**BASELOAD GENERATION**

**Baseload generation** provides electricity to the grid to meet the around-the-clock power needs of the U.S. The grid is powered by a variety of baseload generation, including coal-fired power plants, natural gas combined cycle plants, nuclear plants, hydropower plants, and geothermal plants.

**Key Technologies**

Utility scale baseload generation includes commercial nuclear reactors, super critical pulverized coal fired power units, and combined cycle natural gas plants. Coal and natural gas power plants account for 98% of the U.S. power sector GHG emissions.\(^1\) Carbon capture, utilization, and storage (CCUS) can be deployed to decarbonize coal and natural gas plants. Small modular nuclear reactors (SMRs), micro-hydropower systems, hydroelectric re-powering, long duration energy storage and enhanced geothermal systems (EGS) will also be needed to create zero emissions baseload generation.

**Potential Market Size & Timing**

The U.S. has set an overall goal of decarbonizing the generation of electricity by 2035, as part of the target to reach net zero emissions economy-wide by 2050.\(^2\) With coal and natural gas plants currently generating 60% of the U.S. power supply (or 1,675 billion kWh),\(^3\) the transition to a decarbonized grid will create an enormous market opportunity for zero carbon solutions that create clean, firm, baseload power. The DOE Renewable Lab (NREL) has found that a net zero grid by 2035 requires:\(^4\)

- 8 GW\(^5\) of new geothermal capacity.
- 5-8 GW of Hydropower depending on the scenario.
- Between 120–350 gigawatts of energy storage to support intermittent renewable energy.
- A tripling of U.S. nuclear capacity in the "constrained" (but likely) scenario where building numerous new transmission lines and solar and wind facilities is infeasible.\(^6\)

**Barriers**

- CCUS can reduce fossil power plants emissions, but deployment has been hampered by high costs, few commercial projects, and uncertainty regarding the permanence requirements.
- High construction costs, lengthy permitting requirements, and lack of acceptable nuclear waste solutions have largely stopped commercial deployment of new nuclear plants.
- Geologic constraints (or suitable river sites) currently restrict geothermal and hydroelectric growth.
- Limited long term energy storage alternatives.

**Accelerators**

- The Inflation Reduction Act contains $369 billion in climate incentives, much of it focused on expanding clean energy production. Full, rapid deployment of the IRA will accelerate clean generation technologies including CCUS, Energy Storage, SMR's, and advanced geothermal.
- Currently, two SMRs are moving towards operation by 2030 in the U.S., but more are needed to meet 2035 grid decarbonization goals. The U.S. can accelerate siting and construction of new nuclear units by repurposing coal plant sites for new nuclear installations.\(^7\)
- A national carbon reduction mandate for fossil generation and/or additional voluntary corporate greenhouse gas reduction commitments would accelerate GHG reductions in the power sector.
- Measures to support the commercialization of enhanced geothermal system (EGS) man-made reservoir technology could expand geothermal power by 100 GW, 30 times current capacity.\(^8\)
- Support for development and commercialization of long duration batteries and other high-capacity energy storage solutions (e.g., pumped storage, compressed air, etc.).

**Relevant NEMA Technologies**

- Wire and Cables
- Motors and Generators
- Electrical Measuring Equipment
- Grid products including transformers, voltage regulators, monitors and meters
- Energy Storage

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4. NREL, Examining Supply-Side Options to Achieve100% Clean Electricity by 2035 (2022) [https://www.nrel.gov/docs/fy22osti/81644.pdf](https://www.nrel.gov/docs/fy22osti/81644.pdf); see also [https://www.nrel.gov/analysis/100-percent-clean-electricity-by-2035-study.html](https://www.nrel.gov/analysis/100-percent-clean-electricity-by-2035-study.html).
5. A gigawatt (GW) provides power for ~750,000 homes. See: [https://www.cnet.com/home/energy-and-utilities/gigawatt-the-solar-energy-term-you-should-know-about/#:~:text=For%20those%20who%20are%20looking,to%20power%20about%20750%20homes](https://www.cnet.com/home/energy-and-utilities/gigawatt-the-solar-energy-term-you-should-know-about/#:~:text=For%20those%20who%20are%20looking,to%20power%20about%20750%20homes)