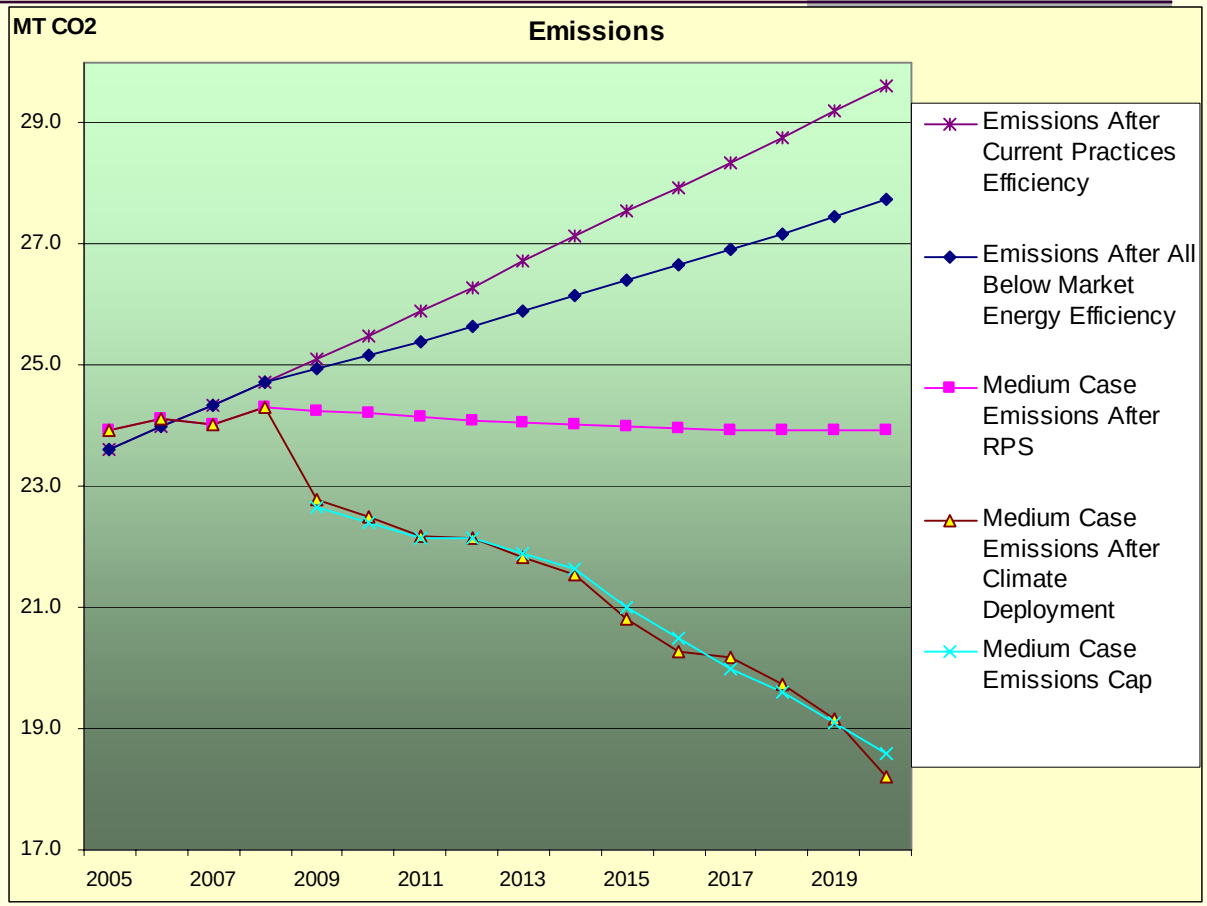
Agenda

*"It's tough to make predictions, especially about the future."***--** Niels Bohr

- Overview
  - Emissions trends and Medium Case parameters
- Cost Overview
- Economic Impacts
- Energy Efficiency Sensitivities
- Increased Regional Demand for Renewables
- Alternative Compliance Payment Level Analysis
- Substitutability between the CO2 Cap and the RPS
- Take-Aways

