

**Richard Devlin**  
Chair  
Oregon

**Ted Ferrioli**  
Oregon

**Guy Norman**  
Washington

**Patrick Oshie**  
Washington



## Northwest **Power** and **Conservation** Council

**Bo Downen**  
Vice Chair  
Montana

**Jennifer Anders**  
Montana

**Jim Yost**  
Idaho

**Jeffery C. Allen**  
Idaho

April 7, 2020

### **MEMORANDUM**

**TO: Power Committee Members**

**FROM: Massoud Jourabchi, Manager Economic Analysis**

**SUBJECT: Load Forecast for areas outside NW**

### **BACKGROUND:**

**Presenters:** Massoud Jourabchi, Steven Simmons and John Ollis

**Summary:** Council staff has created a set of load forecasts for areas outside NW. Forecasts show moderate growth except for states that are pursuing deep electrification policies, where significant increases in load is expected. For example, State of California loads are expected to double over the next 30 year as California pushes toward decarbonization of its economy. This is after considering, increased behind-the-meter solar and battery installs and more energy efficiency investments.

**Relevance:** To produce long-term wholesale electricity prices for use in the Plan, the Council modeling tool needs forecast of loads outside NW.

**Workplan:** Create long-term load forecast for all Balancing Authorities in WECC.

**Background:** The Council's Aurora Model needs an hourly load forecast for all balancing authorities in WECC. The Council staff searched through regulatory filing and utilities IRPs to produce a long-term forecast of loads for outside NW. The level of detail for these forecasts is not as high as the forecast produced for the region. Staff investigated load forecasts for larger states in more detail. For example, the load and resource forecasts for Canadian provinces of British Columbia and Alberta as well as load

forecast for State of California have larger impact on the regional wholesale prices.


More Info:

Average Annual Growth Rate in Energy and Peaks across Balancing Areas

2021-2050 AAGR	Energy	Peak
BC	0.9%	0.9%
Albera	0.8%	0.8%
CA_IID	1.90%	1.99%
CA_PGandE_North	1.90%	1.99%
CA_PGandE_ZP26	1.89%	1.97%
CA_SCE	1.96%	1.95%
CA_SDGE	1.99%	2.13%
CA_LDWP	2.04%	1.95%
CA_PGandE_BayArea	1.90%	1.99%
CA_BANC	2.00%	2.05%
CA_TIDC	1.89%	1.95%
NevadaNorth	-0.9%	-0.4%
NevadaSouth	0.6%	0.9%
NorthwesternMT	0.8%	0.9%
WAPA_CO	0.6%	0.3%
WAPA_WY	0.5%	0.5%
WAPA_LwrCO	0.7%	0.9%
WAPA_UprMO	0.1%	0.0%
VEA	0.7%	0.9%
PublicServiceCO	0.6%	0.3%
AZPublicService	1.7%	2.2%
SaltRiverProject	2.1%	2.3%
TucsonElectric	1.3%	0.9%
PublicServiceNM	1.2%	1.1%
ElPasoElectric	1.2%	1.4%

# Load Forecast for Areas outside Northwest

**Massoud Jourabchi**  
**Steven Simmons**  
**John Ollis**



THE 2021  
**NORTHWEST**  
**POWER PLAN**  
FOR A SECURE & AFFORDABLE ENERGY FUTURE

1


## Areas Outside NW

Alberta	PNW_PortlandGeneral
BritishColumbia	PNW_Bonneville_OR
CA_IID	PNW_Bonneville_WA
CA_PGandE_North	PNW_Bonneville_IDMT
CA_PGandE_ZP26	PNW_IdahoPowerTV
CA_SCE	PNW_IdahoPowerMV
CA_SDGE	PNW_IdahoPowerFE
CA_LDWP	PNW_PacificorpEastID
CA_PGandE_BayArea	PNW_PugetSoundCentral
CA_BANC	PNW_PacificorpEastWY
CA_TIDC	PNW_PacificorpEastUT
N_BajaCA	NorthwesternMT
NevadaNorth	WAPA_CO
NevadaSouth	WAPA_WY
PNW_Olympia	WAPA_LwrCO
PNW_PACWSouth	WAPA_UprMO
PNW_PugetSoundNorth	VEA
PNW_SeattleCL	PublicServiceCO
PNW_TacomaPower	AZPublicService
PNW_GrantCountyPUD	SaltRiverProject
PNW_ChelanCountyPUD	TucsonElectric
PNW_DouglasCountyPUD	PublicServiceNM
PNW_Avista	EIPasoElectric

In the expanded topology of Aurora modeling, 46 different transmission nodes are modeled.

