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April 30, 2019

MEMORANDUM

TO: Council Members

FROM: Steven Simmons

SUBJECT: Transportation Forecast

BACKGROUND:

Presenter: Steven Simmons

Summary: In preparation for the 2021 Power Plan, staff will be providing the Power Committee a series of presentations on different aspects to developing the Plan.

Staff has worked to implement a transportation module into the long-term load forecasting model Energy 2020. This module is brand new for the 2021 Power Plan. The presentation will provide an overview of the transportation forecasting process.

Relevance: Though demand for electricity from the transportation sector is relatively small now, the increasing sales and operation of light duty electric vehicles will result in a growing electrical load for the region's utilities. Electric vehicles are more efficient, emit less pollution, and in many cases offer lower ownership costs than traditional internal combustion engine powered gasoline cars. As more fully electric car models are made available for purchase or lease along with infrastructure buildout, the resulting long-term load in the region over the next twenty years could become significant.

Workplan: A3.2 Forecasting and Economic Analysis - Transportation Forecast

Background: The transportation – the movement of people and goods - is a large energy consumer. In the US, as much as 28% of all the energy consumed annually is for transportation, and most of the energy is from petroleum-based fossil fuels. In the Northwest, carbon-dioxide emissions from the transportation sector are more than twice as high as from the electric generation sector, due to the abundance of clean generation in the region. Transitioning from petroleum based transportation fuel to electricity could help to limit greenhouse gas emissions.

Transportation Forecast -

Process for the 2021 Northwest Power Plan

Power Committee - May 7, 2019 – Boise Idaho

Steven Simmons



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POWER PLAN
FOR A SECURE & AFFORDABLE
ENERGY FUTURE

Agenda

1. The Transportation Forecast, where it fits in, and why it's important
2. General Approach and Methodology
3. Wrap Up



Transportation Forecast

1. Long term demand forecast for the Northwest transportation sector
2. Full fuel & technology forecast with a focus on estimating the future market share of electric passenger vehicles and their impact on regional electricity load
3. It is a module within the long term load forecast model – Energy 2020
4. It is a new methodology for the Council's Power Plan load forecast
5. Key products include: fuel consumption, electricity load, vehicle unit sales & stock



