



# IRP Public Input Meeting

October 5<sup>th</sup>, 2005



# Agenda

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- Update on IRP Acknowledgement
  - Load and Resource Balance Update
  - New Portfolio Development / Overview of Analysis
  - Status of Update Filing
  - Progress on IRP Action Plan
    - RFP 2003 B Renewable, RFP 2009
    - DSM Update
  - Next Steps – IRP
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- Load Forecasting Technical Workshop - Annual Review
    - Comparisons of State Economic Forecasts
    - Commercial Electric Model Design and Inputs
    - Preliminary Commercial Economic and Sales Forecast



# Update on IRP Acknowledgement

Melissa Seymour



# Update on IRP Acknowledgement

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- **California / Wyoming**
  - California – Exempt from filing
  - Wyoming – Informational filing
- **Idaho**
  - Acknowledged – August 26, 2005
- **Oregon**
  - Under Commission Review
- **Utah**
  - Acknowledged July 21, 2005, however the Action Plan was not acknowledged
- **Washington**
  - Acknowledged – June 22, 2005



# Load and Resource Balance Update

Melissa Seymour



# L&R Agenda

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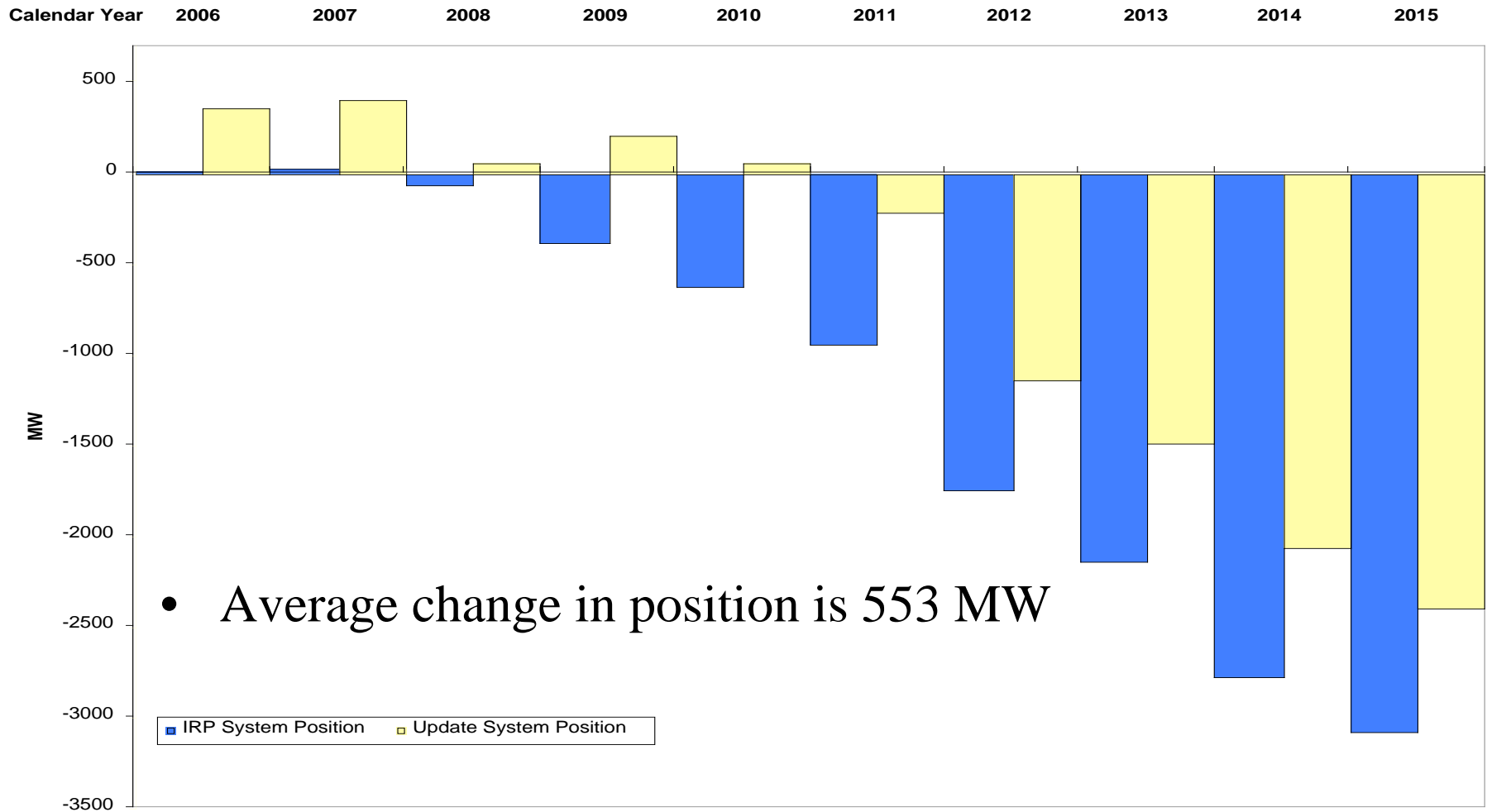
- What has changed
- Compare Updated L&R to filed IRP
- Observations

# Summary of L&R Differences

Note: % and amount listed in parentheses represent 10-year average increase or decrease

Category	PAC East	PAC West
Thermal	No change	No change
Hydro	Slight Increase (6% - 6 MW)	Increase in owned hydro (35% - 239 MW), mostly Swift1 and Merwin, and Mid-C (71% - 84 MW) because we are using available, instead of expected generation.
DSM	Increase due to new Class 1 DSM program (21% - 28 MW)	No change
Renewables	Increase due to addition of Wolverine Creek (64.5 MW, 12.9 MW at Peak)	No significant change
Purchases/Exchanges	Increased in early years with completion of Front Office Transactions. Decreased from Grid sync-up (83 MW). Small changes in out years.	Decreased from Grid sync-up (59 MW)
QF	No change in contracted amounts, however contracts have been extended through study period (49% - 77 MW)	No change in contracted amounts, however contracts have been extended through study period (120% - 15 MW)
Interruptibles	Large increase in interruptibles (300% - 185 MW) since contracts have been extended through study period.	No change
Transfers	No change	No change
RFP Wind	No change	Amounts were adjusted based on Wolverine Creek Purchase
Front Office Transactions	Reduced in early years since transactions have been executed.	Reduced in early years
QF Planned	No change	No change
Load	No change	No change
Sales	Decrease in sales (50 MW) due to sync up with GRID model.	Increase in sales (17 MW) due to sync up with GRID model.

# System Capacity Position Comparison



# Observations

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- Updates to the latest load and resource balance forecast reveal that the gap between loads and resources is diminishing
- Result is the timing of resources has changed
- The Preferred Portfolio now results in greater than a 20% planning margin over the CY 2009-2015 time period



# New Portfolio Development / Overview of Analysis

Melissa Seymour & Kim McRunnel



# Portfolio Analysis for IRP Update

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- The IRP Update uses the most up-to-date information to modify the Preferred Portfolio and associated Action Plan
  - Portfolios modified to reflect current load and resource balance
  - Portfolios take into consideration the latest information regarding resource opportunities

# Overview of Portfolios Evaluated for Update

- Starting point was the [Preferred Portfolio](#)
  - East
    - 44 MW DSM in 2008, 44 MW DSM 2013
    - Dry Cool 535 MW CCCT in 2009
    - 575 MW Coal (Hunter 4) in 2011
    - Wet Cool 561 MW CCCT in 2013
    - 383 MW Coal (Jim Bridger 5) in 2014
  - West
    - 44 MW DSM in 2008, 45 MW DSM 2013
    - Wet Cool 561 MW CCCT in 2012
- [Scenario 1](#) – Timing of resources in the Preferred Portfolio were changed to reflect updated load and resource balance; some resources were eliminated
- [Scenario 2](#) – Evaluate Path C upgrade and increased size of 2nd East Coal Unit (modeled as Bridger 5)
- [Scenario 3](#) – Similar to Scenario 2, except incorporated share of 1st Coal Unit in the East (modeled as Hunter 4)
- [Scenario 4](#) – Similar to Scenario 3, except removed Path C upgrade to validate incremental value of upgrade

# Review of Portfolios

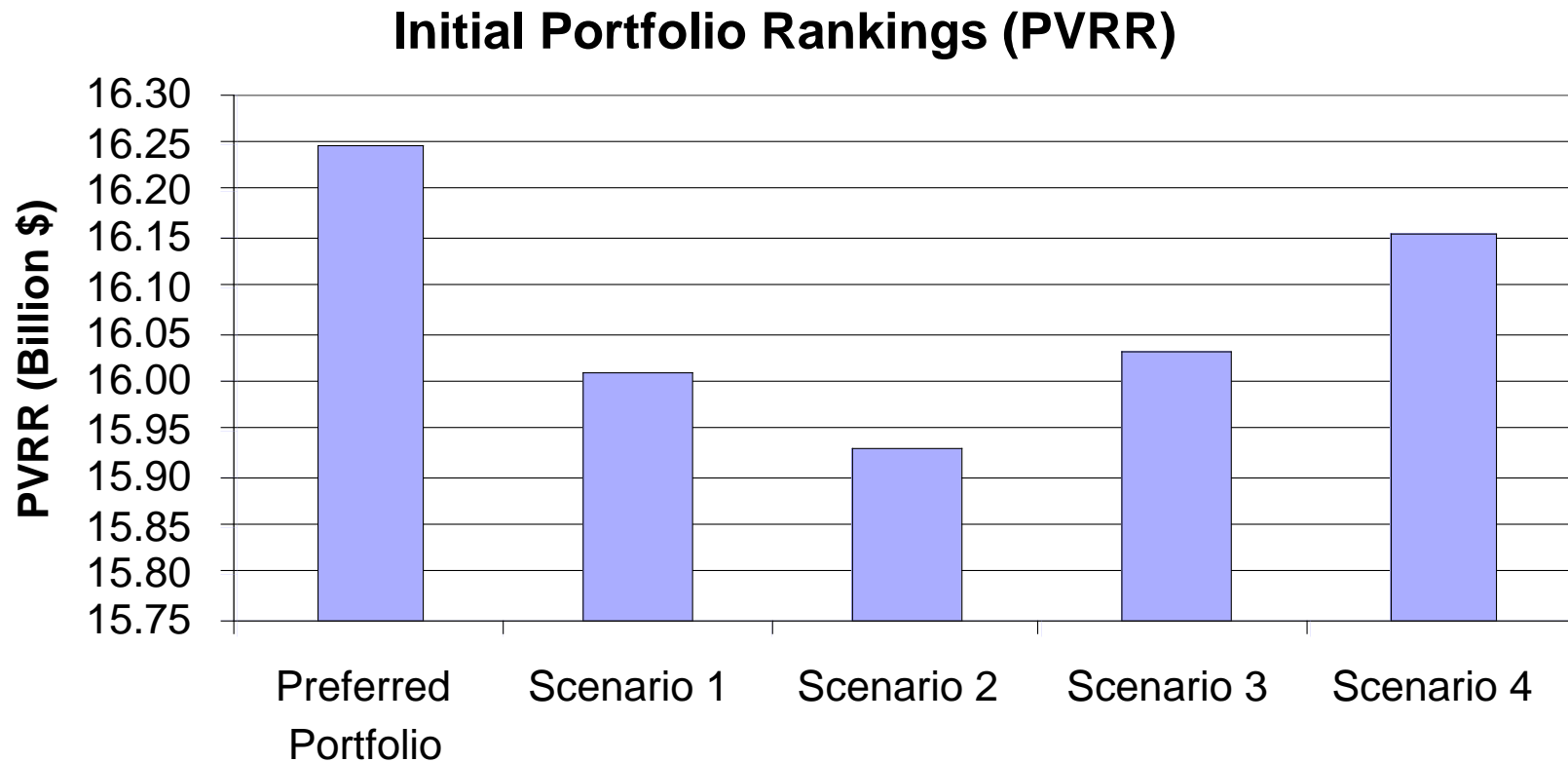
<b>Preferred Portfolio</b>	<b>Scenario 1</b>	<b>Scenario 2</b>	<b>Scenario 3</b>	<b>Scenario 4</b>
	<b>Resources Deferred and Eliminated based on New L&amp;R</b>	<b>Test Path-C Impact and Increase Share in Wyoming Coal Plant</b>	<b>Test Share in Utah Coal Plant</b>	<b>Test Path-C Incremental Value</b>
? East Dry Cool 535 MW CCCT in 2009	? Delay 2009 East CCCT 2 years (2011)	? Remove 2009 East CCCT	Same as Scenario 2 except	Same as Scenario 3 except
? East 575 MW Coal (Hunter 4) in 2011	? 2011 Coal (Hunter 4) delay 2 years (2013)	? Remove 2013 East CCCT	? Assume share in 2012 (Hunter 4)*	? Remove Path-C
? West Wet Cool 561 MW CCCT in 2012	? Remove 2013 East CCCT	? Add Path-C Upgrade	Coal Unit (340 MW)	? Remove Phase-in 300 MW West Seasonal Resource
? East Wet Cool 561 MW CCCT in 2013		? Phase-in 300 MW West Seasonal Resource	? Add 261 MW East Aeros in 2013	? Remove 261 MW East Aeros in 2013
? East 383 MW Coal (Jim Bridger 5) in 2014		? Delay East Coal (Hunter 4) Plant one year (2012)		? Add 174 MW East Aeros in 2010
		? Increase size of 2014 Coal Plant (Jim Bridger 5)		? Add East 561 MW CCCT in 2013

