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July 2, 2013

## MEMORANDUM

**TO:** Power Committee  
**FROM:** Massoud Jourabchi  
**SUBJECT:** Demographic and Economic Drivers for Seventh Power Plan

Demand for goods and services drives the demand for energy. Demand for energy is also determined by consumers' choices on energy efficiency of the homes and appliances they choose and how these appliances are used. This presentation discusses the key demographic and economic drivers for the Seventh Plan such as size and mix of regional population, number of new homes, new square footage additions for commercial buildings, and output of industrial sectors, among other drivers.

To develop the range of demographic and economic forecast, Council staff consulted with the Demand Forecast Advisory Committee (DFAC). Thirty two members of this advisory group consist of Public, Co-op, Investor Owned Utility forecasters, public interest groups, and State economists as well as general public. During a day-long session on May 23, 2013 Council staff took the DFAC members through all key demographic and economic drivers. The initial assumptions for the forecast were subsequently refined using insight from the committee and state forecasts.

The key driver that ultimately drives economic activities and their energy requirement is population growth. Consistent with the growth rate projections at the national level, the population growth in the Seventh Plan's forecasting horizon is expected to slow-down to about nine-tenth of percent, compared to 1.5% growth experienced since 1985. This slow-down in turn is reflected in slower growth rate in residential household formation, requirement for new commercial floor space requirement and to lesser degree growth in industrial output that has been on a partial rebound.

Staff, in consultation with the DFAC, has developed three scenarios to establish a range of demographic and economic drivers. The medium or Base Case, and two alternative scenarios Pessimistic scenario is reflective of a future with slow economic growth, weak demand for fossil fuels, declining fuel prices; slow down in labor productivity. Optimistic scenario on the other hand, assumes faster economic growth, stronger demand, higher prices for fuels, and sustained growth in labor productivity.

## Demographic and Economic Drivers for the Seventh Power Plan

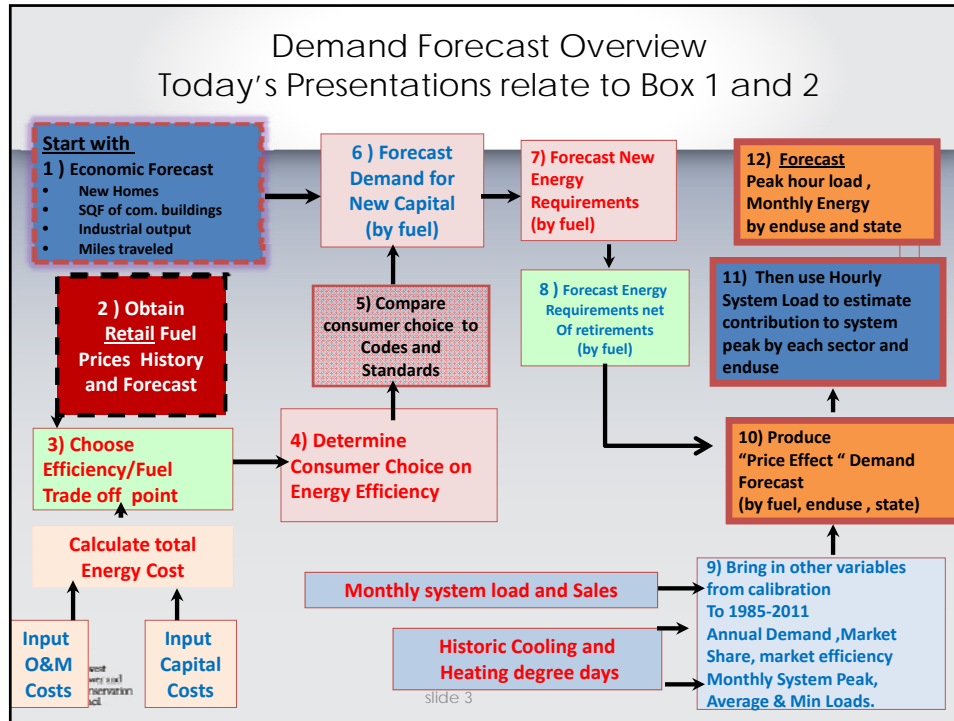
**July 9, 2013**



## In This Meeting

- Discussion of Drivers
  - Population- growing
  - Residential sector- recovering
  - Commercial square footage- increasing slowly
  - Industrial output (slow recovery)
  - Electric Vehicles (slow and steady)
  - Next Steps





## Major Drivers of Long-term Load Forecast

- **Demographic and Economic Factors**
- Energy Prices
- Customers choice of fuel
- Customers choice of efficiency
- Trends in socio-economic factors
- Trends in change in temperature

## Box1- Economic Drivers

- **Economic and Demographic factors**
  - Growth in Population
  - Changes in population mix
  - Stock and Additions to residential units
  - Stock and additions to Commercial square footage requirements
  - Changes in industrial output and mix
  - Change in Agricultural output
  - Transportation (income, VMT)



