



Demand Forecast Advisory Committee Meeting

December 3rd, 2008
Massoud Jourabchi

12/3/2008

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This meeting will cover

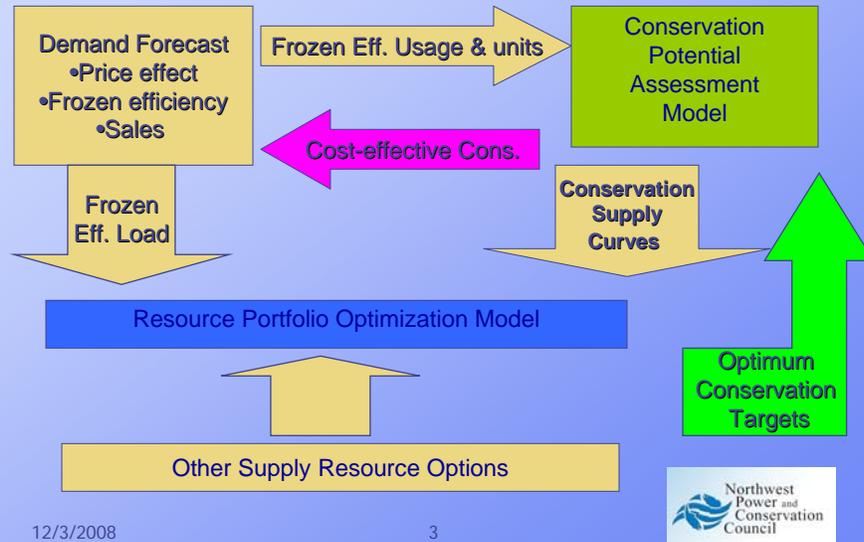
- Review of Economic forecasts - 10:10 - 11:00
- Review of Base Case load forecast - 11:00 - 11:45
- Lunch 11:45 - 1:00
- Discussion of Alternative scenarios - 1:00 - 2:00
- Background on Council's Portfolio Model/ 2:00 - 3:00
Interaction with Demand Forecast/Conservation
- General Discussions and next steps 3:00 - 4:00

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Council's Planning Process



Brief review of National Forecast

- Recession in 2008- 2009?
- 25% chance of deepening recession in 2009 if financial packages can not unfreeze lending
 - GDP contracting 2% in 2009
 - GDP growing 0.8% in 2010
- Source: Global Insight October 2008

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Slow down in US Economy

Growth rate			
1990-2007	2008-2010	2010-2030	
3.43%	2.6%	3.50%	Industrial Production--All Manufacturing
3.22%	1.6%	2.44%	Real Gross National Product
3.17%	1.7%	2.82%	Real Disposable Income
1.94%	-1.2%	1.49%	Real Gross Private Investment In All Structures

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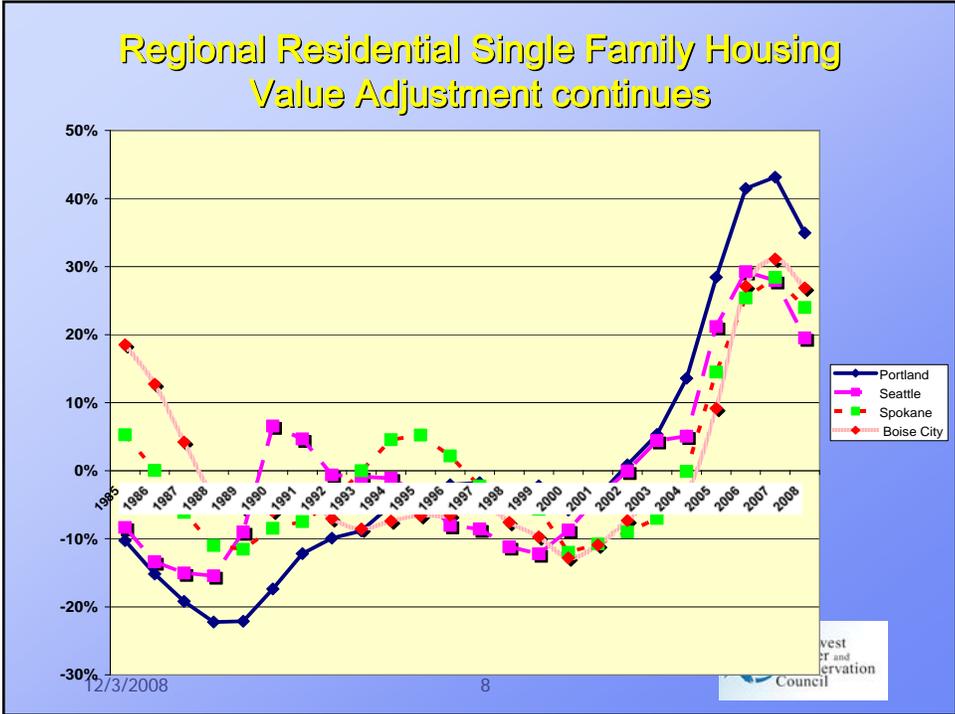
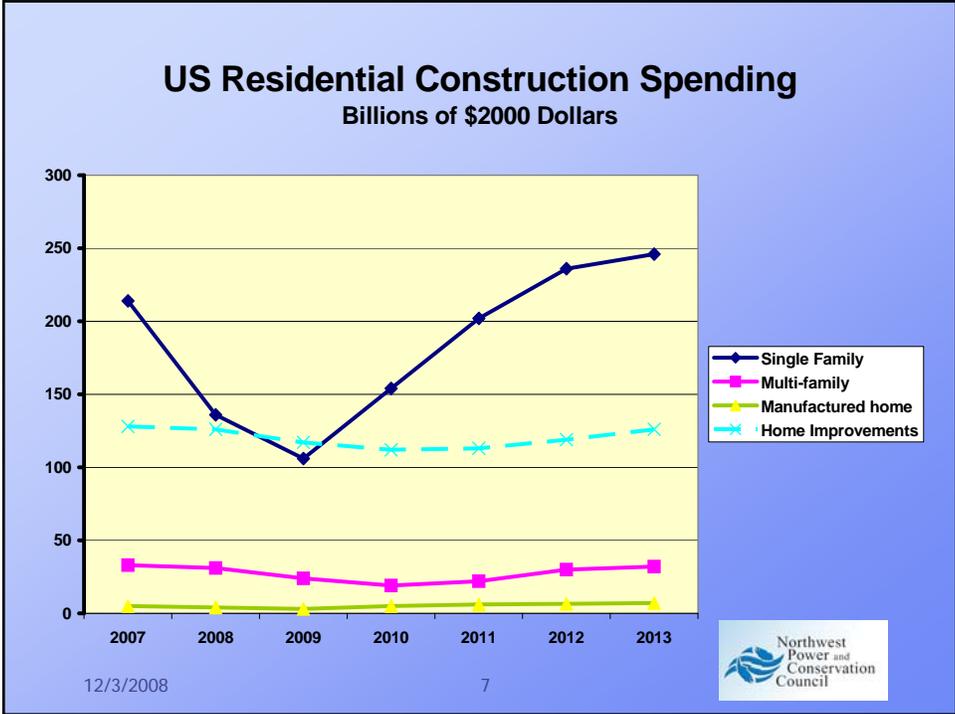
US Housing Market

- Current large inventory
- In 2008, housing starts slipped to less than 1 million units, lowest since 1945.
- Expected to drop further the 800,000 units in 2009.
- Market Price adjustment continuing, Mean price dropping from \$215,000 in 2007 to \$179,000 by 2009.
- Housing market is projected to hit bottom in the second quarter 2009.