DSM included in all portfolios

\* Could represent IPP3

*Note: All scenarios are compared to the Preferred Portfolio*

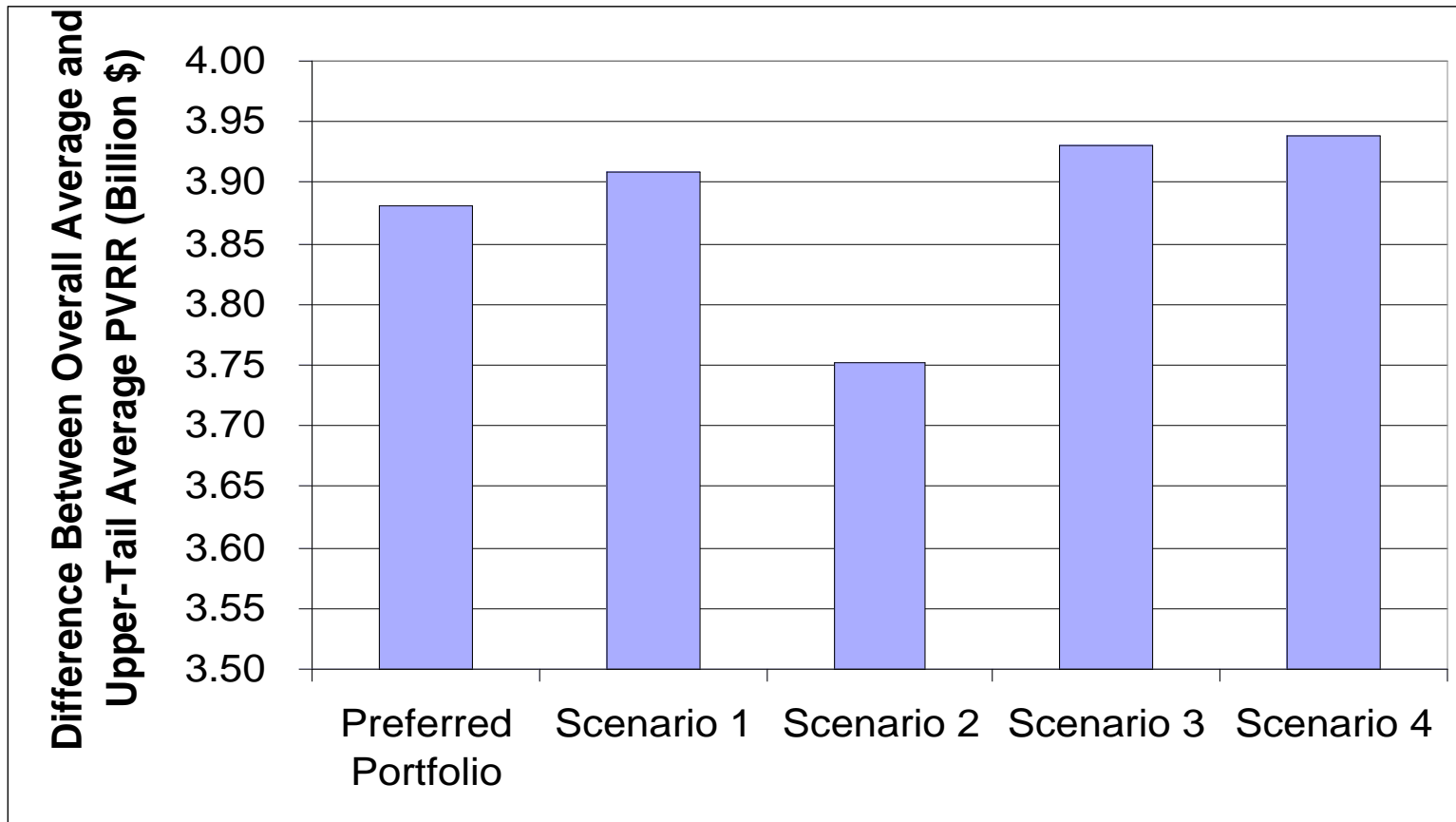
# Results of Deterministic Analysis



- PVRR results are within 2% between Preferred Portfolio (High) and Scenario 2 (Low)
- Variable Cost: Main Driver for gas plants
- Capital Cost: Main driver for portfolios with coal plants and transmission expansion

# Stochastic Analysis

- Scenario 2 Portfolio appears to be least cost and lowest risk.
  - Result is consistent with lower dependence on gas resources in Scenario 2.
  - Statistical significance of result has yet to be determined.



# Conclusion

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- Overall PVRR and Risk Analysis, support Scenario 2, however portfolios are very close
- Plan will need to remain flexible to changing circumstances
- What changes need to be made to the Action Plan?
  - No longer need to pursue 2009 East CCCT
  - Delay Action Item 8 (Coal Resource) by one year to CY2012; continue work on pursuing options.
  - An action item to pursue the Path-C Upgrade will need to be added to the Action Plan



# Status of Update Filing

Melissa Seymour



# Update Filing Purpose and Timeline

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- *Purpose:* Inform participants of updates, changes and progress on the January 2004 IRP – not a new IRP.
  - Informational filing only
  - Serve as a starting point for 2006 IRP process
- *Timeline:* Targeting informational filing for the first week in November

# Outline for Update Filing

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- Executive Summary
- Changes to the Marketplace
  - Natural Gas and Power Market Update
  - Climate Change Policy Update
  - Impacts of the Energy Policy Act of 2005
- Resource Needs Assessment
  - Resource Situation
    - Existing Resources (i.e. New Contracts, Hydro Update)
    - Planned Resources
    - Topology/Transmission Update
  - Load and Resource Balance Update
    - Summary of changes to L&R
    - New Capacity and Energy Charts

# Outline for Update Filing, Cont.

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- IGCC Resource Update
  - Update on Costs and Performance (Parson's Study)
  - Investment Incentives (Energy Policy Act)
  - Regulatory Treatment in other States
  - Next Steps
- Portfolio Analysis
  - Portfolio Descriptions
  - Portfolio Evaluation Results
  - Conclusions
- Action Plan
  - Updates to the Action Plan
  - Status of Action Plan implementation

# Outline for Update Filing, Cont.

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- Appendices
  - Updates to Assumptions
  - Portfolio L&R Balances
  - Portfolio Summary Tables
  - Portfolio Scorecards
  - Benchmarking Study



# Progress on Action Plan

Stacey Kusters – RFP Update

Mike Koszalka – DSM Update





# Request For Proposals Update

Stacey Kusters



# Request for Proposal Updates

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- 2003B Renewable RFP
- 2009 Request for Proposal

# 2003B RFP

- Executed 65MW Wolverine Creek Project on line 2006
- PTC Credit was extended for two years 2006 and 2007
- IRP target for Renewable resources is 2006/07 is 400MW (200MW each year)
- Counterparties with online dates of 2006 have already provided updates on the following:
  - Pricing
  - Turbine availability
  - Update on project feasibility
- Prioritization of projects economics and transmission feasibility
- Economic and transmission analysis have been completed
- Negotiation with three counterparties are still underway
- Commercial terms have been reached with a geothermal project in Utah for 42MW
- Successful Negotiation on the balance of the wind negotiations will depend on 1) the economics 2) the turbine availability 3) transmission feasibility.
- Evaluation of counterparties with online dates of 2007 will be completed at the end of September.

# 2009 RFP update

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- The IRP update has incorporated changes to inputs and assumptions, creating a new load and resource and changes the Action Plan.
- The load and resource forecast, the load curtailment renewals and the extension of Qualifying Facilities contract assumptions eliminate the need for 2009.
- As a result the 2009 RFP review process, which is currently underway in Oregon, Utah and Washington, has been delayed in order to evaluate the impact of the new assumptions and updates.
- Once the assumptions and updates are reviewed the RFP format will need to be changed based on the new information and input from the IE.



# DSM Update

Mike Koszalka



# DSM New Resource RFP 2005 Schedule

- Develop RFP/Scope of Work **Complete** May-Jul, 2005
- Re-run IRP Decrement Analysis w/revised gas and electricity price forecasts **Complete** Jul-Aug, 2005
- Issue DSM RFP for Class 1 and 2 **Complete** August, 2005
  - 40 MW or more in West by FY2009
  - 5 MW min. blocks in East
  - Class 2 program (targeted end-uses under development)
- Bids due **October 17** October, 2005
- Finalize Evaluation/Internal Approvals December, 2005
- File New Program Tariffs Feb-Mar, 2006



# Next Steps

Melissa Seymour



# Next Steps for IRP Group

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- Continue work on Update Filing – tentative filing date is first week in November
- Begin work on 2006 IRP!
  - Tentatively scheduled Kick-off Meeting for December 8<sup>th</sup>



# Load Forecasting Technical Workshop

October 5, 2005

Comparisons Of State Economic Forecasts

Recent Economic Outlook

Draft Commercial Forecast



# Agenda

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- Comparisons of State Economic Forecasts (1Hour)
- Commercial Electric Model Design and Inputs (15 Minutes)
- Preliminary Commercial Economic and Sales Forecast  
(1 Hour 45 Minutes)



# Comparisons of State Economic Forecasts

Kevin Cline



# Data Sources

- **Sources**

**Company Assumptions** - Global Insights, Spring 2005 Long Term, released 4/05, Economy.com, Bureau of Labor Statistics, Bureau of the Census, state labor market information, newspaper articles, company judgment

**Oregon** – Office of Economic Analysis, Oregon Revenue and Economic Forecast, released 9/1/05

**Utah** – Governor’s Office of Planning and Budget, Demographic and Economic Analysis, 2005 Baseline Economic and Demographic Projections

**Wyoming** – Department of Administration and Information, Economic Analysis Division, Ten Year Outlook, Wyoming Economic Forecast 2003-2012, released 7/03

**Washington** – State of Washington, Office of Financial Management, Forecasting Division, Forecast of State Population, released 11/04 (population, net migration), The 2005 Long-Term Economic and Labor Force Forecast for Washington, released 5/05 (personal income, employment)

**Idaho** – Executive Office of the Governor, Division of Financial Management, Idaho Economic Forecast, released 7/05 (runs only through 2008)

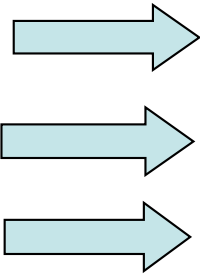
**California** – California Dept. of Finance, Population Forecast, released 5/04; California Department of Finance, Projected births, released 9/04; Personal Income and Employment, released 4/05

# Summary of Findings

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- These company assumed forecasts are at the state level for comparative purposes
- There are no significant differences between the company assumed forecasts and the state forecasts for California, Idaho, Oregon and Wyoming
- For Utah, the differences are mostly in the net migration, population, and household forecast growth rates
- For Washington, there is a difference in the net migration forecast
- In upcoming slides, significant items are denoted with an arrow

# Utah Forecast Comparison



Topic	Source	2005-2006	2007-2017
<b>Net Migration</b>	Company Assumptions	12,200	10,000
	State of Utah	15,202	22,360
<b>Population</b>	Company Assumptions	2.10%	1.92%
	State of Utah	2.11%	2.24%
<b>Households</b>	Company Assumptions	2.50%	2.10%
	State of Utah	2.65%	2.44%
<b>Births</b>	Company Assumptions	52,723	58,861
	State of Utah	52,135	58,629
<b>Deaths</b>	Company Assumptions	14,094	15,580
	State of Utah	13,892	15,612
<b>Total Employment</b>	Company Assumptions	2.74%	2.89%
	State of Utah	2.80%	2.31%
<b>Transportation, Trade and Utilities Emp</b>	Company Assumptions	3.59%	3.63%
	State of Utah	3.17%	1.46%
<b>Professional and Business Services Emp</b>	Company Assumptions	3.68%	4.00%
	State of Utah	3.77%	2.78%
<b>Educational and Health Services Emp</b>	Company Assumptions	4.58%	3.06%
	State of Utah	3.50%	4.36%
<b>Real Personal Income (2000\$)</b>	Company Assumptions	2.82%	2.77%
	State of Utah		

# Net Migration Forecast Differences

- Global Insight uses Census data for population, households and migration estimates in order to have a consistent data set for all states
- The Census uses exemptions reported on Federal Income Tax returns as an indicator of migration
- The Utah Population Estimates Committee (UPEC) makes use of the following methods for population estimation: the School Enrollment Method, the LDS Membership Method, the IRS Method (considering exemptions on Federal tax returns) and the Housing Method
- 2004 estimates were calculated using simple average of School, LDS and Housing methods, with some exceptions
- In the preliminary residential forecast, the company assumed data yields a 2.5% energy growth rate from 2007-2017; Global Insight data yields a 1.9% energy growth rate over the same time period
- In the preliminary residential forecast, the company assumes an average in-migration of 10,000 per year from 2007-2017; upon further review, this figure will likely be revised upwards

# Idaho Forecast Comparison

Topic	Source	2005-2006	2007-2008
<b>Net Migration</b>	Company Assumptions	10,931	11,025
	State of Idaho	11,097	9,317
<b>Population</b>	Company Assumptions	1.60%	1.57%
	State of Idaho	1.55%	1.48%
<b>Households</b>	Company Assumptions	1.42%	1.31%
	State of Idaho		
<b>Births</b>	Company Assumptions	22,471	22,990
	State of Idaho	22,762	23,477
<b>Deaths</b>	Company Assumptions	10,752	11,042
	State of Idaho	10,875	11,203
<b>Total Employment</b>	Company Assumptions	2.33%	1.48%
	State of Idaho	1.73%	2.08%
<b>Leisure and Hospitality Emp</b>	Company Assumptions	3.52%	1.39%
	State of Idaho	3.65%	3.32%
<b>Transportation, Warehousing and Utilities Emp</b>	Company Assumptions	0.78%	1.05%
	State of Idaho	2.03%	2.03%
<b>Professional and Business Services Emp</b>	Company Assumptions	4.02%	3.19%
	State of Idaho	4.10%	3.87%
<b>Educational and Health Services Emp</b>	Company Assumptions	3.33%	1.71%
	State of Idaho	3.24%	3.30%
<b>Real Personal Income (2000\$)</b>	Company Assumptions	3.24%	3.47%
	State of Idaho	3.67%	3.72%

