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July 10, 2012

## MEMORANDUM

**TO:** Power Committee

**FROM:** Massoud Jourabchi

**SUBJECT:** Revised Short-term Electricity Loads and Forecast 2008-2017

As part of the Mid-term Assessment and as input to the Resource Adequacy analysis, we have prepared an update to the regional load forecast for 2012-2017. The update reflects an increase in regional economic activities and continued slow recovery in the regional employment picture. The presentation includes a discussion of key driving forces, a retrospective review of impacts of energy efficiency activities, recent experience with loads and finally a forecast for loads for years 2012-2017. Our analysis shows that demand for electricity grew by about 634 MWa during 2010-2011 and that 81% of this growth was met by conservation.

We also have compared the Council's updated regional load forecast with the 2012 NRF regional load forecast and find the two forecasts are reasonably close. Analysis of the regional loads for the past few years suggests that regional loads are on their way to recovery and the forecast for loads to surpass 2008 levels by 2014.

Due to concerns for the oversupply situation, we also analyzed load growth during the graveyard period (12 AM-4 AM) for the months of May-July, which is typically when oversupply occurs. By 2017 loads during graveyard hours are expected to grow by 1,000 MWa, which may be sufficient to absorb increased generation from new wind turbine installations between 2011 and 2017. Our analysis shows that minimum load has been growing faster than average load during 2008-2011.

q:\mj\ww\cm revised short-term electricity loads and forecast 2008-2017- boise 2012 .docx

# REVISED SHORT-TERM ELECTRICITY LOADS AND FORECAST 2008-2017

Massoud Jourabchi July 10-2012 Boise ID.

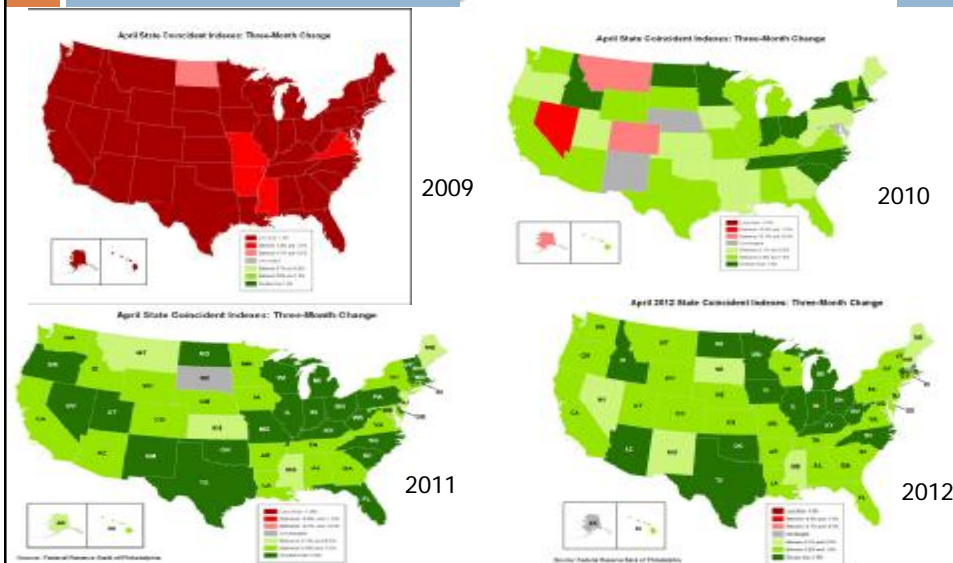
## In this presentation

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- Factors influencing load
  - ⊗ Economy
  - ⊗ Weather
  - ⊗ Investments in Efficiency (programmatic and consumer driven)
- Review of regional loads in the past few years
- Load Forecasts under "normal" weather