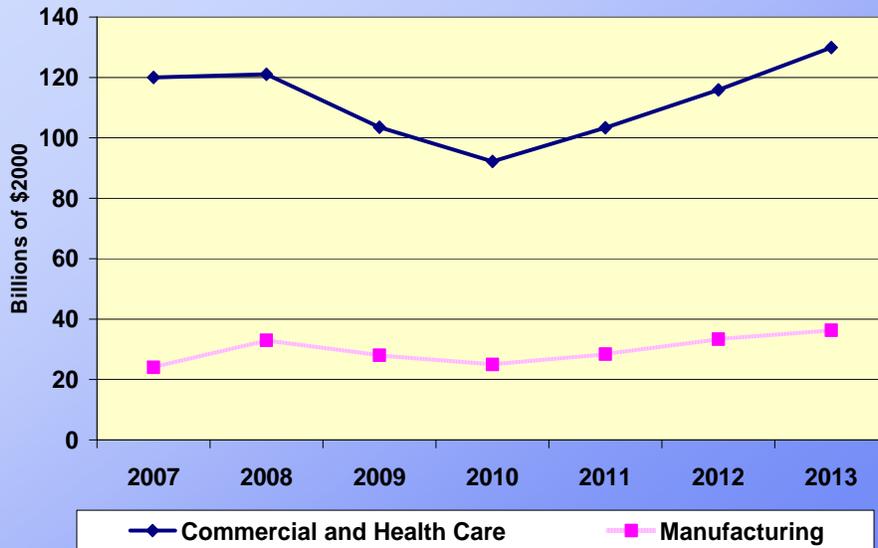
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US Nonresidential Construction Spending



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Comparison of Key Regional Economic Drivers Indicates Slow Growth Path

Drivers	1985-2007	2010-2030
Population	1.6%	1.3%
Residential (000's units)	1.8%	1.7%
Commercial Floor space (millions of sqf)	2.3%	1.5%
Manufacturing Output (billions \$2000)	4.1%	3.0%
Agriculture Output (billions of \$2000)	4.4%	3.9%
Transportation (\$billions of \$2000 income/output)	3.6%	3.3%

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Reminder on Key Economic Drivers

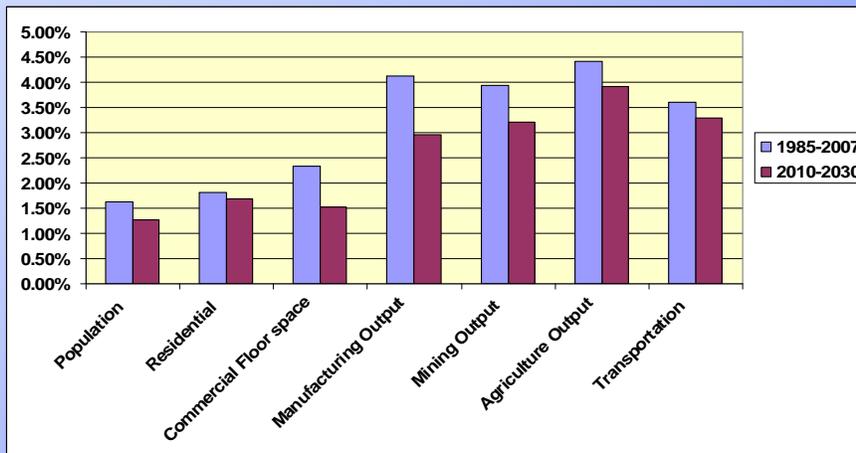
- For Residential sector: number of homes
- For commercial sector: square footage of buildings
- For Industrial/Ag sector: Dollar value of output.
- For transportation sector: Sectoral income and number of new cars
- Other drivers include:
- Fuel and electricity prices, saturation rate assumptions, Energy efficiency and energy intensity of use.

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Summary of Growth Rates in 6th Plan's Economic Drivers



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Residential sector

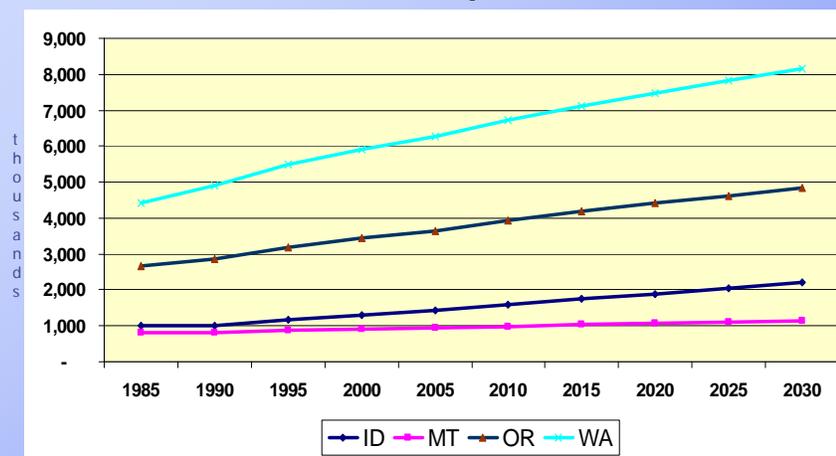
- Population Growth
- Changing Composition of Population
- Impact on regional economy

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Regional Population is the Primary Driver

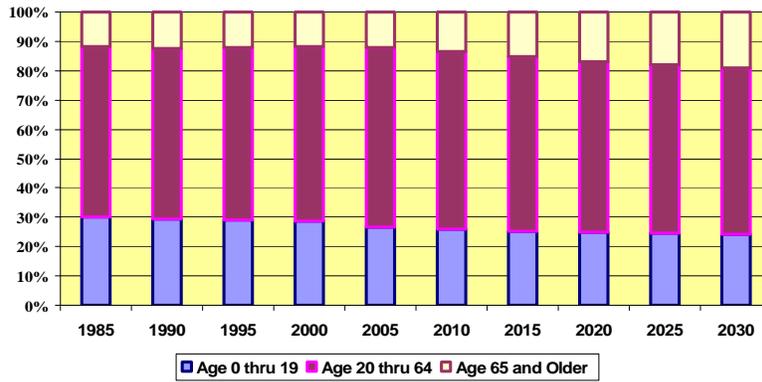


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Changing Composition of Population

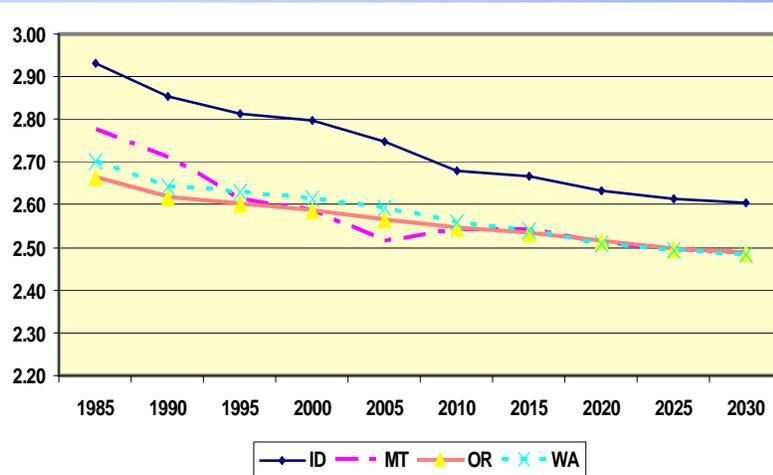


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Declining Household Size

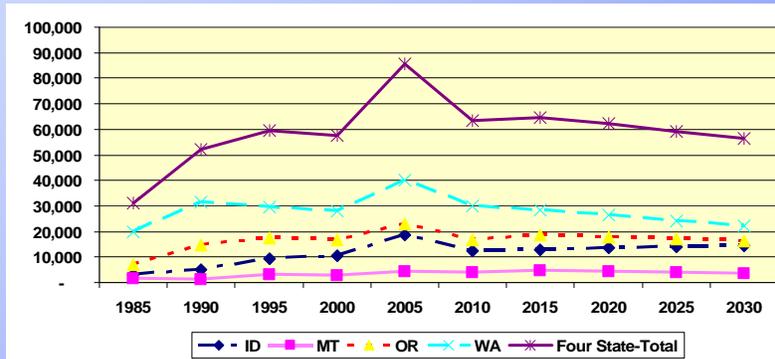


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New Single Family Additions

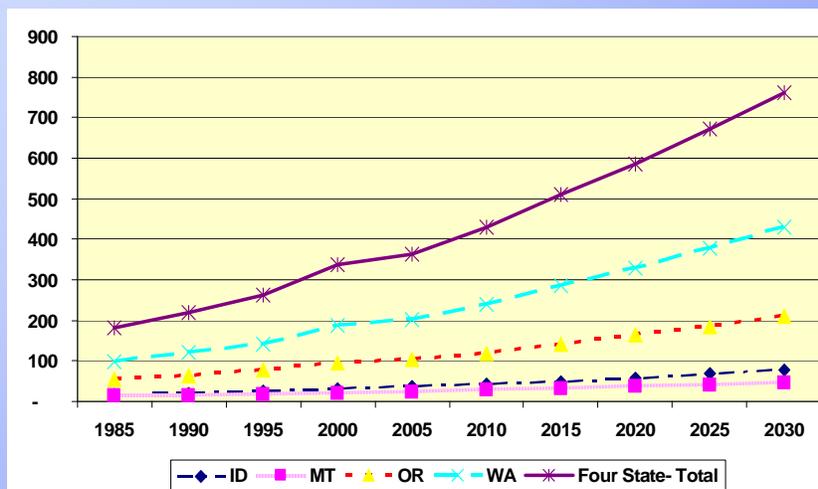


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Personal Income (Billions of 2000 dollars)