Natural Gas
and Other
Fuels Price
Forecast

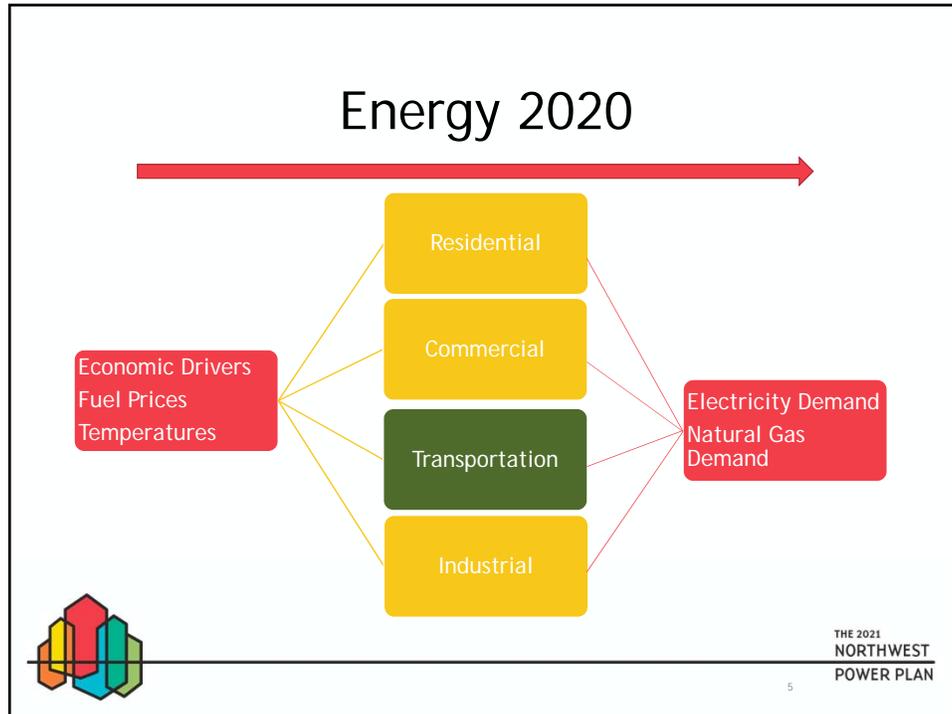


Transportation
Forecast



Price Effect
Load
Forecast

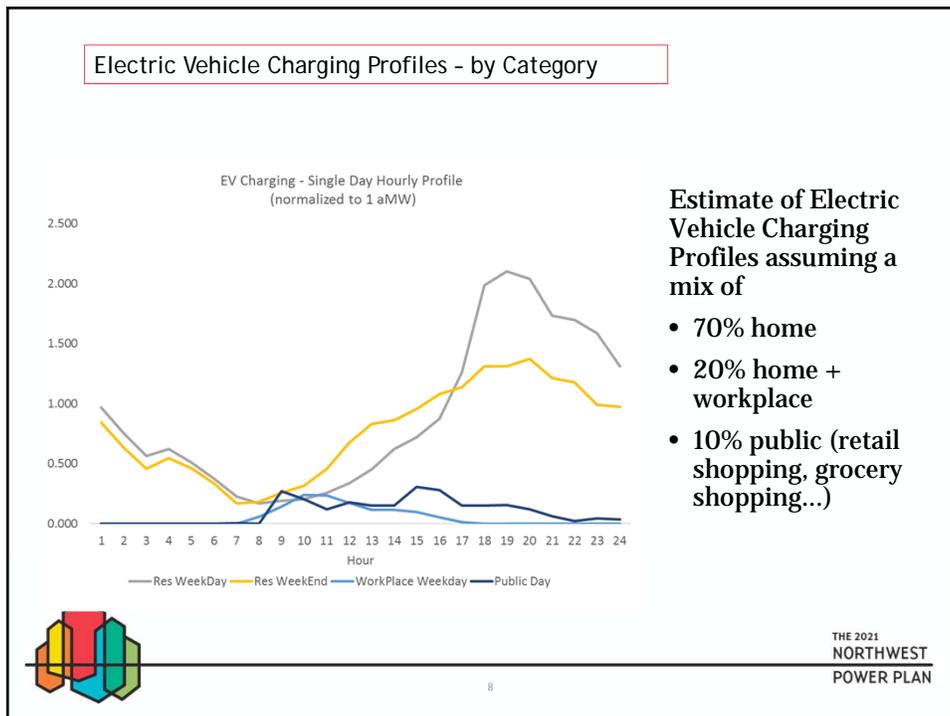
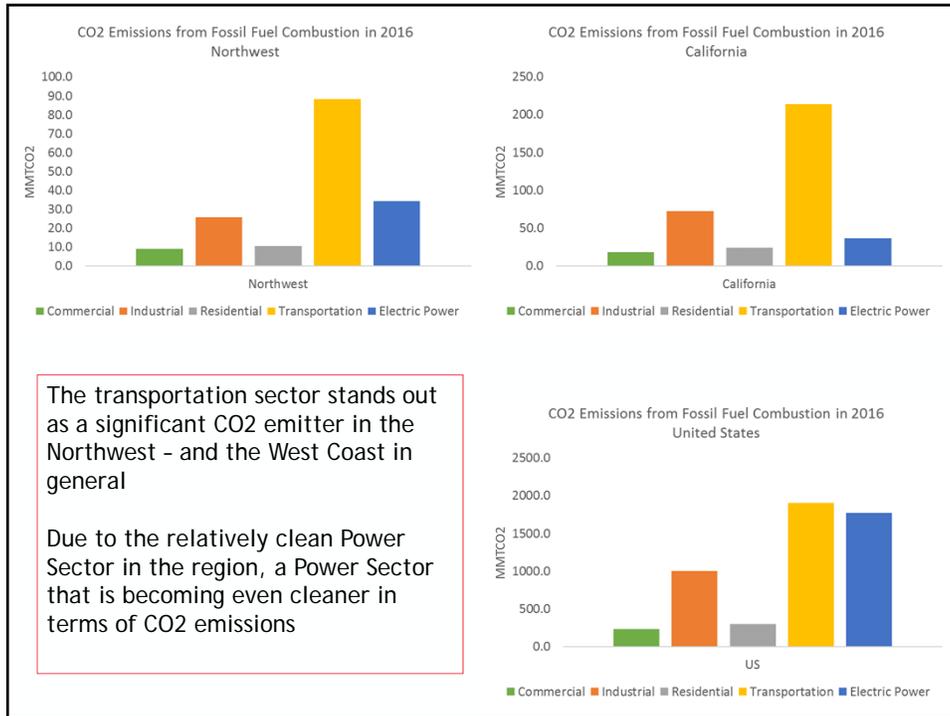