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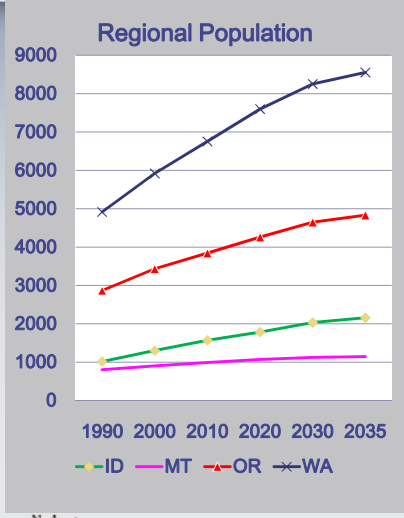
## Source of Information for Economic Drivers

- IHS\_Global Insight
- In-house analysis
- State economic forecasts
- Demand Forecast Advisory Committee
- Vintage of data: Q1 2013 and Q4 2012



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# Regional Population



	1985-2015	2015-2035
<b>ID</b>	<b>1.7%</b>	<b>1.3%</b>
<b>MT</b>	<b>0.8%</b>	<b>0.5%</b>
<b>WA</b>	<b>1.6%</b>	<b>0.9%</b>
<b>OR</b>	<b>1.4%</b>	<b>0.9%</b>
<b>4 States</b>	<b>1.5%</b>	<b>0.9%</b>
<b>USA</b>	<b>1.03%</b>	<b>0.9%</b>

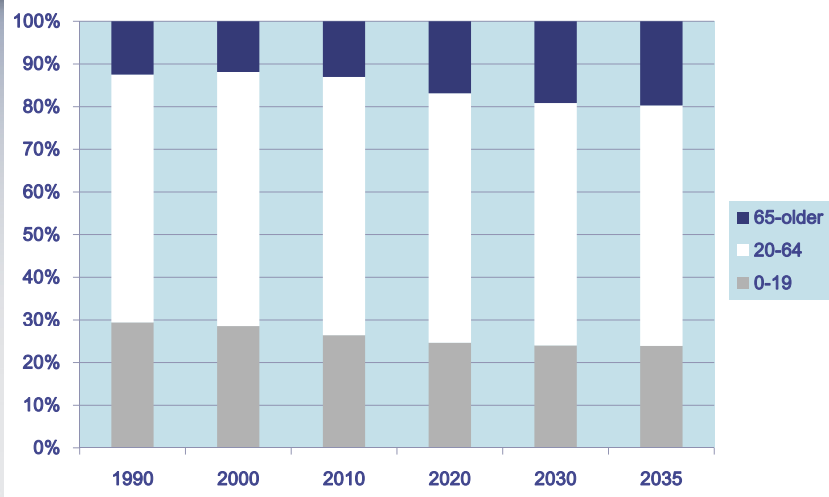
Average Annual Addition to Population (1000)	1985-2015	2015-2035
<b>ID</b>	<b>21</b>	<b>33</b>
<b>MT</b>	<b>7</b>	<b>7</b>
<b>WA</b>	<b>89</b>	<b>86</b>
<b>OR</b>	<b>44</b>	<b>50</b>
<b>4 States</b>	<b>132</b>	<b>136</b>

Overall regional population growth projected to slow down.

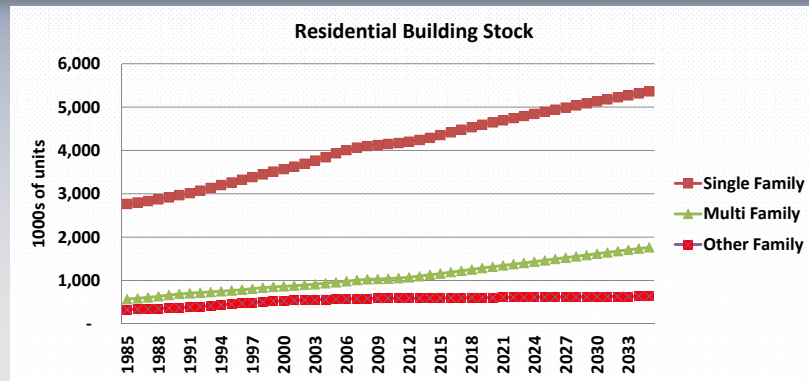
Northwest population remains about 4% of national population.



## What is the impact of declining working age adults?



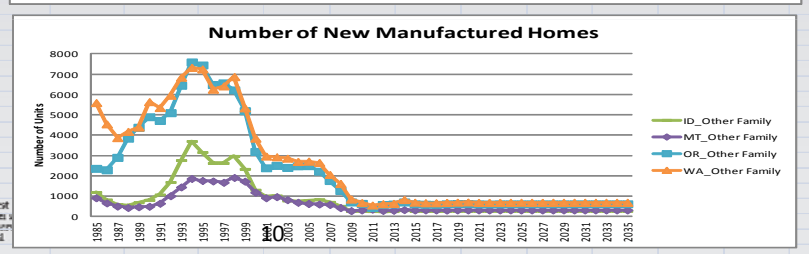
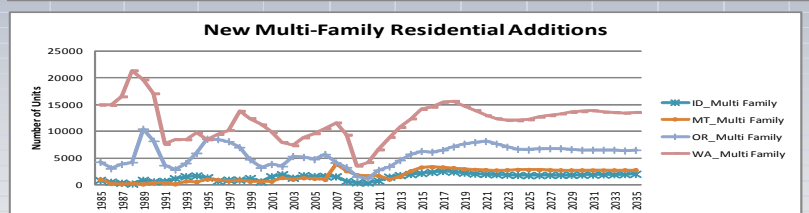
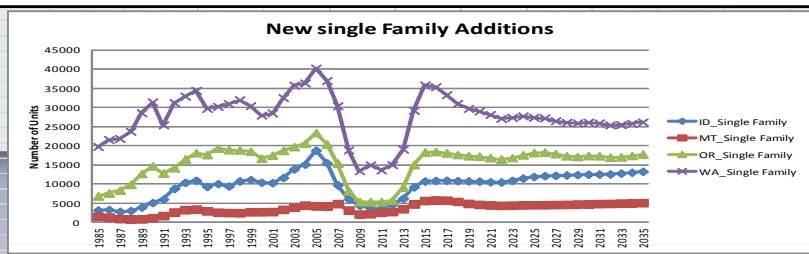
# Regional Growth in Residential Building Stock