Emissions Trends—Medium Case

- 1.7% gross load growth
- +1.8% SBC for efficiency
- 6600 aMW demand in 2020
- 15% (of load) RPS by 2020



Net Present Value of Program Cash Flows to Customers ($2005 millions)

	0.7% Load Growth	1.7% Load Growth	2.7% Load Growth
Net Present Value of Benefits (costs) of Climate Policy Beyond RPS	$790	$638	$39
Net Present Value of Benefits (costs) of Climate Policy and RPS	$518	$255	($414)

Average Annual Costs in Phase IV (2018-2020)

Average of Phase IV (2018-2020) Outputs:	**0.7% Load Growth**	**1.7% Load Growth**	**2.7% Load Growth**
Forecasted Allowance Price	$ 3.75	$ 21.14	$ 40.00
Rate Impact of Climate Policy	5.9%	4.4%	7.5%
Rate Impact of Climate Policy and RPS	6.1%	6.5%	10.4%
Monthly Rate Impact to Residential Ratepayer for Climate Policy and RPS (1000 kWh/month)	$ 0.70	$ 1.66	$ 2.95

Partial Economic Impacts on Gross State Product

- Relative to 2005 GSP of $153 billion

	0.70% Load Growth	1.70% Load Growth	2.70% Load Growth
Average Annual Net Benefit to Customers of Climate Policy in 2018-2020 Period (million $)	$ 130	$ 83	$ (73)
Gross State Product Impact: Low Survey # (million $)	$ 71	$ 45	$ (40)
Gross State Product Impact: High Survey # (million $)	$ 353	$ 225	$ (198)

Effects of Energy Efficiency: Climate Policy Loads v. Current Practice Loads

- Non generation, non conservation costs--1.7% case
  - Allocating fixed costs over fewer TWh could result in $.70-$1.10 increase per MWh
  - Variable costs could be reduced by $42-$64M per year systemwide
- More modeling required
  - RGGI shows $100-$300 average annual customer cost savings from 2X efficiency

Medium Load Growth Scenario	Non Generation, Non Conservation, Variable Cost Portion Of Tariff		
	20%	**25%**	**30%**
Increased Fixed Costs of Climate Policy v. Current Practices $/MWh	$ 1.10	$ 0.90	$ 0.70
Variable Cost Savings $M	$ 42	$ 53	$ 64

Rates Impacts for CO2 Cap and RPS in 2020 v. No Policy Case*

- Pacific

  Percent of non-generation costs that vary with growth 10-30%

Load Growth	30%	20%	10%
High	16.00%	16.90%	17.90%
Med	12.50%	13.20%	13.90%
Low	10.80%	11.60%	12.40%

- PGE

Load Growth	30%	20%	10%
High	8.60%	9.40%	10.20%
Med	4.00%	4.60%	5.20%
Low	3.50%	4.20%	4.90%

*For illustrative purposes only

Energy Efficiency Sensitivities (1.7% load growth)

Low EE Case

- IF: Only existing SBC (No additional EE)
  - 490 aMW of EE by 2020
- THEN: NPV of costs w/ RPS= ($750M)
- 17.3 Million MWh of renewables by 2020
- $31 allowance price in final phase

High EE Case

- IF: Additional 2.7% SBC
  - 1125 aMW of EE by 2020
- THEN: NPV of benefits w/ RPS= $366M
- 14.4 Million MWh of renewables by 2020
- $13.50 allowance price in final phase

