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June 6, 2017

### MEMORANDUM

**TO: Power Committee**

**FROM: Ben Kujala**

**SUBJECT: Carbon Tax, REC Price, Hydro and Other Inputs in RPM**

#### **BACKGROUND:**

**Presenter:** Ben Kujala

**Summary:** The Power Committee had a high-level overview of the RPM model presented in March. In April, there was a discussion of how load inputs are developed for RPM. In May, there was a presentation on the natural gas and electricity market prices used in the model. This presentation covers the other significant inputs into the RPM model.

**Relevance:** The Regional Portfolio Model has been used to inform the resource strategy included in the 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> Power Plans.

**Workplan:** C. Prepare for the 8<sup>th</sup> Plan.

**Background:** The Regional Portfolio Model was first used by the Council in the Fifth Power Plan. It was developed at the Council by staff. For the Seventh Power Plan, the Council contracted with Navigant to redevelop the model.

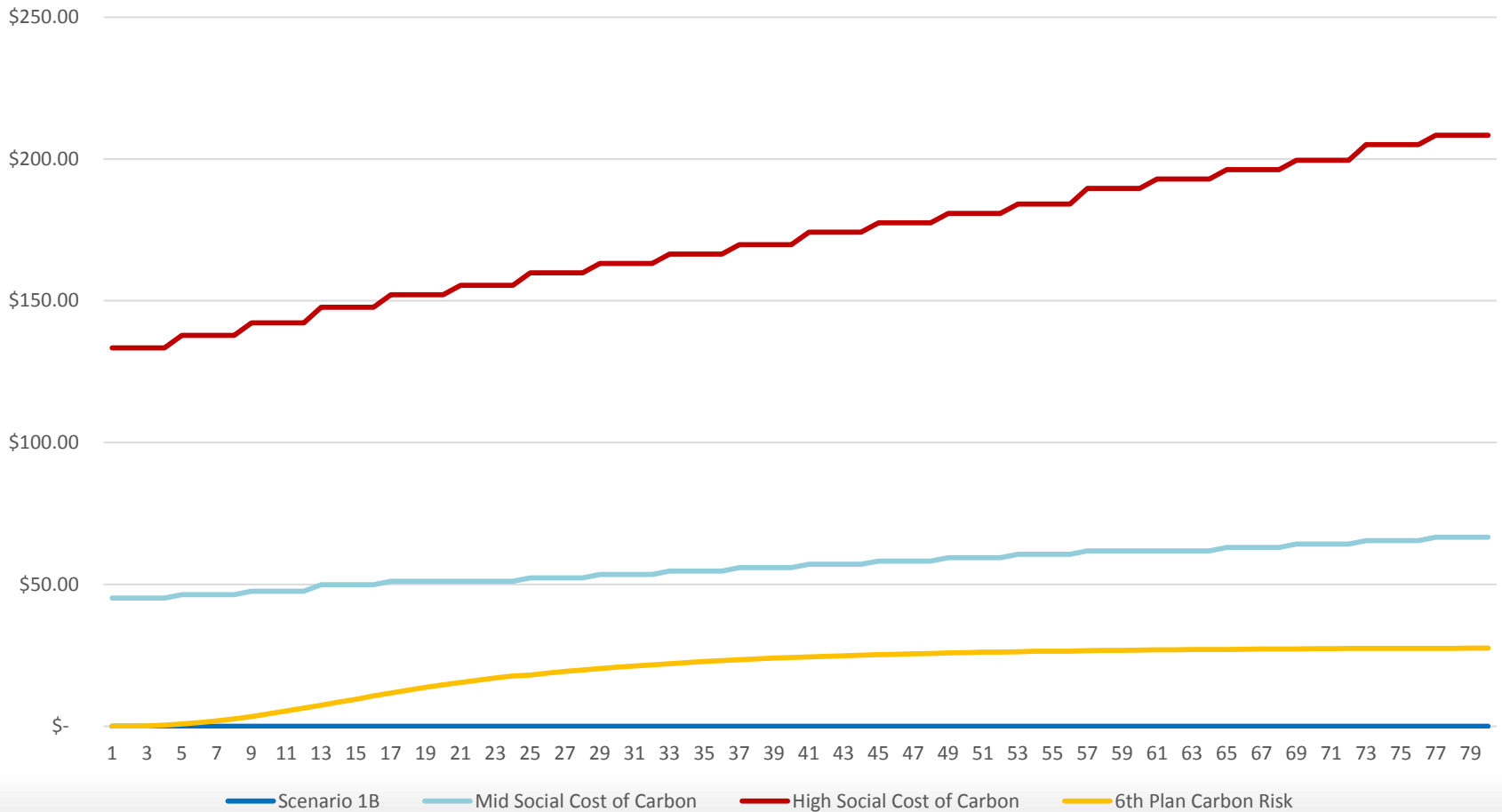
**More Info:** <https://www.nwcouncil.org/energy/rpm/home/>

