

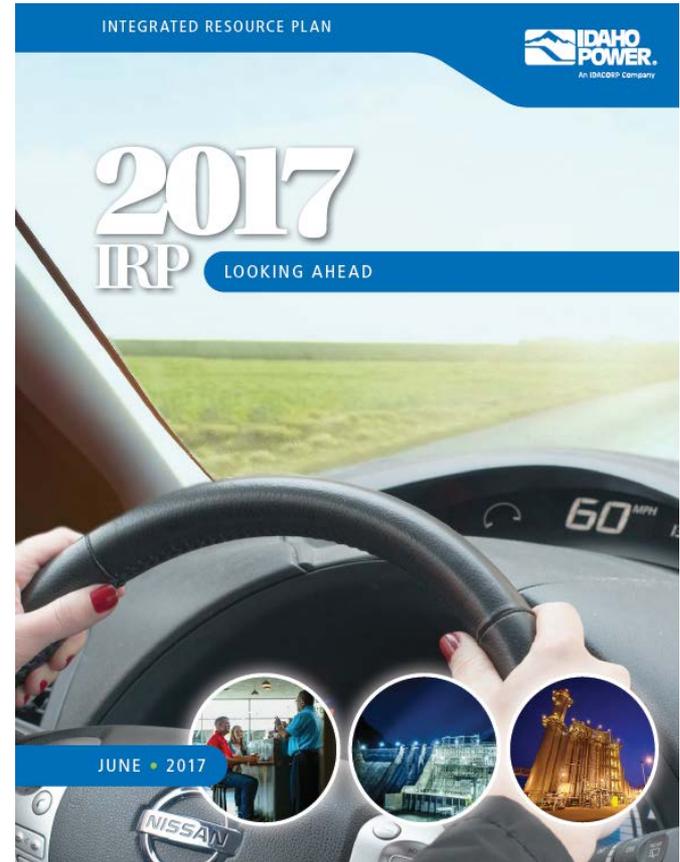


Transmission Planning
&
The IRP

Jared Ellsworth
Leader, System Planning
Idaho Power

Transmission / IRP Coordination

- Resource Integration Costs
 - Interconnection Evaluation
 - Delivery Evaluation
- Transmission as a Resource



