

CHP in Minnesota:

Technical and economic potential

In addition to combined heat and power (CHP) systems currently operating in Minnesota, the state has substantial potential for new deployment. A 2014 study commissioned by the Minnesota Department of Commerce showed the state has technical potential to add about 3,100 MW of new combined heat and power and waste-heat-to-power (WHP) capacity. Of that technical potential, 984 MW is considered economic, given current market factors and technology

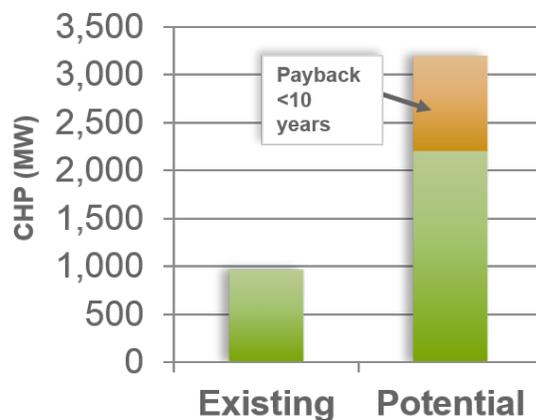


Fig. 1: Existing CHP capacity in Minnesota vs. technical and economic potential. (Source: *Minnesota CHP Policies and Potential Report*, FVB Energy, July 2014)

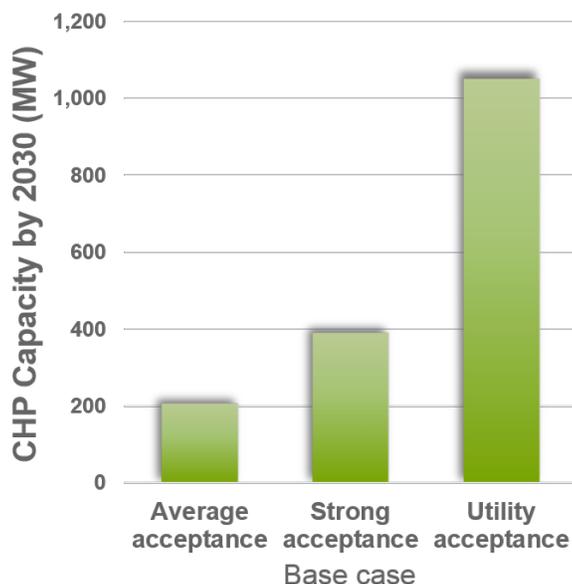


Fig. 2: Projected 2030 new CHP market penetration without new policies under three acceptance curves. (Source: ICF, FVB Energy.)

options, with payback periods of 10 years or less. (See Fig. 1).

Most of Minnesota's economic potential for new CHP is located in high load-factor areas in the Xcel Energy and Minnesota Power service territories.

The study showed that without new policies, more than 200 MW of new CHP and WHP capacity is expected to be implemented by 2030. With new policies and incentives, Minnesota could add anywhere from 100 MW to 840 MW of new CHP and WHP capacity, beyond the base case. If utilities invest in new systems, Minnesota's total CHP capacity could double by 2030 under the base case. (See Fig. 2).

CHP Economics

Key economic factors for CHP include:

- **Host requirements:** Sites that need resilient, year-round thermal and electric energy supply represent the best candidates for CHP deployment.
- **Commodity prices:** Low-cost gas accelerates payback. Low-cost electricity extends payback time.
- **Costs of capital:** Lower-cost funding increases deployment potential.
- **Policy and regulation:** Greenhouse gas regulation improves the CHP business case. Unfavorable or uncertain policies increase regulatory and financial risk.

