



Technology Availability

Technology Scenarios

	Baseline	Emerging Tech	Limited Tech* (No New Gas)	Limited Tech* (No New Combustion)
Solar				
Wind				
Battery storage				
Pumped storage				
Demand Response				
Energy Efficiency				
Small Hydro				
Geothermal				
Offshore wind (floating)				
Natural gas to H2 retrofits				
New dual fuel natural gas + H2 plants				
New H2 only plants				
Gas w/ 90-100% carbon capture + storage				
Nuclear Small Modular Reactors				

Unavailable Available

* Limited tech scenarios consider scenarios of no new gas plants and no emerging technologies. For these scenarios to be feasible, additional renewable capacity on new transmission lines was made available.

+ Mature Technologies

- Renewables provide low-cost form of zero-carbon energy w/ limited capacity value
 - Solar, wind (onshore)
- Storage resources support renewable integration but show limited value in the Northwest with the large hydro fleet
 - Battery storage, pumped hydro
- Demand response supports peak reduction but faces same ELCC decline as batteries; energy efficiency supports energy reduction but increasingly competes against low-cost renewables
- Geothermal is expensive and limited but provides "clean firm" capacity
- Small hydro potential is very limited

+ Emerging technologies

- "Clean peakers" such as new H2, new NG+H2, or NG→H2 retrofits provide low-cost form of capacity with very high energy cost (when burning hydrogen)
- Gas w/ CCS provides a moderately high cost source of energy and capacity
- Nuclear SMR provides moderately high capital cost but low operating cost source of firm zero-carbon energy
- Floating offshore wind can address onshore resource / land constraints, but is generally higher cost than onshore wind for same capacity factor