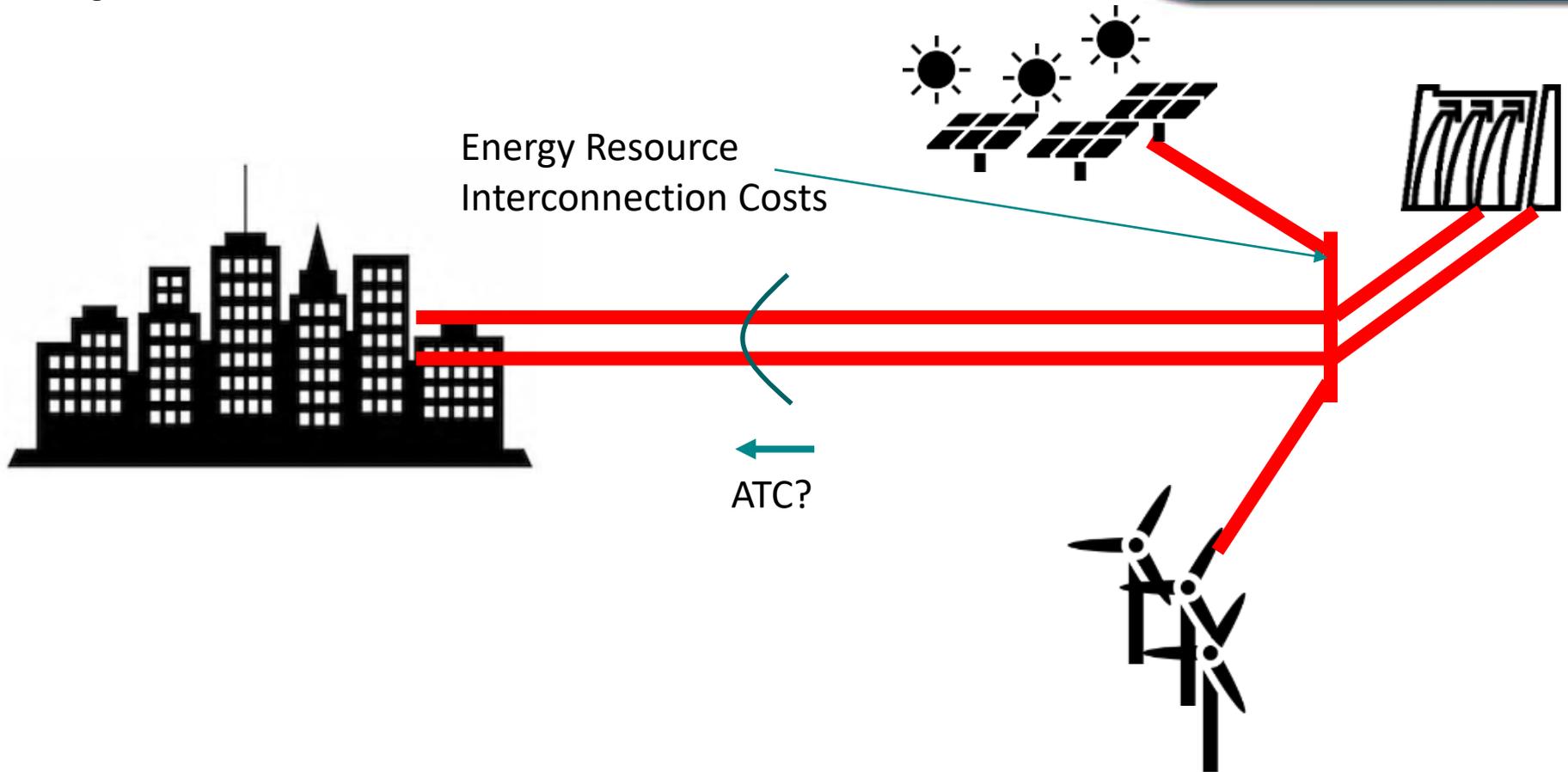
Aurora New Resource Selections

Resource Type	Nameplate (MW)	Total Nameplate (MW)	Flexible Resource
CCCT	300	1,200	X
Solar	5, 40, 100, 120	1,200	
Wind	100	1,200	
Reciprocating Engines	55, 111	1,000	X
SCCT	170	850	X
Small Modular Nuclear	60	720	X
Hydro Pumped Storage	500	500	X
Batteries	5, 10, 20, 30	280	X
Biomass	30	210	
Geothermal	30	210	
Demand Response	5	50	
Energy Efficiency	Varies by MWh	MWh Bundles	