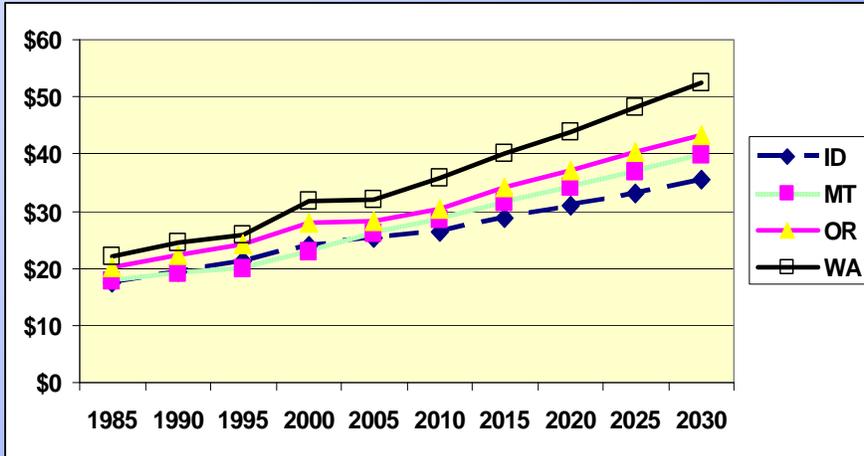
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Raising Per Capita Income

constant \$2000

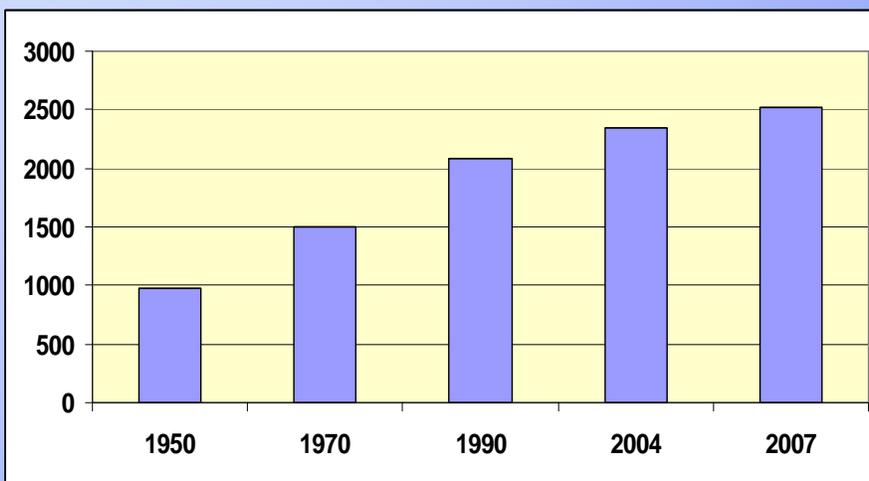


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Growing Average Size (SQF) New Single Family Homes

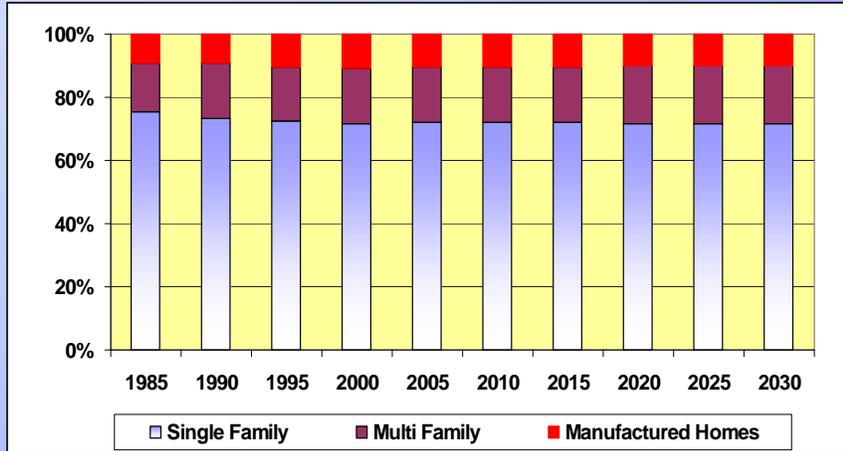


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Composition of Regional Housing stock – fairly stable

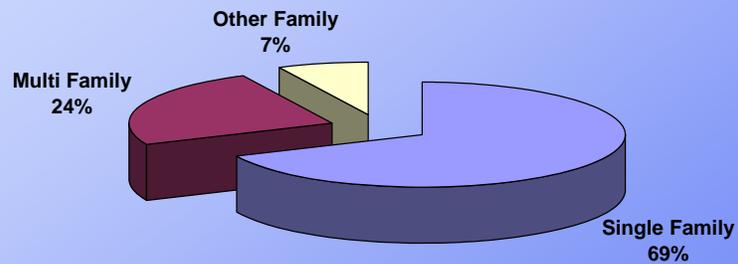


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Breakdown of Northwest Residential Electricity Consumption (2005)



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Commercial Sector Drivers

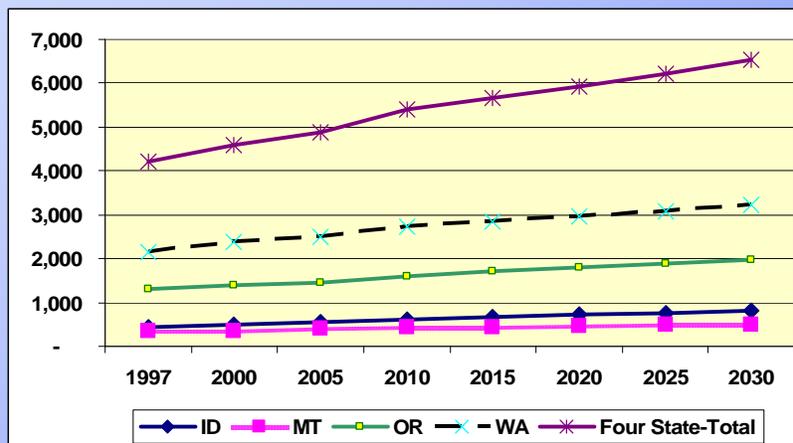
- Commercial square footage
 - Commercial square footage is driven by employment
 - Extensive analysis was done to estimate square footage requirement
- Major shifts in employment
- Shift in intensity

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Projected Growth in Commercial Employment (in 1000)



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Changing Composition of Commercial Employment

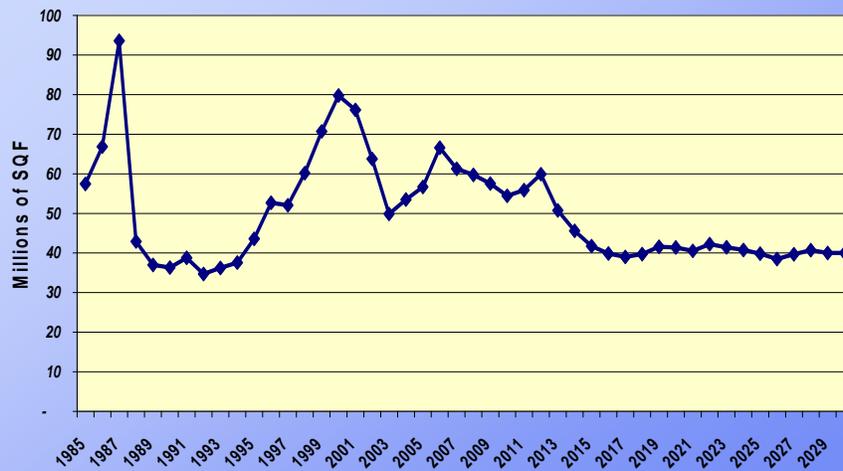
Businesses with Increasing Employment Market Share	1997	2007	2030
Health Care and Social Assistance	10.8%	11.7%	12.5%
Administrative and Support and Waste Management	5.4%	6.1%	9.7%
Information	2.9%	3.1%	3.7%
Construction	6.4%	7.4%	7.8%
Professional, Scientific, and Technical Services	5.1%	5.5%	7.4%
Wholesale Trade	5.5%	5.0%	5.4%
Businesses with Declining or stable Market Share	1997	2007	2030
Government Employees	21.3%	20.0%	18.0%
Retail Trade	13.8%	13.1%	10.7%
Accommodation and Food Services	9.6%	9.4%	7.8%
Transportation and Warehousing	3.9%	3.4%	3.5%
Other Services (except Public Administration)	4.4%	3.9%	3.5%
Finance and Insurance	4.0%	4.1%	3.4%
Real Estate and Rental and Leasing	2.2%	2.2%	1.9%
Arts, Entertainment, and Recreation	1.6%	1.7%	1.7%
Educational Services	1.5%	1.7%	1.6%
Management of Companies and Enterprises	1.4%	1.4%	1.3%
Utilities	0.4%	0.3%	0.2%
Total Employment in Commercial Activities (000)	4,222	5,117	6,531