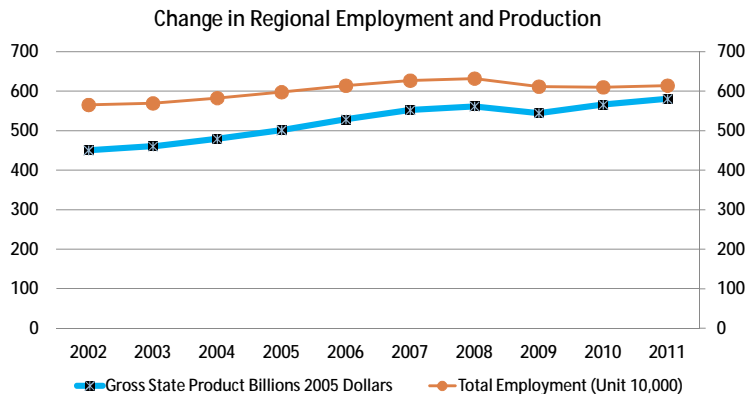
Economy:  
 Compared to 2009, regional economy is doing a lot better.  
 – State Coincident Indexes for months of April 2009-2011

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Economy of the region been growing  
 but it has been a jobless recovery

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## Economy: Changes in Gross State Product 2007-2011

5		2011 GSP (Billions of 2005\$)	2011 Share of GSP by Industry	Annual Growth Rate (2007-2011)	
	All industry total	\$581	100%	1.3%	<p>Economic output grew at 1.3% Annually between 2007-2011</p> <p><b>Growth Sectors :</b>                      Manufacturing (durable),                      Information industry,                      Health care                      Technical services                      Private sector</p> <p><b>Declining Sectors:</b>                      Construction, utilities, mining,                      Transportation, real estate,                      Management companies,                      Wholesale trade                      Government sector                      Among others....</p>
	Private industries	\$507	87%	0.03%	
	Agriculture, forestry, fishing, and hunting	\$10	2%	-9%	
	Mining	\$2	0%	-1%	
	Utilities	\$6	1%	-3%	
	Construction	\$20	3%	-8%	
	Manufacturing	\$125	22%	8%	
	Durable goods	\$111	19%	11%	
	Nondurable goods	\$17	3%	-3%	
	Wholesale trade	\$30	5%	-3%	
	Retail trade	\$40	7%	0%	
	Transportation and warehousing	\$15	3%	-3%	
	Information	\$40	7%	3%	
	Finance and insurance	\$28	5%	-1%	
	Real estate and rental and leasing	\$69	12%	-3%	
	Professional, scientific, and technical services	\$36	6%	1%	
	Management of companies and enterprises	\$7	1%	-3%	
	Administrative and waste management services	\$15	3%	-1%	
	Environmental services	\$3	1%	0%	
	Health care and social assistance	\$41	7%	3%	
	Arts, entertainment, and recreation	\$4	1%	-4%	
	Accommodation and food services	\$15	3%	-1%	
	Other services, except government	\$12	2%	-4%	
	Government	\$74	13%	-0.10%	

## Weather: Impact of weather on loads

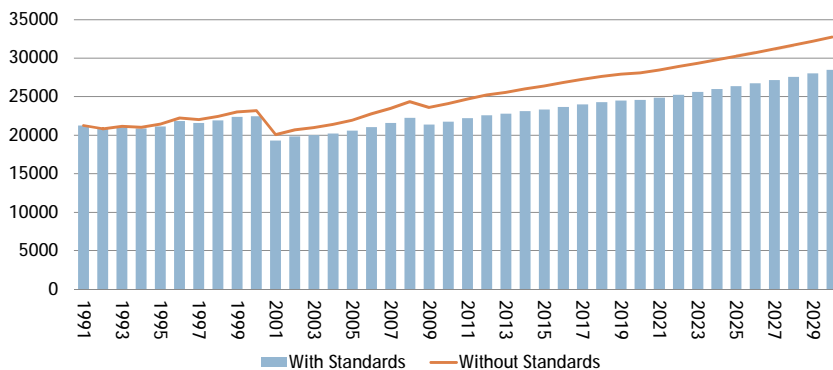
6	
	Compared to "normal" weather:
...	Loads in 2008 were 463 MWA Higher
...	Loads in 2009 were 241 MWA Higher
...	Loads in 2010 were 292 MWA Lower
...	Loads in 2011 were 41 MWA Lower
...	If we had normal weather in 2008, impact of economic recession on load would have been felt less.