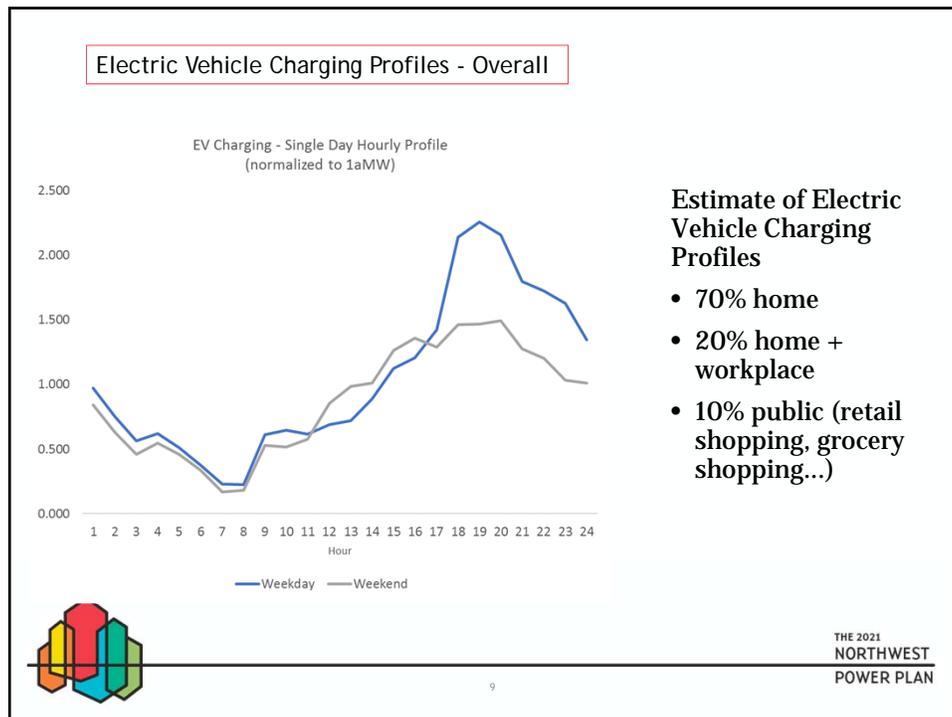


Transportation Forecast

1. Electric vehicles are on the market now and offer some advantages over traditional, gasoline fuel vehicles (ICE)
2. Although limited in market share now, sales could take off within the next 20 years
3. In the Northwest, the Transportation Sector is a big contributor to regional CO₂ emissions from fossil fuel combustion
 1. The regional electricity power sector is not heavily fossil fuel driven
 2. Switching from gasoline/diesel as a fuel to electricity fuel would reduce CO₂ emissions
4. If sales of electric vehicles were to take off, it would present the region with new electricity load and could impact peak loads in the late afternoon

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General Approach & Methodology

1. Module within the Energy 2020 Model - consumer choice model
2. There is a calibration to historic data to set price-effect and non-price effect variables to model future choices
3. New demand must be met – due to stock retirement and growth via the forecast economic drivers
4. Note – this is an “energy” based model, not units based
5. Technologies compete in terms of price (vehicle capital cost, fuel cost, efficiency) and non-price factors to set market shares
6. The slowly changing makeup of the vehicle stock over time can impact electric loads and emissions

Key inputs	Vehicle capital and maintenance costs
	Fuel prices
	Vehicle efficiency
	Emission factors
	Economic growth
	Charging profile
	Vehicle lifetime
Key outputs	Electricity Demand
	Contribution to electricity peak load
	Pollution
	Vehicle unit sales & stock



Wrap Up

- In addition to a base forecast, some scenarios will likely be built – such as looking at a case of 100% electric vehicle sales market share by 2050
- Some components of the forecast may be exogenously calculated
- Work on the forecast is on-going thru the summer of 2019

