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

February 7, 2017

MEMORANDUM

TO: **Council Members**

FROM: **Gillian Charles**

SUBJECT: **Briefing on wind generation during recent cold-weather events**

BACKGROUND:

Presenter: Gillian Charles, Energy Policy Analyst

Summary: As a follow-on to the previous presentation on the effect of recent cold-weather events on load and power prices, this presentation will discuss how the region's wind fleet performed during that same time period.

In general, wind production is not affected by extreme cold temperatures and weather events. The technology is built to sustain these conditions in order to be operable in areas with strong winter wind resources, like Montana.

Staff will present actual wind generation data from BPA's balancing authority, as well as two wind farms in Montana. During the major snow event in Portland and the Columbia Gorge on January 11-16, the wind fleet in the gorge produced very little energy – due to low or no wind during that time period. In Montana, there were periods of strong – and sustained – winds that resulted in high wind generation for several days at a time.

Relevance: Evaluation of actual events compared to assumptions we make in our analysis.

Workplan: Continual evaluation of generation technologies and performance

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Briefing on wind generation during recent cold-weather events

Gillian Charles

February 14, 2017

Council Meeting

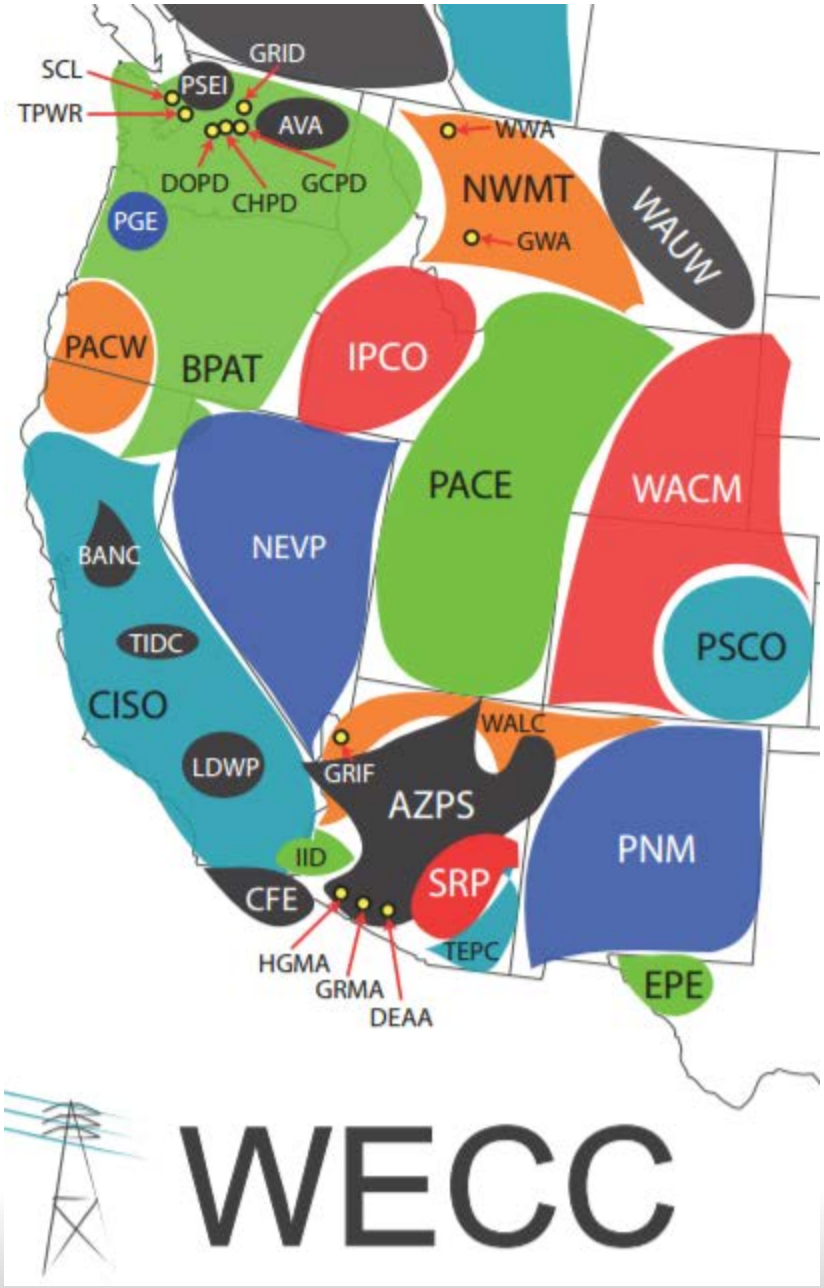
Recent cold-weather events

- Unseasonably cold temperatures for the region during last two weeks of December and first three weeks of January
- Region experienced one of the highest peak loads in the past twenty years
- How did the region's wind fleet perform during this cold snap?