30 of the nodes are outside NW.

Council does not create independent forecast for these areas, rather it uses external third-party sources



THE 2021  
**NORTHWEST**  
**POWER PLAN**

2

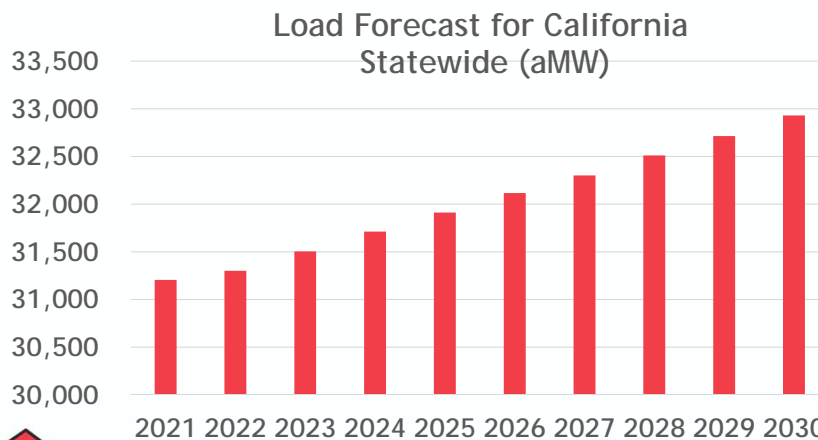
### Areas covered for New Topology of 2021 Plan

- For two areas, Canada and California, a more extensive analysis of loads was conducted.
  - For Canada (British Columbia, and Alberta) we used regulatory filings by BC Hydro and AESO.
  - For California( nine nodes) we used IOU and POU filing with CEC.
- Typically forecast horizon is 10-20 years. We extended the forecast by extrapolating 10 year forecasts or used third-party research.
- For extending California forecast past 2030 we used information from the E3 study
- For all other areas outside California and Canada we used Aurora default growth rates



3

### Load Forecast For California From CEC 2021-2030



4

## California Load under High Electrification

- To generate a long-term load forecast for state of California, for 2021-2050, we started with CEC's official forecast for 2021-2030, we then extrapolated loads at the annual rate calculated by E3 under high electrification.
- What is high electrification?
  - Similar to Paths to Decarbonization- strategies for reducing emissions
  - Strategies to reduce Carbon footprint in California. Non-electric uses are moved to electric upon replacement.
  - Consulting company E3 was contracted by CEC to identify strategies that would meet states Carbon reduction policies.
  - These policies increase electric load growth significantly.



## Loads under and in response to Climate Change Can be significantly higher

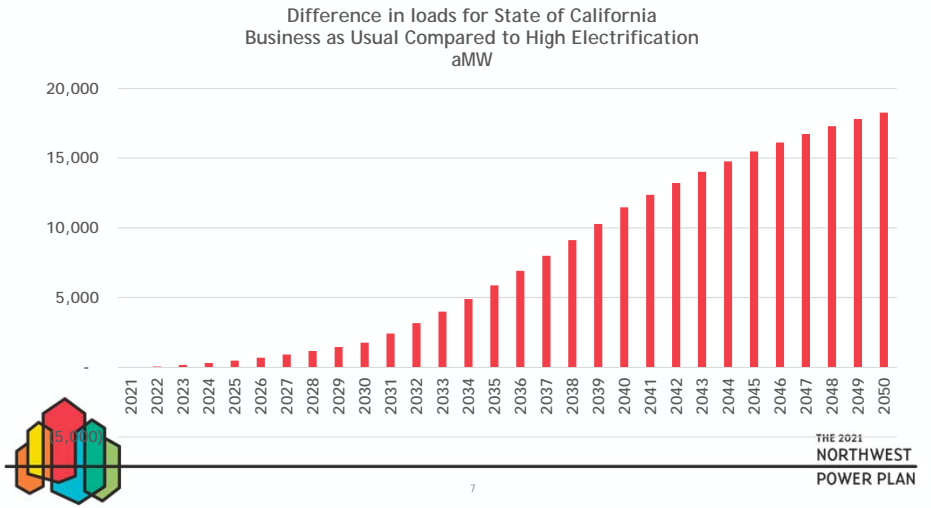
As more and more states take initiatives to reduce impact of climate change, and strategies such as; electrification of transportation, distributed behind-the-meter Solar generation and switching from fossil fuels to electricity are implemented, Demand for electricity is expected to increase substantially.