# California Forecast Comparison

Topic	Source	2005-2006	2006-2007
<b>Net Migration</b>	Company Assumptions State of California	136,085	130,811
<b>Population</b>	Company Assumptions State of California	1.20% 1.30%	1.18% 1.27%
<b>Households</b>	Company Assumptions State of California	1.32%	1.23%
<b>Births</b>	Company Assumptions State of California	551,895 555,197	556,324 560,980
<b>Deaths</b>	Company Assumptions State of California	248,766	253,094
<b>Total Employment</b>	Company Assumptions State of California	1.42% 1.75%	1.10% 1.62%
<b>Leisure and Hospitality Emp</b>	Company Assumptions State of California	1.09% 2.09%	0.70% 2.28%
<b>Transportation, Warehousing and Utilities Emp</b>	Company Assumptions State of California	2.12% 1.69%	1.59% 1.17%
<b>Professional and Business Services Emp</b>	Company Assumptions State of California	3.21% 2.52%	2.93% 2.49%
<b>Educational and Health Services Emp</b>	Company Assumptions State of California	1.77% 2.45%	1.18% 2.34%
<b>Real Personal Income (2000\$)</b>	Company Assumptions State of California	3.46% 3.35%	3.24% 3.24%

# Oregon Forecast Comparison

Topic	Source	2005-2006	2007-2011
<b>Net Migration</b>	Company Assumptions	28,371	28,414
	State of Oregon	29,635	32,183
<b>Population</b>	Company Assumptions	1.17%	1.11%
	State of Oregon	1.24%	1.26%
<b>Households</b>	Company Assumptions	1.73%	1.55%
	State of Oregon		
<b>Births</b>	Company Assumptions	46,416	47,012
	State of Oregon	46,300	48,313
<b>Deaths</b>	Company Assumptions	31,872	33,147
	State of Oregon	31,185	33,096
<b>Total Employment</b>	Company Assumptions	1.50%	0.89%
	State of Oregon	1.49%	1.25%
<b>Wood Products Emp</b>	Company Assumptions	-4.11%	-0.34%
	State of Oregon	-1.47%	-0.93%
<b>Transportation, Trade and Utilities Emp</b>	Company Assumptions	1.14%	0.41%
	State of Oregon	1.24%	1.29%
<b>Professional and Business Services Emp</b>	Company Assumptions	3.38%	3.59%
	State of Oregon	3.12%	2.96%
<b>Educational and Health Services Emp</b>	Company Assumptions	1.63%	0.50%
	State of Oregon	2.87%	1.37%
<b>Real Personal Income (2000\$)</b>	Company Assumptions	3.43%	3.20%
	State of Oregon	3.78%	3.16%

# Wyoming Forecast Comparison

Topic	Source	2005-2006	2007-2011
<b>Net Migration</b>	Company Assumptions	(1,488)	(979)
	State of Wyoming	210	188
<b>Population</b>	Company Assumptions	0.20%	0.34%
	State of Wyoming	0.46%	0.37%
<b>Households</b>	Company Assumptions	1.49%	1.24%
	State of Wyoming	0.63%	0.71%
<b>Births</b>	Company Assumptions	6,883	7,143
	State of Wyoming		
<b>Deaths</b>	Company Assumptions	4,291	4,451
	State of Wyoming		
<b>Total Employment</b>	Company Assumptions	2.01%	0.77%
	State of Wyoming	1.04%	0.84%
<b>Leisure and Hospitality Emp</b>	Company Assumptions	1.98%	0.38%
	State of Wyoming		
<b>Transportation, Warehousing and Utilities Emp</b>	Company Assumptions	1.79%	1.36%
	State of Wyoming		
<b>Professional and Business Services Emp</b>	Company Assumptions	4.17%	3.09%
	State of Wyoming		
<b>Educational and Health Services Emp</b>	Company Assumptions	2.31%	1.09%
	State of Wyoming		
<b>Real Personal Income (2000\$)</b>	Company Assumptions	2.76%	2.25%
	State of Wyoming	2.30%	2.16%

# Washington Forecast Comparison



Topic	Source	2005-2010	2010-2015
<b>Net Migration</b>	Company Assumptions	31,925	33,085
	State of Washington	59,183	51,050
<b>Population</b>	Company Assumptions	1.02%	0.98%
	State of Washington	1.52%	1.31%
<b>Households</b>	Company Assumptions	1.46%	1.23%
	State of Washington		
<b>Births</b>	Company Assumptions	82,141	84,207
	State of Washington	87,183	94,150
<b>Deaths</b>	Company Assumptions	48,585	51,409
	State of Washington	49,567	53,450
<b>Total Employment</b>	Company Assumptions	0.94%	0.80%
	State of Washington	1.45%	1.29%
<b>Leisure and Hospitality Emp</b>	Company Assumptions	0.71%	-0.13%
	State of Washington	1.25%	0.72%
<b>Transportation, Warehousing and Utilities Emp</b>	Company Assumptions	1.29%	1.71%
	State of Washington	1.82%	1.33%
<b>Professional and Business Services Emp</b>	Company Assumptions	2.82%	2.77%
	State of Washington	2.89%	2.77%
<b>Educational and Health Services Emp</b>	Company Assumptions	0.94%	0.90%
	State of Washington	1.29%	1.29%
<b>Real Personal Income (2000\$)</b>	Company Assumptions	3.52%	3.25%
	State of Washington	3.64%	3.76%

# Washington Forecast Differences

- From 2010-2015, the state of Washington forecasts an average net in-migration of 51,000 annually, while the company assumed forecast shows a net in-migration of 33,000 annually over the same period
- Global Insight uses Census data for population, households and migration estimates in order to have a consistent data set for all states
- The Census uses exemptions reported from Federal Income Tax returns as an indicator of migration
- The state of Washington uses drivers license exchanges as a measure of net migration
- **To forecast net migration:** The state develops a forecast for traded sectors (Mfg., Fed, Services), observes percentage change in WA traded sector employment relative to traded sector employment in the US and CA, respectively, observes national unemployment rate and then determines levels of Washington net migration



# Commercial Electric Model Design and Inputs

Michael Rife



# Brief History of COMMEND

## (Commercial End-Use Planning System)

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- First implemented in the industry during the early 1980s
  - Mainframe end-use forecasting system for the commercial class
  - Constructed by Oak Ridge National Labs
- During late 1980s/early 1990s
  - Converted to a PC system by RER/ITRON
  - Sponsored by EPRI
  - Declared mature in mid-1990s and returned to EPRI

# Key Inputs

- Major Drivers of COMMEND Forecasting System
  - Building Type Square Feet
  - Energy Utilization Intensity (EUIs)
    - Measures the average annual usage of equipment in kWh per square foot for each building type.
    - Dependent on amount and size of equipment within a building type and the efficiency of the equipment.
  - Appliance Saturation Rates
    - Base year rates and new building rates from 2003 Commercial Equipment Saturation Survey
    - Measured as a percent of square feet, e.g., percent of square feet air conditioned
  - Economic Forecasts
    - Commercial employment forecasts by sector (building type) is the basis for the square foot forecast

# Key Inputs

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- Commercial Equipment Saturation Survey
  - Conducted during the Spring 2003
  - Building and Equipment Type Information Used in End-Use Forecasting
    - Supplies Base Year and Estimated Future Equipment Saturation Rates
    - Supplies estimates of square feet per employee
    - Survey Results and Customer Usage are used in Conditional Demand Analysis to produce EUIs



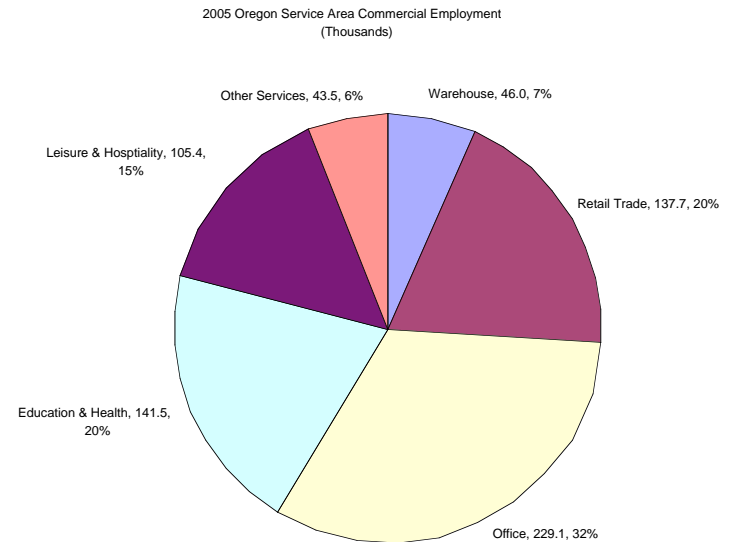
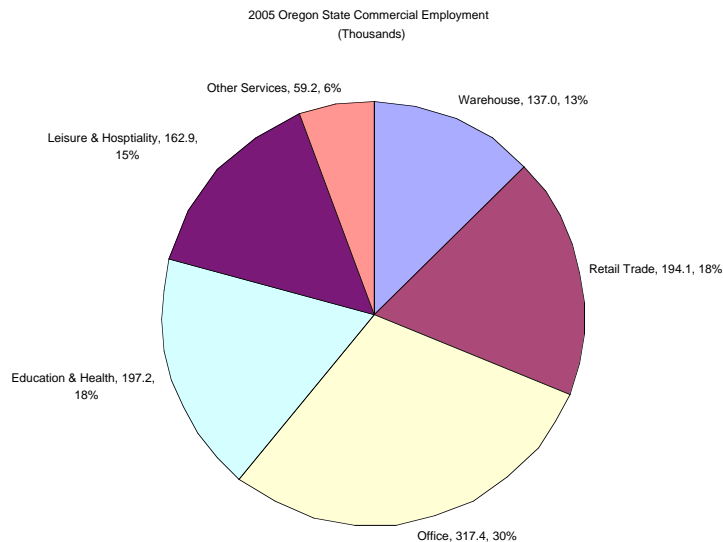
# Oregon Commercial Sales Forecast

William O'Shea



# Oregon Non-Manufacturing Employment

	1994 - 2004	2005	2006	2007 - 2017
Wholesale Trade	1.1%	2.4%	0.8%	0.8%
Retail Trade	1.6%	3.1%	1.2%	0.0%
Trans. Warehousing, Utilities	0.8%	5.4%	1.4%	1.0%
Information	1.2%	1.4%	-0.5%	1.4%
Financial Activities	1.4%	2.5%	0.8%	0.8%
Professional & Business Services	2.7%	4.5%	3.4%	3.3%
Educational & Health Services	3.0%	2.2%	1.6%	0.5%
Leisure & Hospitality	1.4%	4.3%	2.7%	-0.1%
Other Services	1.6%	3.3%	1.3%	0.7%
Government	1.4%	1.9%	1.1%	0.8%
<b>Total State Non-Manufacturing</b>	<b>1.8%</b>	<b>3.2%</b>	<b>1.7%</b>	<b>1.0%</b>

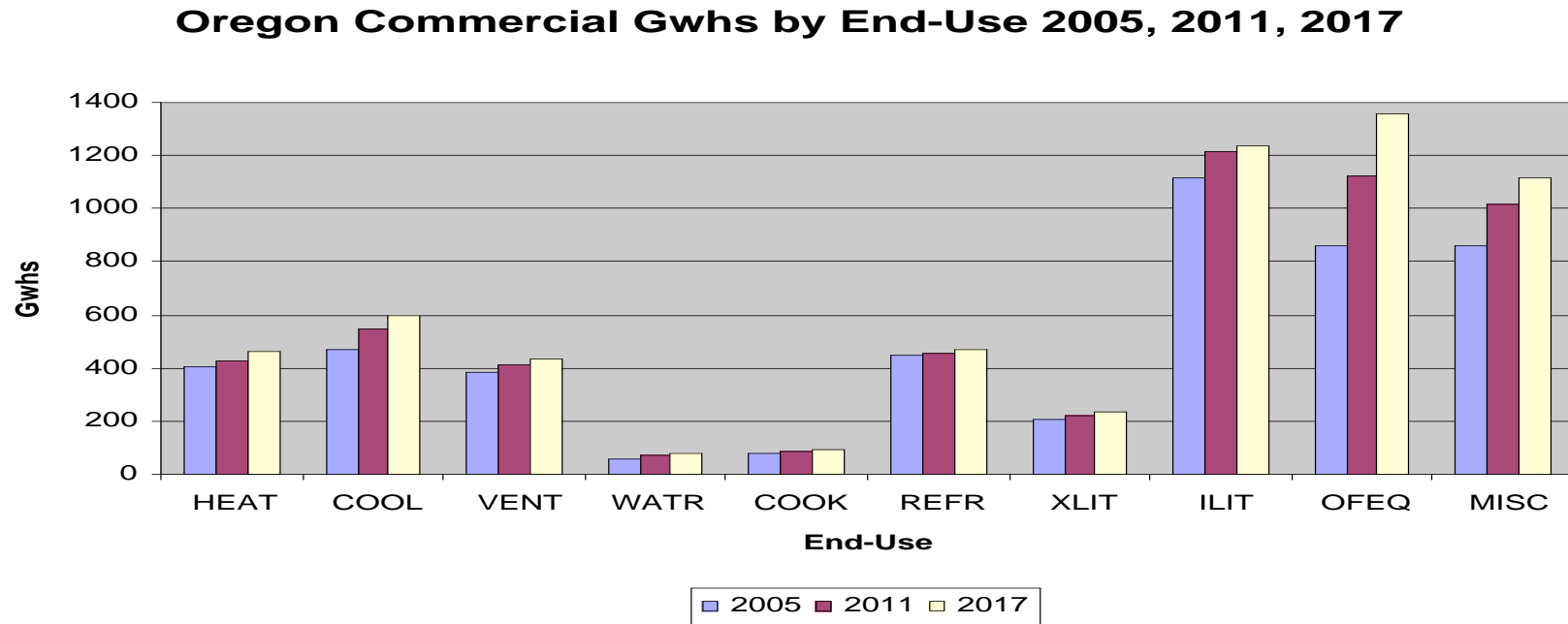


# Oregon COMMEND Summary

	2005	2017
Energy (GWh)	4,883	6,082
Customers (Thousands)	72.77	86.84
Use per Customer (kWh)	67,101	70,037

