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The Future of CHP Programs

How Today's Policies are Driving the Evolution of Tomorrow's CHP Programs

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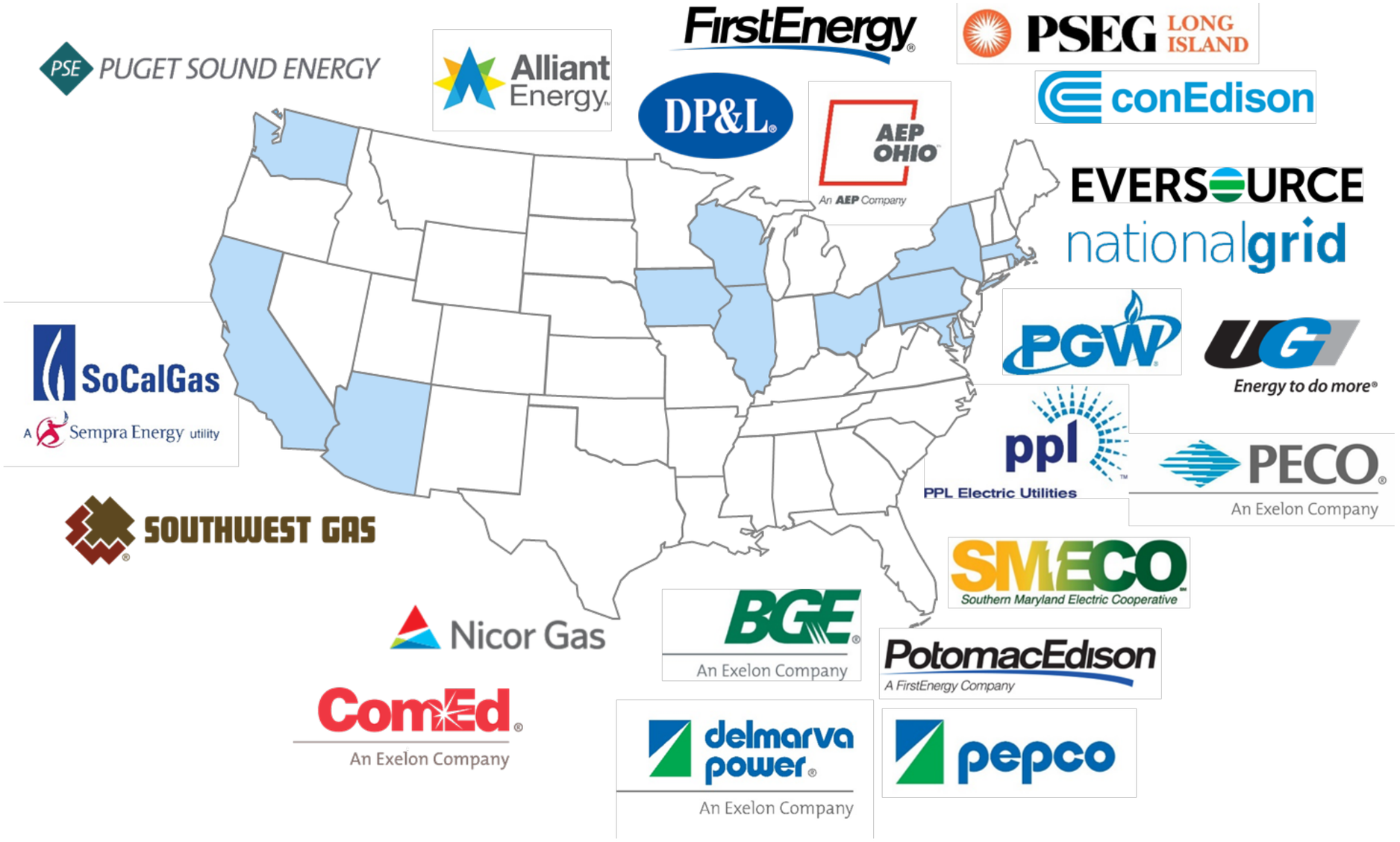
Key Takeaways

- **Clean energy policies continue to expand**, setting stronger emissions reduction targets and encouraging electrification of end-uses, while prioritizing resilience and the need to withstand multi-day grid outages.