Year	Impact (MWA)
2008	463
2009	241
2010	-292
2011	-41

## Investments in Efficiency: Federal Appliance Standards and state codes impact loads

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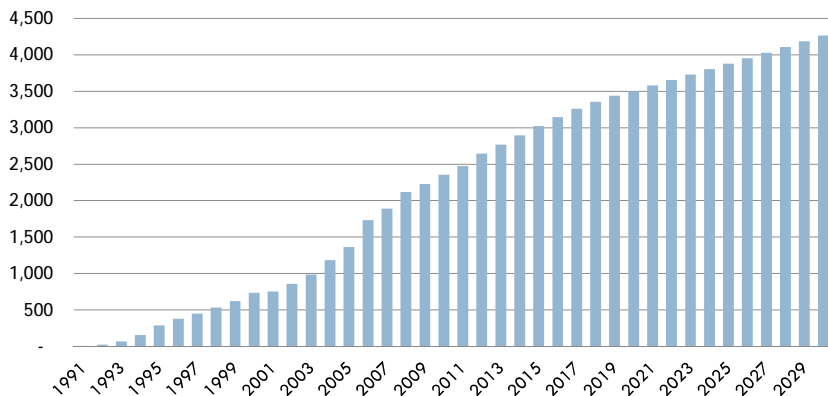
6th Plan Price Effect load forecast  
with and without Codes and Standards  
MWA



## Investments in Efficiency: Cumulative Impact of Standards

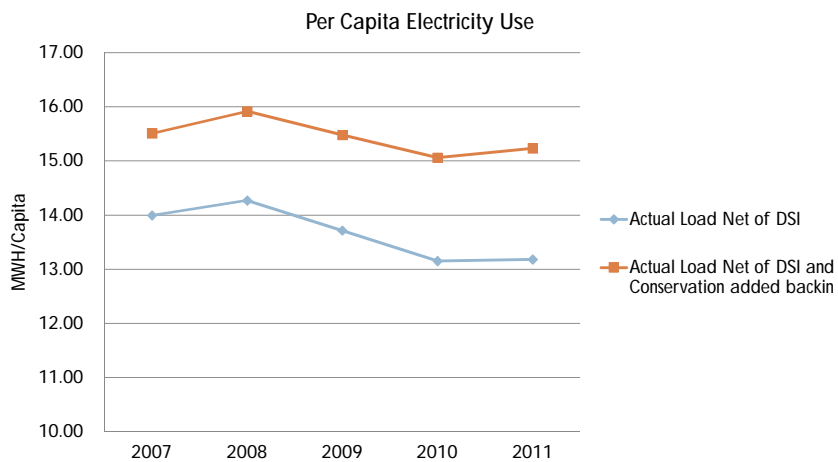
8

Impact of codes and Standards on Loads  
Price-effect forecast (MWA)



## Investments in Efficiency: Per capita usage up slightly

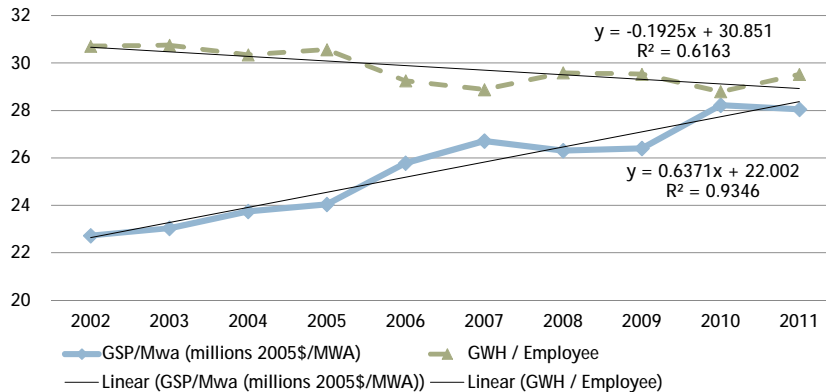
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## Investments in Efficiency: Electric Efficiency Improving

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Change in Electric Intensity in the Regional Economy