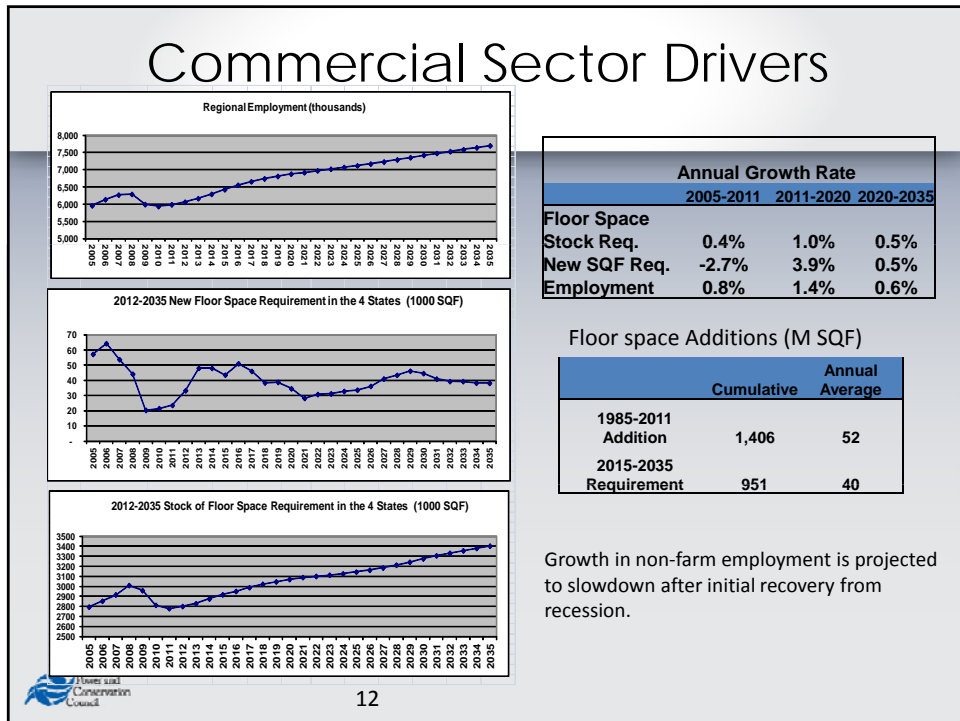
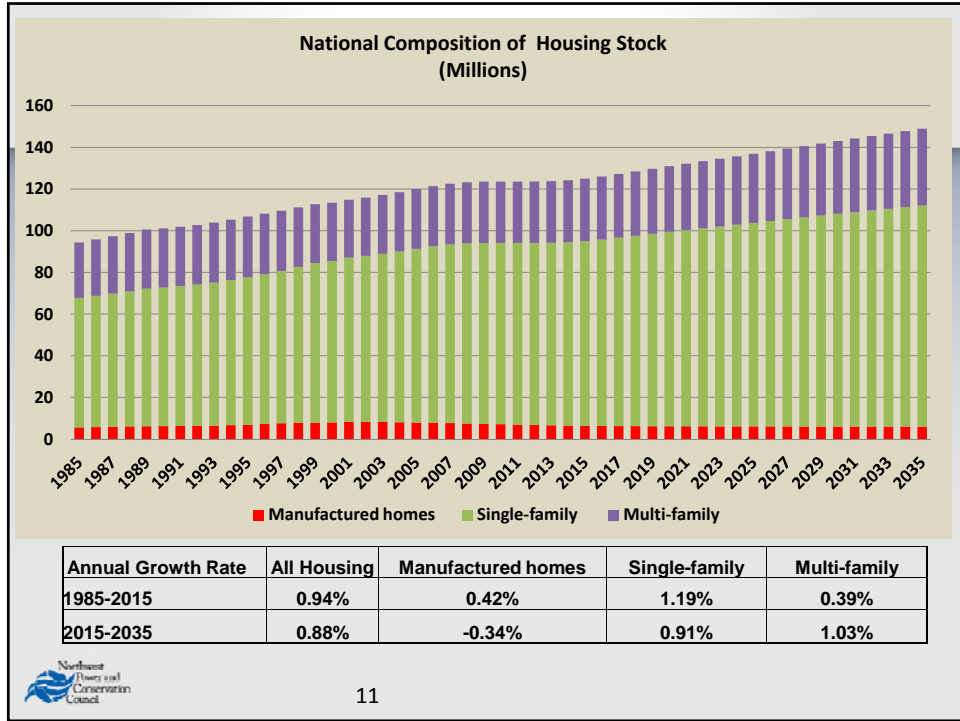