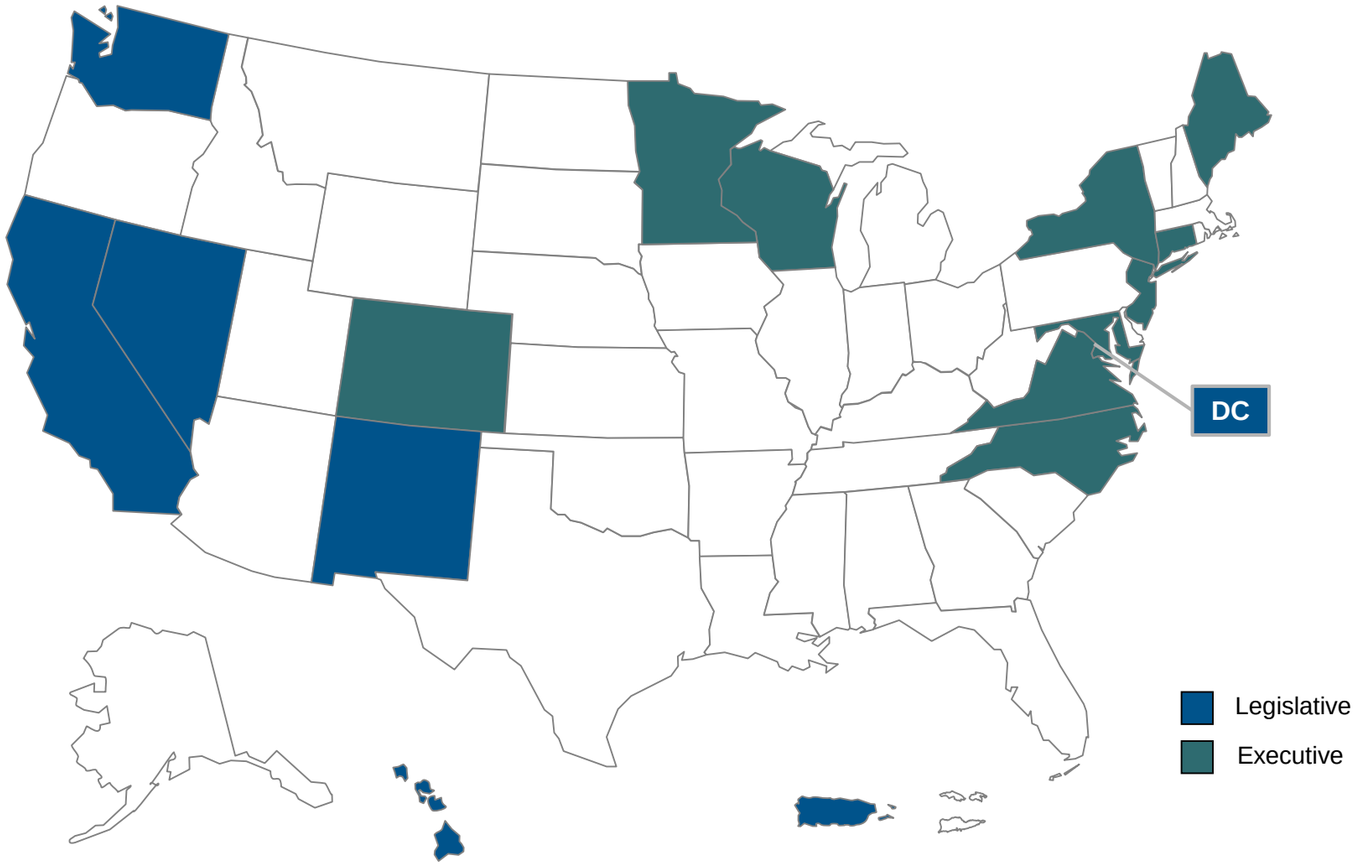
- **CHP delivers near- and long-term benefits** in high value applications (e.g. industrial end-uses, at critical infrastructure, paired with renewable technologies, fueled with renewable fuels) and **state and utility CHP programs can evolve to encourage these applications of CHP**

- **New CHP program strategies can balance needs** to meet multi-day resilience requirements and serve industrial process loads, with the need to lower carbon emissions by emphasizing microgrids, encouraging hybrid systems, and focusing on renewable fuels.