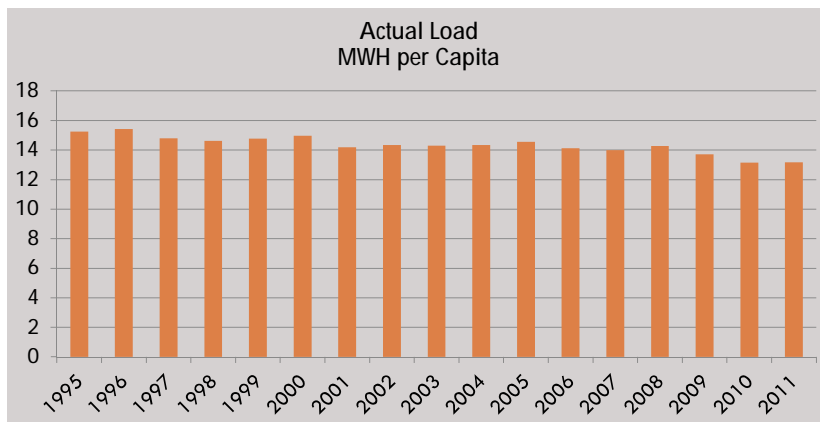
Structural shift from energy/electric intensive industries to less energy intensive industries continues.

Load is normalized for weather



## Improvements in Electricity Usage

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## So far we discussed

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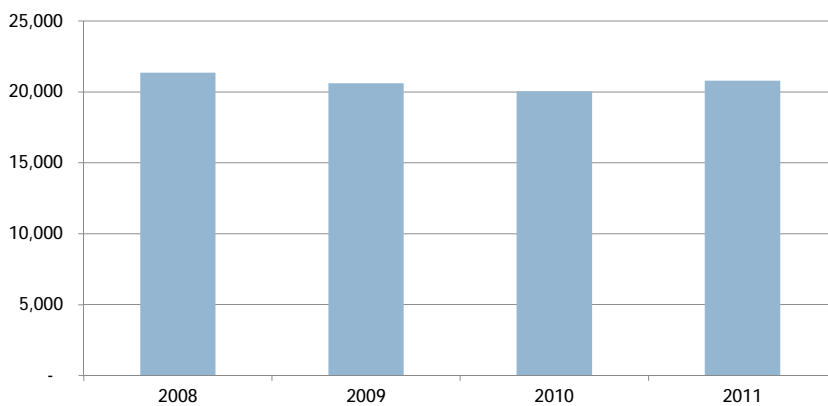
- Factors influencing load
  - ▣ Economy
  - ▣ Weather
  - ▣ Investments in Efficiency (programmatic and consumer driven)
- Review of regional loads in the past few years
- Load Forecasts under "normal" weather



## Review of regional loads: Regional loads reflect the growth in economy

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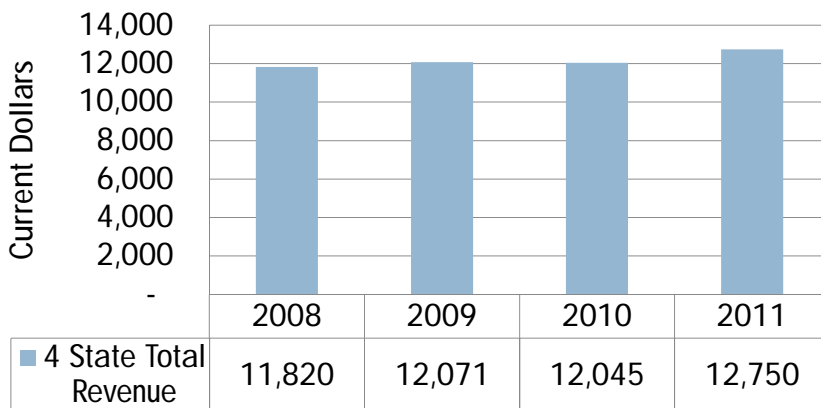
Average Annual Load (MWA)



## Electric Sales and Revenues Increasing

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4 state Electric Sales Revenue (millions \$)