Load aMW	2021	2050	AAGR 2021-2050
E3 WECC wide BAU	85,653	100,847	0.6%
E3 WECC wide High Electrification	85,653	147,300	1.9%

- Compared to Business as Usual, E3 analysis expects from 36% to 53% increase in loads due to high electrification policies.
- For state of California, during 2031-2050, we are using high electrification scenario growth rates

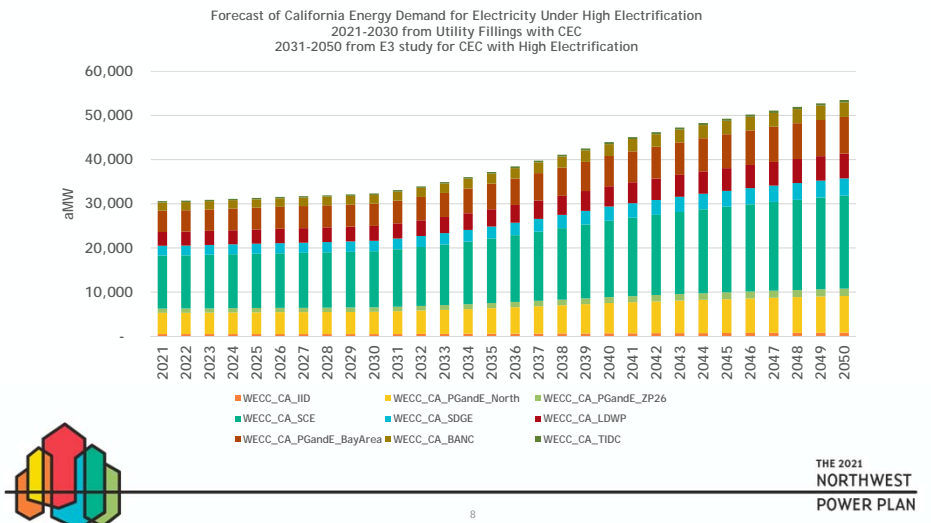


## By 2050, California Loads are expected to be about 18,000 aMW Higher (53%)

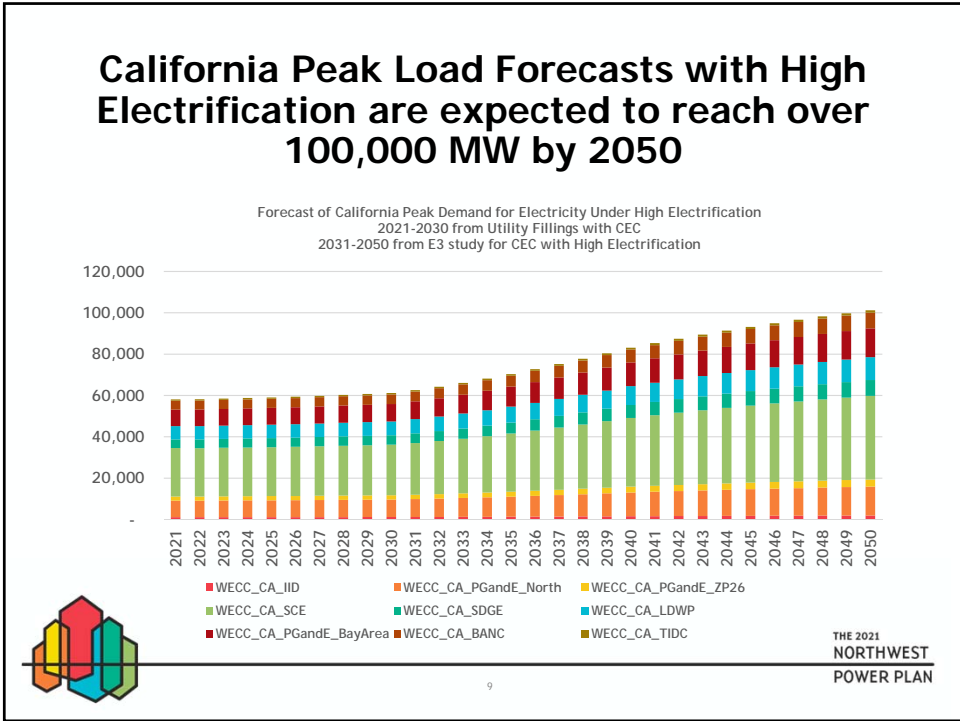


7

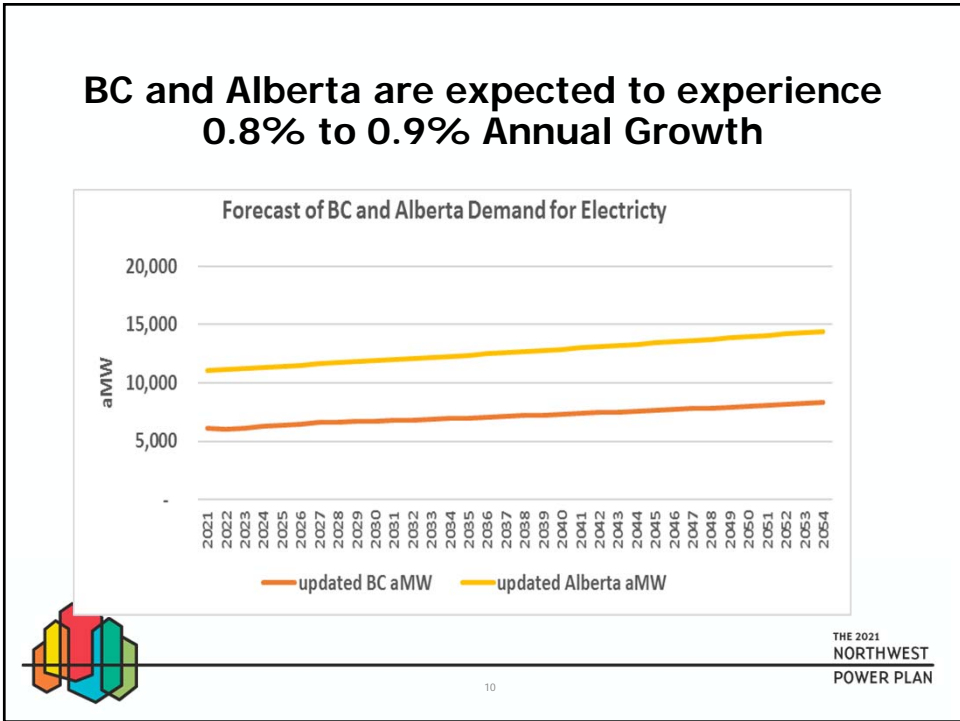
## California Load Forecasts with High Electrification are expected to reach over 55,000 aMW by 2050



