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Sent via email to: CThydrogentaskforce@strategen.com

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To:
Connecticut Green Bank
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Public Comments to the Connecticut Hydrogen Task Force

Dear Connecticut Green Bank:
I appreciate the opportunity to comment on this proceeding. I have participated in the Supply task force meetings.

Background
As Connecticut and New England move forward with an energy supply dominated by variable renewable resources (wind and solar) we will be challenged to match load and supply. Adding to the challenge will be the simultaneous electrification of transportation and building heating. Wind and solar have distinct daily and seasonal patterns of generation.

This future grid challenge is the reason that the Hydrogen Task Force was assembled. Hydrogen can be produced by either electrolysis of water or by use of reversible fuel cells. Once produced hydrogen can be stored and utilized for power generation, as a vehicular energy source, or as a chemical feedstock.

Comment 1: Hydrogen Supply
Thus far in the sessions on the supply side we have not explored the need for seasonal energy storage as the origin point of hydrogen supply and production. This seasonal energy storage role is a key component because it will outline where the hydrogen will come from (solar farms and wind production sites), when it is available, and how the infrastructure will operate. Additional infrastructure may be added – but is this key role of seasonal balancing for the grid that will be the foundation of the hydrogen economy in New England. A crude estimate would suggest that without hydrogen as a mechanism about one quarter of energy produced will be curtailed. Attached as Exhibit A is an illustrative approach to calculating the amount of potential curtailment facing the New England grid.
I suggested that the Green Bank and Strategen establish a reference case for this load balancing role of hydrogen and use it as the nucleus of thinking about an H2 hub.

Comment 2: Hydrogen Infrastructure
Storing and transporting Hydrogen will be expensive and potentially difficult. H2 and CH4 are not interchangeable in the transmission or distribution systems.

It is well established that H2 is difficult to store and difficult to transport. As such – a more thorough review of where is to be produced and where it is to be used are important and as yet undiscussed.
I suggest that the Green Bank and Strategen address the storage and transportation of produced Hydrogen at least at a high level.

Comment 3: Hydrogen Supply – Electrolysis v. Fuel Cell Hydrogen production
In supply discussions so far, the basic pathway for making hydrogen is electrolysis of water using renewable electricity. There are "reversible fuel cells" – which can operate either to take electricity and produce hydrogen or to take hydrogen and make electricity. I think more research should be conducted to add these fuel cell H2 generators to the discussion. There are two reasons for this:

- Fuel Cell H2 generation may be more efficient than electrolysis and,
- Having a reversible fuel cell on the grid would permit H2 generation AND electricity production. This could spread out equipment capital costs over a range of time and function.

Thank you again for the opportunity to comment – I look forward to continuing progress on this topic
Yours,

Bernard Pelletier

Exhibit A

Sample Modelling of Seasonal Curtailment

Modeled Electric Future in New England by Month
Giga Watt Hours of Supply and Load

	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Year
Future Load	Current Net Electrical Load	10,680	9,747	9,502	8,347	8,655	10,722	11,025	12,099	9,648	8,881	9,104	10,296	118,706
	Future EV load	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	9,892	118,706
	Future Winter load from heat pumps	34,623	34,623	19,784	-	-	-	-	-	-	-	9,892	19,784	118,706
	Total Future Load - all electric	55,195	54,262	39,179	18,239	18,547	20,614	20,917	21,991	19,540	18,773	28,888	39,973	356,118
Future Supply	Assume 50% solar generation	6,694	5,185	20,608	19,886	23,234	22,446	18,377	18,968	16,014	11,354	9,648	5,644	178,059
	Assume 50% wind generation	17,181	17,181	17,181	15,619	14,057	12,495	12,495	10,933	12,495	15,619	15,619	17,181	178,059
	Total Renewable Generation	23,876	22,366	37,790	35,506	37,291	34,941	30,872	29,901	28,510	26,974	25,267	22,825	356,118
	Month demand v supply	(31,319)	(31,896)	(1,389)	17,266	18,744	14,327	9,955	7,910	8,969	8,200	(3,621)	(17,147)	-
		Oversupply months			85,372									
		Oversupply percent of total			24%									