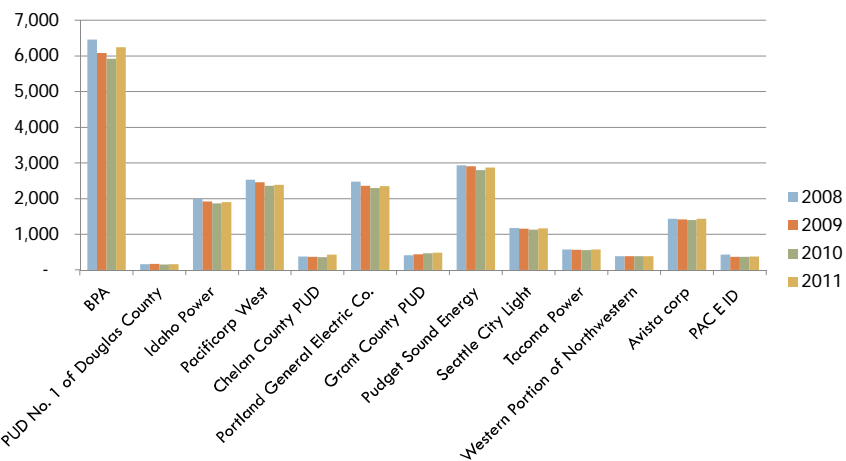


EIA - 861 subject to change



## Review of regional loads: Recovery is evident across all Control Areas

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## Review of regional loads: Change in loads since the recession

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- In 2011 regional loads grew by over 700 MWa ~ 4%
- However Regional loads in 2011 were still below 2008 levels by about 500 MW ~3%

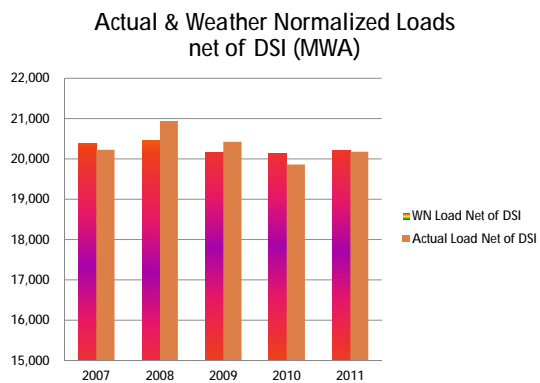
MVA	2008	2009	2010	2011	Change since 2008	Change since 2010
BPA	6,400	6,000	5,900	6,240	-3.2%	3.5%
PUD No. 1 of Douglas County	100	170	150	101	0.0%	0.8%
Idaho Power	1,892	1,918	1,867	1,901	-4.0%	1.8%
PacifiCorp West	2,028	2,458	2,358	2,381	5.7%	1.1%
Chelan County PUD	375	372	360	402	1.0%	20.1%
Portland General Electric Co.	2,477	2,302	2,296	2,358	5.0%	2.6%
Grant County PUD	418	440	404	402	1.0%	0.9%
Pudge Sound Energy	2,938	2,907	2,807	2,670	2.1%	2.8%
Seattle City Light	1,100	1,101	1,100	1,104	-1.3%	0.0%
Tacoma Power	571	588	555	570	0.7%	-1.2%
Western Portion of Northwestern	391	388	384	385	-1.5%	0.2%
Avista corp	1,431	1,421	1,387	1,440	0.4%	3.1%
PAC E ID	430	398	371	382	-11.0%	3.1%
<b>Grand Total</b>	<b>21,360</b>	<b>20,682</b>	<b>20,066</b>	<b>20,704</b>	<b>-2.7%</b>	<b>3.0%</b>

Once adjusted for impact of the weather, loads in 2011 are above 2009 levels.



## Review of regional loads: Weather normalized load growth since 6<sup>th</sup> action plan period

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During the current recession Loads started from a strong high position in 2008. In 2009 and 2010 they lost ground. But in 2011 they had regained some of the losses.

Once normalized for the weather we see that regional loads grew slightly since start of the action plan period.

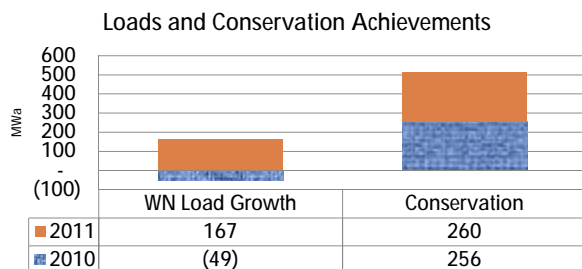
One issue that creates the impression that loads have gone down significantly, compared to 2008, is the higher that expected loads in 2008 (due to weather) .