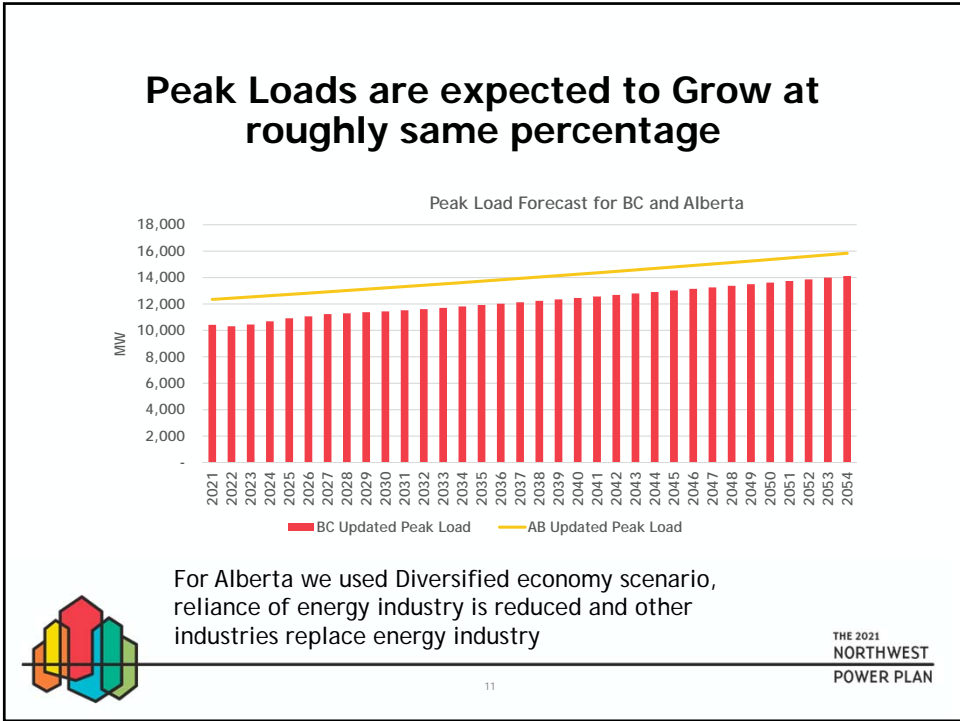
8



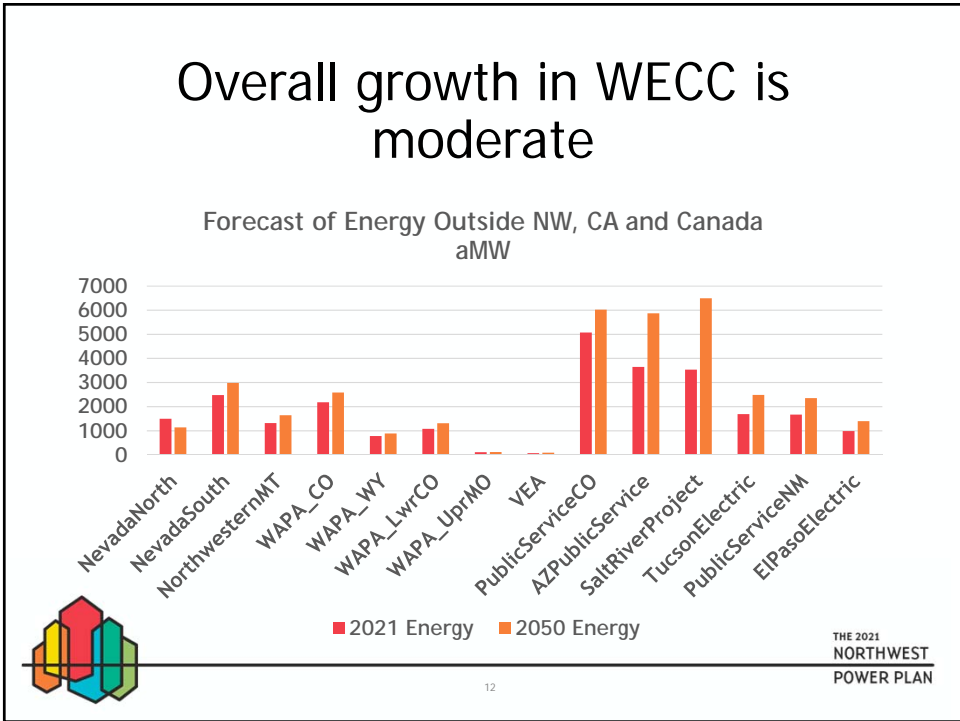
9



10



11



12



## Annual Growth in Energy and Peak is modest for most cases- Electrification increases projected load growth

2021-2050 AAGR	Energy	Peak
BC	0.9%	0.9%
Alberta	0.8%	0.8%
CA IID	1.90%	1.99%
CA_PGandE_North	1.90%	1.99%
CA_PGandE_ZP26	1.89%	1.97%
CA_SCE	1.96%	1.95%
CA_SDGE	1.99%	2.13%
CA_LDWP	2.04%	1.95%
CA_PGandE_BayArea	1.90%	1.99%
CA_BANC	2.00%	2.05%
CA_TIDC	1.89%	1.95%
NevadaNorth	-0.9%	-0.4%
NevadaSouth	0.6%	0.9%
NorthwesternMT	0.8%	0.9%
WAPA_CO	0.6%	0.3%
WAPA_WY	0.5%	0.5%
WAPA_LwrCO	0.7%	0.9%
WAPA_UprMO	0.1%	0.0%
VEA	0.7%	0.9%
PublicServiceCO	0.6%	0.3%
AZPublicService	1.7%	2.2%
SaltRiverProject	2.1%	2.3%
TucsonElectric	1.3%	0.9%
PublicServiceNM	1.2%	1.1%
EIPasoElectric	1.2%	1.4%