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Commercial Floor Space Additions (Northwest Region)

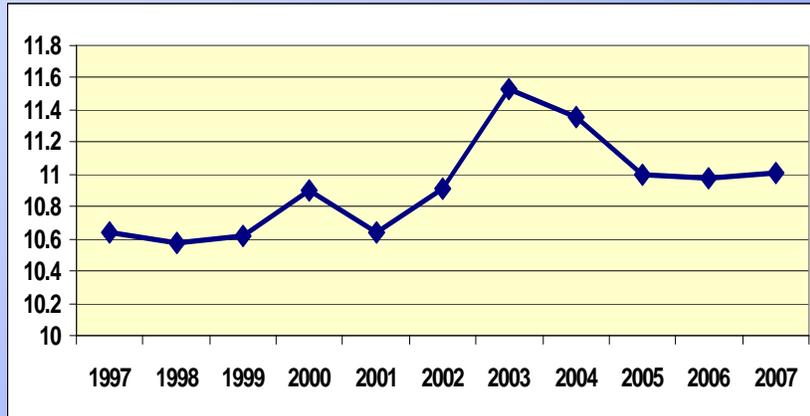


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Energy Intensity in Commercial Sector (MWH/employee)

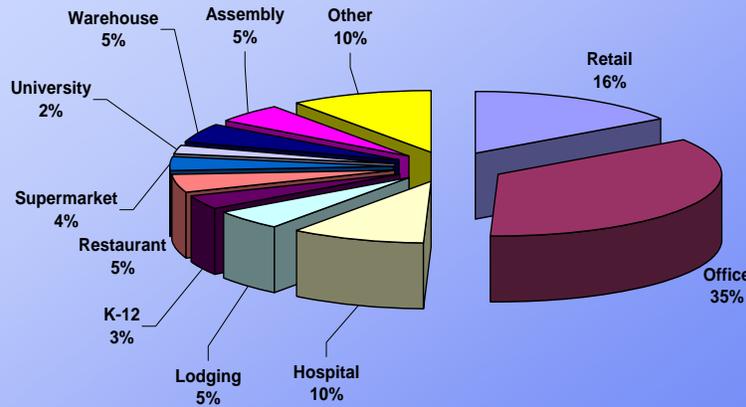


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Breakdown of Electricity Consumption – 4 State Total (2005)



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Economic Drivers of Industrial sector Demand for Energy

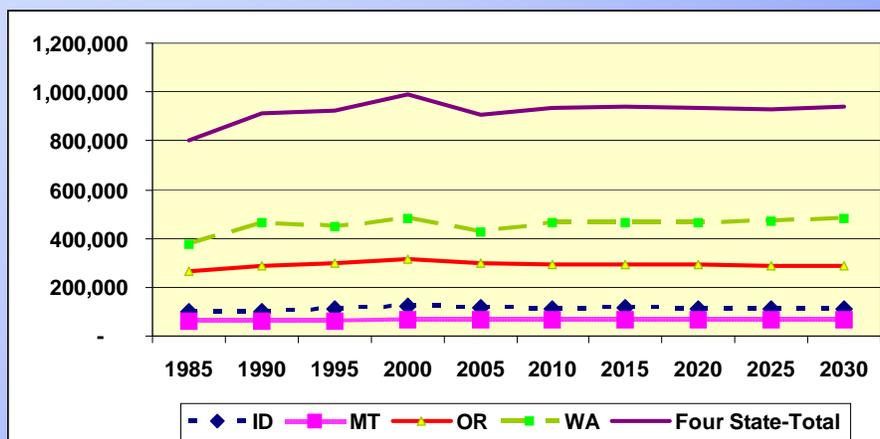
- Sectoral output drives the demand for energy
- Sectoral output grows as employment and productivity in the sector increases.
- Employment has been flat
- Productivity has been increasing
- Electricity intensity declining

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Projected Employment in Manufacturing

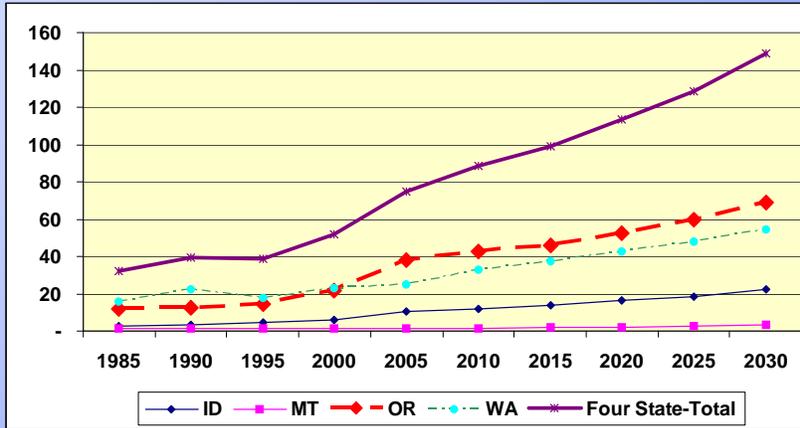


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Growth in Manufacturing Output



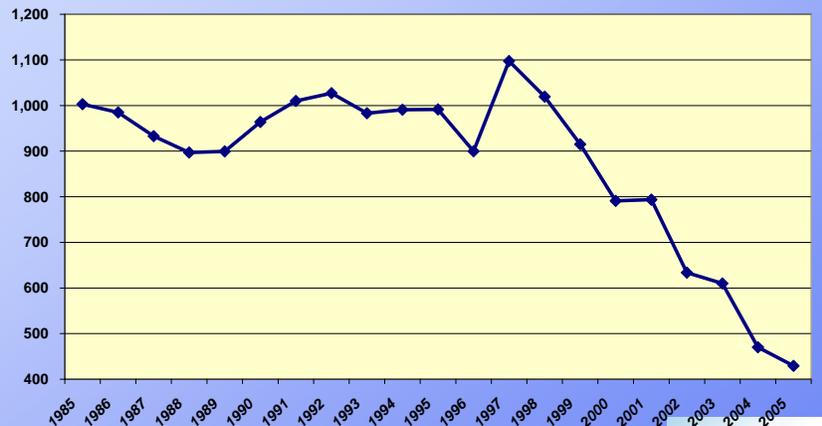
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Regional Change in Intensity of Electricity Use – Manufacturing Sector

KWH/1000 dollars of output (\$2000)

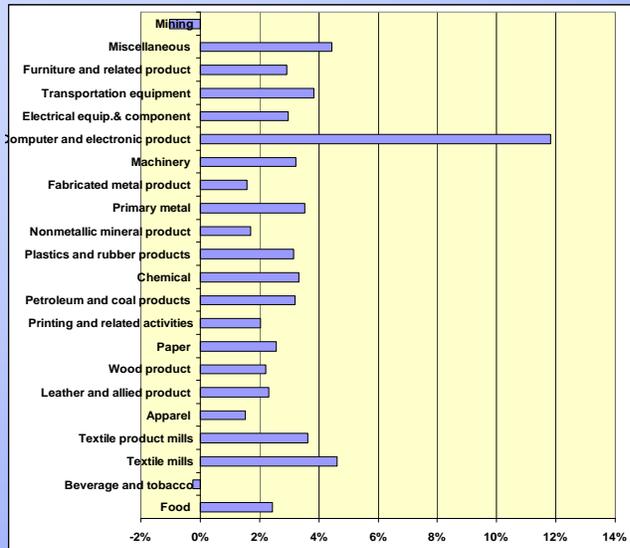


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1997-2005 Growth rate in dollars of output per unit of Labor (productivity)

