CAPACITY

Idaho Power Resource Planning Perspective

IDAHO POWER
An IDACORP Company

By: Mitch Colburn, Director,
Resource Planning and Operations

June 14th, 2019

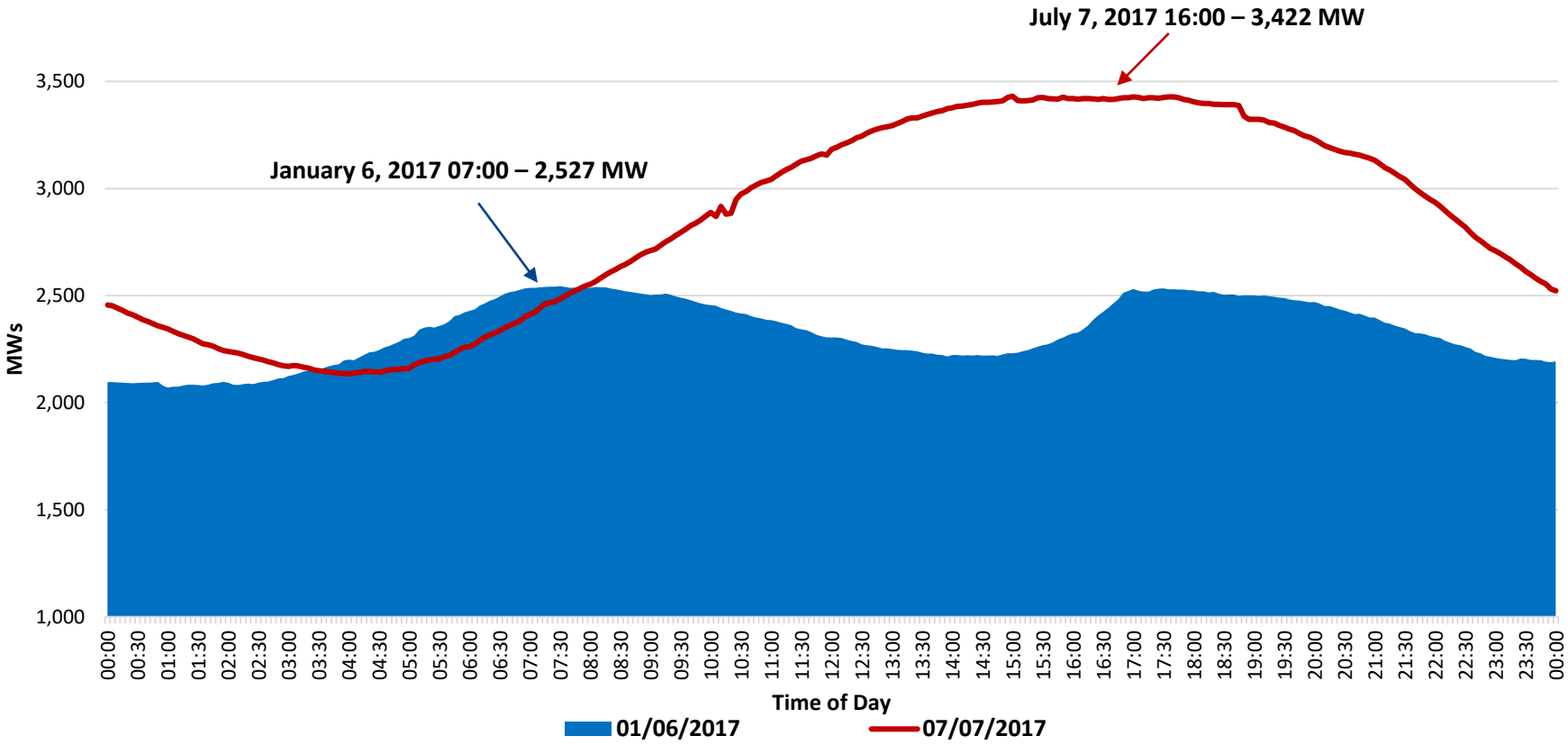
Portland, Oregon

Resource Planning

Plan to meet the following:

1. Peak-hour demand
2. Energy needs
3. Reserve requirements
4. Flexible capacity needs

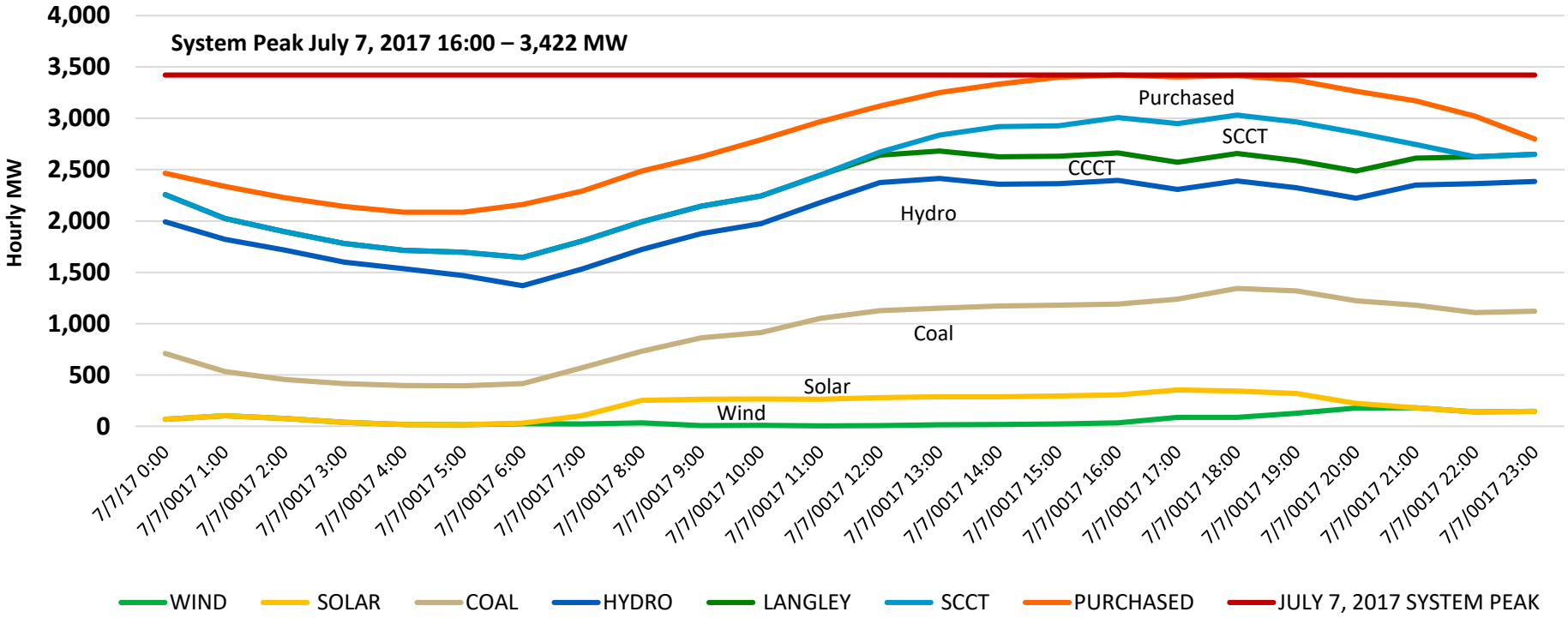
Idaho Power System Peak Demand



2017 Summer Peak