Wind turbine performance

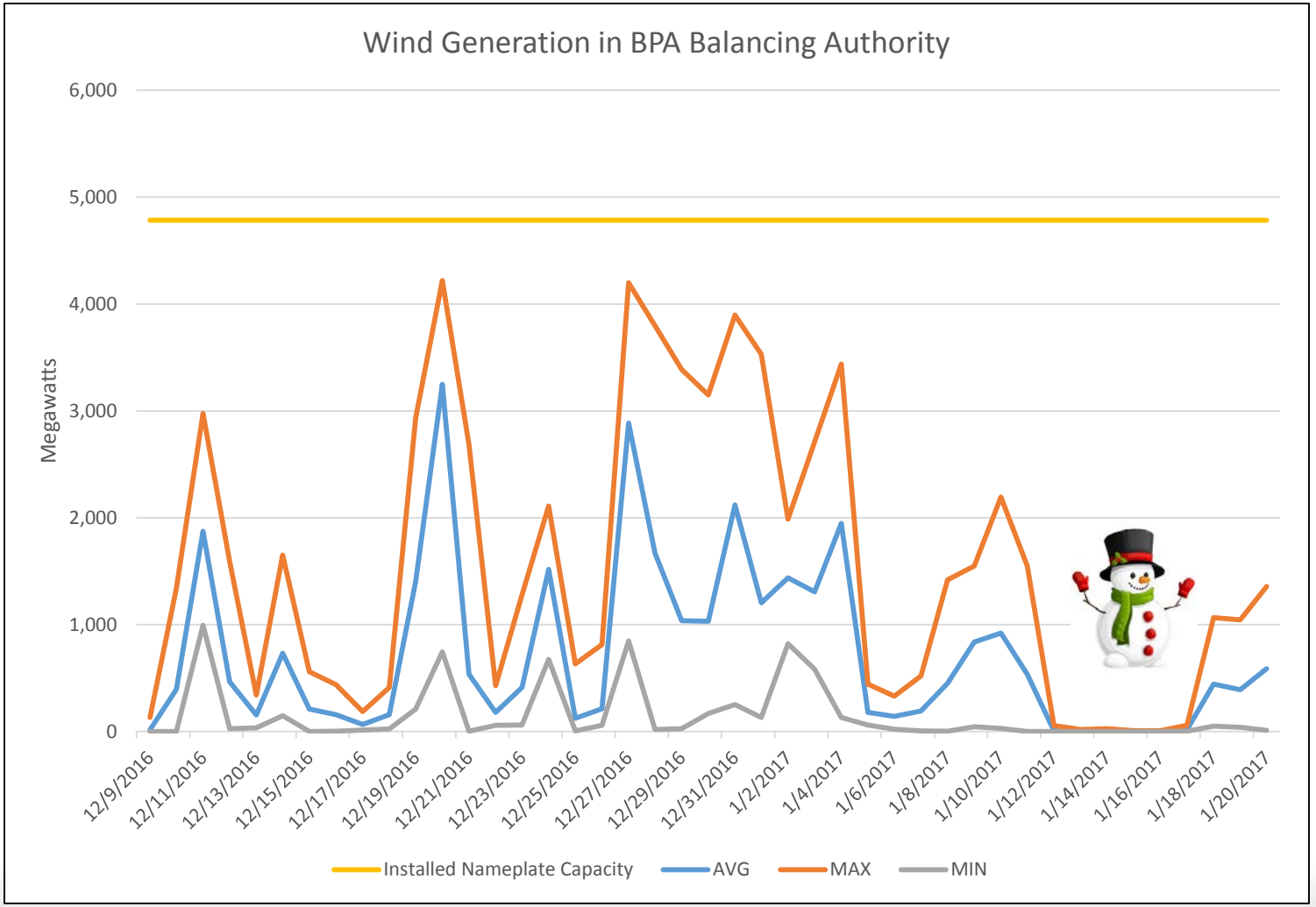
- In general, wind turbines are largely unaffected by extreme cold temperatures and ice and snow events
  - Icing may result in temporary loss or reduction of power production – but not too common in the region
- Wind turbine technologies are built to sustain winter conditions to take advantage of winter peaking areas, such as Montana