# Carbon Tax, REC Price, Hydro, and Other Inputs in RPM

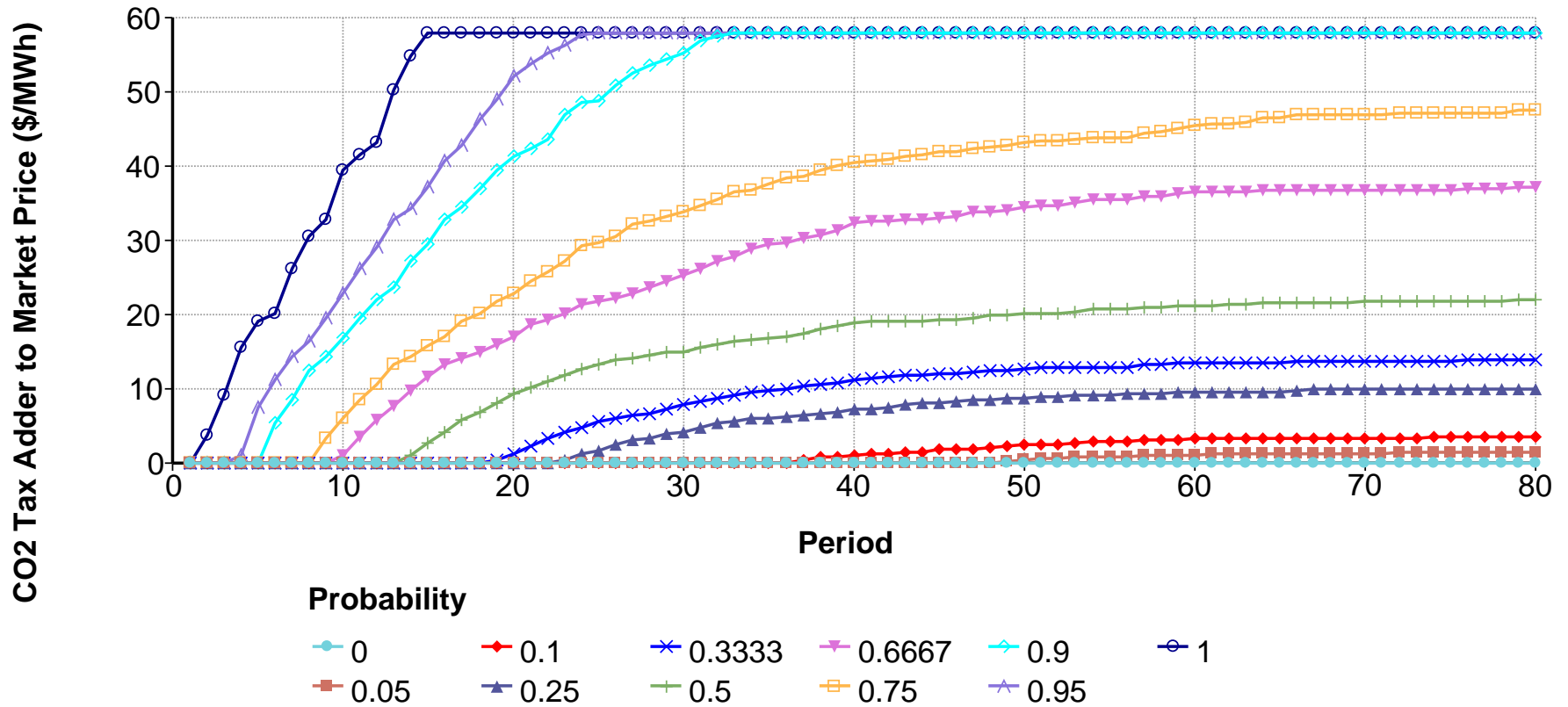
# Carbon Tax

- **The 7<sup>th</sup> Plan involved significant exploration of carbon pricing**
- **Implemented in RPM as an added cost to dispatch**