Current CHP Programs in the U.S.



States with 100% Renewable or Clean Energy Targets



States with either 100 percent renewable energy or 100 percent clean energy targets that have been passed into law or signed as an explicit goal through executive orders. Source: Adapted September 30, 2019 from UCS (https://blog.ucsusa.org/jeff-deyette/states-march-toward-100-clean-energy-whos-next), EQ Research (https://eq-research.com/blog/100/), and Energy Sage (https://news.energysage.com/states-with-100-renewable-targets/).

Examples of High Value Applications of CHP Today and in the Future

- For high temperature **industrial process** needs
- For **resilience** at critical infrastructure (microgrids)
- For **integration with renewables** (hybrids, district energy, balancing variable RE)
- When powered by **renewable fuels**

State and utility CHP programs are evolving to prioritize the benefits of CHP in clean energy future

Maryland Energy Administration

- October 2019 – MEA announced increased funding for FY2020 CHP Program in anticipate of high demand for CHP.
- May 2019 – Governor Hogan announced CHP as one of five goals for achieving a target of 100% clean energy by 2040 in the Clean and Renewable Energy Standard (CARES) plan.

Trends and New Program Strategies

1. Broader focus on resilience
2. Pairing CHP with renewables
3. Encouraging renewable-fueled CHP

Broader Program Focus on Resilience

- **Special programs for resilient microgrids at critical facilities**
  - Connecticut Microgrid Grant and Loan Pilot Program
  - NY Prize – 10 microgrids with CHP under development
  - New Jersey Town Center DER Microgrid Feasibility Study Incentive Program
- **Designated funds to cover the cost of adding black-start and islanding capability**
  - New Jersey Energy Resilience Bank – Financed 100% of costs associated with resilience (including black start components, interconnection costs, flood-proofing, etc.) and 40% of other costs.
- **Specifying the ability to operate during an outage as an eligibility requirement**
  - PSEG Long Island CHP Program (2018) required black start capability in for systems 50 kW or larger to receive funds.

NEW JERSEY ENERGY RESILIENCE BANK

Building a solid foundation for the future

Pairing CHP with Renewable Technologies

- CHP can be paired with other DER technologies like solar and storage
- Hybrid CHP programs have potential to make a stronger impact than programs focused on individual technology options
  - Combinations can be matched to end-user needs
  - Streamlined process for incentive applications
  - More customers likely to install multi-technology solutions
- In June 2019, NYSERDA's Onsite Resilient Power Conference invited suppliers of solar, storage, CHP, fuel cells, and other service providers to explore integrated solutions

Encouraging Renewable-Fueled CHP

- **States may focus support for CHP on renewable fuels, specified in legislation or eligibility guidelines**
  - California's Self-Generation Incentive Program (SGIP) created in 2001 to increase on-site distributed electric generation and energy storage.
  - In 2018, Senate Bill (SB) 700 specified only renewable fuels would be eligible for SGIP starting in 2020.
  - (For 2019, CHP systems that use a mixture of fuel that is more than 75% renewable can benefit from incentives)
- **Production of pipeline-quality renewable natural gas (RNG) is continuing to grow and market is expanding**

City of Escondido Invests in Clean Energy with SGIP Incentive

- 1.2 MW CHP system
- $1,316,400 through SGIP rebate
- Fuel from biogas byproduct of the wastewater treatment plant
- Saves city $10 million over the life of the system