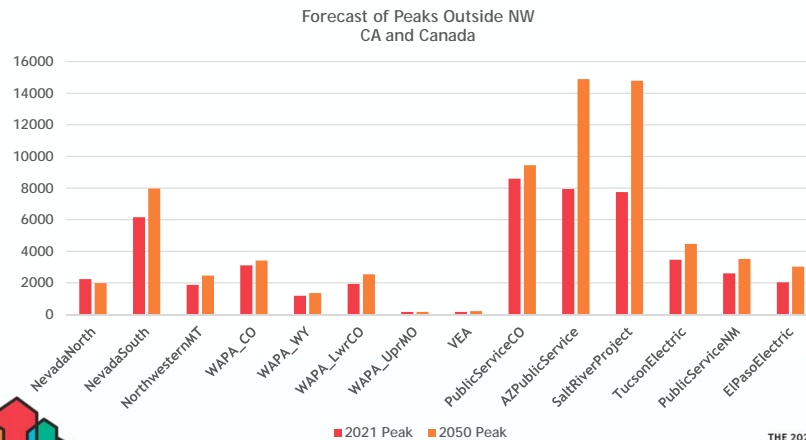


THE 2021  
NORTHWEST  
POWER PLAN

13

13

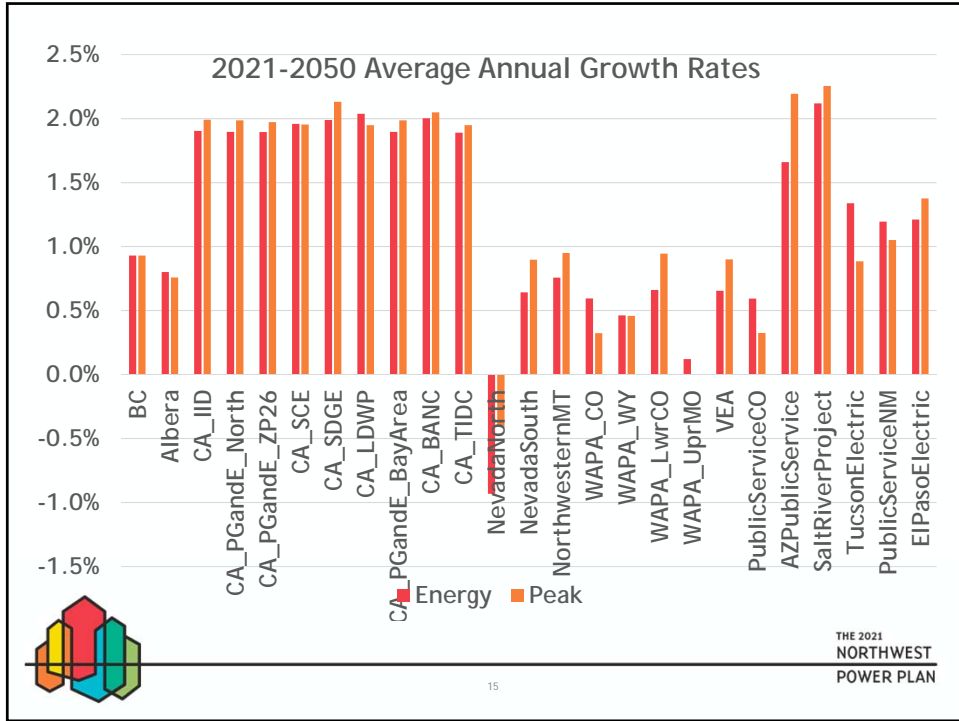
## Except for Arizona, load growth is rather modest over next 30 years