	1985-2011	2012-2035
Single Family	1.6%	1.1%
Multi Family	2.4%	2.3%
Manufactured Homes	2.3%	0.3%

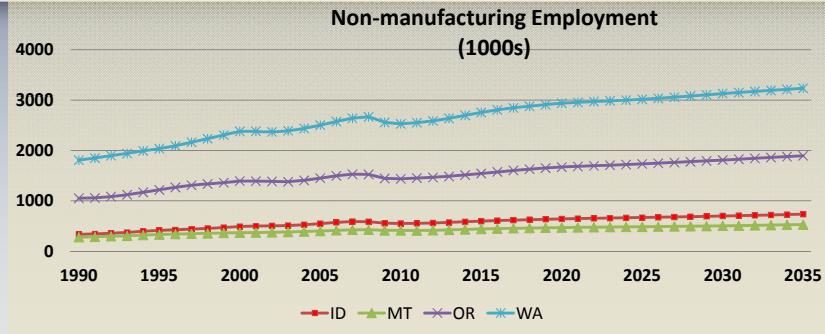


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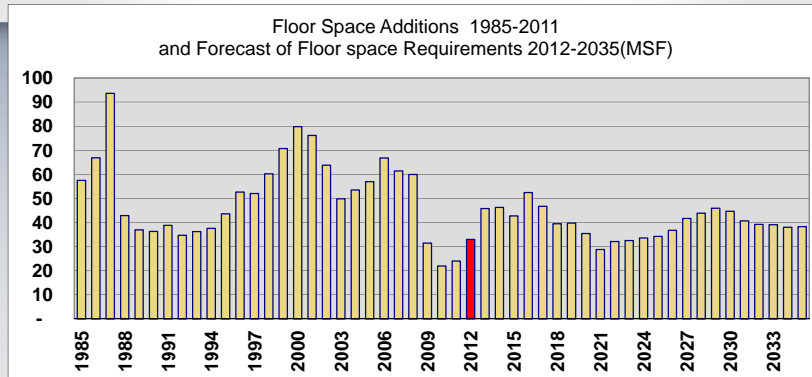
# Commercial Sector Slowing Down



Employment (Non-Manufacturing)	1990-2015	2015-2035
ID	2.36%	1.04%
MT	1.86%	0.91%
OR	1.55%	1.03%
WA	1.70%	0.81%
13 4 States	1.74%	0.91%



# Our current forecast suggest



	Floor Space Additions (Millions of S.Q.F)	
	Cumulative	Annual Average
1985-2011	1,406	52
2015-2035	951	40





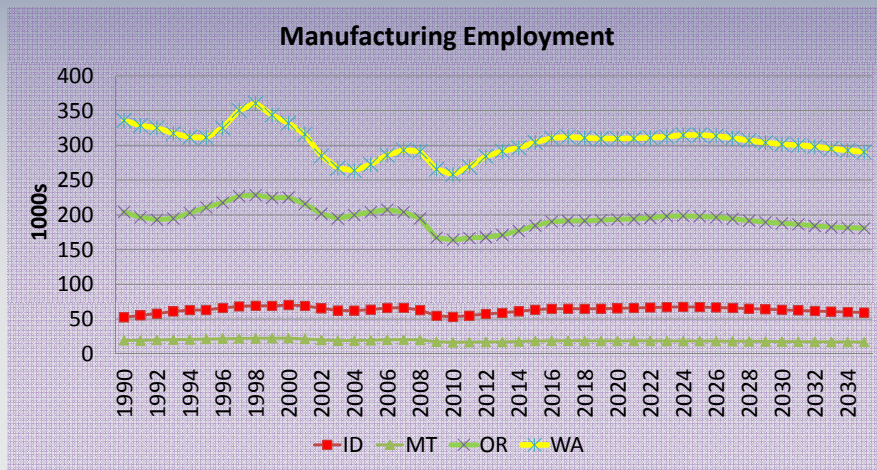
## Slow down in rate of growth for commercial sector space requirements