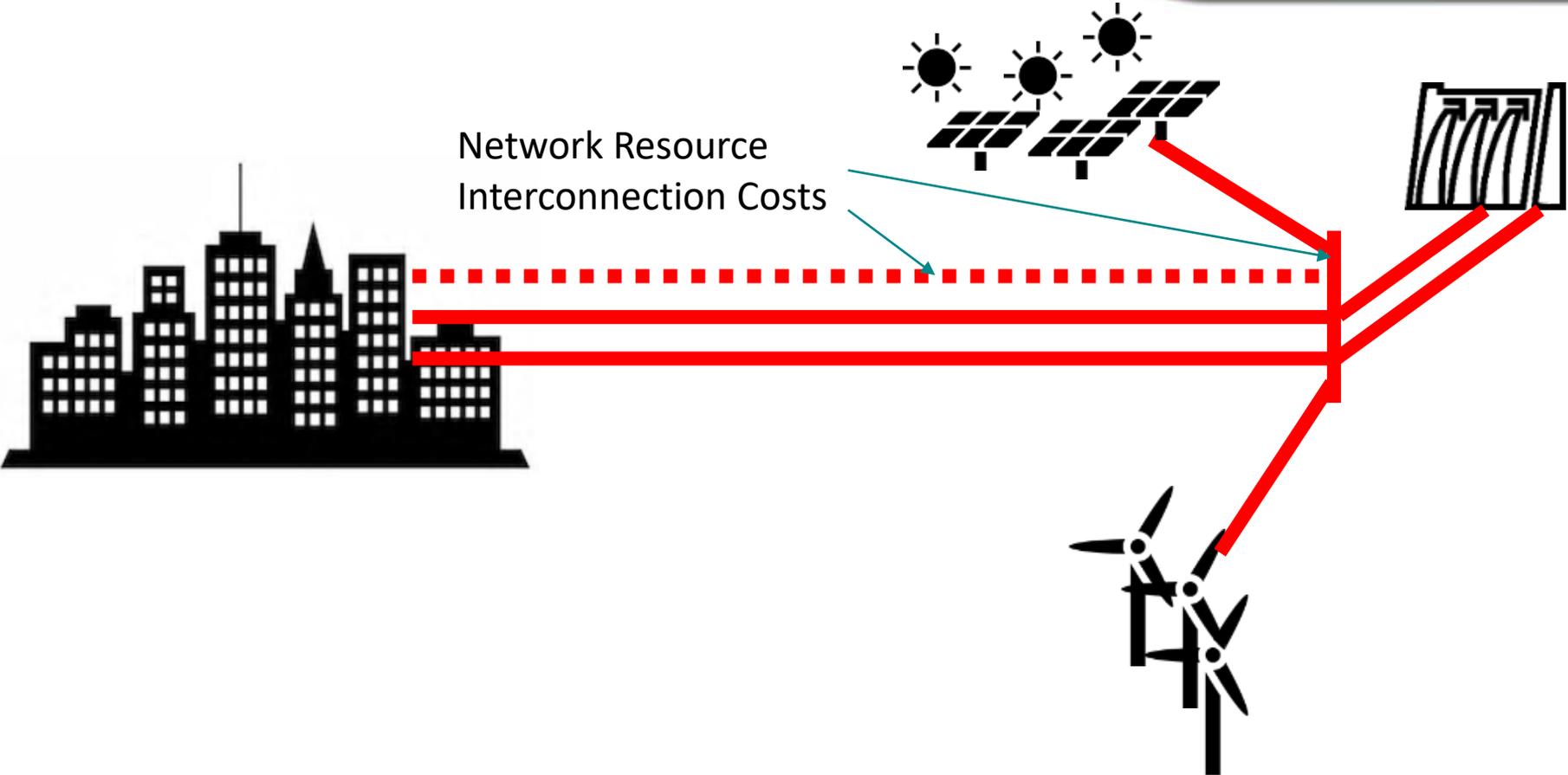
Preferred Portfolio

MW	Portfolio 14 (Planning NG, Planning Carbon, B2H)					Portfolio 16 (Planning NG, High Carbon, B2H)					
	Gas	Solar	Battery	DR	Coal Exit	Gas	Wind	Solar	Battery	DR	Coal Exit
2019	0	0	0	0	-127	0	0	0	0	0	-127
2020	0	0	0	0	-58	0	0	0	0	0	-58
2021	0	0	0	0	0	0	0	0	0	0	0
2022	0	120	0	0	-177	0	0	120	0	0	-177
2023	0	100	0	0	0	0	0	100	0	5	0
2024	0	0	0	0	0	56	0	0	0	5	-180
2025	0	0	0	0	-133	111	0	40	0	5	-133
2026	0	0	0	5	-174	0	0	0	0	5	-174
2027	0	0	0	0	0	0	100	160	0	5	0
2028	111	0	0	0	0	300	100	0	0	0	-177
2029	0	0	0	5	0	0	100	80	0	0	0
2030	111	0	0	5	0	0	100	45	30	0	0
2031	0	0	0	5	0	0	100	365	30	0	0
2032	0	0	0	5	0	0	100	40	10	0	0
2033	0	0	0	5	0	0	0	40	0	0	0
2034	0	45	30	5	-357	0	0	0	0	5	0
2035	300	40	20	5	0	0	0	0	0	5	0
2036	0	0	0	5	0	0	0	0	0	5	0
2037	0	40	10	0	0	0	0	160	10	5	0
2038	300	0	0	5	0	0	0	40	0	5	0
Nameplate	822	345	60	50	-1,026	467	600	1,190	80	50	-1,026
B2H (2026)	500					500					
B2H*	751					1,861					