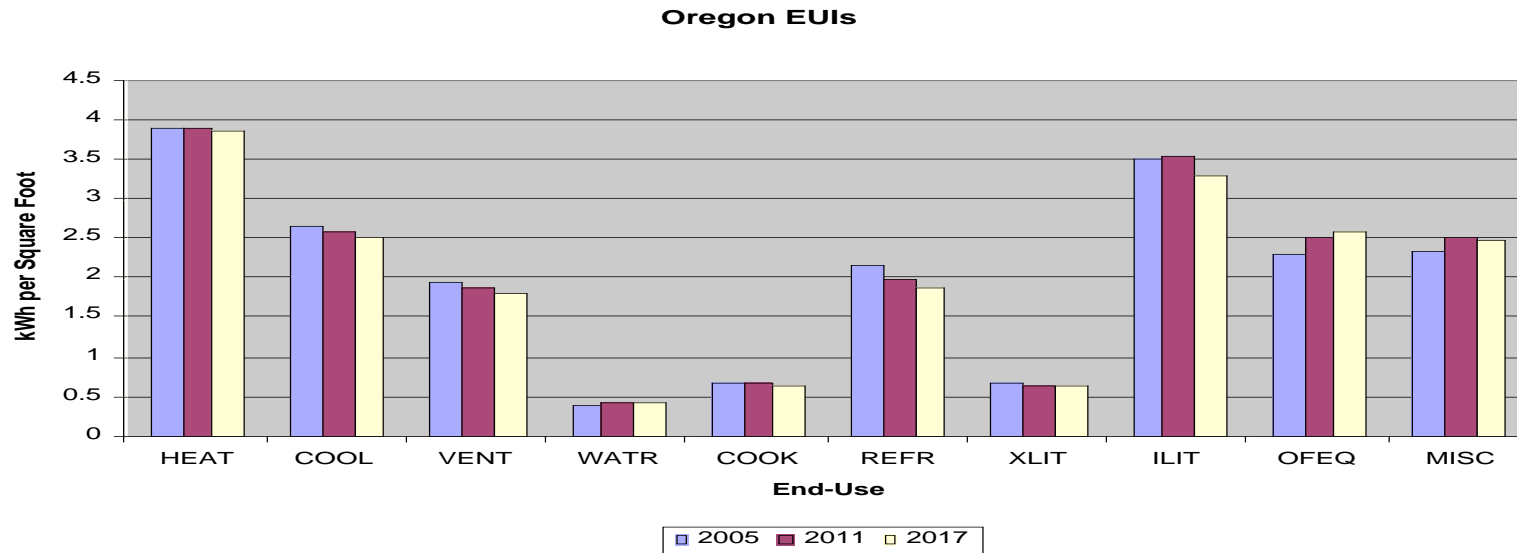
- Energy driven by growth in residential populations and Offices, Health Services, and Other Services
- Use per customer growing through contributions from growth in Office Equipment and Cooling

# Oregon Sales Summary



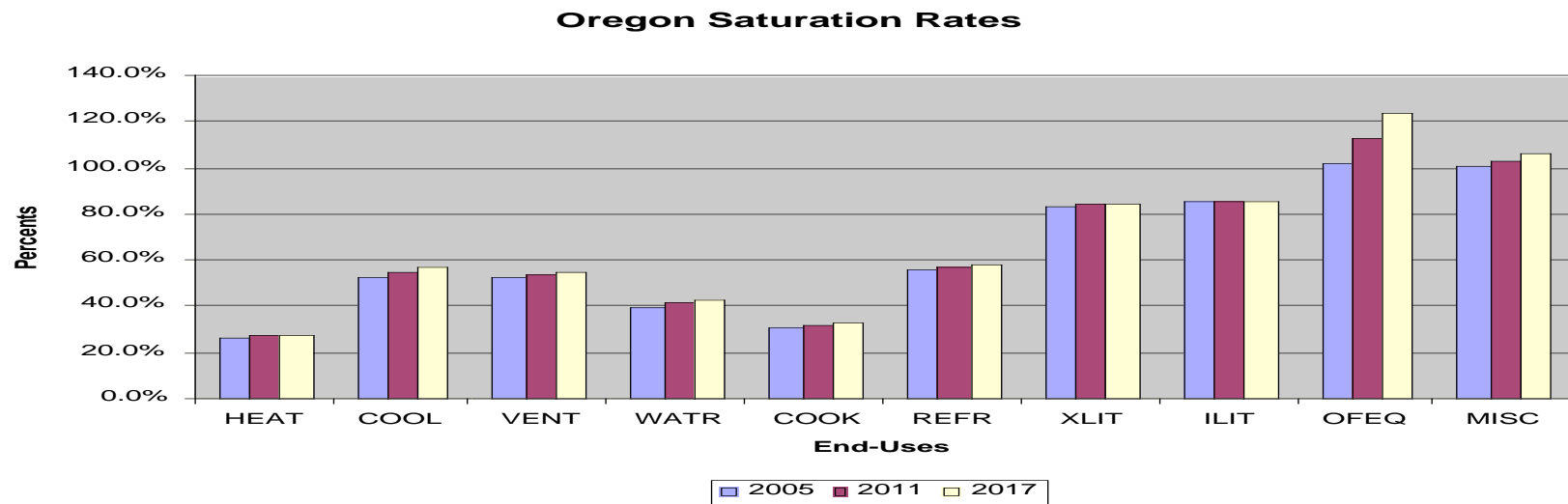
- Office Equipment is growing through Offices, Health Services, and Retail businesses
- Cooling growth from Offices, Health Services, and Retail businesses
- Heating growth from Groceries, Restaurants, and Retail businesses

# Oregon EUIs



- Most EUIs declined due to efficiencies
- Office equipment growth due to increasing use in Offices, Health Services, Other Retail, and Other Services

# Oregon Saturation Rates



- Declining saturations of Heating, Water Heating, and Cooking in some buildings are offset through increasing saturations of these end uses in Offices, Health Services, and Lodging
- Office Equipment saturation is growing in Offices, Health Services, Schools, and Retail businesses



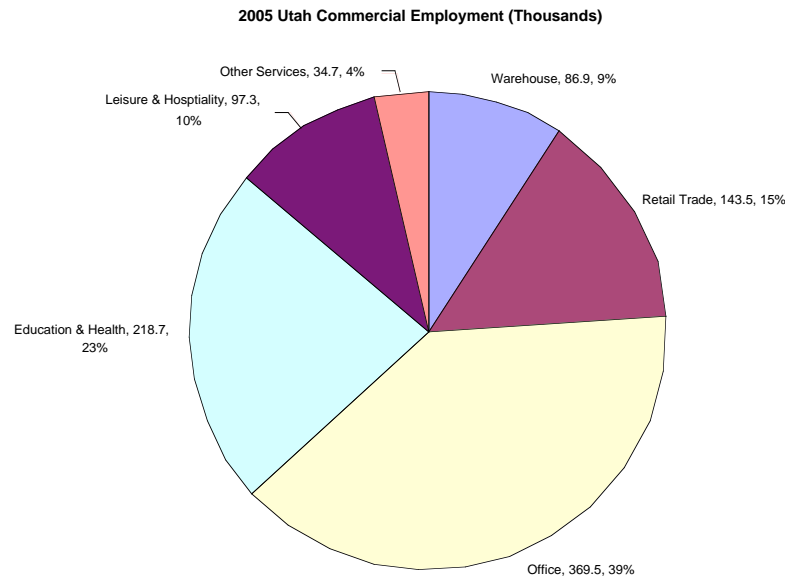
# Utah Commercial Sales Forecast

Kevin Cline



# Utah Non-Manufacturing Employment

	1994-2004	2005	2006	2007-2017
Wholesale Trade	2.5%	4.0%	3.0%	2.9%
Retail Trade	2.3%	5.9%	3.4%	2.4%
Trans., Warehousing, Utilities	0.7%	3.9%	3.6%	3.6%
Information	3.9%	4.7%	1.1%	3.5%
Financial Activities	3.4%	4.7%	2.5%	3.1%
Professional & Business Services	3.9%	1.4%	3.7%	4.0%
Educational & Health Services	4.3%	5.1%	4.6%	3.1%
Leisure & Hospitality	2.7%	-6.3%	0.1%	2.2%
Other Services	1.0%	3.9%	3.0%	3.1%
Government	2.1%	3.4%	3.1%	2.8%
<b>Total Non-Manufacturing</b>	<b>2.8%</b>	<b>3.1%</b>	<b>2.8%</b>	<b>3.0%</b>



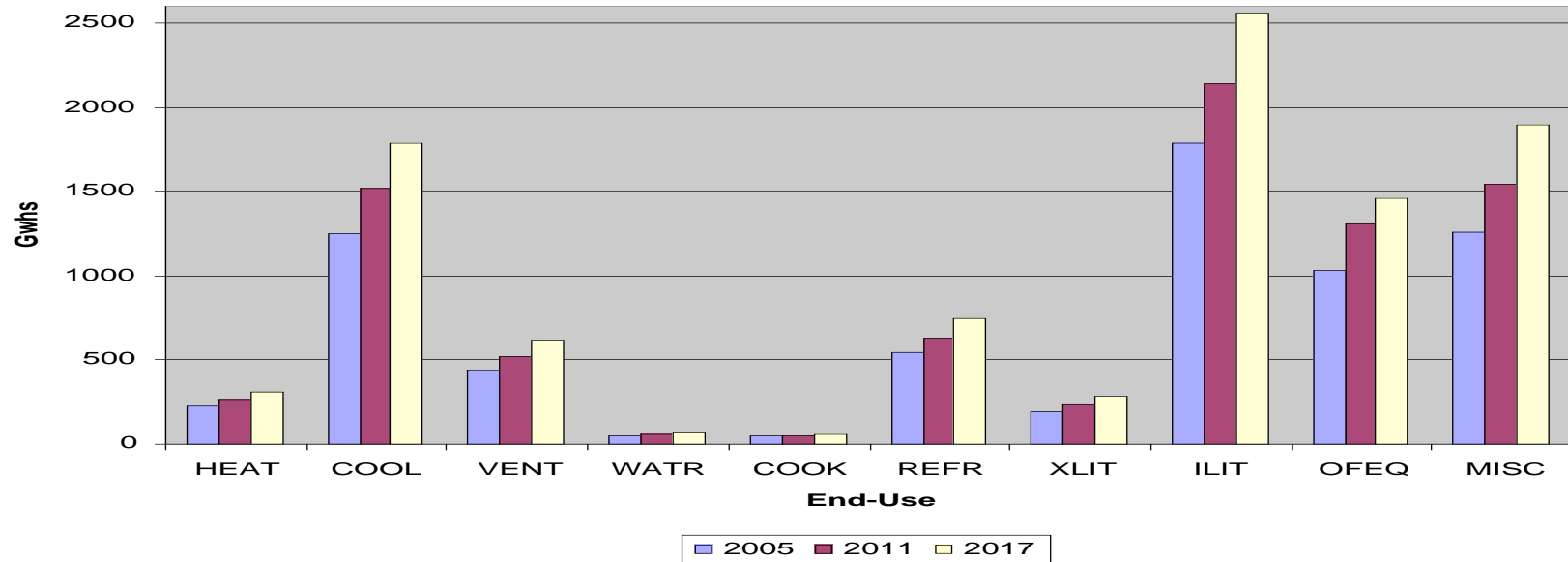
# Utah COMMEND Summary

	2005	2017
Energy (GWh)	6,828	9,794
Customers (Thousands)	69.8	94.0
Use per Customer (kWh)	97,800	104,174

- Customer growth is mainly due to stable residential customer growth and strong growth in offices and health
- Use per customer is rising mainly due to increasing cooling and office equipment saturations

