From: Greg Pierce
To: PSD - Comprehensive Energy Plan
Subject: CITIZEN COMMENT ON NOVEMBER 2021 DRAFT OF COMPREHENSIVE ENERGY PLAN 2022
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01 December 2021
Record of Comments by Greg Pierce P.E. (CE), retired
on Vermont Department of Public Service [VT-DPS]
Comprehensive Energy Plan [CEP] – 2022
[Draft of November 2021]

I'm seldom at a loss for words. After reading section five [5] of the CEP draft on transportation, I was aghast and—momentarily—speechless! The exclusively battery electrification of the Vermont transportation system?! Wow! Let's take it one step at a time.

Presently, Vermont's transportation runs on fossil fuel. But, current law requires us to end the domain of fossil fuel because it is far and away the biggest polluter of our Earth's atmosphere. Now, think through the names of major fossil fuel suppliers: **Leading Oil And Gas Companies In The US**

1. ExxonMobil. ExxonMobil is the leading oil and gas company of the US with a market value of 356.5 billion. ...
2. Chevron. Chevron is the 2nd largest US oil and gas company. ...
3. ConocoPhillips. The 3rd largest oil and gas company in the US is ConocoPhillips, which has a market value of $76.7 billion.
4. Occidental Petroleum. ... 5. Sun Oil Company [Sunoco]….

Altogether the value of large energy companies is huge. So, ask yourself are the above companies and other notable fossil fuel companies, all over the planet, going to sit around on their collective derrieres and see America and the rest of the world go to exclusively battery powered electric vehicles. There is no way that is going to happen. Why? Because 'Big Oil' is going to transmogrify into 'Big Hydrogen' and, therein lies their reason for existing: 'Big Money'!

It's already happening folks:

Thirty-five [35] countries spread all over the planet are moving to hydrogen.
Click on the following URL and read the details:
Which countries are backing the hydrogen economy? (h2bulletin.com)
Forty-seven [47] U.S. states are involved in the move to hydrogen.
Click on the following URL and read the details.
United States of Hydrogen - Hydrogen Forward (hydrogenfwd.org)
Noteworthy, regarding the U.S. on hydrogen, is the dense concentration of activity among the northeastern seaboard states and the conspicuous absence of the State of Vermont in the listing.

Click on the following URL for details on the U.S. government, Department of Energy undertakings in the move to hydrogen: DOE Hydrogen Program: About the Hydrogen Program (energy.gov)

And how is it all going to happen? It'll be the alliance of government and industry as we have so often witnessed in other great national adventures. Big Gov and Big Oil are not going into electricity. Big Gov and Big Oil are going to make America big on hydrogen powered vehicles. Exclusively electric battery powered vehicles will turn out to be a brief and unpleasant side note in the annals of American transportation history.

So, VT-DPS, for heaven's sake, please don't embarrass our proud little state in front of the whole United States and the world—don't make us a laughing-stock. Please scrap all of the totally unrealistic present section five [5] of the CEP and do a complete re-write, focusing on what's actually going to happen in the next twenty-eight [28] years. Following are a few useful tidbits of well-grounded, factual wisdom in support of a rewrite.

The hydrogen under discussion in this commentary is so-call 'green' hydrogen. It is produced by the electrolysis of water using safe, clean, renewable energy sources such as hydroelectric and solar. The hydrogen is fed into fuel cells where electricity is produced to power the electric drive motors of the hydrogen vehicle. The only waste product of this process is pure water. No greenhouse gases are emitted to the atmosphere. Click on the following URL to download the "Green Hydrogen Guidebook" and read detailed information on green hydrogen. Green+Hydrogen+Guidebook+8.25G.pdf (squarespace.com)

Additional 'common sense' factors need to be thought through carefully —for example: "exclusively" electric vehicles have many negative—even dangerous—aspects, to wit:

1. If the electricity to recharge the batteries comes from a plant such as Burlington Electric's wood fired electric plant, greenhouse gases

continue to pollute our atmosphere.

2. Batteries for “exclusively” electric vehicles have huge drawbacks:

a.) they are extremely heavy, exceeding a half a ton, causing great public expense due to the need for heavier, stronger motor vehicles and more frequent repair and replacement of public roadways

b.) batteries provide short distance/range capability between recharging as opposed to long distance/range for hydrogen vehicles

c.) recharging batteries takes a long time—up to an hour; refilling a hydrogen vehicle is done in less than five [5] minutes

d.) batteries are prone to unpredictable explosions and fires—and even much more so if recharging is expedited to save time.

e.) batteries introduce huge new environmental concerns relating to:

1] – open pit mining of specialty battery metals

2] – disposal of spent batteries

f.) safety in impact accidents is greatly diminished due to the huge battery weights which will cause far greater damage and more serious injuries

3. Miscellaneous Useful Information

a.) February 2019, there were **6,558** hydrogen fuel cell vehicles on the road. Flash forward: Note FCEV = hydrogen fuel cell electric vehicle.

FCEV Sales, FCEB, & Hydrogen Station Data - California: FCEV Sales, FCEB, & Hydrogen Station Data As Of November 1, 2021 (fuelcellsworks.com)

Numbers as of November 1, 2021	Total
FCEVs—Fuel cell cars sold and leased in ...	12,082
FCEBs—Fuel cell buses in operation in Calif ...	48
Fuel cell buses in development in Calif ...	58
Hydrogen stations available in California ...	**47**

b.) Toyota, Honda, Hyundai are all manufacturing and selling hydrogen vehicles. Toyota’s Mirai has been on the road since 2016

c.) In October of this year, New York State began constructing a large new hydrogen production plant which will use clean renewable

hydroelectric power to produce the hydrogen. Click on the following URL for details
Governor Hochul Announces Construction Start at Largest Green Hydrogen Plant in North America (ny.gov)

d.) four [4] hydrogen vehicle filling stations already exist on the East Coast; two stations in Massachusetts and one station each in New Jersey and Pennsylvania. Click on following URL for location map. (1) hydrogen fueling stations in usa - Bing

e.) passenger car hydrogen refueling stations cited above are located at regular gasoline stations. Hydrogen refueling is performed by the vehicle operator the same as is done for gasoline refueling. The refueling takes five minutes or less. There is no spilling of fuel as all fill connections are pressure-tight. Click on the following URL's for multiple visuals of new hydrogen fueling stations: Slide 1 (cafcp.org) Slide 1 (cafcp.org)
Stations | California Fuel Cell Partnership (cafcp.org)
(1) pictures of hydrogen refueling stations - Bing images

4. Does Vermont have to "go it alone" in moving from fossil fuel to hydrogen? An emphatic NO. Review the following data for confirmation.

a.) Given the long history of Vermont purchasing New York hydroelectric power, there's every likelihood New York would be honored to act positively on a request from Vermont to 'buy in' to the new New York state hydrogen production facility

b.) Bringing New York produced hydrogen to Vermont filling stations would be the same as Vermont presently brings in most of its fossil fuels —by highway tractor trailer trucks.

c.) Progressive citizens in neighboring, large, northeastern cities will quickly understand the obvious limitations of "exclusively" battery electric cars and it will sway their decision to make a hydrogen vehicle purchase. Sadly, will they want to drive to Vermont to enjoy our ski areas, hunting, fishing, hiking, biking, camping, autumn foliage tours if we haven't had the prescience to make hydrogen fueling stations readily available to them?

Respectfully submitted,

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