THE 2021  
NORTHWEST  
POWER PLAN

14

14

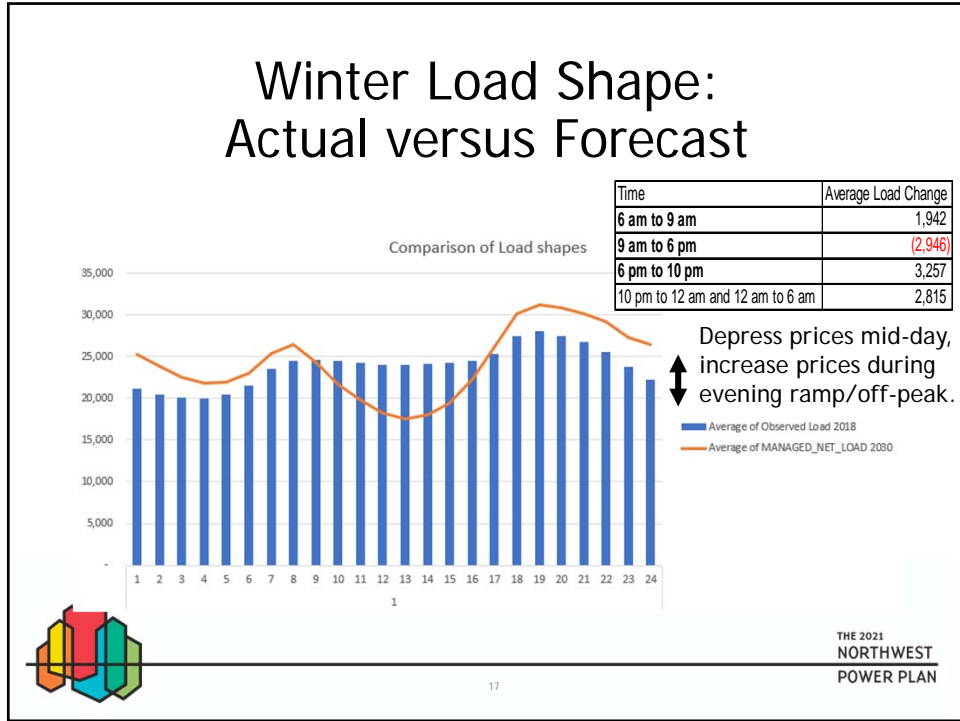


15

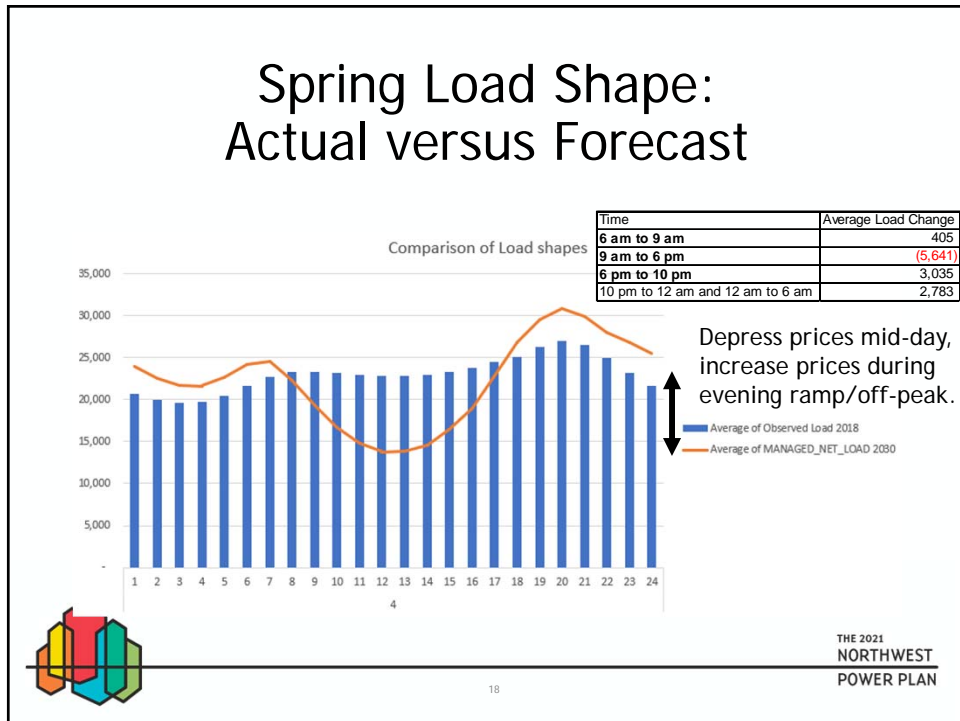
## Change in Patterns of Usage

- Not only level of demand is expected to change, hourly profiles are also expected to change.
- We took observed 2018 hourly loads for California ISO and compared it to forecasted hourly loads for 2030.
- Significant reductions in load during the day, can create opportunity for sale of power to other regions. While sharp increase in evening loads may be an opportunity to buy.
- For example, for month of January we observe that, compared to 2018 observed loads the 2030 loads will be lower by 7000 aMW during mid-day and by 5 pm loads start to increase.