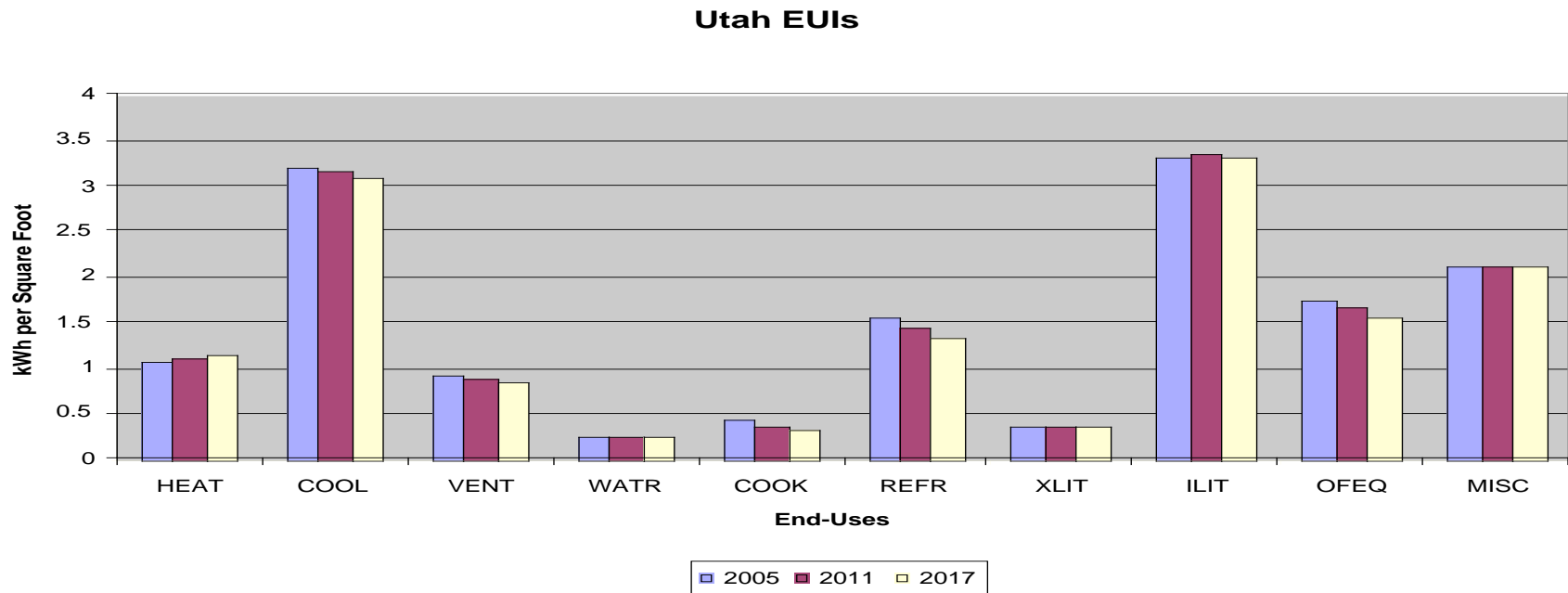
# Utah Sales Summary

Utah Commercial Gwhs by End-use 2005, 2011, 2017



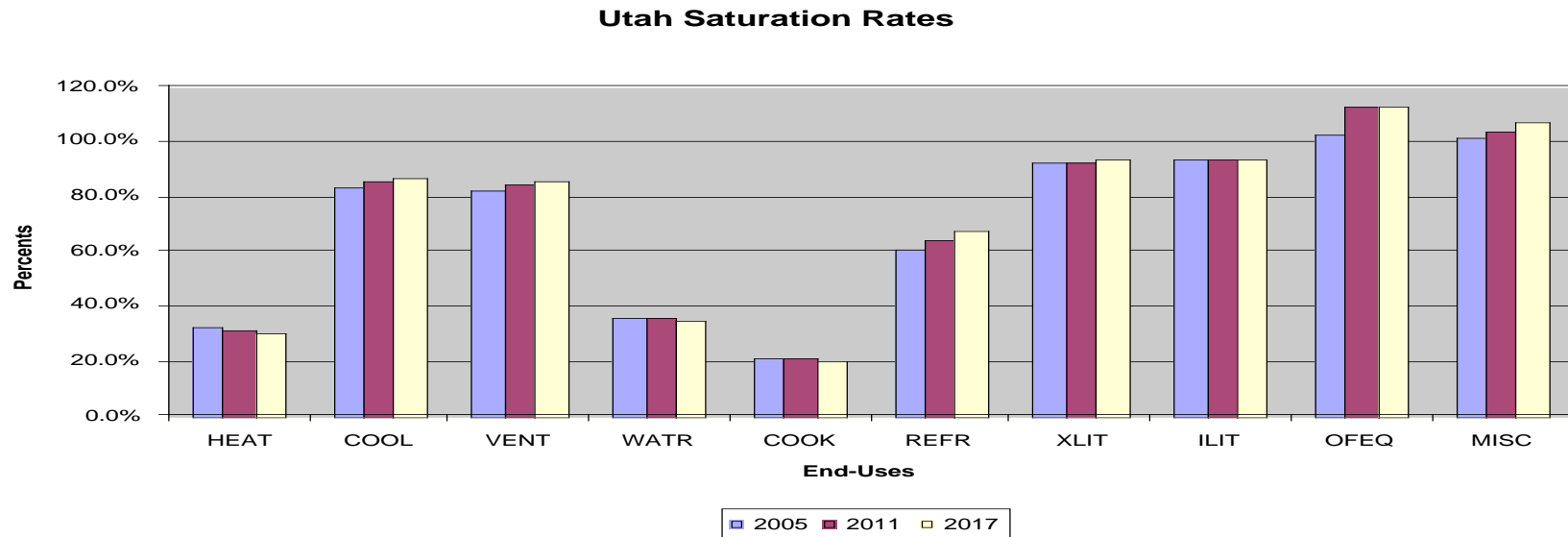
- Sales growth driven increases in interior lighting, cooling, office equipment and miscellaneous

# Utah EUIs



- EUIs are generally declining due to increasing equipment efficiency over the forecasting horizon.

# Utah Saturation Rates



- **Some saturations are decreasing due to preference for natural gas:**
  - Heating, Water heating, Cooking
- **Some saturations are increasing due to offering comfort and amenities to their customers:**
  - Cooling, ventilation, exterior lighting
- **Other saturations are increasing due to changing commercial customer mix:**
  - Office equipment, refrigeration



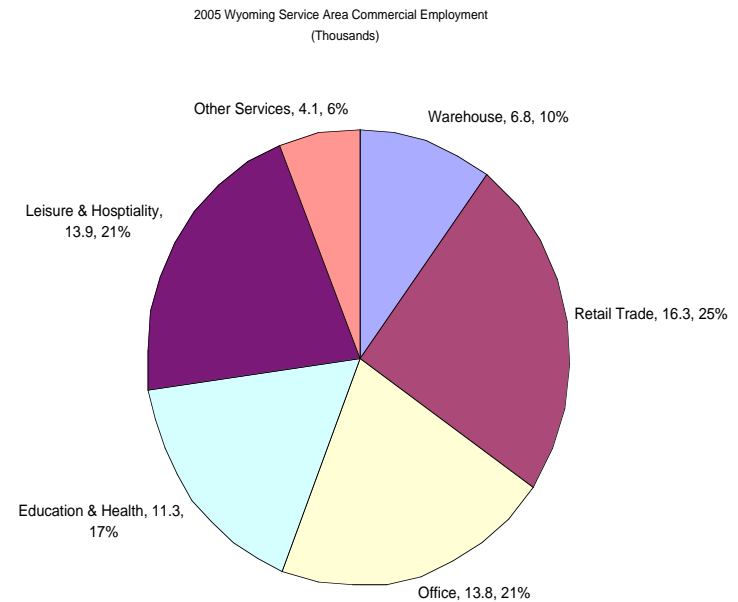
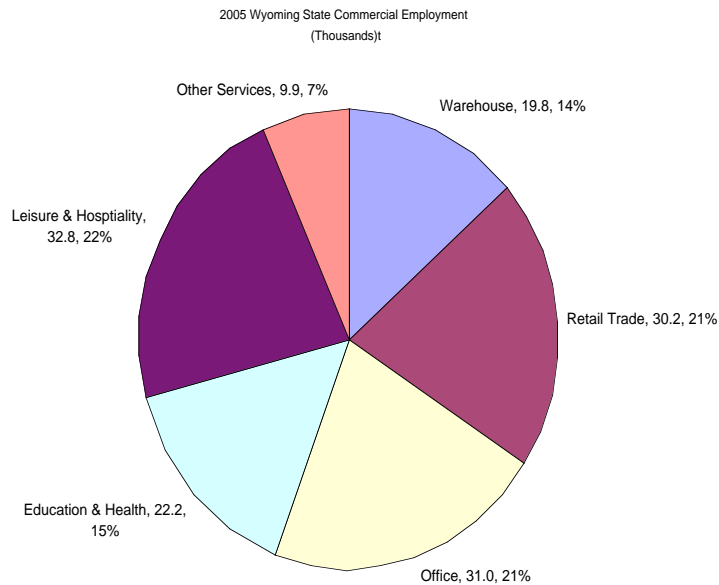
# Wyoming Commercial Sales Forecast

Pete Eelkema



# Wyoming Non-Manufacturing Employment

	1994 - 2004	2005	2006	2007 - 2017
Wholesale Trade	2.8%	3.9%	2.1%	1.3%
Retail Trade	1.0%	0.7%	0.5%	0.2%
Trans. Warehousing, Utilities	0.7%	2.0%	1.8%	1.1%
Information	1.9%	2.2%	2.5%	0.8%
Financial Activities	2.4%	6.8%	3.3%	1.0%
Professional & Business Services	3.4%	0.8%	4.2%	2.8%
Educational & Health Services	3.2%	3.4%	2.3%	0.9%
Leisure & Hospitality	1.4%	4.4%	2.0%	0.4%
Other Service	2.0%	1.5%	-0.1%	0.8%
Government	1.0%	0.3%	0.8%	0.6%
<b>Total State Non-Manufacturing</b>	<b>1.7%</b>	<b>3.1%</b>	<b>2.1%</b>	<b>0.8%</b>



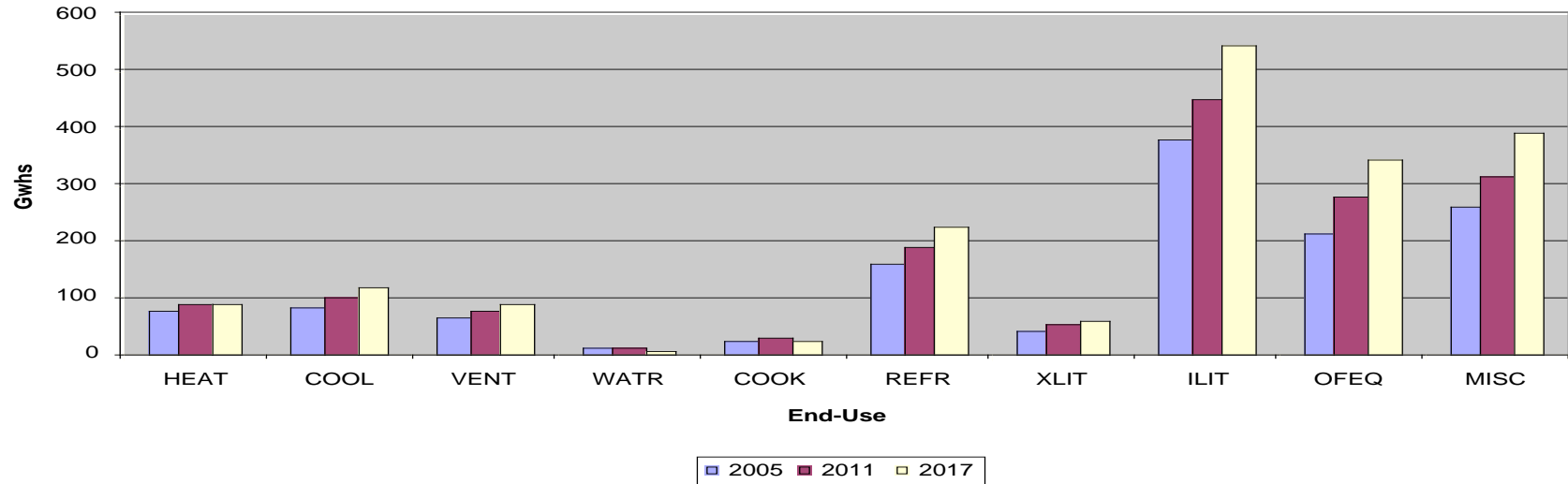
# Wyoming COMMEND Summary

	2005	2017
Energy (GWh)	1,333	1,909
Customers (Thousands)	21.93	28.58
Use per Customer (kWh)	60,785	66,793

- Energy is growing at 3.0% from 2007 to 2017.
- Customers are growing at 2.2% from 2007 to 2017. The fastest growing sectors are Offices, Miscellaneous, Schools, and Health.
- Use per customer is growing at 0.8% from 2007 to 2017. The growth in use per customer is largely driven by increased usage of Office and Miscellaneous Equipment