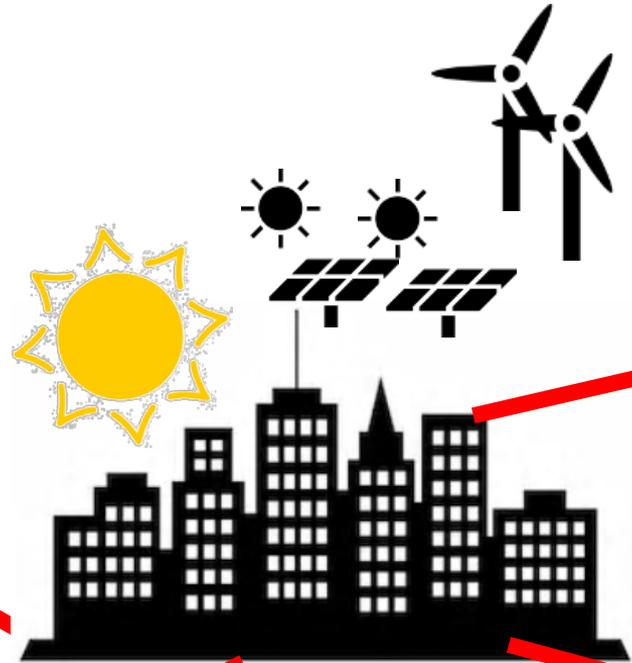
Simple Interconnection



Network Resource Interconnection



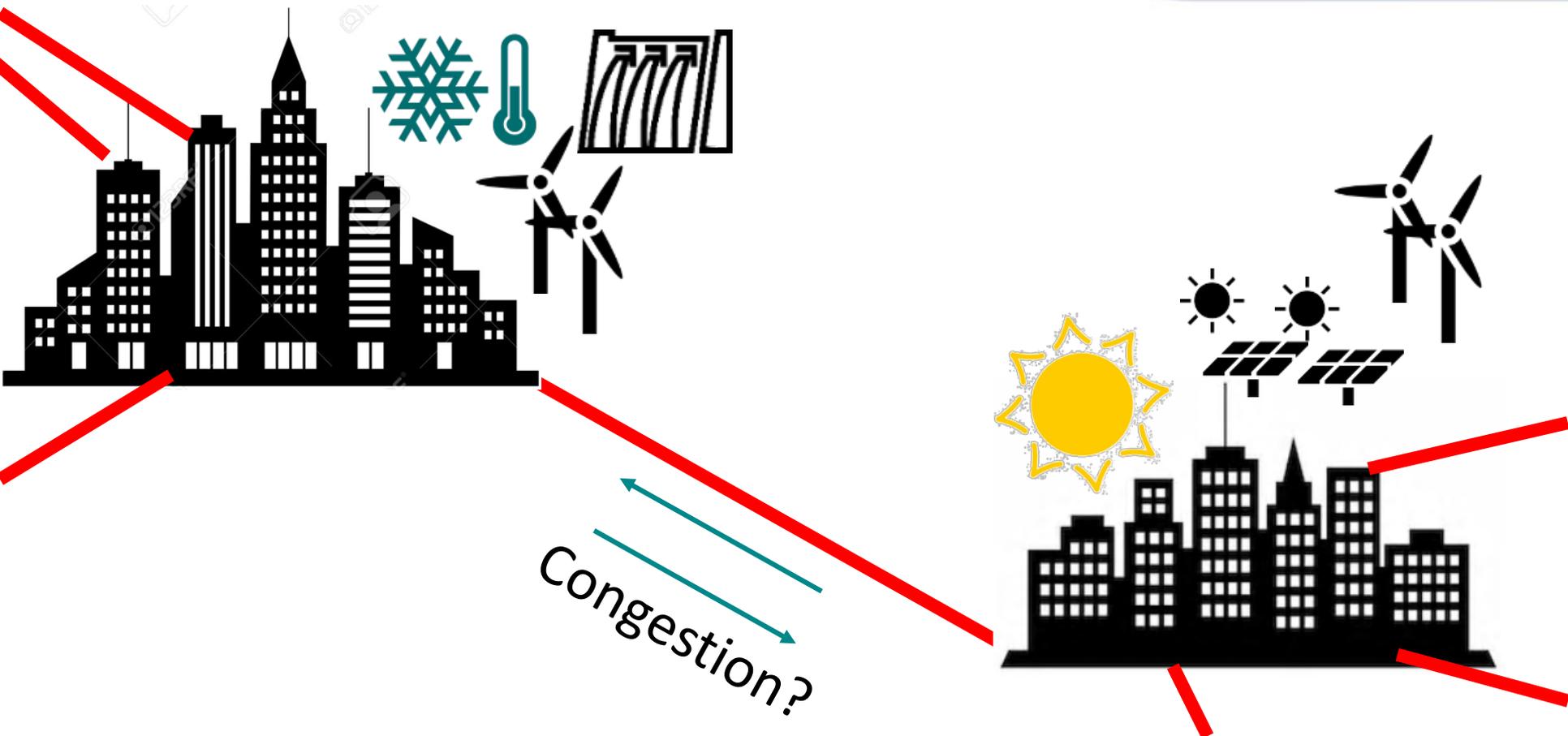
Transmission as a Resource



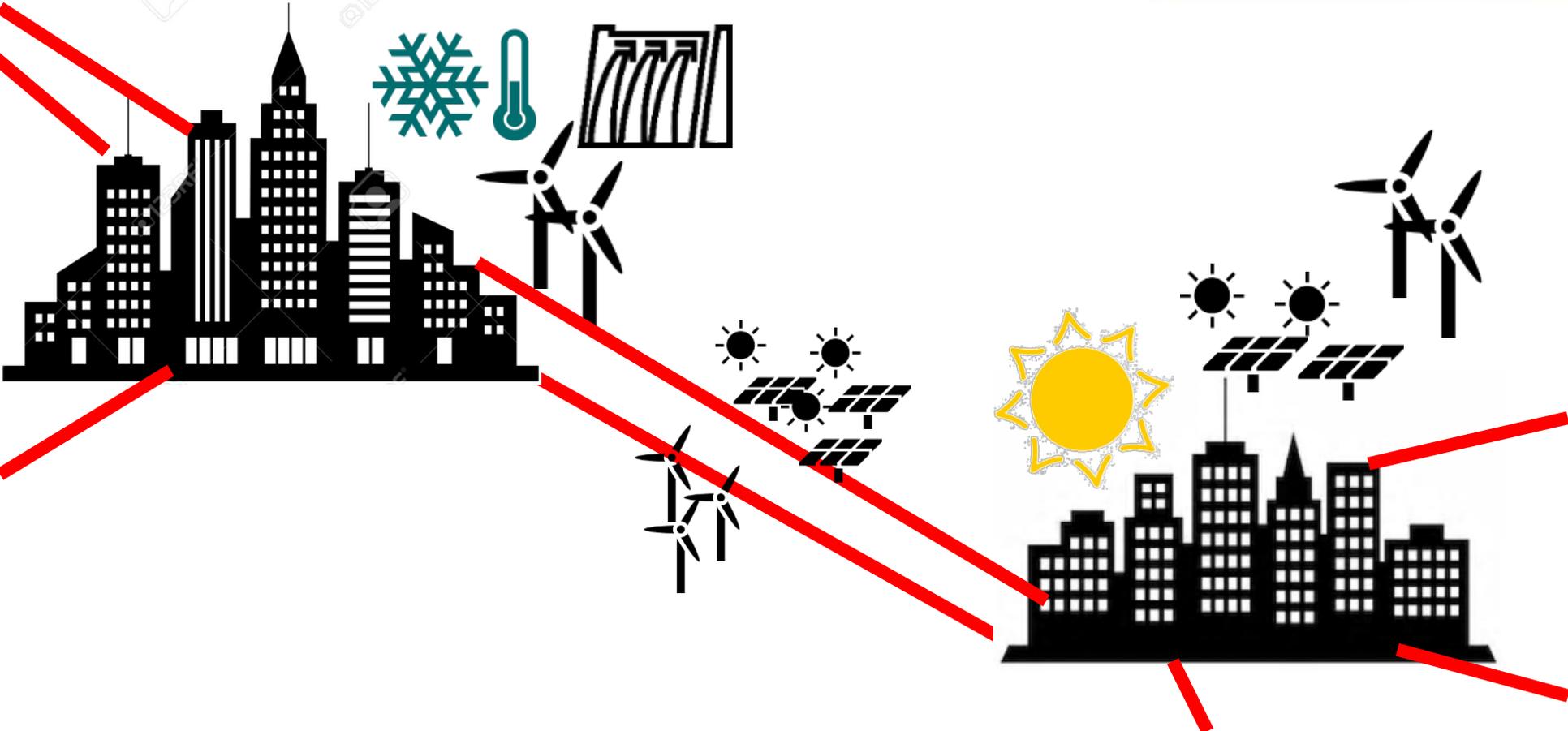
Load and Resource Diversity