# CO2 Price Scenarios



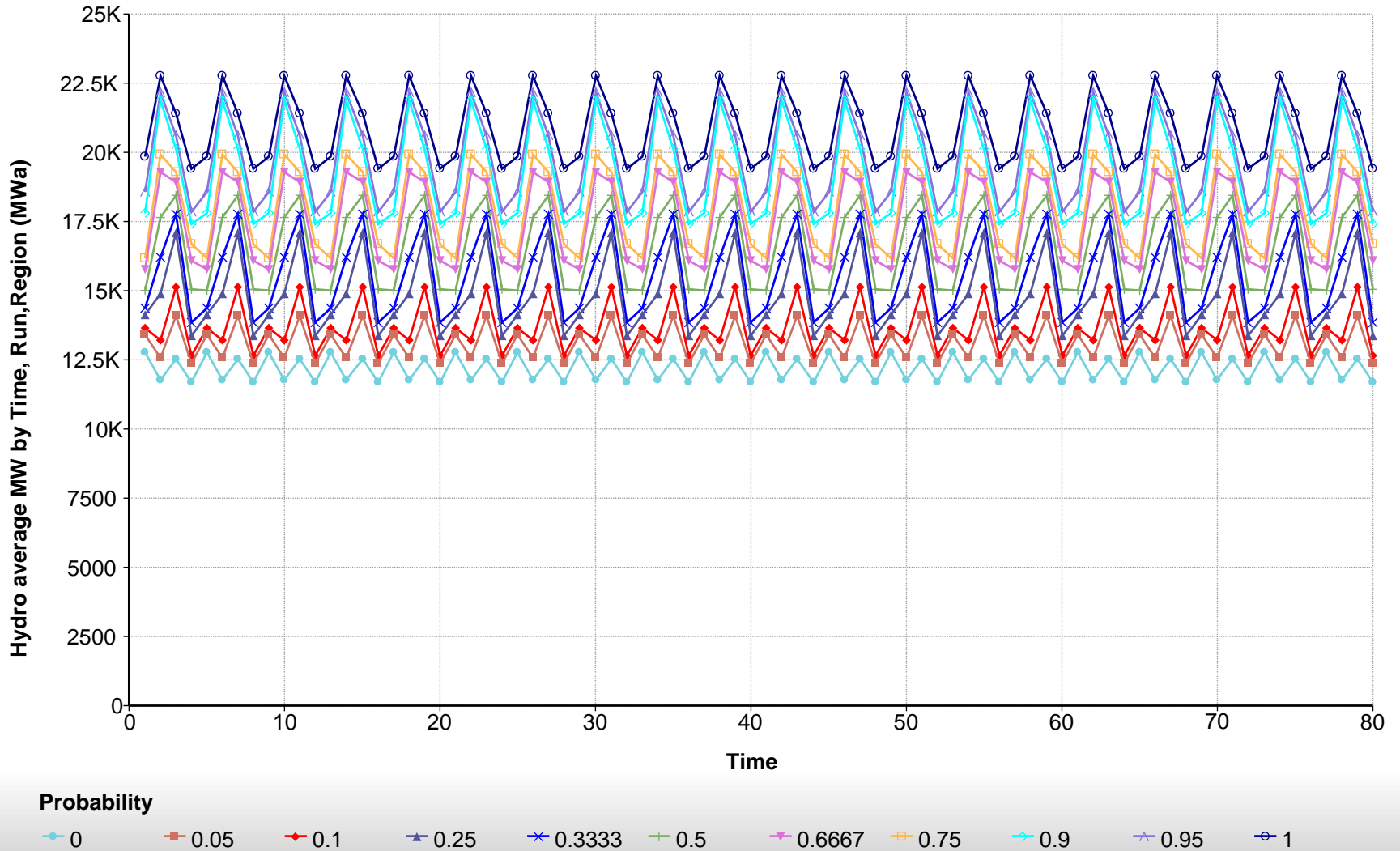
# CO2 Risk Scenario



# Fuel Emissions

Fuel Type	lbs CO2 per MMBTU
Natural Gas	117
Coal	212
Pet Coke	225

# On-Peak Hydro



# REC Pricing

- Model can implement REC pricing and use the risk model structure
- All scenarios assumed the REC value stayed within the region
- Assumed no out-of-region value transfer
- Cost / Value of RECs to the region was assumed to be zero