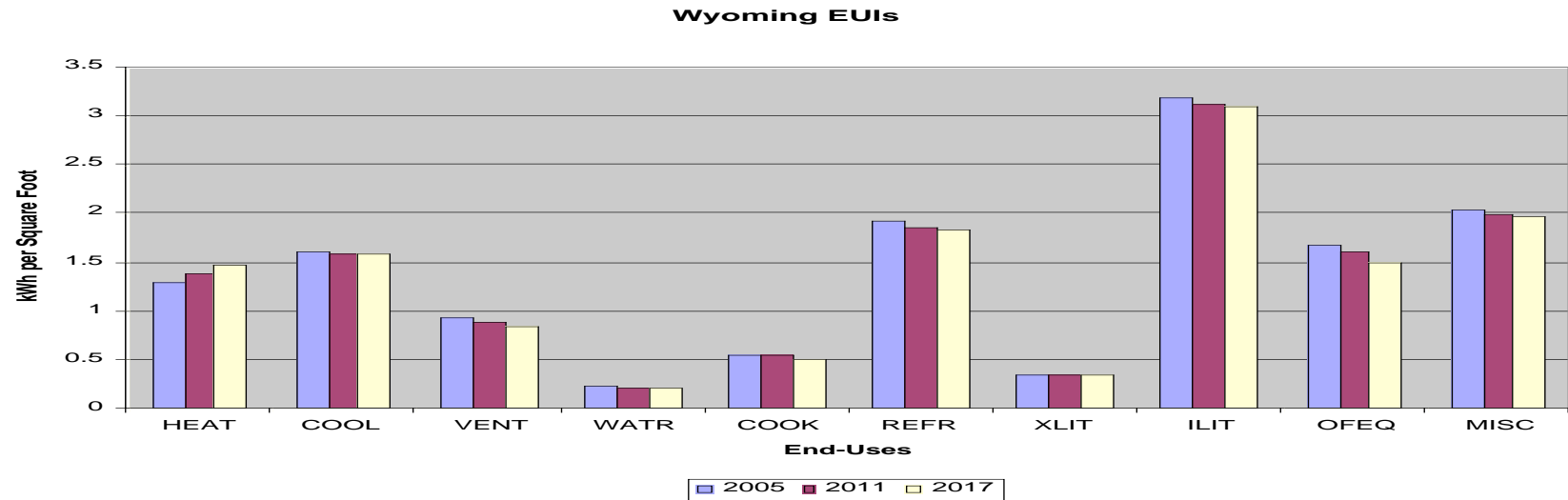
# Wyoming Sales Summary

Wyoming Commercial Gwhs by End-Use 2005, 2011, 2017



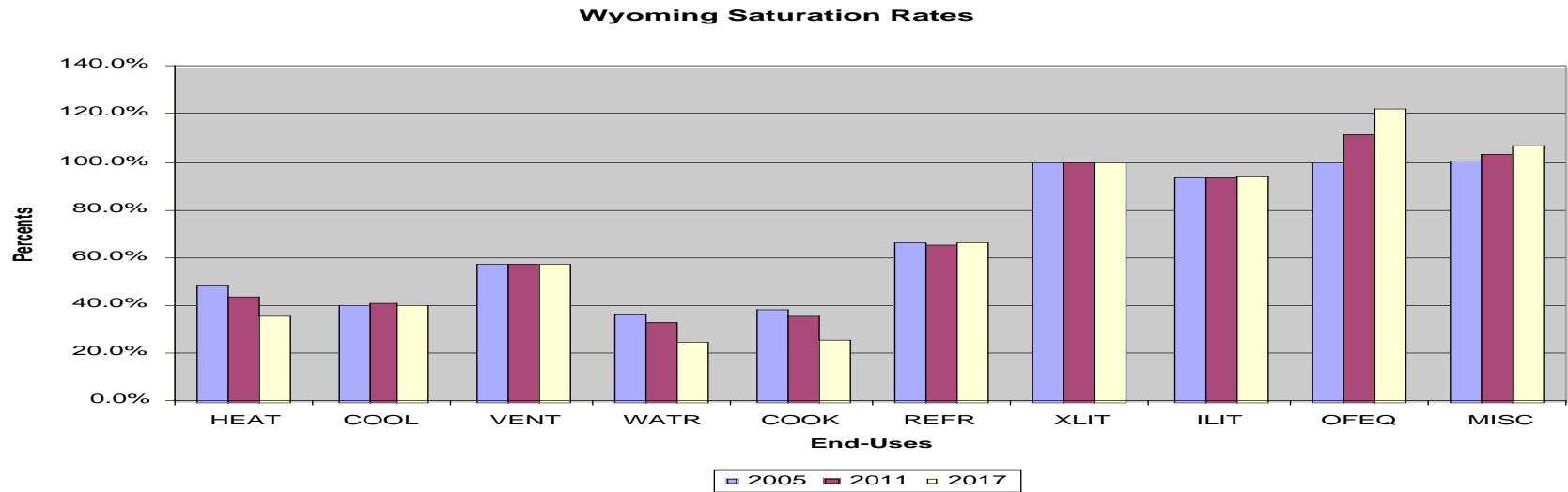
- Sales growth for Lighting, Office Equipment, and Miscellaneous is largely driven by increase in number of customers and increasing saturation of Office Equipment and Miscellaneous

# Wyoming EUIs



- Heat EUI is increasing because the office sector has a higher average EUI and is growing faster than other sectors.
- Ventilation, Refrigeration, Interior Lighting, Office Equipment, and Miscellaneous EUI's are decreasing because of increasing efficiency.

# Wyoming Saturation Rates



- Heating, Water Heating, and Cooking saturations are decreasing because new construction has a higher usage of natural gas.
- Office and Miscellaneous Equipment saturations are increasing because the Office sector is increasing faster than other sectors. The Office sector has a higher saturation of Office Equipment and Miscellaneous Equipment.
- Saturation for Cooling, Ventilation, Refrigeration, Exterior Lighting, and Interior Lighting forecasted to remain fairly constant.



# Idaho Commercial Sales Forecast

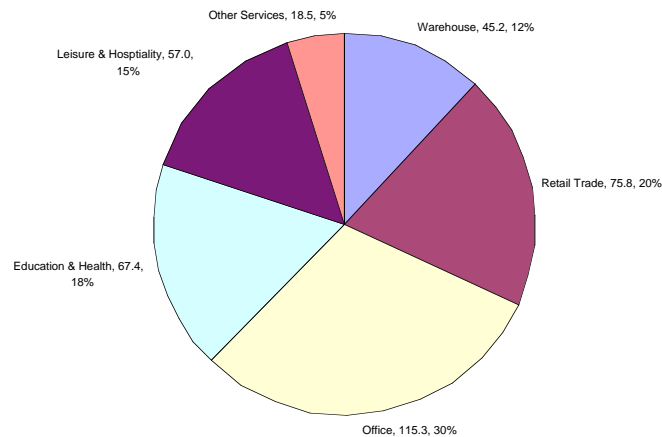
Pete Eelkema



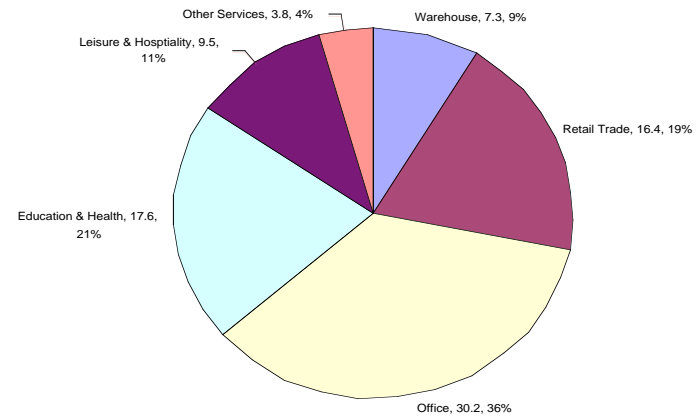
# Idaho Non-Manufacturing Employment

	1994 - 2004	2005	2006	2007 - 2017
Wholesale Trade	1.3%	4.0%	3.1%	2.2%
Retail Trade	2.1%	0.7%	2.4%	1.6%
Trans. Warehousing, Utilities	1.0%	-0.1%	0.8%	1.1%
Information	2.2%	3.5%	1.2%	1.5%
Financial Activities	1.3%	3.7%	2.4%	1.4%
Professional & Business Services	5.7%	4.6%	4.0%	3.3%
Educational & Health Services	5.1%	3.7%	3.3%	1.0%
Leisure & Hospitality	2.5%	2.5%	3.5%	1.4%
Other Services	1.8%	0.8%	1.1%	1.4%
Government	2.1%	1.7%	1.8%	1.1%
<b>Total State Non-Manufacturing</b>	<b>2.8%</b>	<b>2.7%</b>	<b>2.6%</b>	<b>1.8%</b>

2005 Idaho State Commercial Employment  
(Thousands)



2005 Idaho Service Area Commercial Employment  
(Thousands)



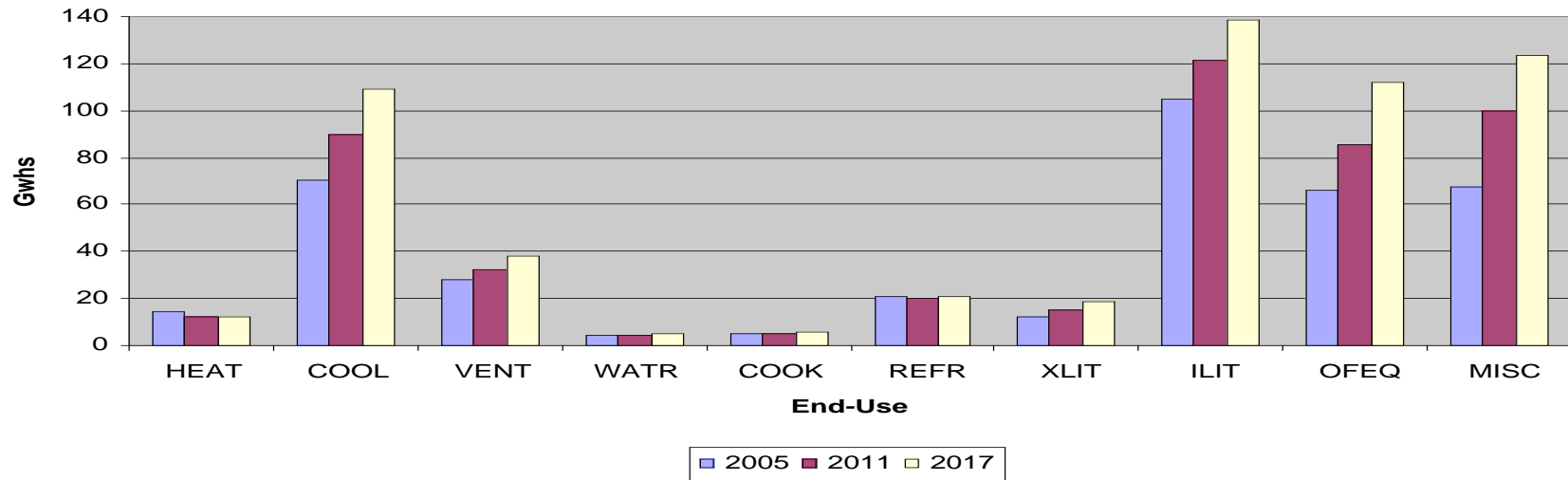
# Idaho COMMEND Summary

	2005	2017
Energy (GWh)	393	583
Customers (Thousands)	7.2	9.1
Use per Customer (kWh)	55,048	64,320

- Energy is growing at 3.2% from 2007 to 2017.
- Customers are growing at 2.1% from 2007 to 2017.
- Use per customer is growing at 1.1% from 2007 to 2017. The growth in use per customer is largely driven by increasing Cooling EUI's and increasing saturation of Exterior Lighting and Office and Miscellaneous Equipment.

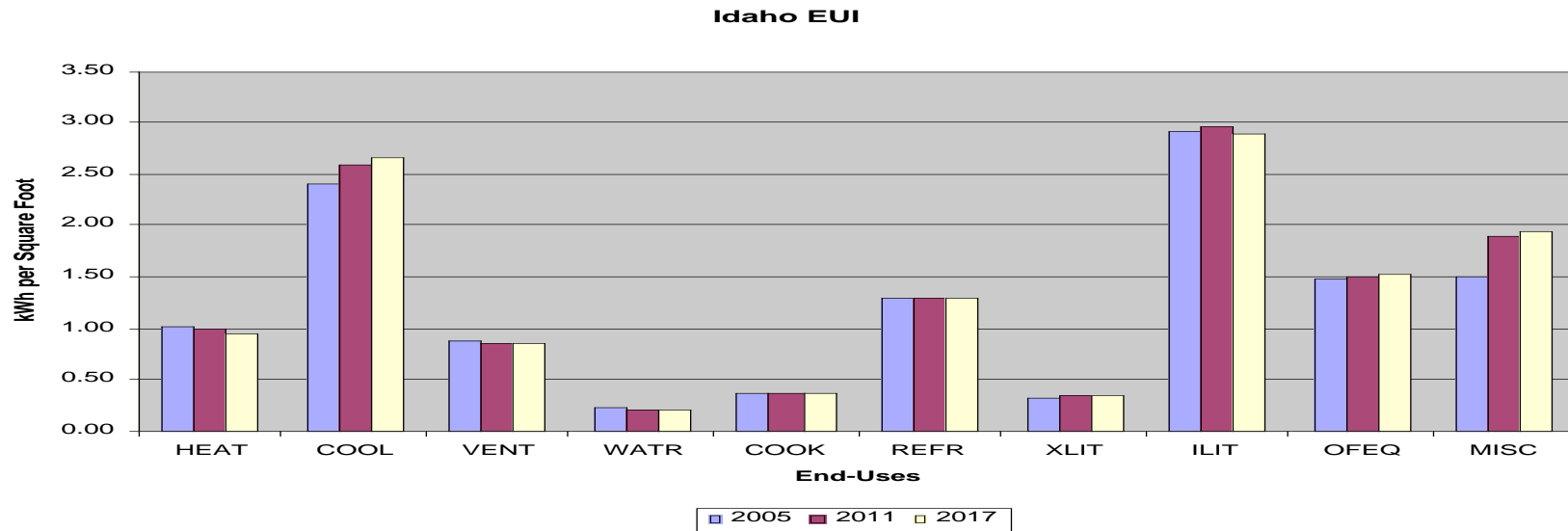
# Idaho Sales Summary

Idaho Commercial Gwhs by End-Use 2005, 2011, 2017



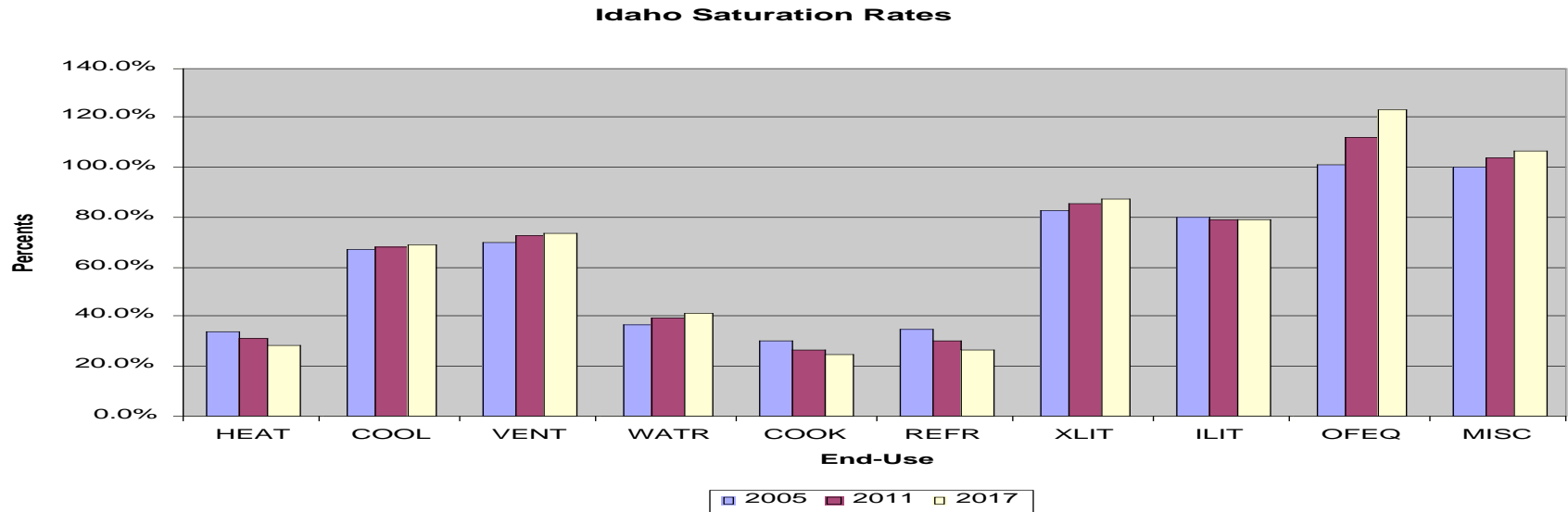
- Cooling, Interior Lights, Office Equipment and Miscellaneous sectors have the highest increases in sales.
  - The increases in cooling sales are driven by increasing EUI's and customer growth.
  - The increases in office equipment sales are driven by increasing saturation and customer growth.
  - The increases in Interior Lighting sales are driven by increases in customer growth.
  - The increases in Miscellaneous sales are driven by increasing EUI's, saturation, and customer growth.

