

DOCKETED

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Wartsila's response to SB 100

see attached letter and document

Additional submitted attachment is included below.



September 15, 2020

California Energy Commission
c/o Ms. Terra Weeks
1516 9th Street
Sacramento, CA 95814

RE: Docket # 19-SB-100

Dear Ms. Weeks:

Wärtsilä, a global leader in smart technologies and complete lifecycle solutions for the marine and energy markets, has studied the California market to determine California's most efficient way to meet its clean energy goals. In our review of the California market, Wärtsilä believes California can achieve 100 percent renewable power by 2045, far exceeding the state's clean power goals. The optimal path to 100 percent renewables includes speeding up the procurement of renewables, storage, and flexible fuels; it will significantly reduce emissions, inject investment into the green economy and create thousands of new green jobs.

California is widely regarded for environmental leadership, especially around clean energy policy. The state has set an ambitious goal of achieving 100% clean power by 2045. Decarbonizing its electric power sector requires new approaches and ways of thinking to meet carbon reduction goals while minimizing land use, emissions, and cost.

A Wärtsilä whitepaper, "Path to 100% Renewables for California," explores a pathway for California to decarbonize its electricity sector between 2020 and 2045, and compares it to alternatives, including the state's current plan. This new pathway, the "optimal path," looks at power-to-methane (PtM), as a long-term energy storage alternative. The study's results show that the optimal path would enable California to meet 100% clean electricity goal by 2040—five years ahead of schedule. That's not the only benefit. Relative to California's current plan, the optimal path emits 124 million tons less CO₂; requires less land for solar and wind development (on the order of 600 square miles versus the current plan's 900 square miles); and provides \$8 billion in savings.

Much like the presentation to you did to the Energy Commission, The Wärtsilä's optimal plan calls for an expedited investment in renewables, storage, and flexible gas generation over the next five years.

	Unit	2021	2022	2023	2024	2025
Solar	MW	2165	2165	2165	2165	2165
Wind	MW	519	519	519	519	519
Battery storage	MW	1692	1692	1692	1692	1692
Battery storage	MWh	6768	6768	6768	6768	6768
Flexible gas	MW	0	2421	0	0	0

Table 5. Annual capacity additions by technology type for Optimal Path

While the white paper calls for an initial increase in energy investment, it leads to overall savings. California's current plan for decarbonization includes a renewable portfolio standard (RPS) that sets a 60% carbon-free target by 2030 before transitioning to 100% clean energy by 2045. Wärtsilä's optimal plan meets these targets by relying on more than just solar, wind, and hydropower. All three of these power sources are subject to daily and seasonal variability. Careful consideration must be given to building a 100% renewable power system that optimizes these resources, maintains security of supply, and minimizes cost and environmental impact. The key to this process will be the design and implementation of long-term energy storage systems.

Wärtsilä's modeling minimizes overbuild of excess renewable and battery storage capacity by retaining flexible thermal units that have the highest effective load-carrying capability and transitioning them to use synthetic carbon neutral "power-to-gas" (that is, using curtailed solar and wind to create synthetic methane). This will save GWs of thermal capacity and infrastructure that ratepayers have already paid for from becoming "climate stranded," while cost-effectively maintaining reliability. These gas power plants will be converted from natural gas to synthetic methane, which can be stored in the existing natural gas storages, and will provide carbon-neutral dispatchable capacity to balance the renewables under all weather conditions.

Aside from the environmental and energy benefits, our research shows that this approach will create thousands of jobs. While Wärtsilä has not studied the specific number of jobs created by our modeling, an estimate for construction jobs can be derived from studies by the UC Berkeley Labor Center. The Center's *The Link Between Good Jobs and a Low Carbon Future* provides a per megawatt average for construction jobs with wind averaging 0.6 jobs per MW and 3.9 per megawatt for utility-scale solar. By extrapolating the per megawatt average to Wärtsilä's white paper recommendations, more than 300 wind power and 8,400 solar power construction jobs would be created annually for the next five years. The job creation estimates do not include the hundreds, if not thousands of jobs, for creating more storage and flexible gas power plants that will transition to bio or clean fuel alternatives.

Finally, as California moves to a cleaner and greener future, energy reliability must be maintained by ensuring enough dispatchable capacity. Wärtsilä's optimal plan retains 32 GW of thermal capacity with existing fuel storage that's capable of holding enough stored renewable energy, in the form of fuel, to power that capacity for 67 days.

Attached is a copy of the Wärtsilä whitepaper, Path to 100% Renewables for California. If you have any questions, please feel free to contact me at jussi.heikkinen@wartsila.com.

In order for California to exceed its SB100 clean power and decarbonization goals five years early, while maintaining reliability and affordability. Wartsila recommends the following policy actions (as noted in the whitepaper):

- California must formally recognize thermal plants operating on renewable fuels, including hydrogen and methane produced from excess renewable energy with carbon capture from air, as renewable and net-zero-carbon generation for the purposes of meeting clean electricity mandates.

For now, there is no such formal recognition, and therefore no guarantee that California will consider the flexible generation plants operating on synthetic methane described in this study as renewable or net-zero-carbon. Regulatory certainty would encourage research, development and deployment of power-to-methane and power-to-hydrogen technologies, enabling the fastest, least-cost Optimal Path to 100% renewable electricity.

- California may retire once-through-cooling power plants on schedule in 2023, with no extensions. To ensure adequate power supplies over the next few years, the California Water Control Board is considering extending the licenses for some of the state's once-through-cooling power plants, which use water from the ocean, lakes or rivers to absorb waste heat. These power plants return warmed water to the original source and can cause problems for local ecosystems.

The Optimal Plan described in this white paper would render those license extensions unnecessary. A combination of increased renewable generation, energy storage, and flexible generation could comfortably provide enough electricity to cover California's projected needs for electricity.

We look forward to working with you and other task force members over the upcoming weeks. Thanks again so much for your time and your consideration of this vital effort.

Sincerely,

Jussi Heikkinen
Growth & Development Director