Business/Building type	Oregon		Washington		Idaho		Montana		Region	
	1985-2011	2012-2035	1985-2011	2012-2035	1985-2011	2012-2035	1985-2011	2012-2035	1985-2011	2012-2035
Large Office	1.7%	1.5%	1.2%	1.5%	4.6%	1.9%	0.5%	2.5%	1.4%	1.6%
Medium Office	3.9%	1.5%	3.4%	1.5%	7.0%	1.9%	2.6%	2.5%	3.6%	1.6%
Small Office	2.2%	1.5%	1.6%	1.5%	5.1%	1.9%	0.9%	2.5%	1.8%	1.6%
Big Box-Retail	7.4%	1.1%	7.4%	0.6%	10.8%	0.9%	7.2%	0.7%	7.5%	0.8%
Small Box-Retail	1.0%	1.1%	1.3%	0.6%	3.7%	0.9%	1.0%	0.7%	1.3%	0.8%
High End-Retail	1.0%	1.1%	1.0%	0.6%	3.7%	0.9%	1.0%	0.7%	1.1%	0.8%
Anchor-Retail	0.5%	1.1%	0.5%	0.6%	3.5%	0.9%	0.4%	0.7%	0.6%	0.8%
K-12	3.0%	0.7%	1.6%	0.8%	2.5%	1.4%	1.1%	0.8%	1.8%	0.8%
University	3.3%	1.1%	1.5%	0.8%	2.8%	0.6%	1.5%	1.0%	1.9%	0.9%
Warehouse	2.2%	1.7%	3.8%	0.9%	3.6%	2.1%	1.3%	1.7%	2.9%	1.4%
Supermarket	0.7%	0.6%	1.0%	0.5%	3.1%	0.3%	1.2%	0.4%	1.2%	0.5%
Mini Mart	5.9%	1.8%	5.5%	0.9%	8.2%	0.7%	6.1%	0.6%	5.9%	1.0%
Restaurant	1.5%	1.1%	1.7%	1.1%	3.5%	1.4%	1.2%	0.9%	1.7%	1.1%
Lodging	1.6%	1.1%	1.9%	0.6%	2.2%	0.6%	0.9%	1.0%	1.6%	0.8%
Hospital	2.9%	1.1%	2.0%	1.9%	3.2%	2.1%	1.9%	1.3%	2.4%	1.7%
Other Health	3.3%	2.0%	2.0%	1.6%	2.2%	1.6%	2.8%	2.1%	2.4%	1.7%
Assembly	3.2%	1.0%	2.0%	1.1%	3.2%	2.5%	1.8%	1.2%	2.3%	1.3%
Other	3.1%	1.6%	1.8%	0.5%	3.2%	1.2%	1.4%	1.3%	2.1%	0.9%

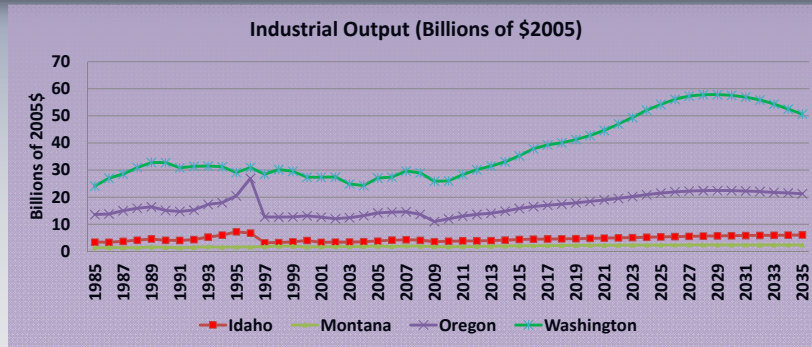
G:\MID\PowerCast\Forecasting Model\Economic Forecasts\Economic drivers for the model-March 2013 7th plan update to load forecast.xlsx



## Manufacturing Employment recovers but does not regain 1990s high level



## Industrial Sector Output Recovering



Industrial	1985-2011	2015-2035
Idaho	0.5%	1.2%
Montana	1.0%	1.7%
Oregon	-0.2%	1.0%
Washington	0.6%	1.8%
Region	0.4%	1.6%