# Idaho EUIs



- Cooling EUI is increasing because of increasing EUI's in the Office, Retail, Warehouse, and Miscellaneous sectors
- Miscellaneous EUI is increasing because of increases in Retail and Lodging EUI's

# Idaho Saturation Rates



- Exterior Lighting saturation is increasing because of business desire to offer comfort and amenities to their customers.
- Heating saturation is decreasing because new construction has a higher use of natural gas
- Office and Miscellaneous Equipment are increasing because the Office sector is increasing faster than other sectors. The Office sector has a higher saturation of Office Equipment and Miscellaneous equipment.
- Cooking and Refrigeration saturation is decreasing because of decreasing overall saturations.



# Washington Commercial Sales Forecast

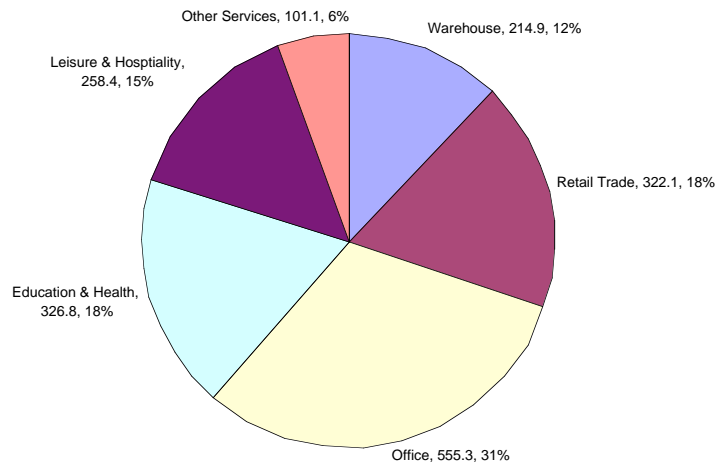
Glen Booth



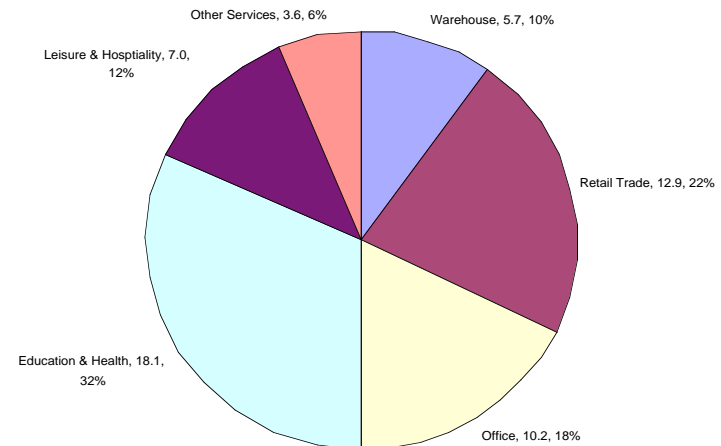
# Washington Non-Manufacturing Employment

	1994 - 2004	2005	2006	2007 - 2017
Wholesale Trade	1.2%	1.4%	0.6%	0.8%
Retail Trade	1.7%	3.7%	1.0%	-0.3%
Trans. Warehousing, Utilities	0.5%	5.0%	1.4%	1.5%
Information	4.6%	0.7%	0.7%	2.3%
Financial Activities	2.1%	0.2%	-0.2%	0.4%
Professional & Business Services	2.7%	2.8%	3.3%	2.7%
Educational & Health Services	2.6%	2.4%	1.8%	1.0%
Leisure & Hospitality	1.7%	1.5%	1.9%	0.0%
Other Services	0.6%	1.0%	0.3%	0.4%
Government	1.8%	0.5%	1.2%	0.9%
<b>Total State Non-Manufacturing</b>	<b>2.0%</b>	<b>2.0%</b>	<b>1.5%</b>	<b>0.9%</b>

2005 Washington State Commercial Employment  
(Thousands)



2005 Washington Service Area Commercial Employment  
(Thousands)



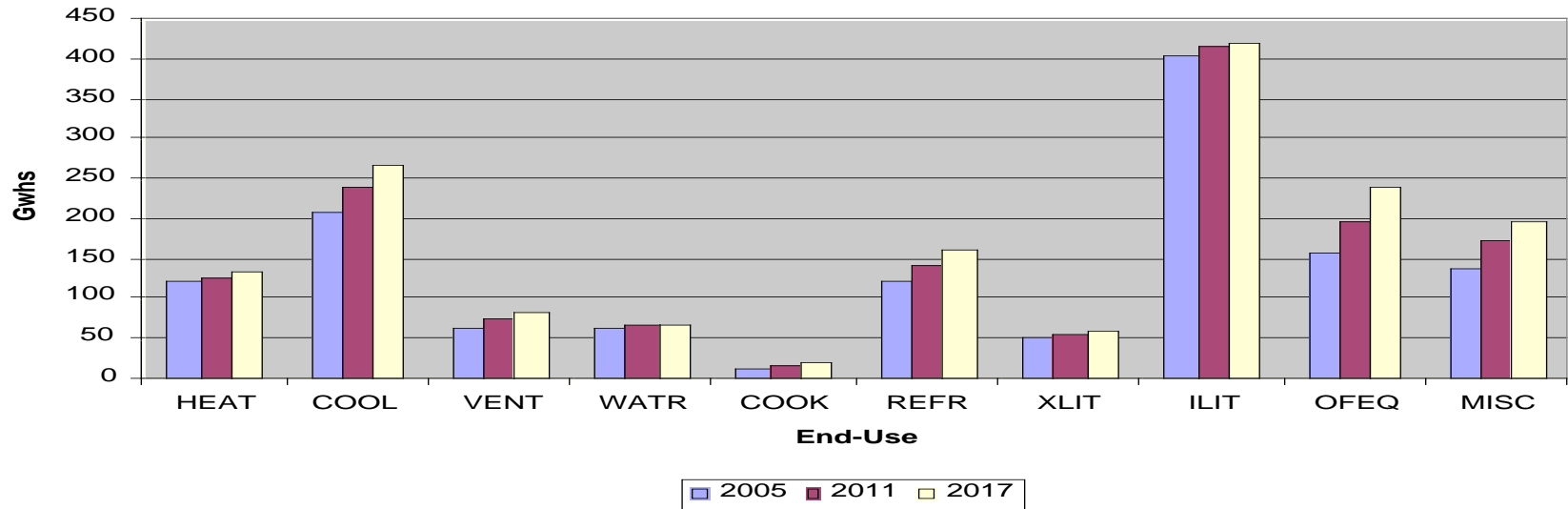
# Washington COMMEND Summary

	2005	2017
Energy (GWh)	1,345	1,657
Customers (Thousands)	16.7	19.8
Use per Customer (kWh)	80,725	83,755

- Customer growth is primarily due to
  - Residential Customer Growth
  - Growth of Retail, Health and Offices
- Use per customer increase is due to decreasing real electricity price and slightly increasing saturations of certain end-uses
  - Heating
  - Cooling
  - Exterior Lighting
  - Office Equipment

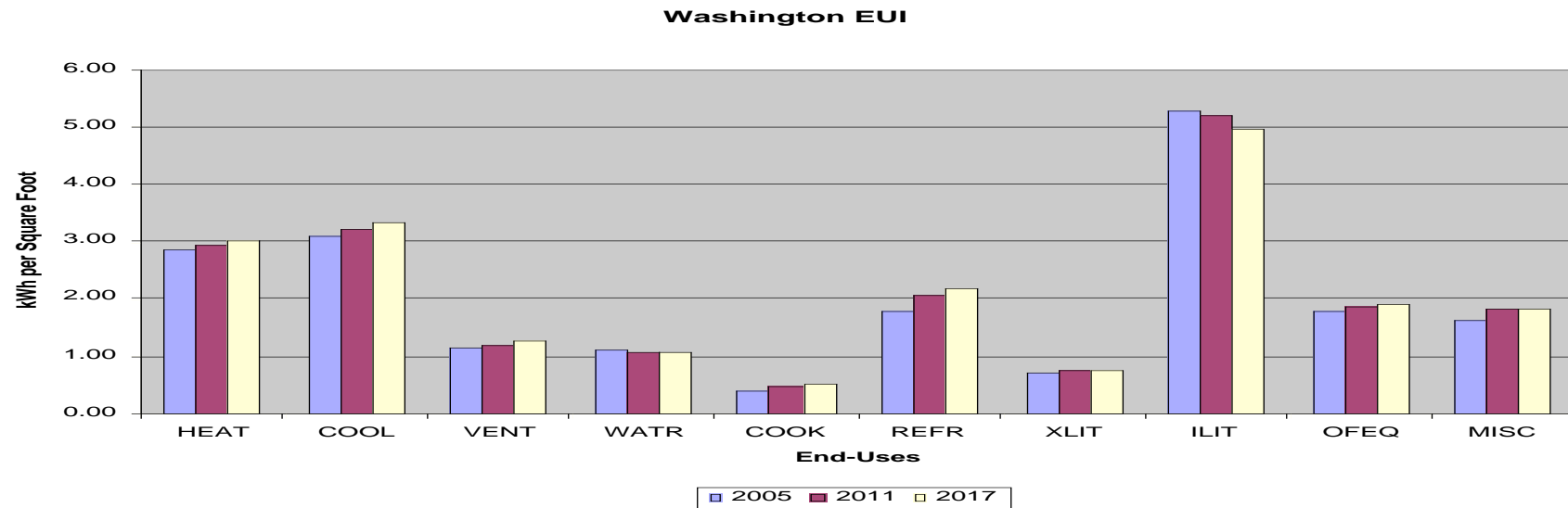
# Washington Sales Summary

Washington Commercial Gwhs by End-Use 2005, 2011, 2017



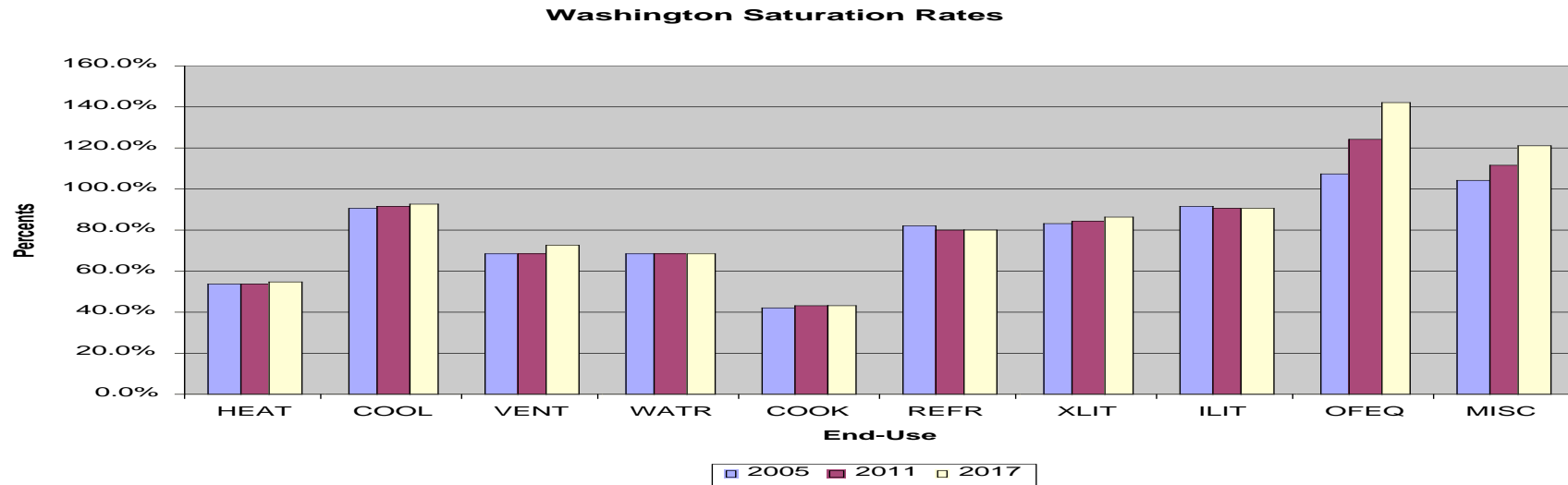
- Between 2007 and 2017 sales growth is forecasted at 1.53%
- Sales growth will drive increases over all end-uses
- Most notable increases: Cooling, Refrigeration, Office Equipment and Miscellaneous

# Washington EUIs



- Some EUIs are slightly increasing due to decline in real price of electricity.
- Other EUIs decrease or are flat due to efficiency gains.