Biglow Canyon, 450 MW, PGE – 12/15/17



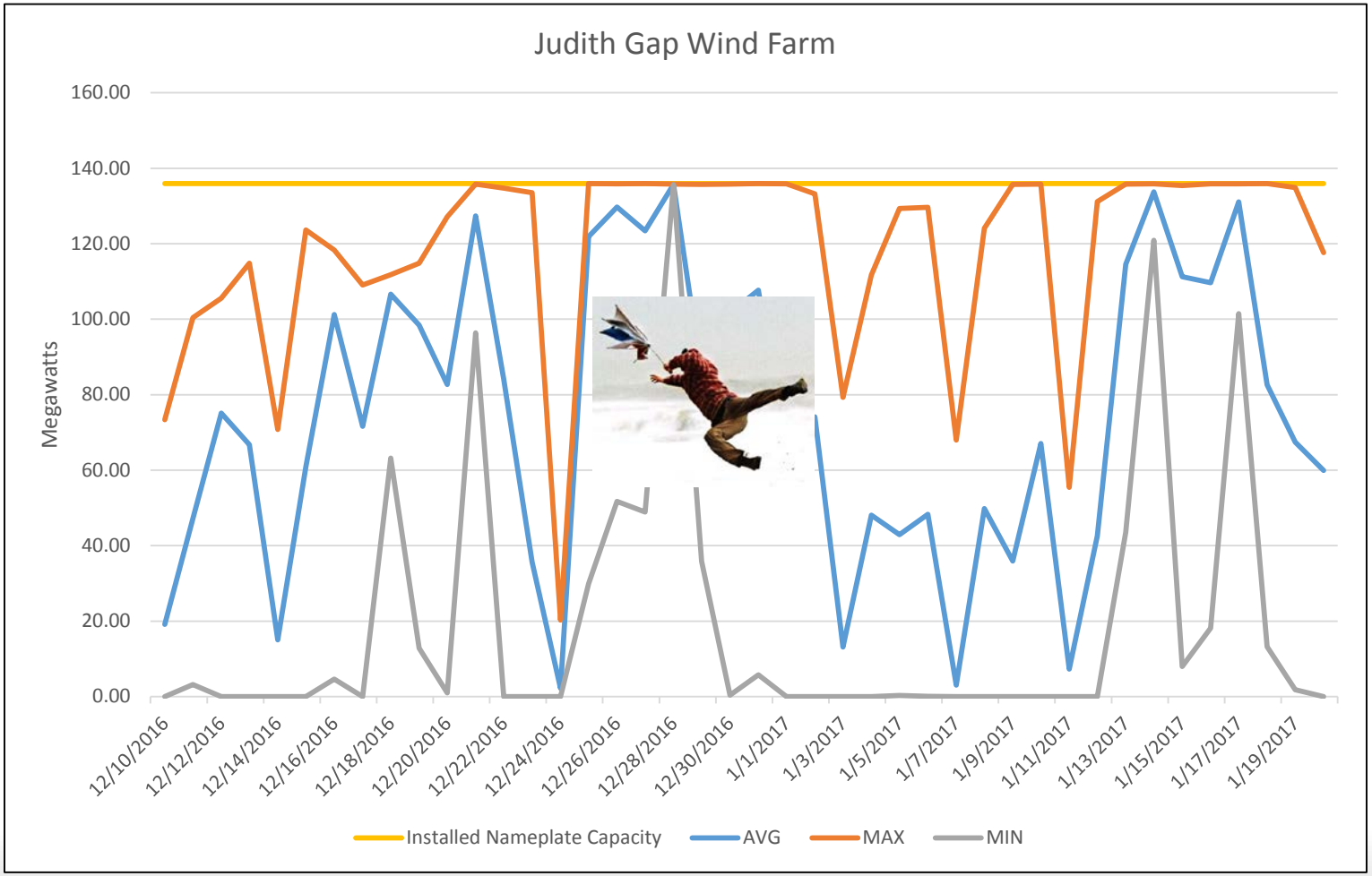
- Bonneville Power Administration Balancing Authority
  - ~ 4,800 MW installed wind capacity
- Judith Gap wind project - Wheatland County, MT
  - 135 MW installed capacity
- Spion Kop wind project – Judith Basin, MT
  - 40 MW installed capacity