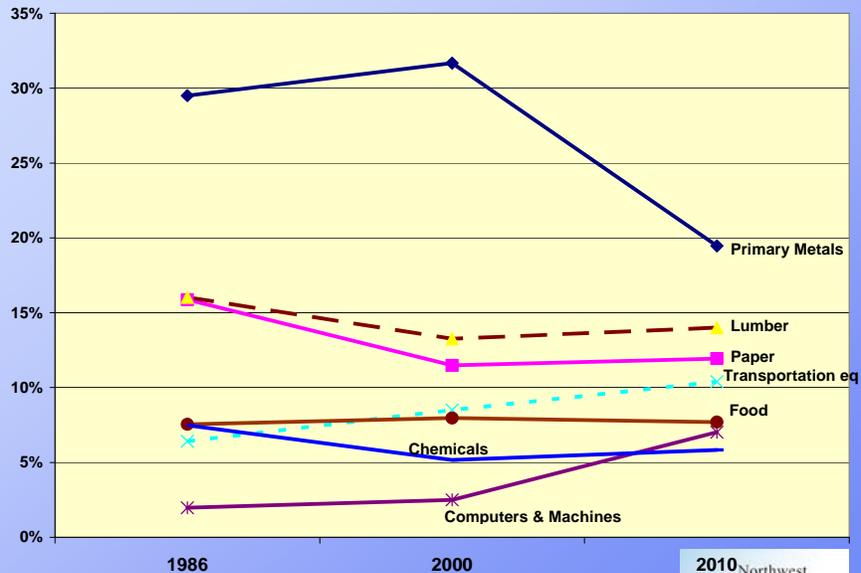


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Changing Mix of Industrial Electricity Sales

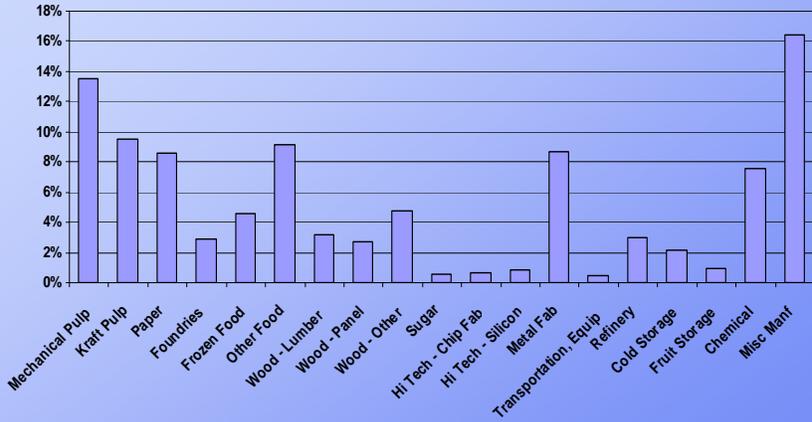


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2006 Northwest Regional Industrial Electricity Consumption Shares
(non-DSI)



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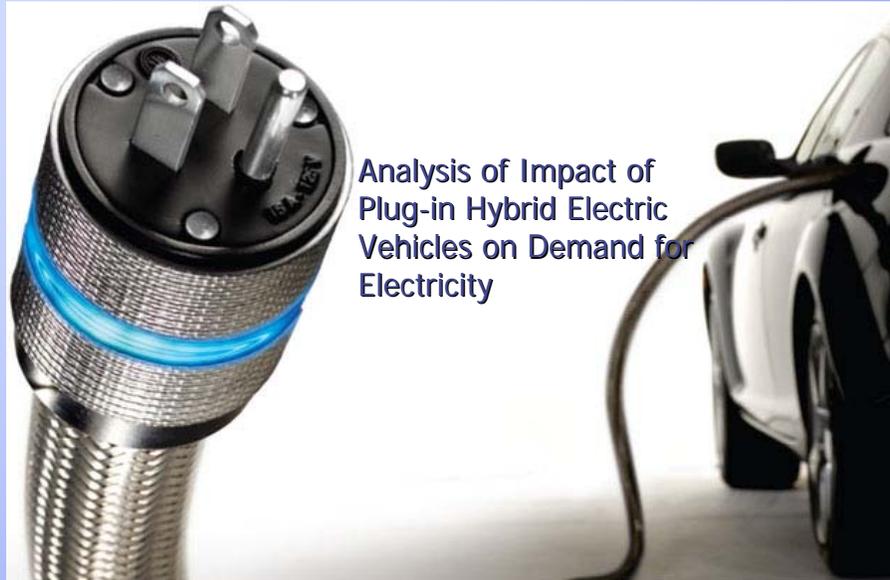
Summary Sheet

- Comparison of Economic Drivers during 5th Plan and 6th Plan Periods

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Analysis of Impact of Plug-in Hybrid Electric Vehicles on Demand for Electricity

Photo illustration by George Lange, with Michael Miller
(Plug-in Popular Mechanics)

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Simple "What If" model

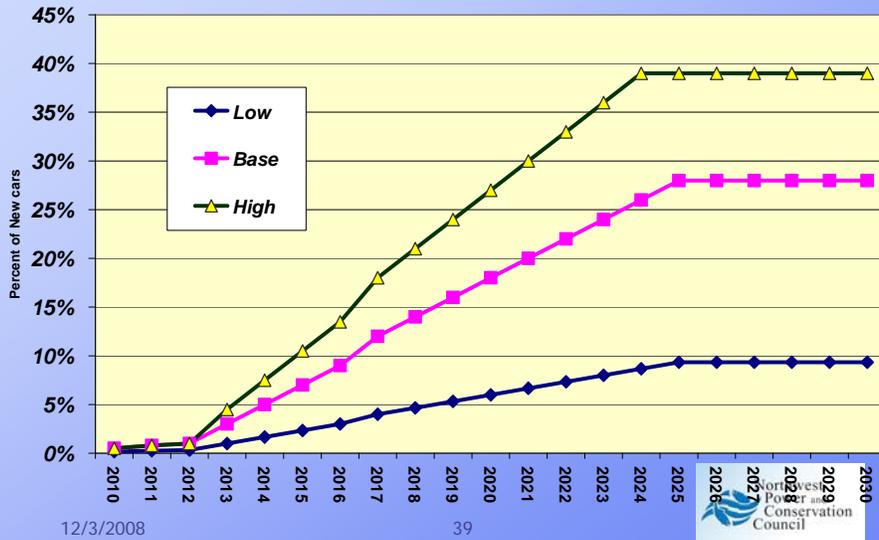
- Forecast of passenger and light trucks –Global Insight
- Market share fraction ~ slow to start: .05% 2010-2013, ~26% by 2025
- Miles traveled per day ~33 held constant
- Energy requirement ~ 0.26-0.46 KWh/mile (0.3 midsize)
- Energy efficiency improvement -5% per year
- Battery size 10 KWh
- Available battery type Lithium-Ion
- T&D and conversion efficiency losses ~20%
- Recharge at 110 v 15 amp in 8 hours
- Recharge at 220 v 30 amp in under 2 hours
- Assumed 95% recharge off peak, 5% during peak hours
- Current average MPG for gasoline vehicles 20.2
- CO2 emissions for gasoline ~ 1 lb/mile

