

**Legislative Testimony of FuelCell Energy, Inc.**  
Energy and Technology Committee  
March 5, 2020

Senate Bill 10  
AN ACT CONCERNING CERTAIN RECOMMENDATIONS CONCERNING  
CLIMATE CHANGE

My name is Derek Phelps and I am Director of Market and Project Development at FuelCell Energy. We are a home grown Connecticut high-tech manufacturer of baseload clean energy power generation. We are headquartered in Danbury and our manufacturing facility is located in Torrington. We employ almost 300 people and the fuel cell products we manufacture here in Connecticut are exported all over the world. Most of you are familiar with our installations and the energy, environmental and economic benefits we deliver to the state in the form of high-tech manufacturing jobs; sales, property, payroll and other taxes; and clean energy free of NOx, SOx and particulate pollutants that is always on, regardless of whether the sun is shining or the wind is blowing. And we are environmental stewards, recycling 93% by weight of our fuel cells at the end of life.

I'd like to offer some brief comments largely in opposition to SB10.

FuelCell Energy is supportive of the provisions of SB 10 that require a reduction in vehicle emissions, and suggests that DEEP should be encouraged to further explore fuel cell vehicles, as current proceedings at the agency are almost

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exclusively focused on electric vehicles.

FuelCell Energy vehemently opposes the provision of SB 10 requiring that all electric generation be zero carbon by 2040. Passage of this provision is essentially an affirmative declaration that fuel cells are not welcome in Connecticut. It is increasingly frustrating to have to appear before this body almost annually to request that the General Assembly remind the administration of the benefits of the fuel cell industry to the State of Connecticut.

FuelCell Energy contributes to the Connecticut economy. Our employees live in 85 of Connecticut's cities and towns. We offer high tech manufacturing , engineering, scientific and information technology jobs with benefits including health care, 401k, paid vacations, holidays and upward mobility that add to the State's ability to retain the highly skilled undergraduate and post graduate students educated at the State's colleges and universities. Our starting hourly rate for shop floor employees was well above the minimum wage before it was raised to \$15. Our direct supply chain includes Connecticut companies in 97 of CT's cities and towns. We have contributed more than \$75M in Connecticut supply chain spend in the past 3 years and have paid millions in sales, property and payroll taxes.

Connecticut is and has been the undisputed world wide capital of the stationary fuel cell market, serving as home to the world's two largest stationary fuel cell manufacturers. Yet fuel cells were completely shut out of multiple years of DEEP clean energy procurements and we had to mount a legislative campaign to force fuel cells to be considered. That campaign resulted in the overwhelming passage of Public Act 17-144, which provided for a solicitation where only 50 MW

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of fuel cells were selected, as compared to the over 2,000 MW of solar and wind that has been procured. That same legislation enabled the utilities to procure up to 30MW of fuel cells, but there has been no movement on that, largely as a result of DEEP energy policy.

And now, SB 10 purports to eliminate fuel cells altogether by 2040 by outlawing carbon emitting electricity generation. Fuel cells emit a fraction of the carbon dioxide emitted by combustion generating technologies and without any of the NO<sub>x</sub>, SO<sub>x</sub> or particulate emissions. These systems are also often deployed in combined heat and power applications – reducing the carbon emissions of commercial and industrial facilities by offsetting fuel used for heat. This new zero carbon energy policy put forth by DEEP does not take into account all of the important policy goals of the state, such as economic development, energy strategy for grid reliability and resiliency, land use, or the practical requirement for always on baseload power. This Committee should reject rolling blackouts like the ones occurring now in California as a result of the over reliance on intermittent renewables.

Science dictates that the State of Connecticut cannot keep the lights on with solar, wind and battery storage alone. With our typical summer demand profile, a power mix consisting of equal parts solar and wind would need on the order of 30 Gigawatt-hours of storage. Even at projected low future storage prices this would cost billions of dollars, and be used far below its capacity outside of the summer months. Using today's lithium battery technology, this deployment would require a significant amount of the global supply of cobalt for a state the size of Connecticut, and an amount that could become hard to obtain as other

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larger states attempt similar deployments. Second, no one wants to talk about what happens to solar panels, wind turbine blades or batteries at the end of life. They are simply thrown in a landfill or, according to a recent exposé in the Houston Chronicle, buried in the sand in Wyoming.

Further, it is time for state policy makers to acknowledge that there are equal, if not more, carbon emissions associated with wind, solar and battery storage, than with fuel cells. Few policy makers talk about how solar panels are manufactured, from the mining of quartz to the giant furnaces used in the refining process. These furnaces are not solar-powered. Nor are the ships that install off-shore wind farms. Based on published data from the EPA, due to the capacity factor of a fuel cell vs. a solar installation, a 100 MW fuel cell project actually displaces **more** carbon emission from the grid than a 100 MW solar project, as demonstrated below:

If one compares by capacity factor, looking at MWh CO<sub>2</sub> avoided per year:

- The EPA eGrid non-baseload emission rate for CT is 1040 lbs/MWh. EPA suggests using the non-baseload rate to calculate avoided emissions for renewables, and this rate is actually lower than some of the resources we expect fuel cells to displace in Connecticut.
- The solar rate (ignoring any lifecycle adder for materials, manufacture, transport, construction, installation, disposal, etc., all of which emit carbon, NO<sub>x</sub>, SO<sub>x</sub> and other pollutants) is zero, so solar power theoretically avoids 1040 lbs CO<sub>2</sub> per MWh produced.
- The FCE SureSource using combined heat and power rate is 738 lb/MWh, so an FCE installation avoids 302 lbs CO<sub>2</sub> for every MWh produced.
- Solar capacity factor in Connecticut is about 15%, fuel cells are 90%.
- Here is how a 100MW solar project compares to 100MW of CHP fuel cells:

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	100 MW Solar	100MW Fuel Cell at 738lb/MWh
Capacity, MW	100	100
Capacity factor	15%	90%
Annual MWh	131,400	788,400
Avoided CO2, lbs per MWh	1040	302
Avoided CO2 per year, tons	68,300	118,873

The fuel cells actually avoid more CO2 because of their high capacity factor.

The state of CT has spent decades fostering its home grown fuel cell industry. Fuel cells represent all of the positive energy, environment and economic policy goals that the state says it wants to achieve – high tech advanced manufacturing, an industry that the state can claim as its own, jobs, tax revenues, product exports, clean power, grid resiliency and reliability, reuse of urban brownfields. Yet we are under attack – again - by the very state that we call home. We should not have to come here year after to year to remind the State that we are one of the last bastions of Connecticut innovation and product manufacturing, and that we have value. We ask that this Committee send another message to CT DEEP that fuel cells are an important part of Connecticut’s clean energy mix, economic development and, unlike California, Connecticut wants to keep the lights on, by rejecting the changes proposed in SB 10 requiring all zero carbon power by 2040.