Wind generation in BPA's balancing authority – Dec 9, 2016 – January 20, 2017



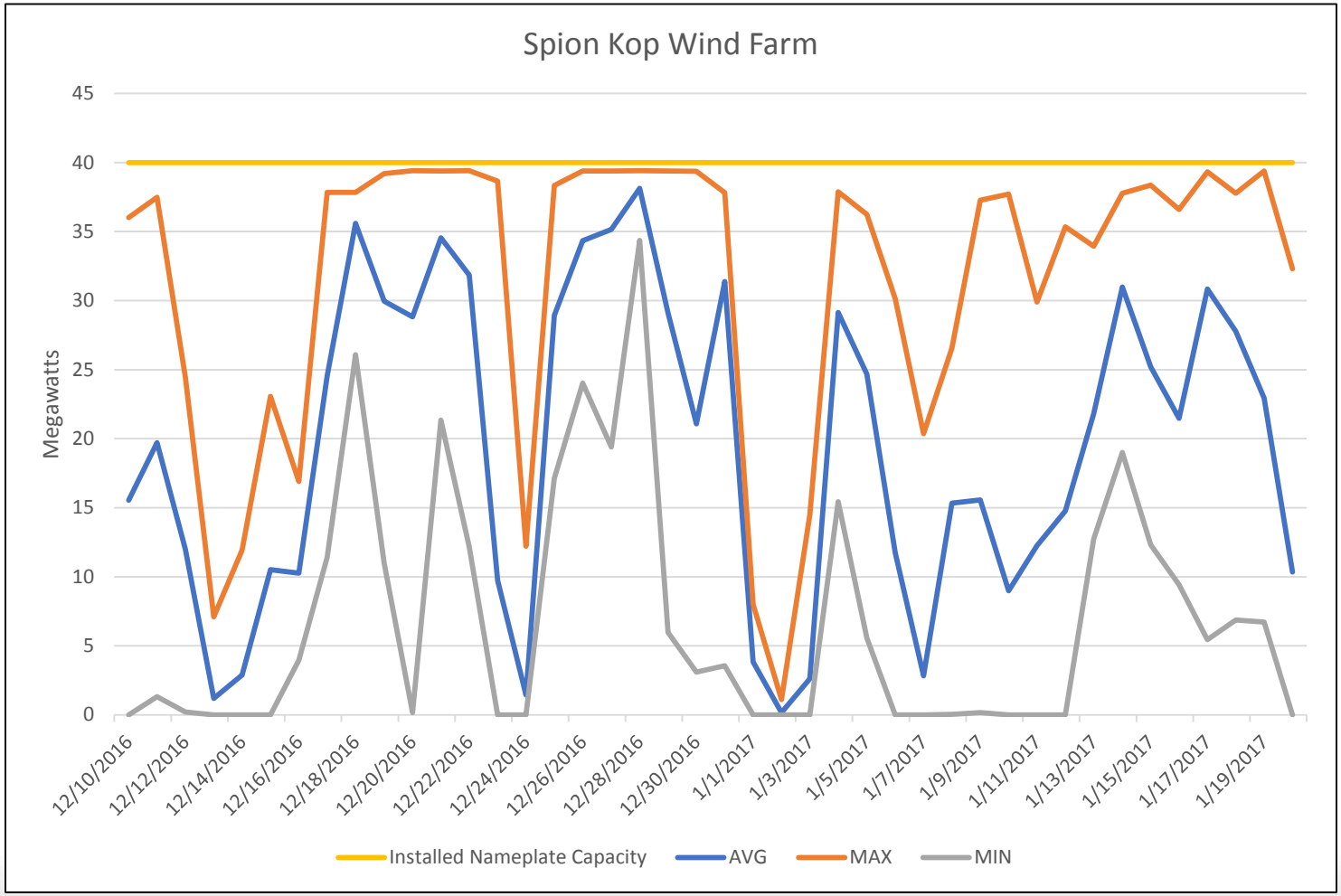
Data source: bpa.gov/transmission

Judith Gap wind farm generation – December 10, 2016 – January 20, 2017



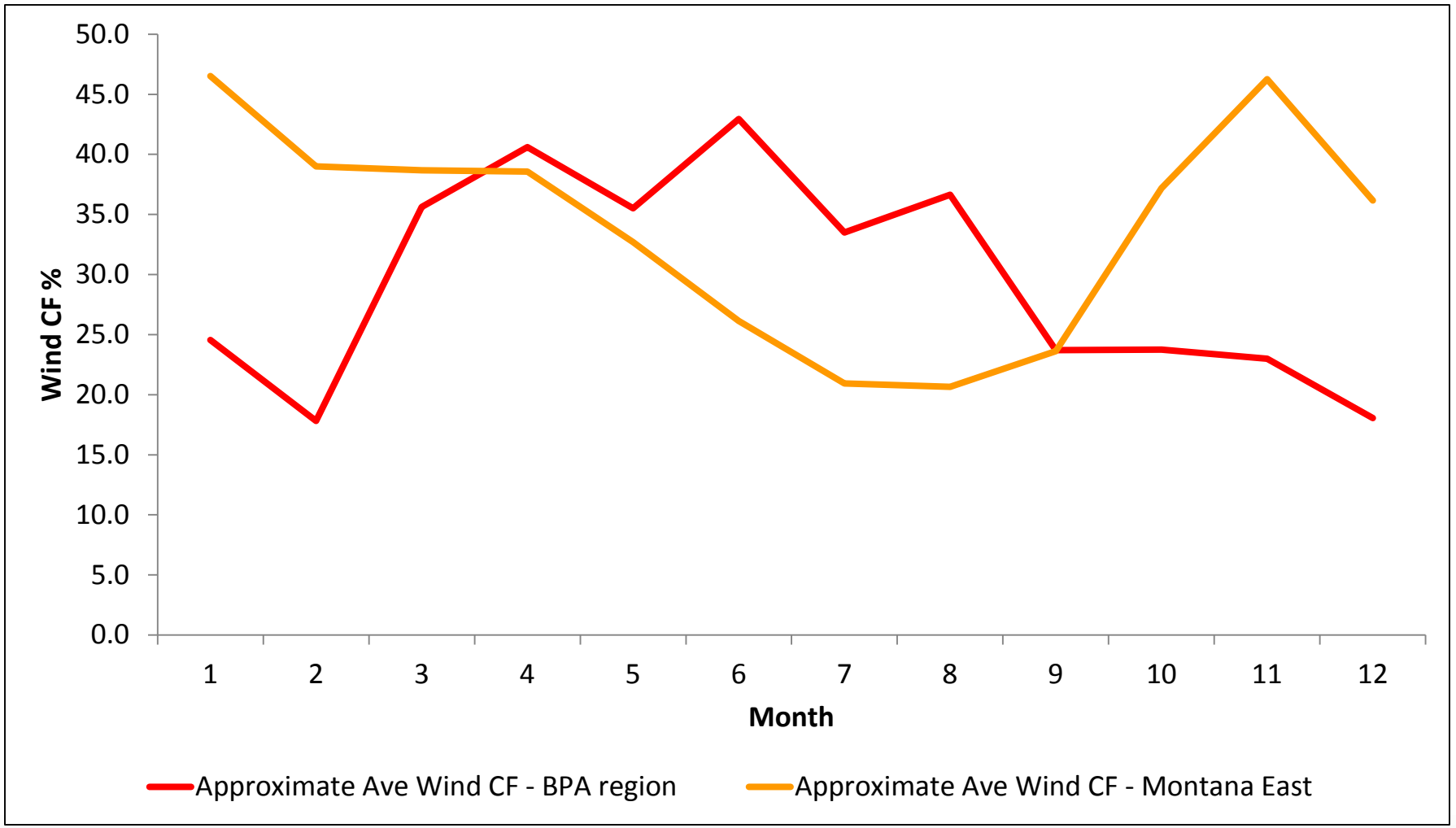
Data source: NorthWestern Energy

Spion Kop wind farm generation – December 10, 2016 – January 20, 2017



Data source: NorthWestern Energy

Regional Wind Shapes



What about solar?

Solar panels in Corvallis, near OSU, 2014. Jess Beauchemin.

Solar PV performance

- Unless the panels are covered in snow, solar technologies are built to withstand cold temperatures and weather
  - However… cloudy skies and shorter days usually will limit generation during this time