## What percent of load growth is met by Programmatic conservation?

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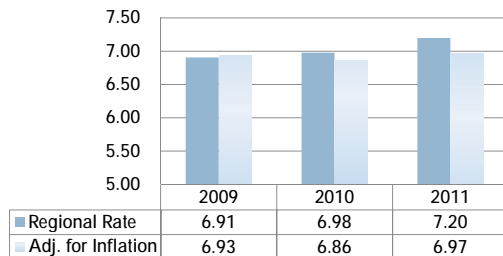
- In the first two years of the plan
- Demand grew by 634 MWa ~ 1.5% annual
- Conservation met 516 MWa of growth ~ 81%



Average Revenue collected per MWH of Sales has increased at an annual rate of 2.1% in nominal terms and 0.3% in real terms.

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Average Revenue Collected per MWH of Sales (cents/mwh)



Adjusted for inflation: annual growth has been about 0.3% on an average regional basis.

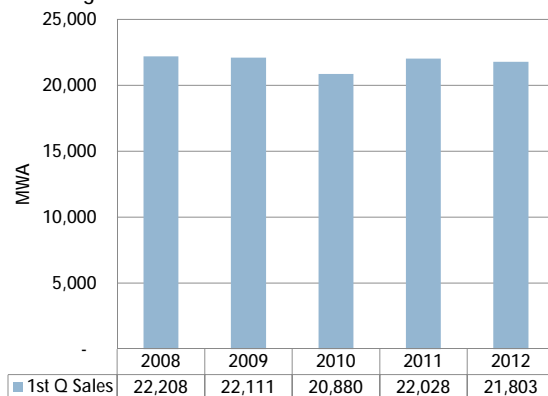
Source: EIA 862 Survey of utilities



For the first 3 months of 2012 Loads Have Been Down, slightly\*

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Regional Sales in the First Quarter of Each Year



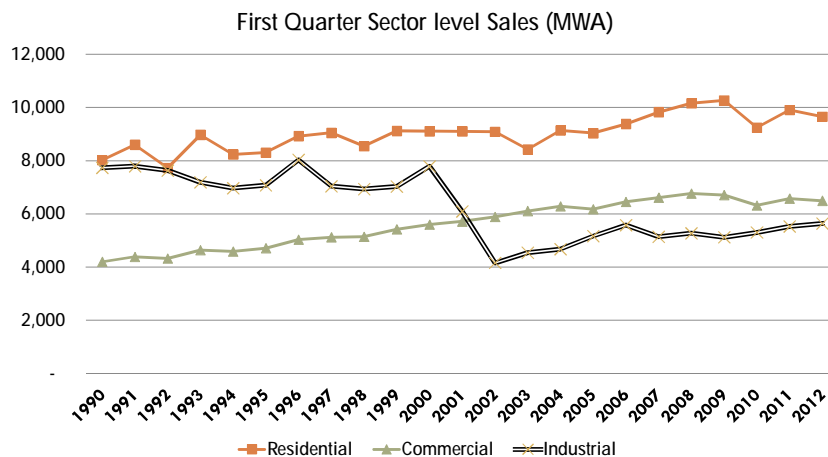
\*Source: EIA 826 monthly reporting of sales based on survey of large utilities.

2011 and 2012 figures are subject to change. reported load are not adjusted for weather.



