PROS AND CONS OF GENERATION RESOURCES

DISPATCHABLE/BASELOAD

LIGNITE COAL

+	−
Abundant, domestic fuel source	Currently, almost impossible to permit
Can reliably run 24 hours per day	Can be difficult to ramp up and down to accommodate renewable production
Cost-competitive with other resources	Higher CO_2 intensity than natural gas, although CO_2 capture technology is advancing

NATURAL GAS

+	−
Lower CO_2 emission levels than coal	Fuel costs have been historically volatile
Currently, natural gas is low-priced	Pipeline infrastructure not adequate for projected demand
Can be run 24/7 or used during peak events	Potentially more expensive to install CO_2 capture technology
Flexible operation	

HYDRO

+	−
No fuel cost	Currently, almost impossible to permit
Low-cost energy to consumer	Affects fish and wildlife habitat
No air emissions	Alters the natural flow of rivers
Flexible operation	Virtually no resources in development (some dams being removed)

NUCLEAR

+	−
No air emissions	High capital cost and increasingly expensive fuel
Can reliably run 24 hours per day	Radioactive waste must be properly disposed of and monitored
	Nearly impossible to permit
	Cannot ramp up and down to accommodate renewable production

INTERMITTENT

WIND

+	−
No fuel cost	Has intermittent production (produces about 45% of its potential on an annual basis)
No air emissions	Requires investment in backup generation resources
Cost-competitive with other resources	Turbines take a larger footprint to produce the same energy as other resources
	Wind farms can impact bird and wildlife populations
	Cannot operate in extreme cold or wind conditions

SOLAR

+	−
No fuel cost	Has intermittent production (produces about 15-18% of its potential on an annual basis)
No air emissions	Requires investment in backup generation resources
Costs are higher than other resources, but are trending downward	Solar panels take a larger footprint to produce the same energy as other resources
	Production affected by clouds, snow and extreme cold temperatures

BATTERY TECHNOLOGY

+	−
No air emissions	Technology is in its infancy at grid scale
Can be dispatched when needed	Costly to deploy and requires investments in other generation resources to charge the batteries
Pairs well with renewable resources	Can only dispatch for 2-4 hours at a time when energy can be needed for days
	Battery components require significant amounts of rare earth elements, which are almost exclusively produced by China