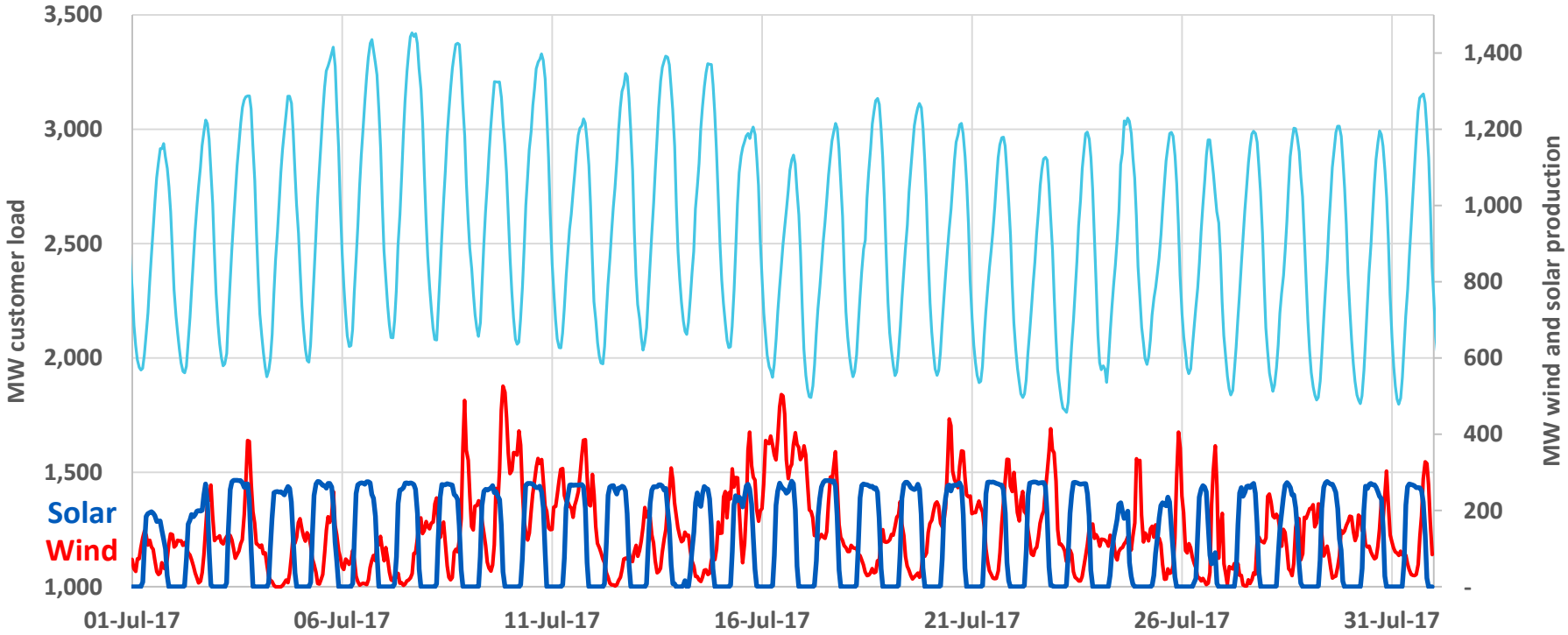
Load and Resources

July 7, 2017 3,422 MW



Note: Each resource represents the incremental addition provided to reach the total demand for the system.