## Sector level sales show slow re-bounce of industrial sector

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## So far we discussed

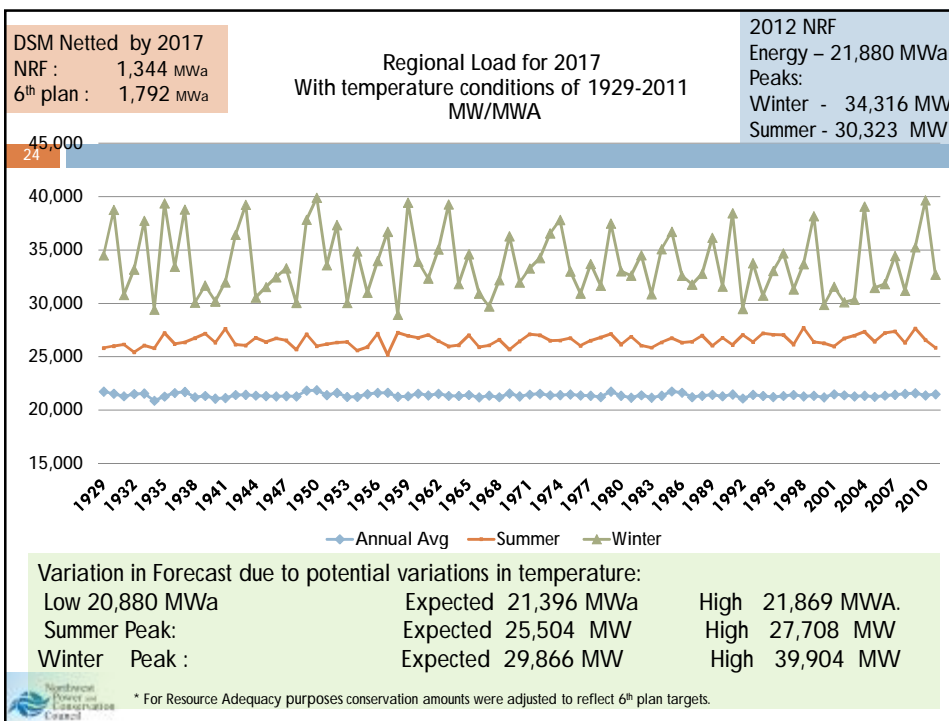
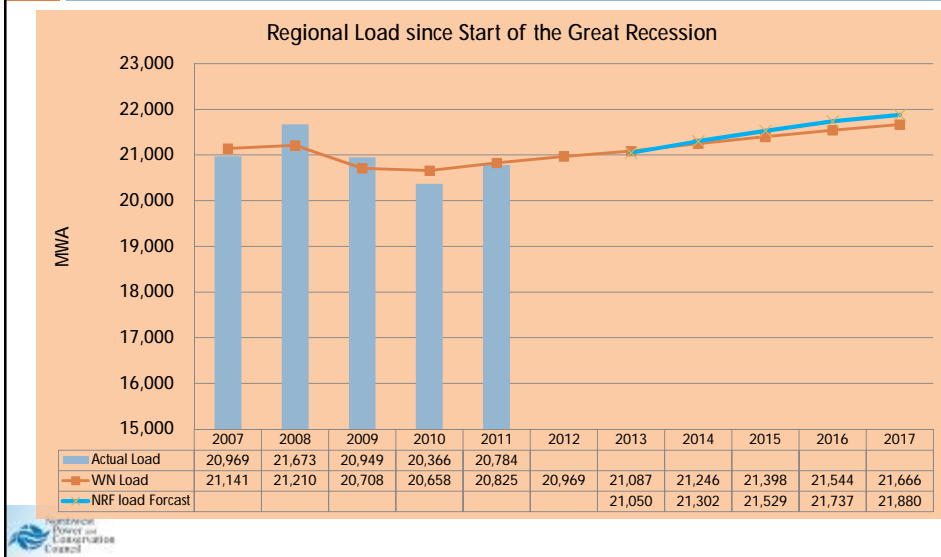
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- Factors influencing load
  - ▣ Economy
  - ▣ Weather
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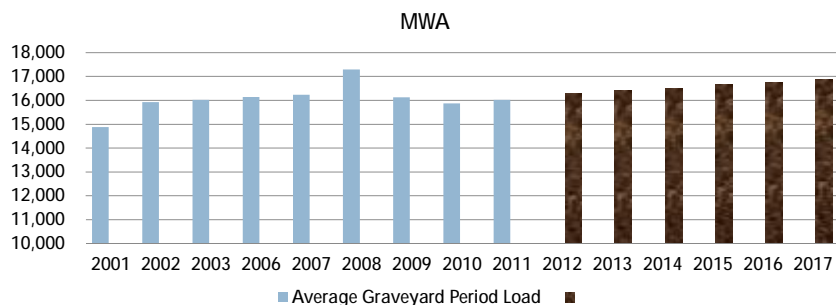
## Regional Load Forecast: Recovery to pre-recessionary levels by 2014

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## Growth in graveyard period loads should help with oversupply

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Graveyard period (May-July 12-4 am)

- Load is forecast to grow to about 17,000 MWA by 2017. This is about 1000 MWA of growth.
- Generation from wind is expected to grow by about 2400 MW
- Average generation from wind is expected to grow by about 1000 MWA
- Increase in load during the graveyard period should offset the increase in expected generation from wind in the same time period.