# Washington Saturation Rates



- Most saturations are flat or change very little: Mature Service Territory
- Some saturations are increasing slightly due to businesses offering comfort and amenities to their customers: Cooling, Exterior Lighting
- Still other saturations are increasing due to changing Commercial customer mix: Office Equipment



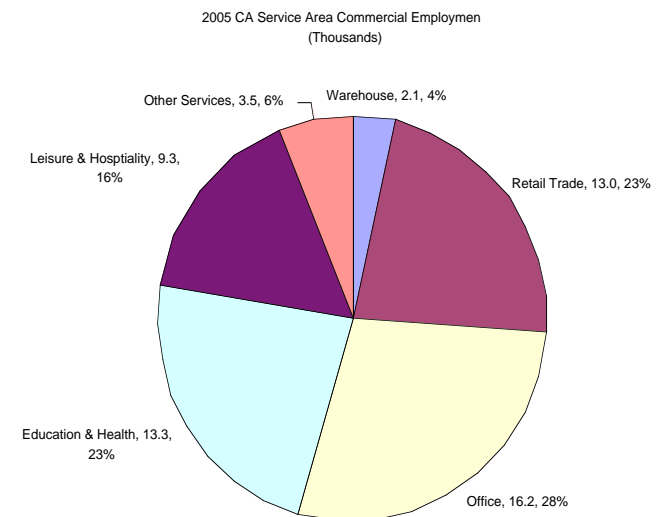
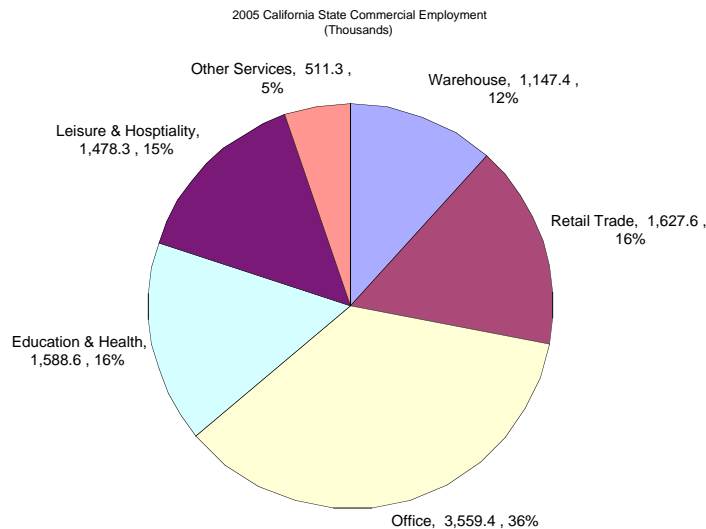
# California Commercial Sales Forecast

Glen Booth



# California Non-Manufacturing Employment

	1994 - 2004	2005	2006	2007 - 2017
Wholesale Trade	1.8%	0.5%	0.2%	0.3%
Retail Trade	1.8%	0.6%	1.1%	0.7%
Trans. Warehousing, Utilities	0.8%	1.6%	2.1%	2.1%
Information	2.0%	-1.5%	-0.9%	1.7%
Financial Activities	1.6%	2.3%	0.3%	0.7%
Professional & Business Services	2.8%	3.0%	3.2%	2.9%
Educational & Health Services	2.6%	1.7%	1.8%	0.9%
Leisure & Hospitality	2.3%	2.6%	1.1%	1.0%
Other Service	1.8%	1.4%	0.9%	1.0%
Government	1.3%	0.3%	1.3%	1.0%
<b>Total State Non-Manufacturing</b>	<b>2.2%</b>	<b>1.6%</b>	<b>1.5%</b>	<b>1.4%</b>

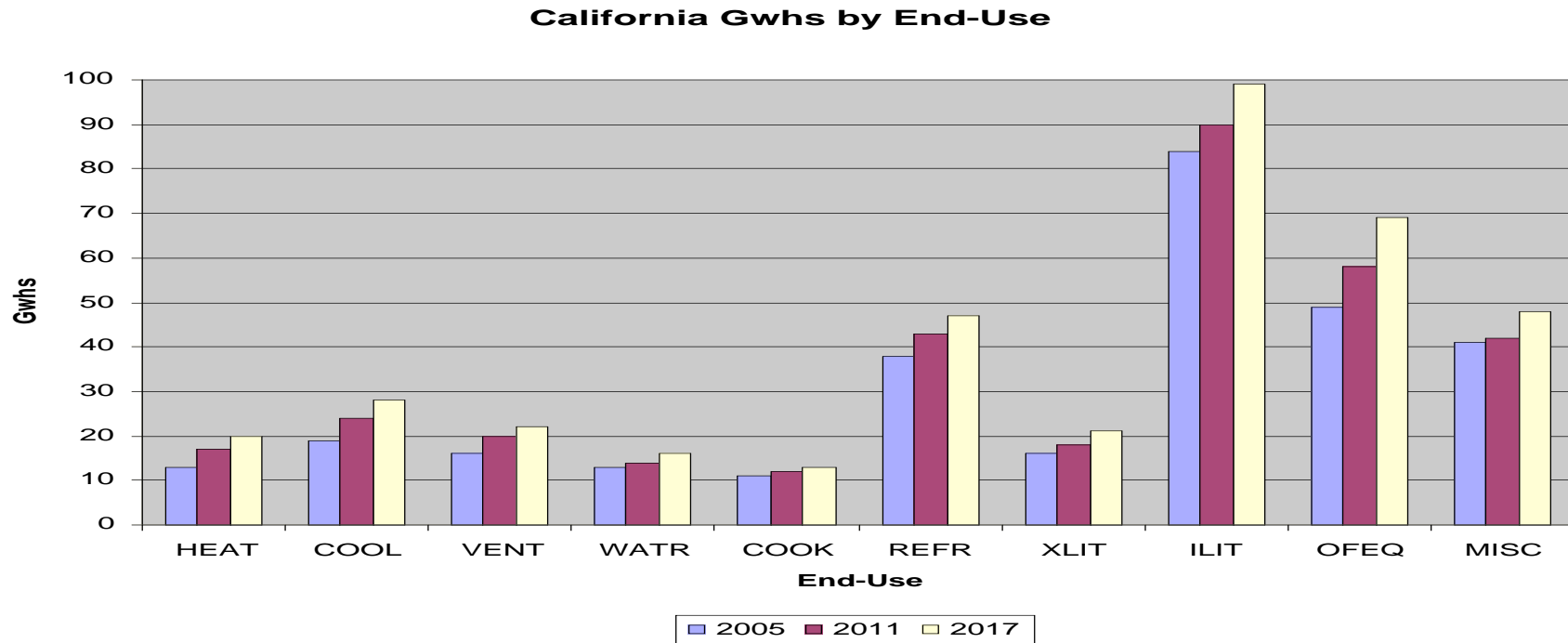


# California COMMEND Summary

	2005	2017
Energy (GWh)	300	383
Customers (Thousands)	7.4	8.6
Use per Customer (kWh)	40,525	44,673

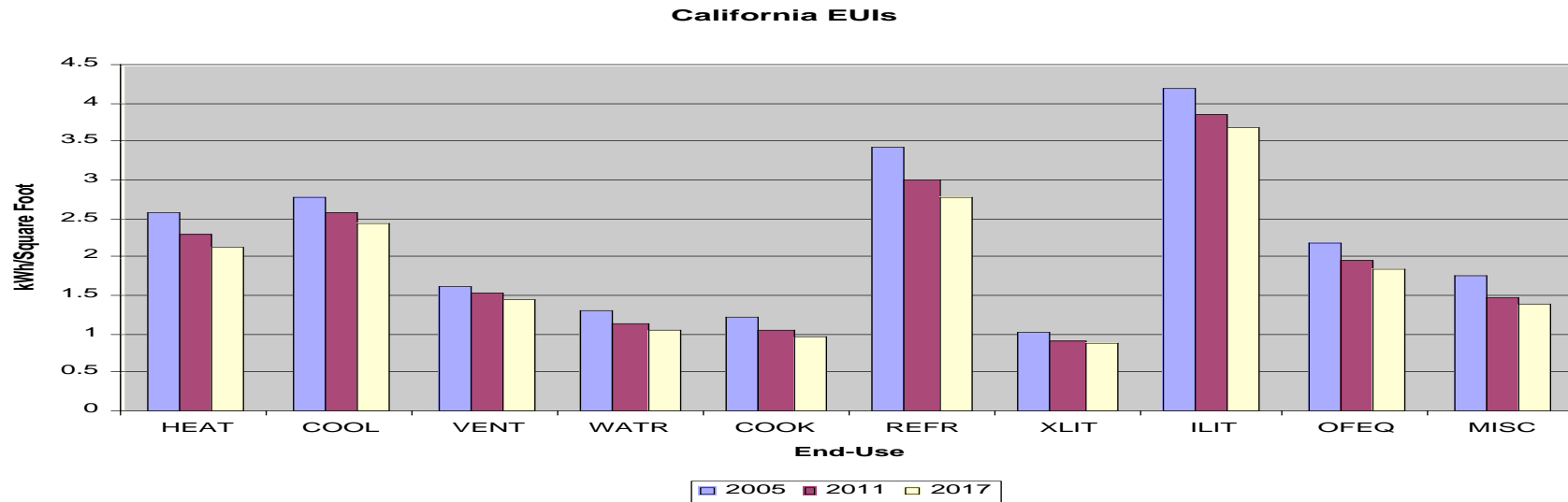
- Customer growth is primarily in due to
  - Residential Customer Growth
  - Growth of offices
- Use per customer increase is due to increasing saturations of certain end-uses
  - Heating
  - Cooling
  - Exterior Lighting
  - Office Equipment
- Use per customer also increases due to larger restaurants and lodging

# California Sales Summary



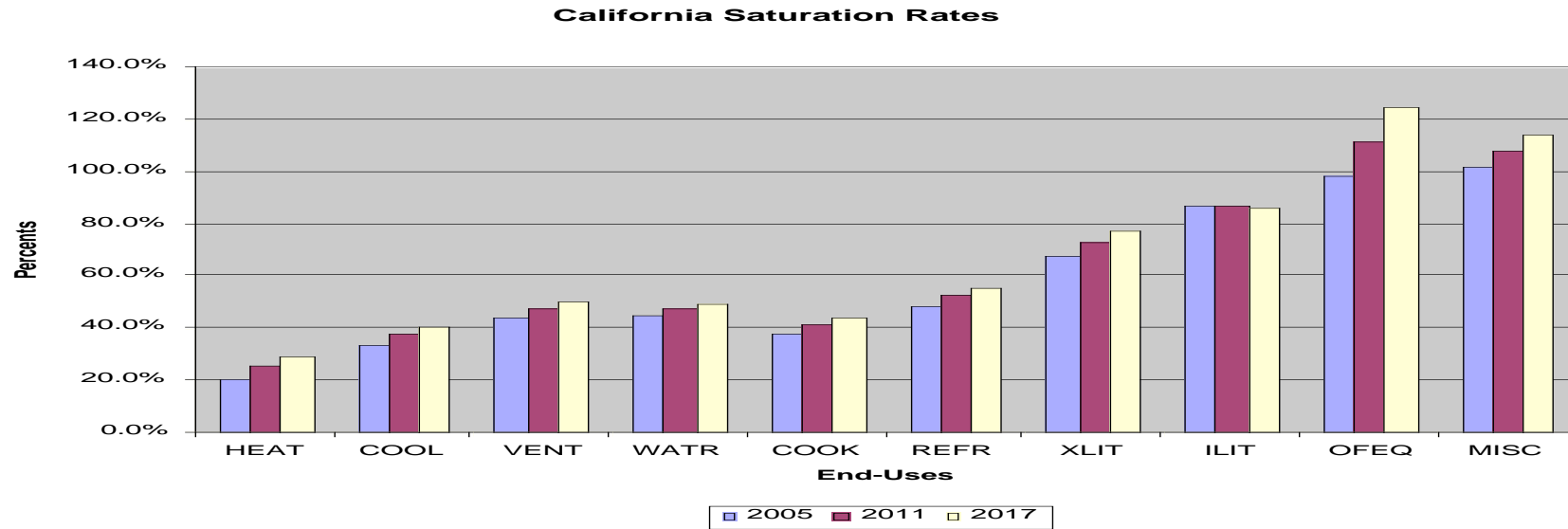
- Between 2007 and 2017 sales growth is forecasted at 2.08%
- Sales growth will drive increases over all end-uses
- Most notable increases: Interior Lighting and Office Equipment

# California EUIs



- EUIs are generally declining due to increasing equipment efficiency over the forecasting horizon

# California Saturation Rates



- Some saturations are increasing due to the relative price of electricity to other fuels: Heating, Water Heating, Cooking
- Other saturations are increasing due to offering comfort and amenities to their customers: Cooling, Exterior Lighting
- Still other saturations are increasing due to changing Commercial customer mix: Office Equipment, Refrigeration



# Commercial Sales Forecast Summary

Michael Rife



# Actual and Forecasted Energy Sales Growth Rate

	94 to 04	07 to 17
Oregon	2.52%	1.70%
Utah	4.82%	3.02%
Wyoming	2.60%	3.00%
Idaho	5.11%	3.17%
Washington	1.45%	1.53%
California	2.27%	2.08%

- **Oregon growth is driven by a moderation in customer growth and in use per customer.**
- **Utah sales growth is driven by strong, though moderating, growth in number of customers and continued increases in use per customer**
- **Wyoming sales is driven by continued gains in use per customer and an increase in the growth rate of customers.**
- **Idaho sales growth is driven by moderating customer growth and use per customer.**
- **Washington sales growth is driven by increasing gains in use per customer and a moderating growth of customers.**
- **California sales is driven by continued gains in use per customer and a steady growth in the number of customers.**

# Actual and Forecasted Customer Growth Rates

	94 to 04	07 to 17
Oregon	2.08%	1.50%
Utah	3.99%	2.44%
Wyoming	1.50%	2.17%
Idaho	2.98%	2.09%
Washington	1.71%	1.38%
California	1.25%	1.24%

- Customer growth is following residential customer growth.
  - **Oregon: Household formation and in-migration**
  - **Utah: Household formation with little help from migration and continued service exports**
  - **Wyoming: “Boomlet” housing formation**
  - **Idaho: Housing formation and 1% rate of in-migration**
  - **Washington: Housing formation, steady birth rate, and in-migration**
  - **California: Steady birth rate, in-migration, and hospitality sector increases.**