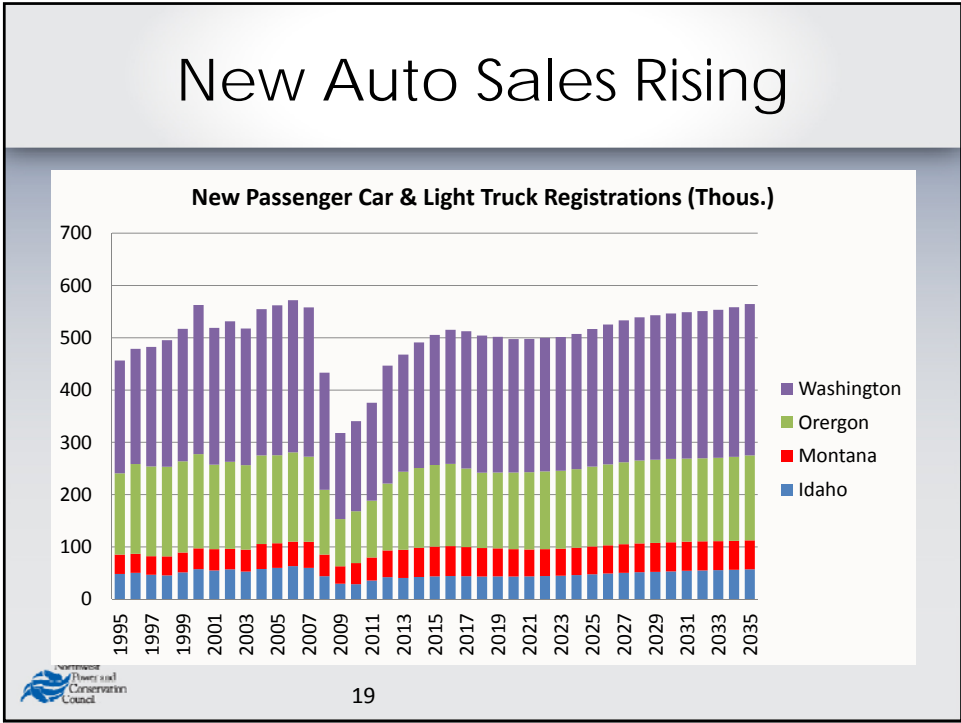


## Growth in Industrial Output

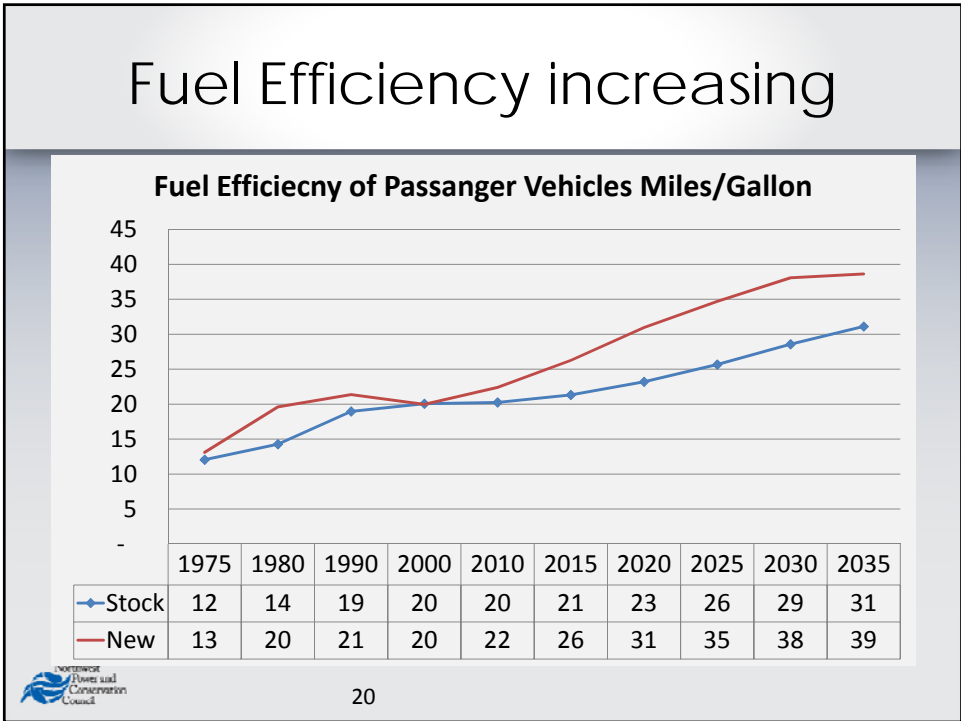
Business/Building type	Oregon		Washington		Idaho		Montana		Region	
	1985-2011	2012-2035	1985-2011	2012-2035	1985-2011	2012-2035	1985-2011	2012-2035	1985-2011	2012-2035
Food & Tobacco	2.0%	3.0%	2.0%	2.5%	2.1%	2.6%	2.8%	2.5%	2.0%	2.7%
Textiles	-3.0%	0.6%	7.3%	0.4%	9.4%	4.9%	NA	1.7%	4.5%	0.9%
Apparel	-2.1%	-2.7%	-4.3%	-0.9%	-3.7%	2.7%	-5.8%	1.7%	-3.7%	-1.0%
Lumber	-3.9%	-3.0%	-3.4%	-0.2%	-2.8%	-1.6%	-3.7%	1.0%	-3.6%	-1.5%
Furniture	4.1%	2.5%	3.4%	2.8%	5.8%	5.6%	3.4%	2.0%	3.9%	3.1%
Paper	-1.2%	2.5%	0.4%	2.6%	2.1%	1.7%	-9.4%	NA	-0.2%	2.5%
Printing	-2.8%	1.6%	-4.8%	-0.6%	-5.0%	2.1%	-5.9%	-0.3%	-4.1%	0.8%
Chemicals	10.1%	4.7%	5.3%	5.6%	NA	3.7%	-1.9%	3.6%	5.5%	5.1%
Petroleum Products	-6.0%	1.2%	2.6%	2.2%	-14.8%	4.8%	12.4%	1.5%	2.2%	2.0%
Rubber	4.3%	3.2%	4.6%	3.5%	-1.7%	4.2%	5.5%	4.0%	3.3%	3.5%
Leather	2.5%	-1.8%	-1.3%	-3.6%	-0.5%	1.6%	1.5%	1.0%	1.1%	-1.3%
Stone, Clay, etc.	3.6%	3.1%	2.6%	4.0%	0.3%	4.1%	-1.2%	1.9%	2.5%	3.6%
Aluminum	-2.2%	-3.5%	-3.2%	-4.1%	NA	NA	-8.5%	NA	-3.3%	-3.9%
Other Primary Metals	1.3%	1.4%	3.2%	-4.0%	10.6%	-4.2%	1.8%	1.5%	2.1%	-0.4%
Fabricated Metals	2.6%	1.0%	3.4%	-2.4%	3.9%	-2.9%	5.5%	5.7%	3.1%	-0.3%
Machines & Computer	0.3%	1.1%	-0.2%	-0.5%	-1.0%	-2.9%	-0.6%	1.0%	-0.2%	0.3%
Electric Equipment	-3.1%	1.0%	-3.7%	0.8%	3.1%	-0.2%	3.3%	5.5%	-3.2%	0.9%
Transport Equipment	2.7%	-0.1%	0.3%	1.0%	8.7%	-15.6%	4.3%	NA	0.5%	0.9%
Other Manufacturing	4.6%	3.9%	4.5%	3.4%	9.0%	4.5%	6.7%	5.4%	4.9%	3.8%