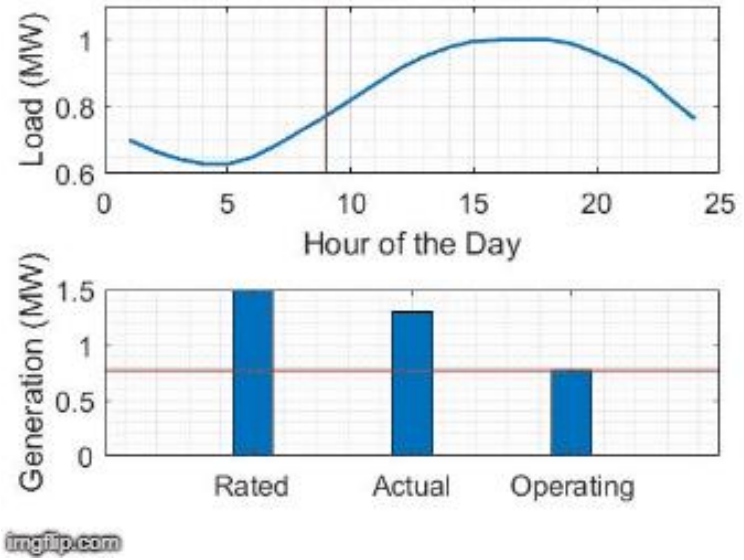
July 2017
Load, Wind, and Solar MW



Capacity Value Concept – Conventional Generation Hydro & Thermal Plants

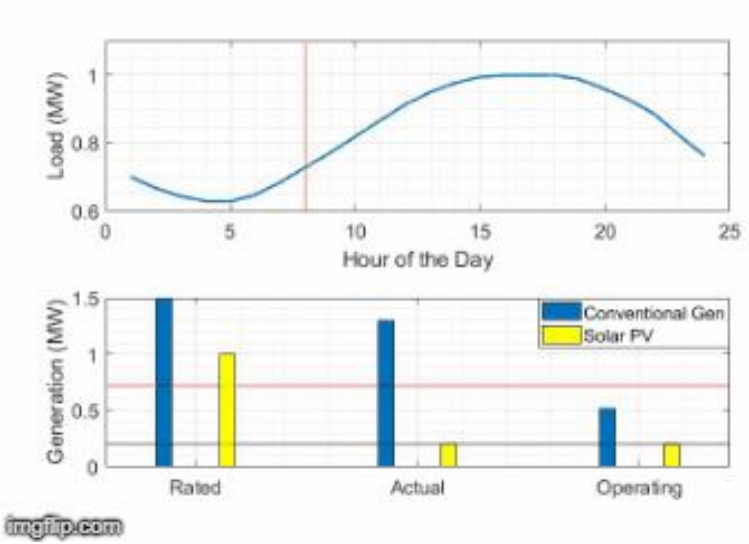
- Capacity Value is the percentage of the nameplate capacity that reliably available during specified hours (i.e. peak demand).

- Aka “peak capacity factor,” or “contribution to peak” or sometimes “effective load carrying capability (ELCC)”



Capacity Value Concept – Solar PV

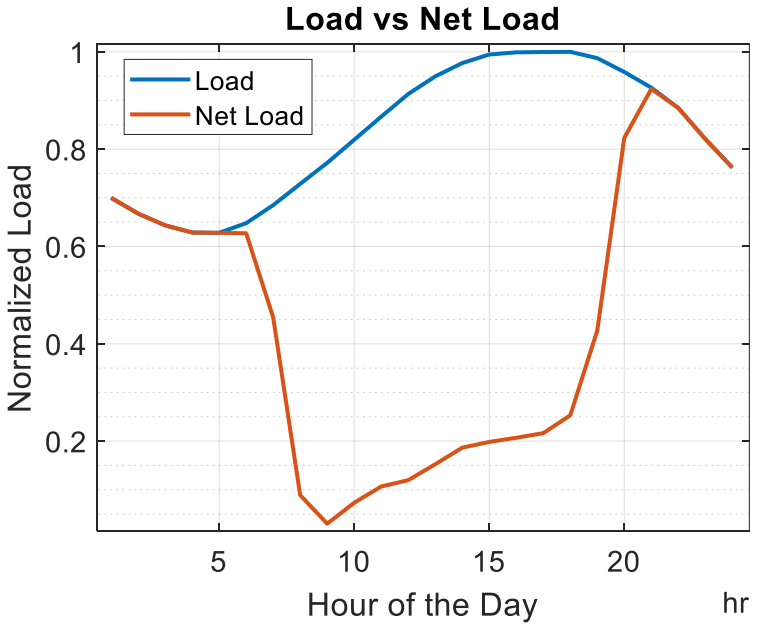
- **Rated Capacity**: Nameplate capacity
- **Actual Capacity**: Maximum amount of electrical load that the system could serve at moment's notice. Changes with time
- **Operating Capacity:** Capacity at which the generator is currently operating. Changes with time