Transmission as a Resource



Transmission as a Resource

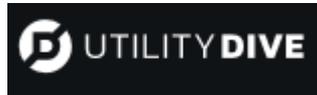


The Experts Agree

Clean  Technica

**Transmission Infrastructure
Lacking For Optimal
Renewable Energy Needs**

**How new transmission can unlock
10 times more renewables for the
Eastern U.S.**



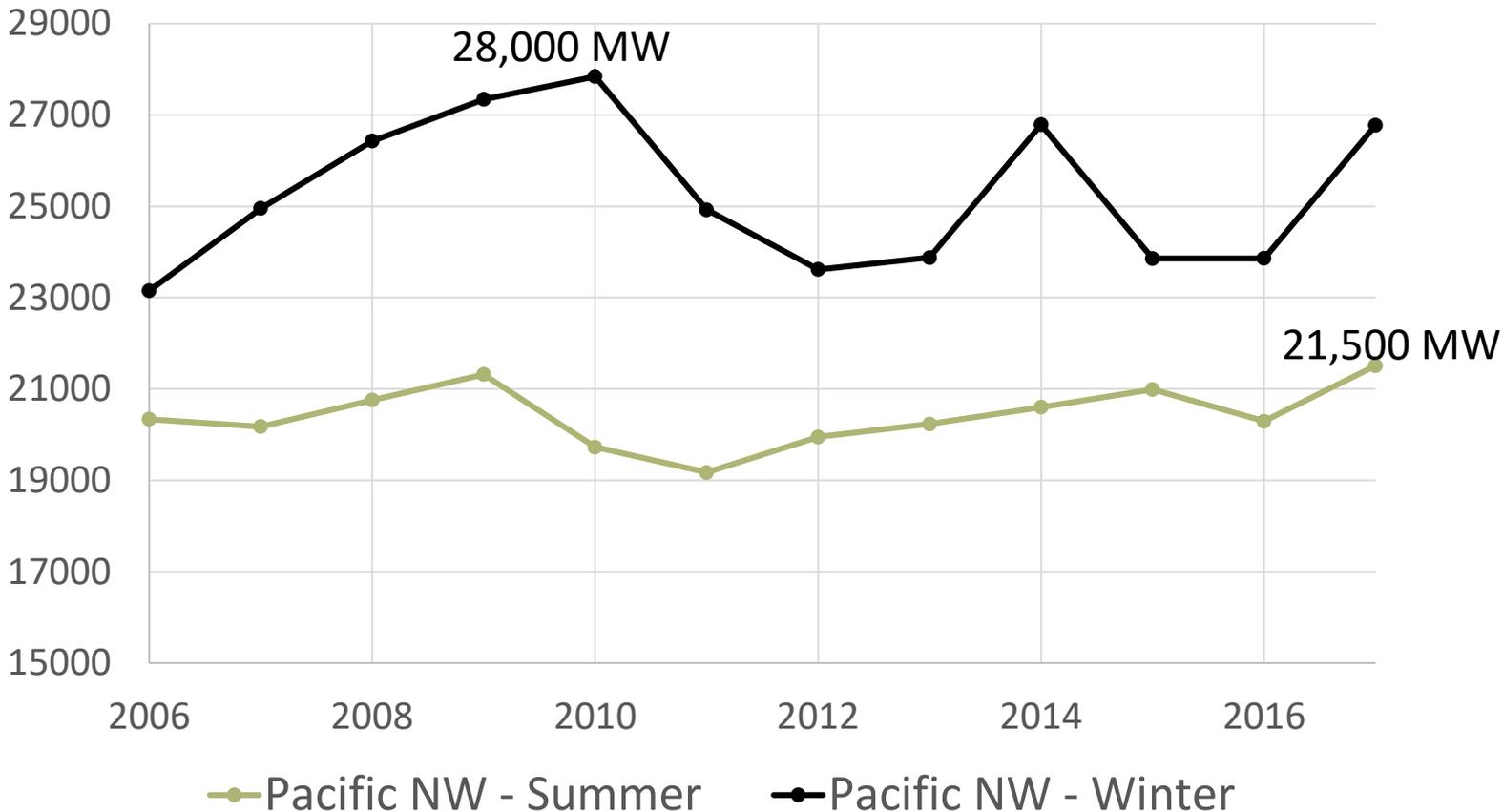
Scaling up renewable energy, such as wind and solar, goes hand in hand with the expansion of transmission infrastructure.