# RPS Load Assumptions

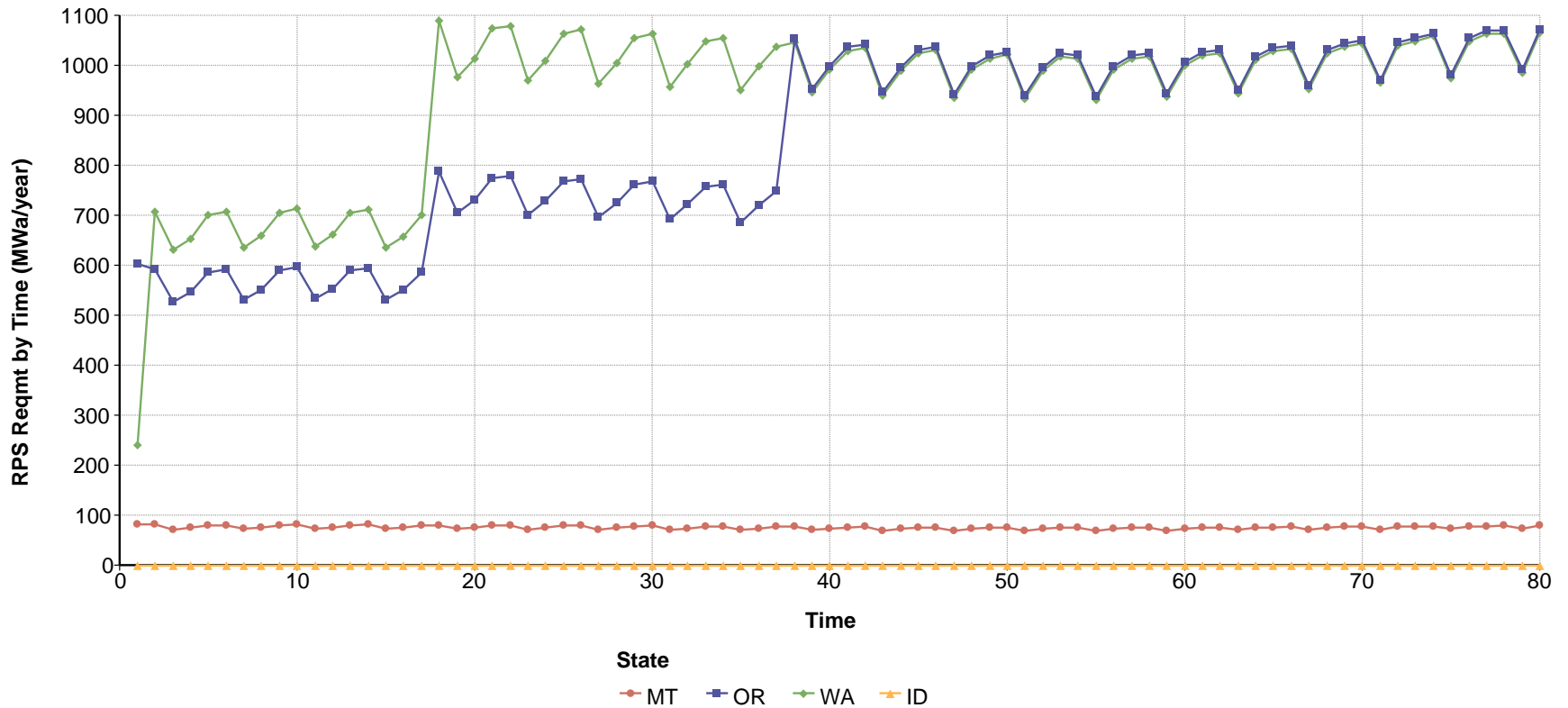
- Regional Load Proportion:

MT	OR	WA	ID
0.05	0.29	0.54	0.12

- Load RPS Obligation:

	MT	OR	WA	ID
2015	0.138	0.138	0.0276	0
2016	0.1382	0.1382	0.0829	0
2017	0.1382	0.1382	0.0829	0
2018	0.1383	0.1383	0.083	0
2019	0.1383	0.1383	0.083	0
2020	0.1385	0.1846	0.1283	0
2021	0.1385	0.1846	0.1283	0

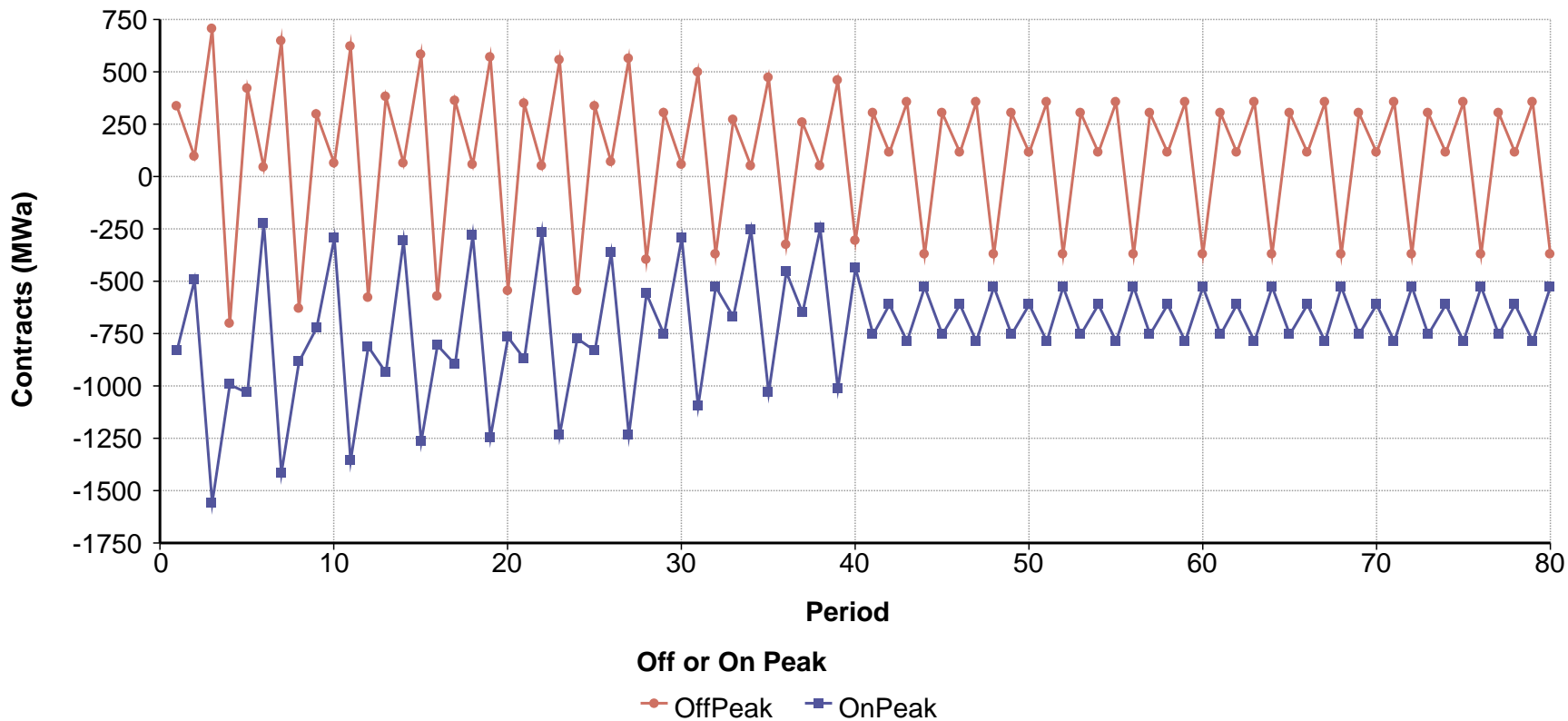
# RPS Requirements



# Forced Outage Rate

Existing Resource	FOR
Boardman	0.067
Centralia	0.067
Other Coal	0.067
East 1	0.059
East 2	0.059
East 3	0.059
West 1	0.059
West 2	0.059
West 3	0.057145
Wind	0
Solar	0
CGS	0.096

# Out-of-Region Contracts



# Import / Export Limits