Increased Demand for Oregon Renewables

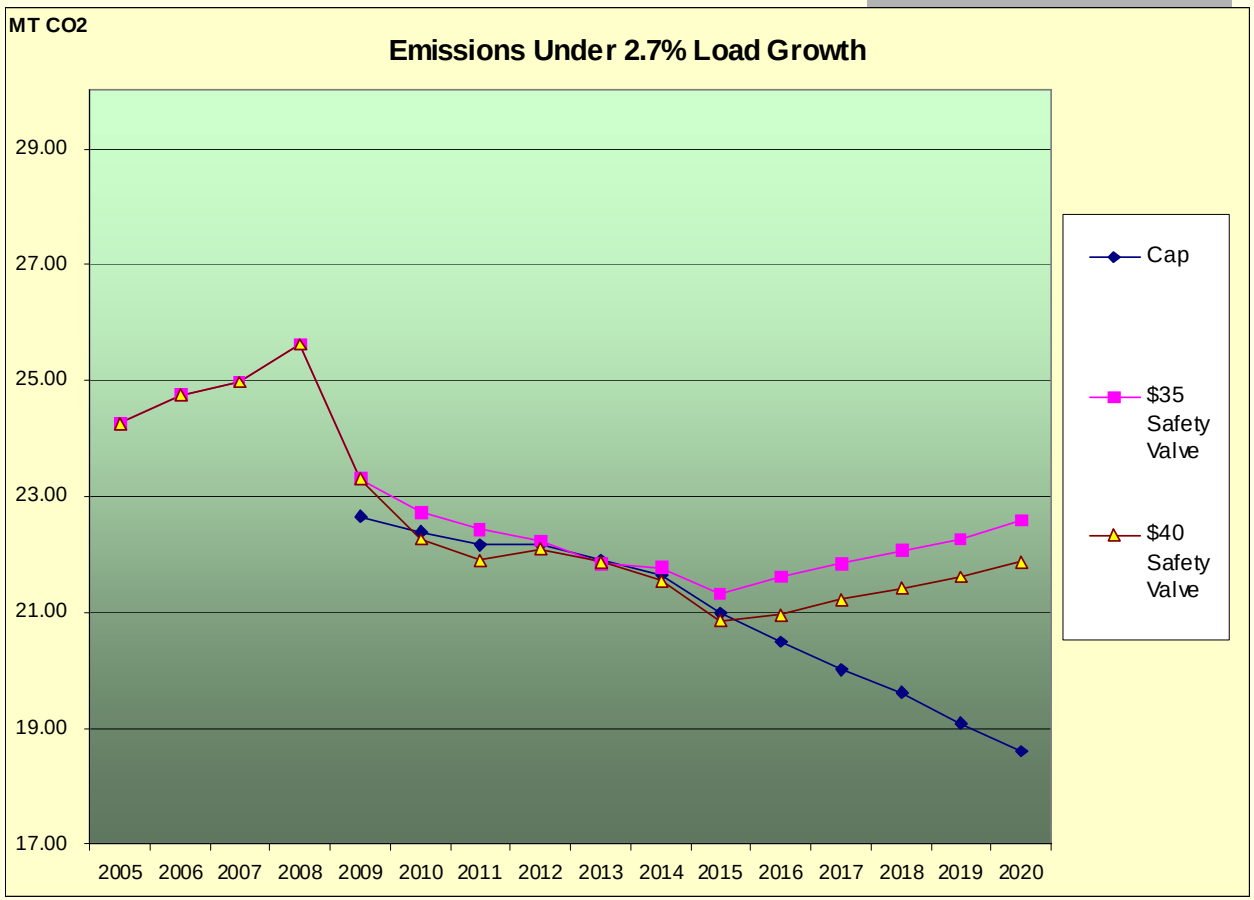
- California SB 32, Washington I-937 and other programs can cause added demand for “Oregon” renewables
- Supply curve reduced by 20% (1.7% load growth)
  - Allowance price increases to $37 in 2018-2020 period
  - Rate impacts could increase to 8.75% from 6.5%

Allowance Price Risks

	0.7% Load Growth	1.7% Load Growth	2.7% Load Growth	High Efficiency (1.7%)	No Additional Efficiency (1.7%)	Regional Renewables Demand (1.7%)
Average of Phase IV (2018-2020) Allowance Prices	$3.75	$21	$40	$13.50	$36	$37

Lowering the Alternative Compliance Payment Level to $35

- $9M/yr cost savings in Phase IV (2018-2020)
- +700K tons/yr CO2 emitted
- $13/ton avoided emissions