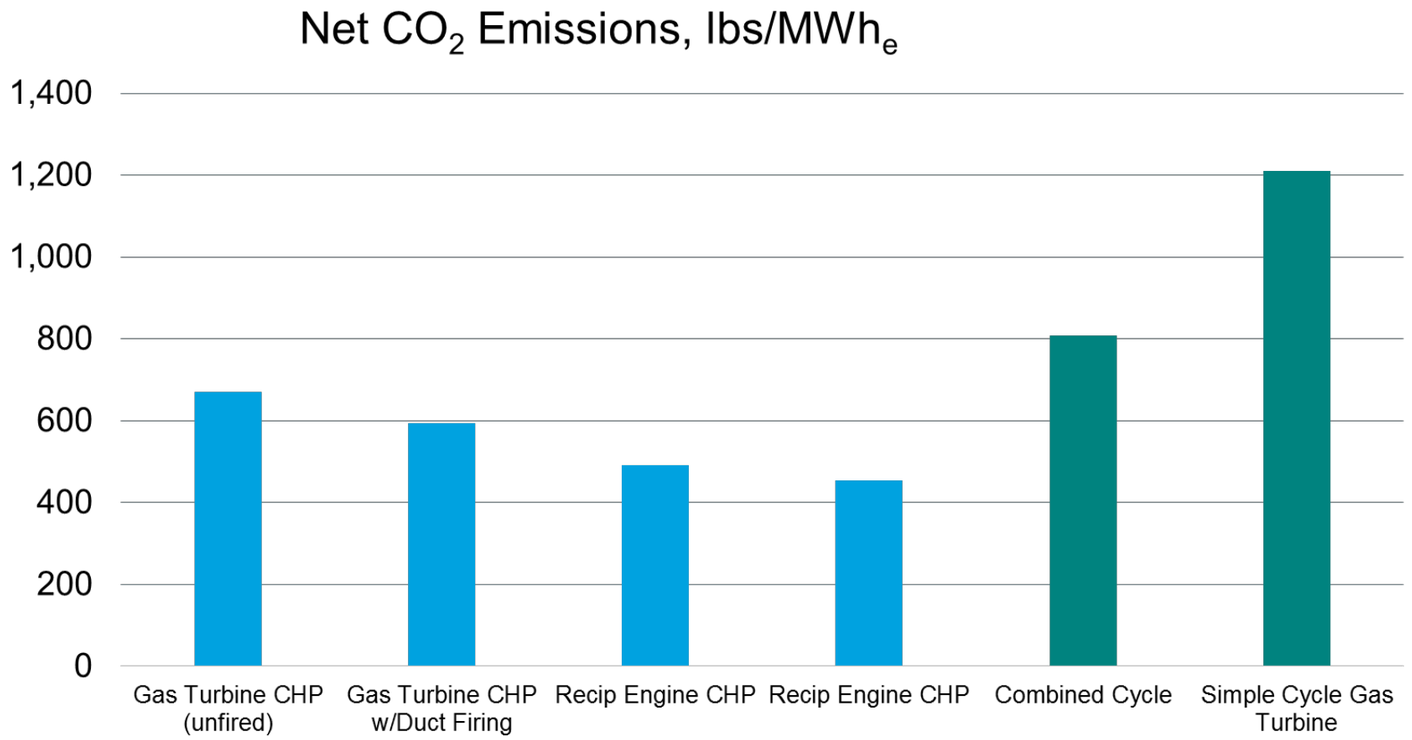
Source: https://energycenter.org/thought-leadership/news/city-escondido-invests-clean-energy-generation-sgip-incentive

Additional Considerations

- **Future CHP systems may be designed or operated differently**
  - Smaller CHP sizes focused on serving only critical loads
  - Downsized CHP to reduce onsite fossil fuel consumption
- **Greater emphasis on locational value and grid services**
  - Encouraging CHP through non-wires programs and other location-based targeting
  - Potential to use flexible sizing strategies to emphasize power export to grid
- **More hybrid analysis tools will be needed**
  - Methods to optimize size and dispatch strategy of CHP for economics, resilience, GHGs
  - DOE AMO project to add CHP to NREL's REopt Lite tool

States and Utilities Can Count on CHP Today, Tomorrow, and in the Future

- Natural Gas CHP reduces emissions compared to marginal natural gas on **today's** grid
- CHP ushers in and supports more renewable integration for **tomorrow's** grid
- CHP is fueled by renewable energy (biogas, syngas, hydrogen) in **the future** grid



Source: Hedman 2019

Source: EFI 2019; https://www.ourenergypolicy.org/resources/optionality-flexibility-innovation-pathways-for-deep-decarbonization-in-california-2/

Thank You

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