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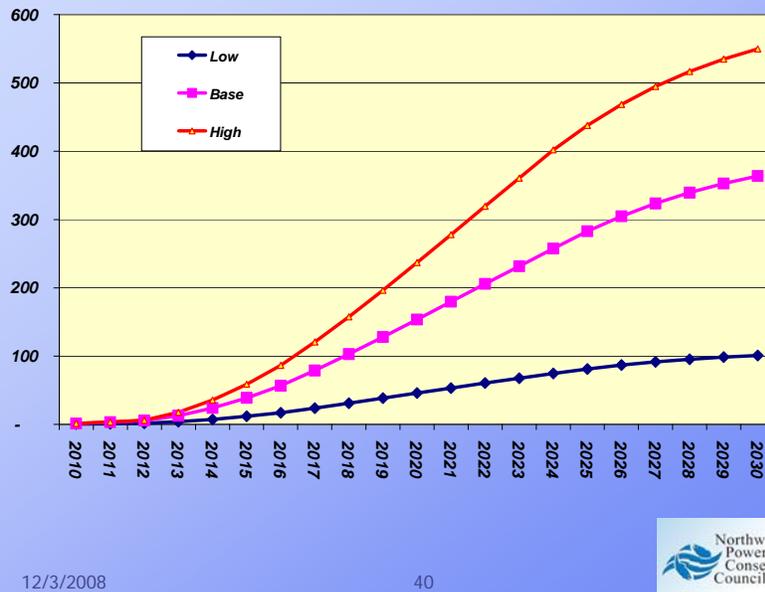
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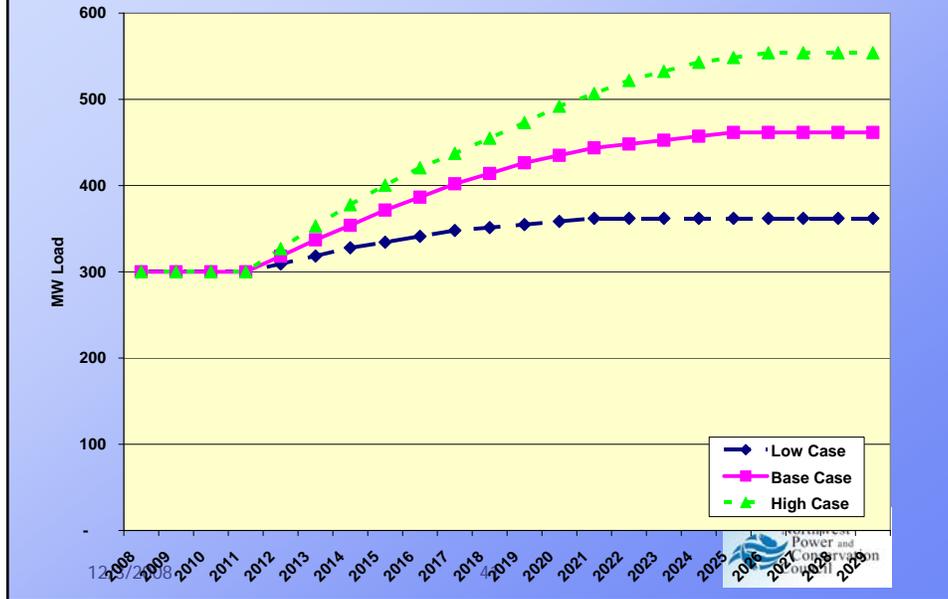
Plug-in Hybrid Electric Vehicles Market Share of New Vehicles



Impact of PHEV on Northwest Energy MWh



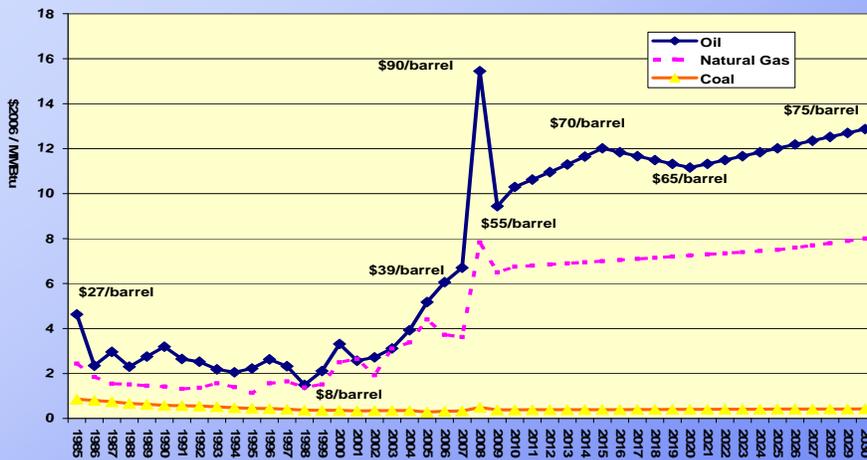
Projected Regional Load from Custom Data Centers



Fuel Price Projections

- For the Natural Gas, Oil, and Coal, price projections are based on Council’s forecast with feedback from advisory group.

Projected Fuel Prices



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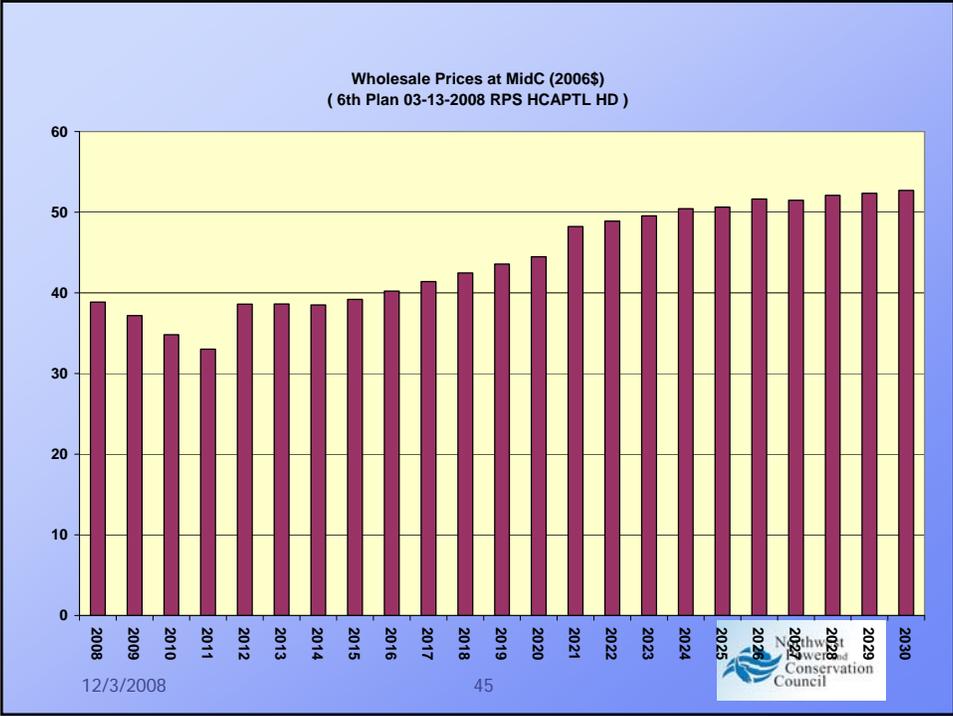
Fuel Price Projections

- For Electricity price- calculated based on
 - 2007 Retail rates by state and sector
 - Wholesale market prices at Mid C 2007
 - Differential between retail rates and wholesale prices in 2007
 - Wholesale market prices at Mid C 2008-2030
 - Above market Cost of RPS resources 2008-2030

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Electricity Prices is calculated as sum of

STATE	AVERAGE RETAIL PRICE OF ELECTRICITY 2007 \$/MWH	WHOLESALE PRICE FORECAST FOR MID C * 2007 \$/MWH	PROXY FOR TRANSMISSION AND DISTRIBUTION CHARGES 2007 \$/MWH
IDAHO	50.63	45.34	5.03
MONTANA	75.06	45.34	29.46
OREGON	69.96	45.34	24.36
WASHINGTON	64.12	45.34	18.52

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Price of Electricity - Base Case Scenario PE (2006\$/mWh)

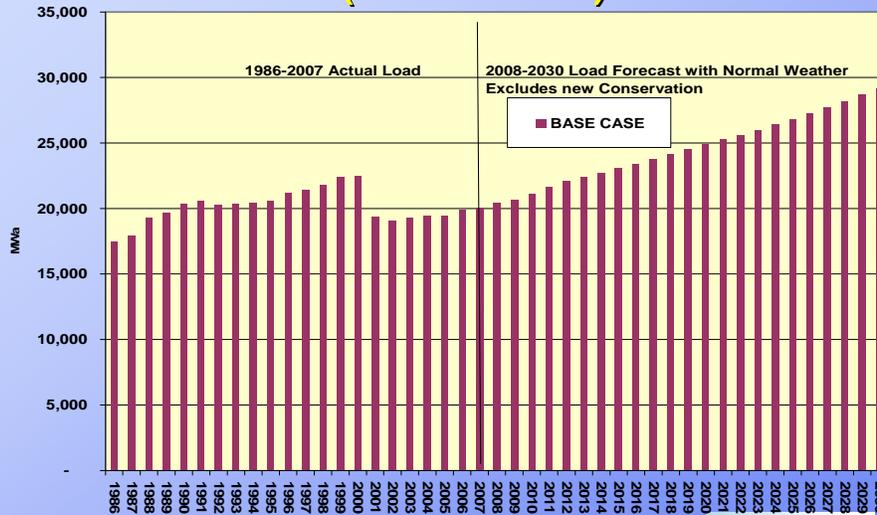
	Residential Sector				Commercial Sector				Industrial Sector			
	Oregon	Washington	Idaho	Montana	Oregon	Washington	Idaho	Montana	Oregon	Washington	Idaho	Montana
2000	69	60	63	76	60	55	50	61	42	39	37	47
2007	84	79	64	92	75	70	48	78	58	48	36	80
2020	88	78	66	91	79	71	54	84	57	53	41	61
2030	99	87	74	99	90	80	62	92	68	61	50	69
Annual Growth												
2000-2007	2.9%	3.9%	0.3%	2.7%	3.2%	3.6%	-0.3%	3.5%	4.8%	3.2%	-0.1%	8.1%
2010-2030	1.5%	1.4%	1.4%	1.1%	1.6%	1.6%	1.7%	1.2%	2.3%	2.1%	2.3%	1.6%