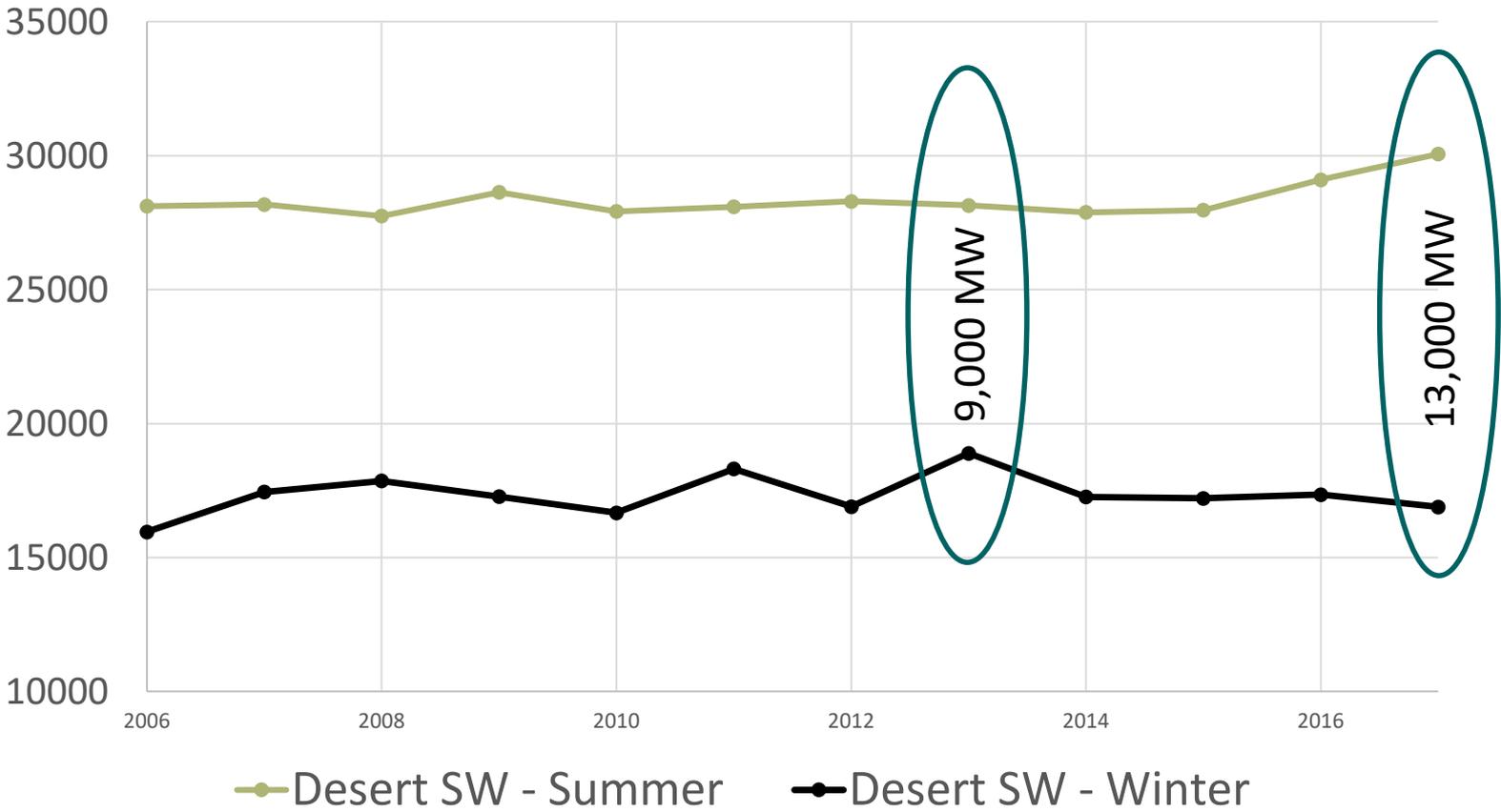
Boardman to Hemingway



Diversity - Past PNW Peak loads



Diversity - Past DSW Peak loads



NWPCC RA Study

2023 Estimated¹ Capacity Need (MW)

SW Import (MW)	1500	2000	2500	3000
High Load (+2%)	1650	1500	1100	600
Med Load	1400	1050	650	50
Low Load (-2%)	950	550	0	0

Capacity Capital Cost Comparison



Project	Capacity	Total Cost (millions)	Cost per kW
B2H	500 MW	\$300	\$600
Combined Cycle CT	500 MW	\$600	\$1,200

Transmission Outage Data



Table WECC 3.1-1
AC Circuit Sustained Outage Metrics - Element-Initiated Only

Voltage Class	Circuit Miles	No. of Circuits	No. of Outages	Total Outage Time (hr)	Frequency (SCOF) (per 100 CM per yr)	Frequency (SOF) (per circuit per yr)	MTRR or Mean Outage Duration (hr)
200-299 kV	44425	1606.9	419	7634.3	0.9432	0.2608	18.2
300-399 kV	10488	136.2	140	545.9	1.3348	1.0279	3.9
400-599 kV	16912	253.0	96	1104.7	0.5677	0.3794	11.5
600-799 kV	0	0.0	-	-	-	-	-
All Voltages	71825	1996.1	655	9284.8	0.9119	0.3281	14.2

Reliability Considerations



Forced Outage Rate: < 1%



Forced Outage Rate: 7-10%

Transmission – Other Considerations

- Long Term Customer Value
 - Transmission doesn't go “obsolete”
- Wheeling/resale opportunities
- **Fits within a Clean Energy Future**
 - Carbon Neutral