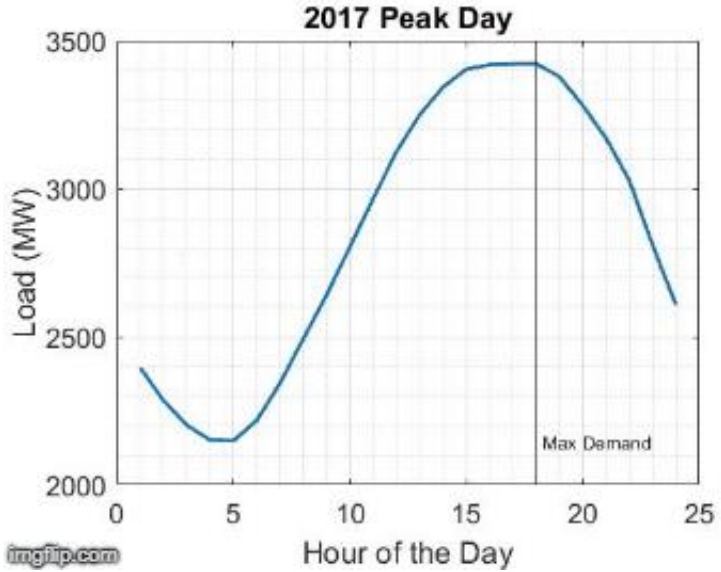
Capacity Value Concept – Solar PV

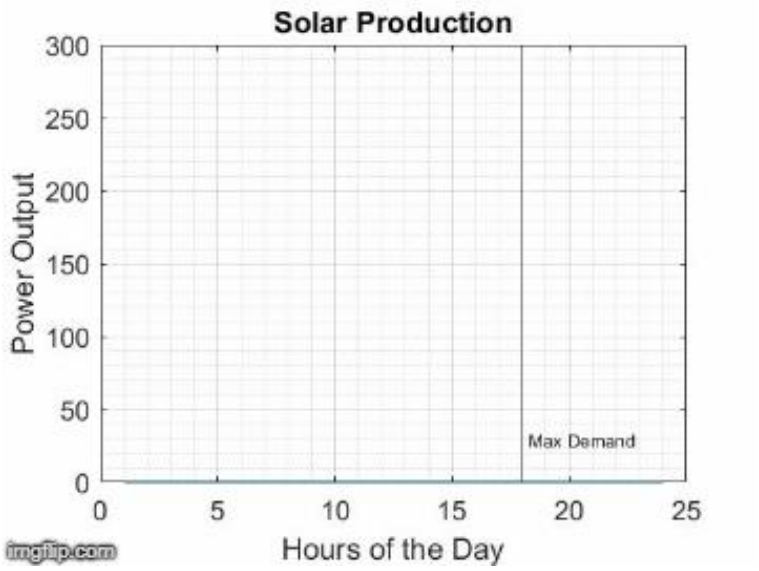
- Increased solar generation on the grid changes the load-net solar patterns and can shift the peak-net solar.

- High penetration levels of solar result in what is known as the “Duck Curve”.



Peak Demand vs. Solar Output



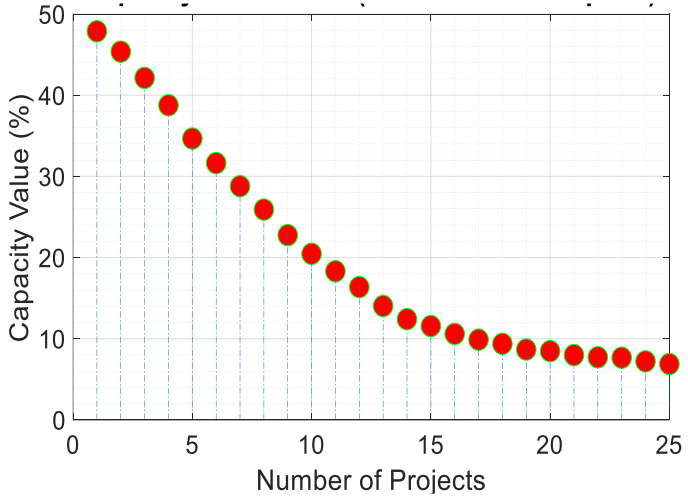


Solar Capacity Value – IPC System (Summer)

Existing:

	Capacity Value (% of Nameplate Capacity)
Existing Solar PV (289.5 MW)	61.86%
Projects in Construction (26.5 MW)	47.92%

Future:



Peak Capacity Factors – Planning View (Summer)

- Hydro – 100% (energy limited)
- Natural gas – 100%
- Battery storage – 100% (energy limited)
- Wind – 5%
- Solar – Depends

Summary – Planning Perspective

1. **Peak-hour demand**
   -Plan to meet by combining expected peak-hour output of resources
2. **Energy needs**
   -Plan to meet by combining expected monthly energy contributions of resources
3. **Reserve requirements**
   -Incremental above expected peak-hour demand
   -Reliability driven
4. **Flexible capacity**
   -Needed for ramping & variability (i.e. intermittent resources)
   -Amount needed depends on resource mix