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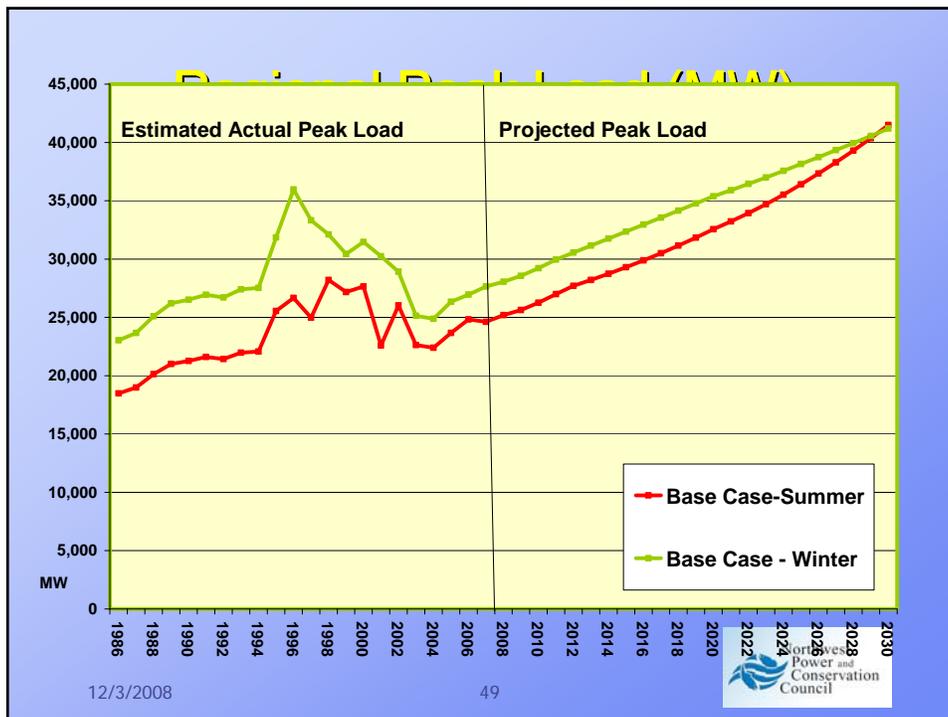
Regional Load Forecast MWa (Price effect)



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Summary of Projections for 2010-2030

Scenario	Energy	Summer Peak	Winter Peak
Low Growth	1.2%	2.0%	1.3%
Base Case	1.6%	2.3%	1.7%
High Growth	2.0%	2.7%	2.0%

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Residential Customers Monthly Bill /Household 2006\$				
	Oregon	Washington	Idaho	Montana
1986	73	72	81	62
2007	80	82	68	81
2020	86	87	74	87
2025	98	99	85	99
2030	106	108	94	109
Increase in Monthly Bills				
1986-2000	-0.3%	-0.5%	-0.8%	0.1%
2000-2007	2.1%	3.1%	0.1%	3.6%
2010-2030	2.1%	2.3%	2.3%	2.2%
Increase in Bills For Same Level of Sales				
2010-2030	1.5%	1.4%	1.4%	1.1%

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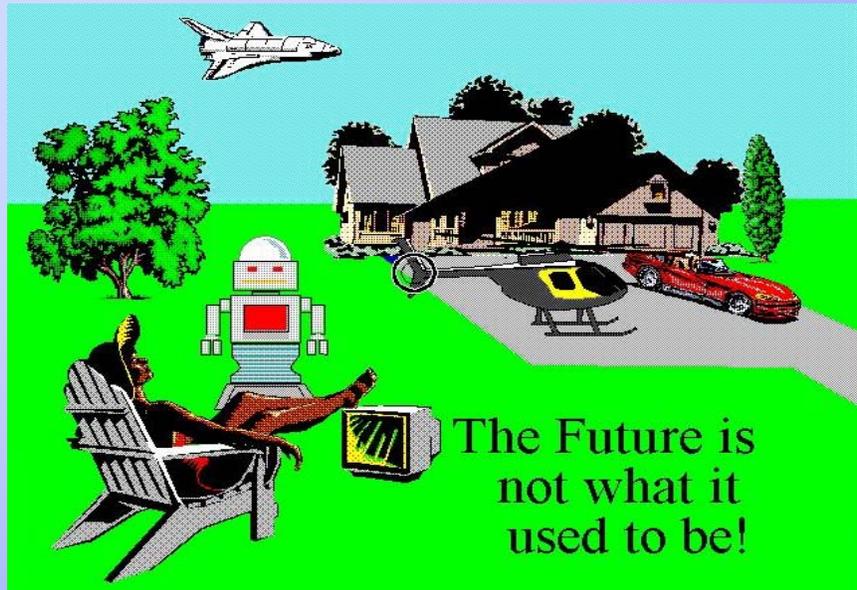


- Lunch Break
- Next on agenda
- Discussion of Alternative scenarios - 1:00 - 2:00
- Council's Portfolio Model/ 2:00 - 3:00
- Interaction with Demand Forecast/Conservation
- General Discussions and next steps 3:00 - 4:00

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Scenarios

- Two alternative economic growth trajectories are considered
 - Low Case
 - High Case
 - Each scenario was developed using detail national level projections from Global Insights October 2008 .

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Driving Forces Council's 6th Plan Scenarios

Scenarios and Key Drivers	Base Case	LOW Case	High Case
Economy Global, National & Regional	Moderately strong economic	Slow Economic growth	Strong economic growth
Climate Change	Some Regional Policies in response to Climate Change	Watered down National and regional actions	Strong public, and business support for green
Fuel Supply and Demand Balance	6 th plan's Medium fuel price scenario	6 th plan's Low fuel price scenario	6 th plan's High fuel price scenario

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Low Case Scenario

- This scenario is reflective of a future with slow economic growth, weak demand for fossil fuels, declining fuel prices; slow down in labor productivity and low inflation rate.
- In this scenario, economic concerns weakens the reaction to climate change. No federal or regional cap-and-trade or CO2 tax is implemented.

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High Case Scenario

- High Case scenario assumes faster economic growth, stronger demand, higher prices for fuels, sustained growth in labor productivity and higher inflation rate.
- This scenario, assumes climate change concerns and demand for cleaner fuels and national cap-and-trade or CO2 tax pushes fuel prices to a higher trajectory.

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Carbon Policies (Draft)

- Base Case: Regional markets implemented, national cap and trade program post 2015, focus on utilities.
- Low Case Scenario: No strict controls on CO2
- High Case Scenario: Nationwide, economy-wide carbon tax by ?

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Natural Gas

- Low Case scenario: Boom and Bust cycles continue. Weak demand keeps pressure on prices to remain low.
- High Case Scenario: Strong economic growth, strong public support for clean options, pushes price of gas up.