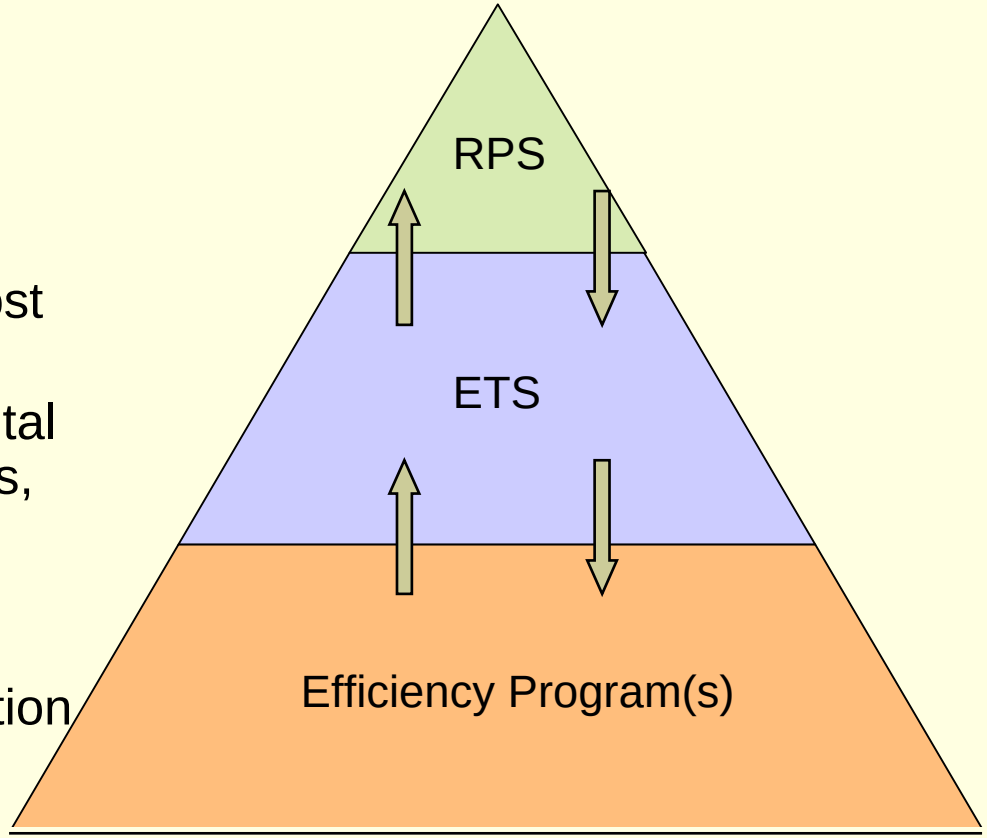


CO2 Cap and RPS Design

- Modeled low gas prices ($3MBTU) in later phases
  - Model can choose fuel switching if it's a cheaper mitigation option
  - Results in 40% fewer renewables installed
- CO2 cap and RPS are NOT substitutes for each other—they compliment each other under uncertainty
- Design the programs to be robust across a range of market outcomes
  - Coal:gas fuel price differential for fuel switching
- Key is reducing compliance burden for regulated actors from the combined programs

Clean Energy Program Linkages

- Energy Efficiency = foundation
  - Reduced loads make CO2 cap and RPS cheaper
- CO2 Cap (ETS) is the most flexible
  - Can provide incremental funding for renewables, end-user, generation efficiency.
- RPS guarantees ancillary benefits from GHG reduction from renewables



Take-Aways

- Preliminary results
- CO2 cap is likely to provide net economic benefits to Oregon
  - Mostly due to benefits from increased energy efficiency
- Largest risk to program cost is from load growth met with fossil based generation
  - RPS and efficiency program need to be implemented as soon as possible to reduce this risk
    - Rapid implementation also reduces risks from increases in regional demand, low efficiency case
    - Rapid implementation also locks in short term benefits from low cost renewables and long term benefits from efficiency