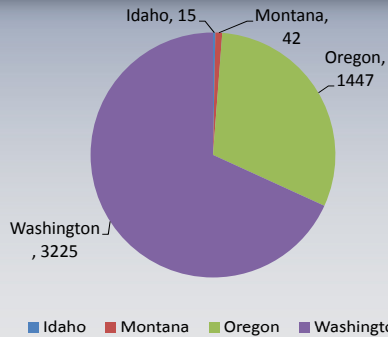
# New Auto Sales Rising



# Fuel Efficiency increasing



## Electric Vehicles increasing



As of Jan 2013, there were about 4700 registered electric vehicles registered with DMV.

Majority of these vehicles are in Oregon and Washington.

	2012	2011	Growth
TOTAL U.S. CAR	7,473,850	6,339,884	18%
Chevy Volt	23,461	7,671	206%
Nissan Leaf	9,819	9,674	1%



## EV Project Experience

- **By the end of 2012**
  - Nearly 60 million miles recorded
  - Over 14,100 MWH
  - 7379 Nissan Leafs, Chevy Volts & smart ForTwo vehicles
  - Over 1.9 million gallons of gasoline avoided.
  - 6694 Residential, 2583 Public, 56 fast Chargers installed.
  - Daily Travel (Leaf ~30 miles, Volt ~40 miles)



Although number of Charging Stations on the rise, so far



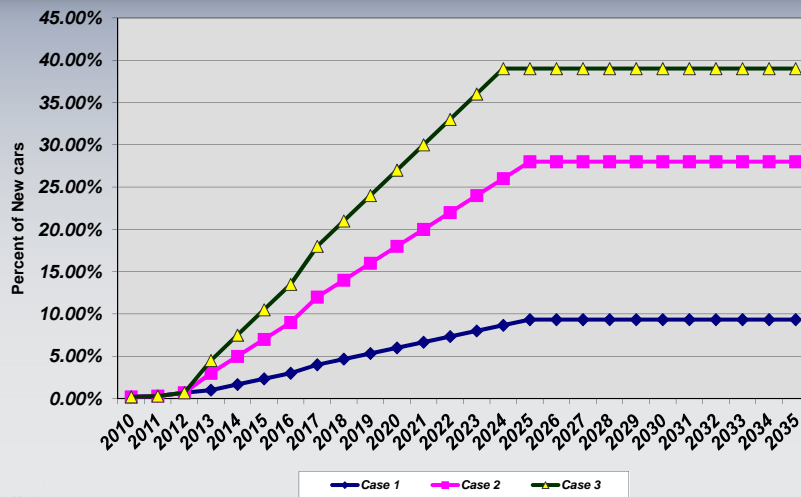
Majority of charging events and energy, (86%-92%) occurs at home.  
EV increase resident's electricity consumption by about 22%