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Climate Change

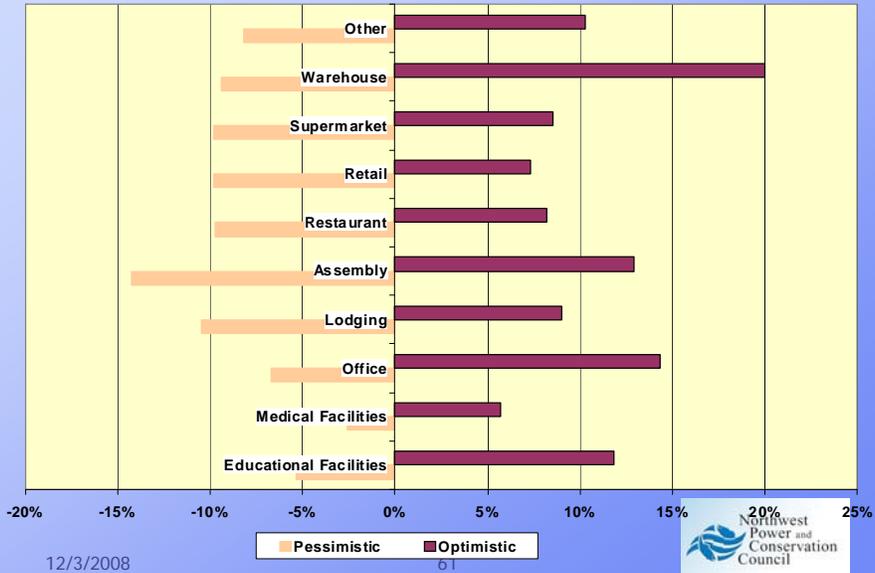
- University Of Washington Long-term trends in climate (temperature) change in the NW.
- Work-in-progress

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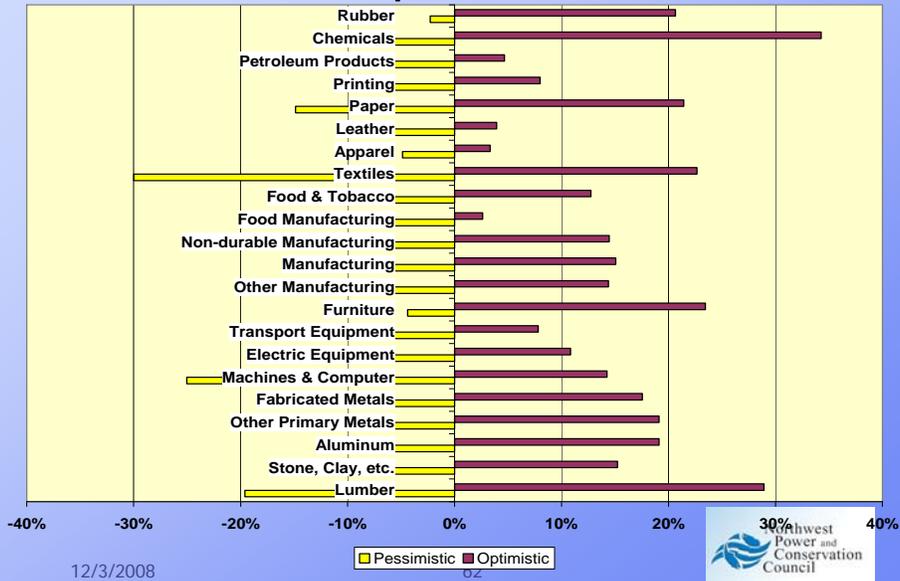
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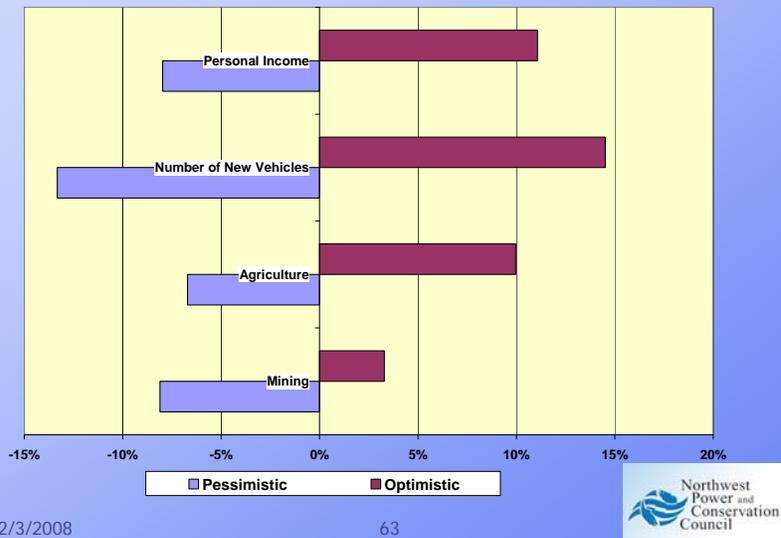
Employment in each sector Percent change from Base case



Variance in Output in Industrial Sectors



Variance in Other key Drivers



Range in Council's Fuel Price Forecast

Annual Growth Rate in Fuel Prices 2010-2030

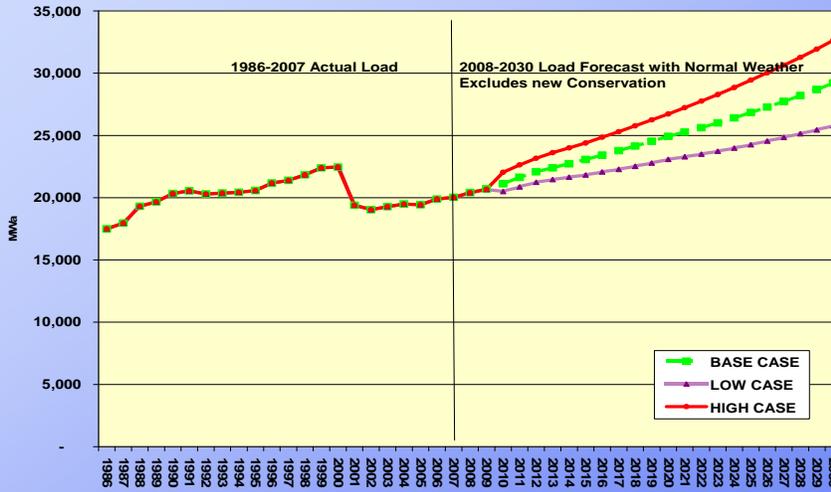
	Low Case	Base	High Case
Oil	-1.11%	1.1%	2.0%
Natural Gas	-1.3%	0.9%	1.7%
Coal	-0.5%	0.5%	1.2%

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Load Forecast (price effect)

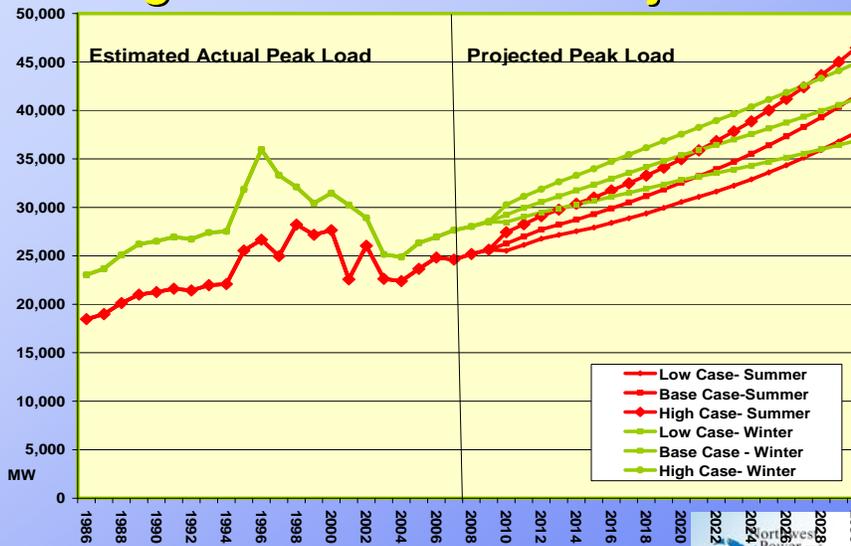


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Regional Peak Load Projections



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Comparison of Growth Rates Across Sectors 2010-2030

	Low Case	Base Case	High Case
Total	1.2%	1.6%	2.0%
Residential	2.1%	2.2%	1.8%
Commercial	1.2%	1.6%	1.3%
Industrial	-0.1%	0.6%	0.7%

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Comparison of the Growth Rates in the Forecasts

2005-25	Med Low/Low	Medium	Med High/High
5th Plan	0.91%	1.36%	1.84%
6th Plan	1.11%	1.63%	2.10%

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Residential Customers Monthly Bill /Household 2006\$				
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Increase in Bills For Same Level of Sales				
2010-2030	1.5%	1.4%	1.4%	1.1%

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Next Steps

- Finalize Electricity Wholesale Price Forecast
- Incorporate additional information coming in from
 - Industrial
 - ICE
- Prepare report for public comment

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Next Items on the Agenda

- Council's Portfolio Model
- General Discussions
 - Modeling Impact of Climate Change (time permitting)

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