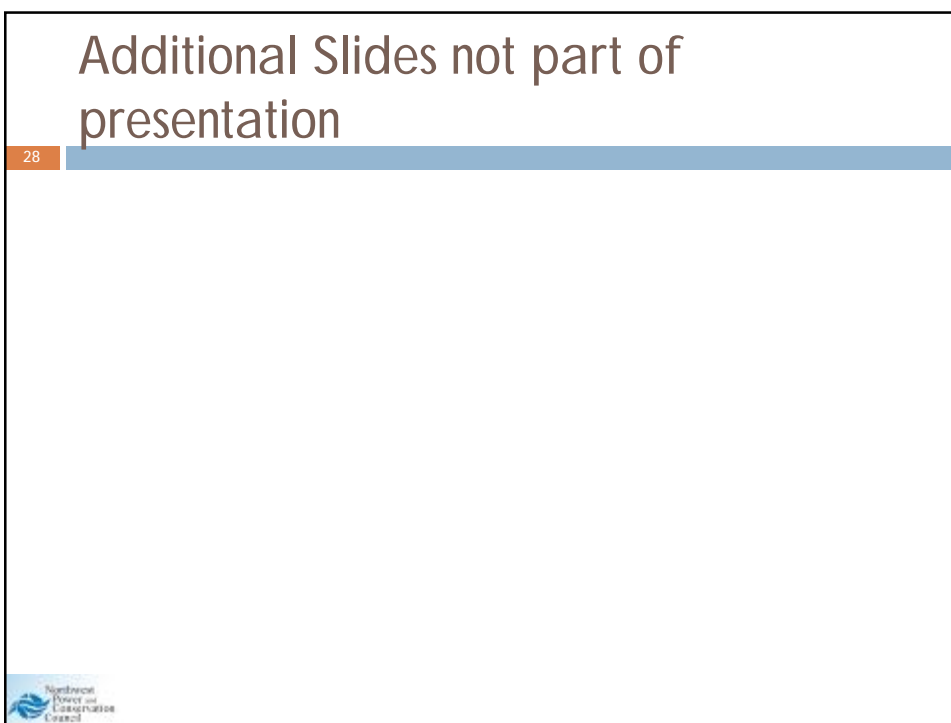


## In Summary

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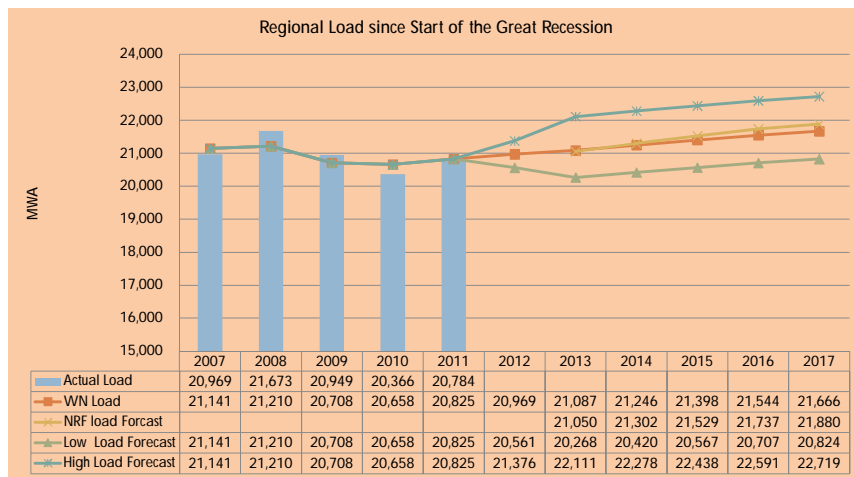
- Since start of the 6<sup>th</sup> plan
  - ✧ Demand for electricity grew by 634 MWa
  - ✧ Conservation has met 81% of this growth ~516 MWa
- Forecast is for weather normalized loads to grow back to their pre-recessionary level by 2014.
- Forecast for graveyard period suggest 1000 MWA increase over the next few years, potentially reducing excess supply.





## Range of load forecast

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## Wholesale price of electricity at Mid C

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- .. \$/MWh
- .. 2007 49.53
- .. 2008 56.76
- .. 2009 31.32
- .. 2010 31.79
- .. 2011 21.86





Regional Loads went down in 2010 but increases in 2011 were more than enough to off-set the 2010 declines

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Change in Loads by Balancing Area