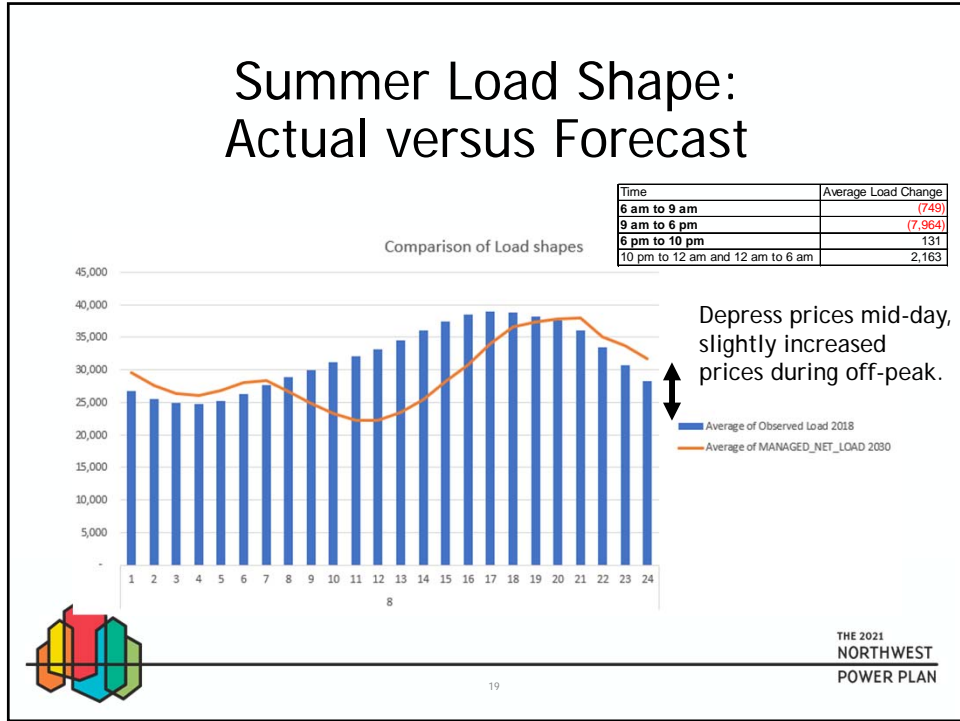
16



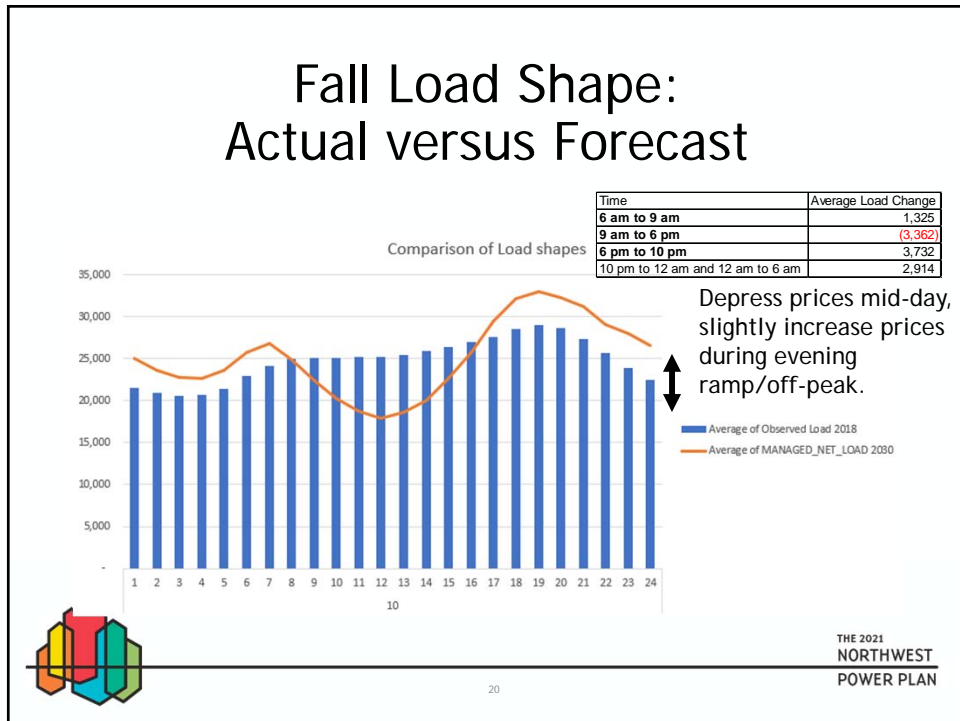
17



18



19



20

## Summary of findings

- Load growth for most states in WECC are expected to be modest.
- Decarbonization strategies lead to higher electrical demand.
- Hourly patterns of load will change significantly.
- These changes introduce opportunities and challenges for utilities.
  
- Next analytical step is to forecast wholesale price of electricity under these load forecasts.