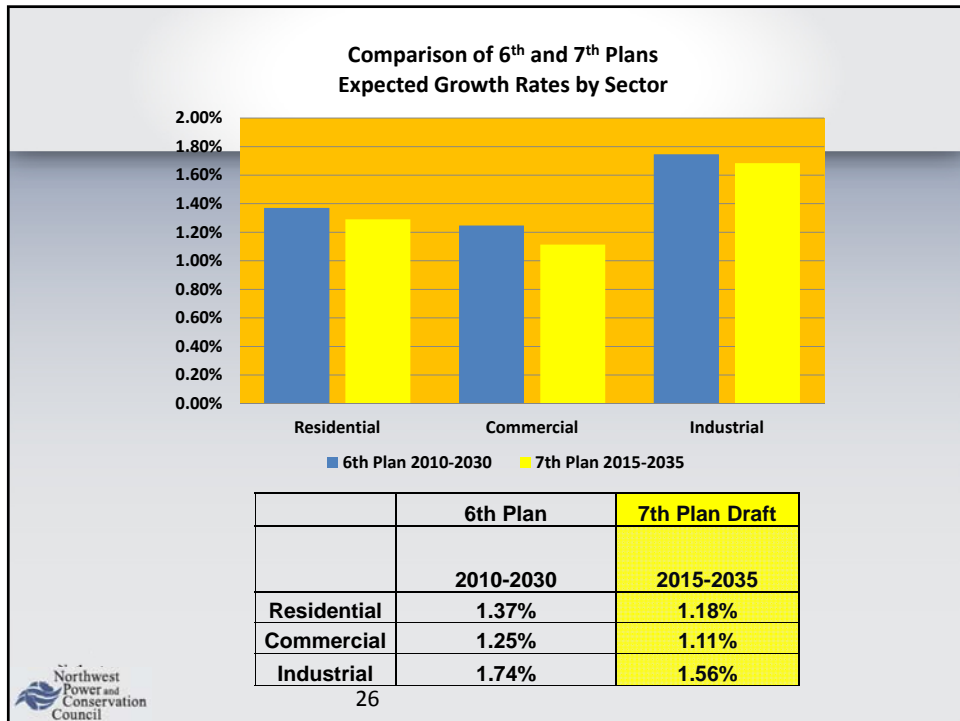
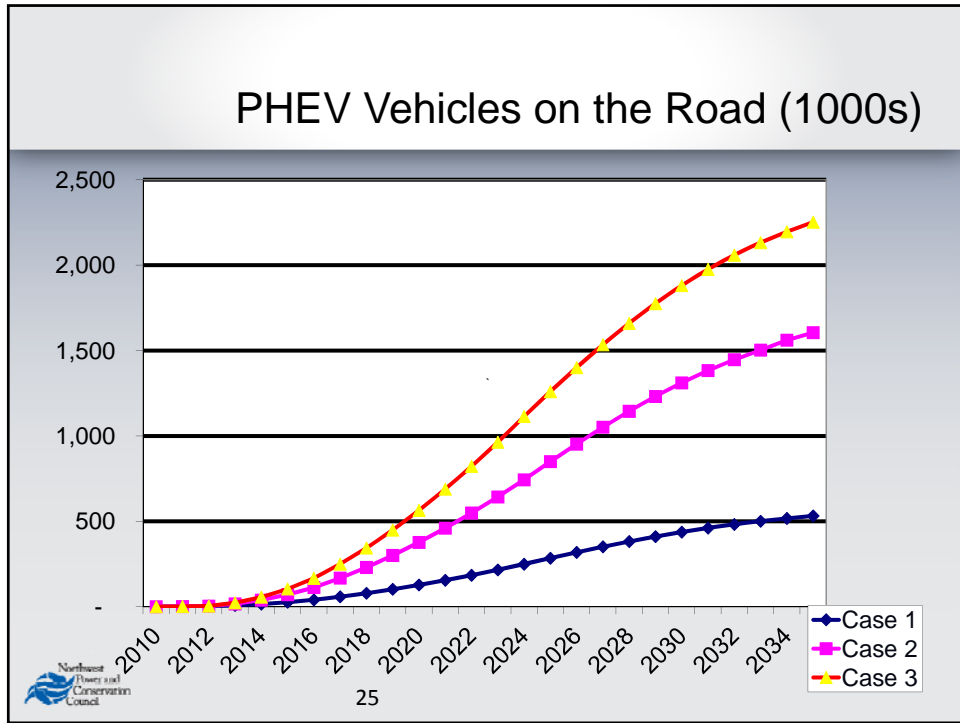
MWH/ Household	Oregon	Washington
Average Consumption	12	13
EV consumption	2.9	2.8

EV project participants as of end of 2012	Oregon	Washington
Number of Nissan Leafs	549	893
Number of Chevy Volts	94	98
Distance Driven (Million Miles)	5.5	8.5
Electricity Consumed (AC GWH)	1.4	2.1



Our current Assumption on market penetration for Electric Vehicles.





## Range of Economic Drivers for Scenarios

2015-2035 Annual Growth rate	Reference	Optimistic	Pessimistic
Residential Units	1.18%	2.0%	0.08%
Commercial Floor space	1.11%	2.1%	0.67%
Industrial output	1.56%	2.4%	0.95%
Agricultural output	0.81%	2.0%	0.26%

	Reference	Optimistic	Pessimistic
Residential Units Stock by 2035 (1000 of units)	7,629	11,446	4,851
Commercial Floor space stock by 2035 (millions SQF)	3,944	4,842	3,562
Industrial output by 2035 (billions \$2005)	72	89	63
Agricultural output (billions \$2005)	10.9	14.0	9.5



## Tentative Timeline of the 7<sup>th</sup> Plan

- Draft Economic forecast ...June 2013
  - Incorporate RBSA data
- Draft Load Forecast ... .....November 2013 (Tentative)
- Final Economic Forecast...June 2014 (Tentative)
  - Incorporate CBSA and Industrial data
- Final Load Forecast.....Q3 2014 (Tentative)
  
- Draft 7<sup>th</sup> Plan... Q1 2015 (Tentative)
- Final 7<sup>th</sup> Plan... Q3 2015 (Tentative)



## Questions



## Average Annual Addition to New Residential Units

	1985-2001	2002-2007	2008-2011	2012-2035
ID-SNGL	7,132	13,786	4,327	9,923
MT-SNGL	1,706	3,471	2,643	2,695
OR-SNGL	13,674	17,489	13,831	14,649
WA-SNGL	26,952	31,643	24,098	24,140
ID-MULT	1,232	1,539	1,906	2,073
MT-MULT	598	844	1,499	1,606
OR-MULT	6,155	4,503	6,658	6,896
WA-MULT	13,435	9,557	13,125	14,206
ID-Manf. Housing	1,818	811	269	269
MT-Manf. Housing	1,161	713	364	365
OR-Manf. Housing	4,983	2,199	662	674
WA-Manf. Housing	5,609	2,567	784	800

