

DATE: July 24, 2014
TO: NH Office of Energy and Planning
FROM: Andy Duncan
RE: Comments on the May 1 DRAFT New Hampshire State Energy Strategy

Thank you for encouraging public comments on the Draft New Hampshire State Energy Strategy. The State Energy Council and its consultant Navigant will have a challenging task to appropriately integrate the extensive and varied comments to the Strategy, including these comments below. The heart of these comments address fundamental assumptions about what is within the realm of “State energy policy.” While these are my personal comments, they are informed by my work and volunteer roles. For identification, I am professor of Energy Services and Technology at Lakes Region Community College, which is the only undergraduate sustainable energy program in New Hampshire. I am also board president of the Residential Energy Performance Association, a NH-based best practices group of building energy efficiency professionals. I also participate in the Outreach and Education committee of the NH Energy Efficiency and Sustainable Energy board, as well as the New Hampshire Energy Code Collaborative. With many colleagues I have a deep commitment to expanding building energy efficiency and sustainable energy in New Hampshire, not only to benefit citizen end-users but also as a means of sustainable economic development.

These comments are divided into three sections:

- (1) Policy Comments -- longer comments about assumptions and recommendations in the Strategy
- (2) Technical Comments -- short, factual notes about the information in this report and how it is presented. For brevity, I have not included citations, but can supply information references if needed.
- (3) Missing Information -- comments about what is Not in the report

Section and page numbers refer to the May 1, 2014 draft.

Policy Comments

Overall, this is a useful document in that it helps policy makers focus on key energy policy issues in the next decade. However, it is an imperfect document, and policy makers need to recognize this. In particular, this report is not as comprehensive as the 350 page, 2011 “Independent Study of Energy Policy Issues” also commissioned by State legislation. The plethora of consultant reports, particularly if not followed by meaningful policy action, even suggests a “paralysis by analysis.”

As with the VEIC report, the technical emphasis of this report (e.g. language such as “technical, economic, and market potential of various supply and demand resources” p.26) by its very nature tends to deemphasize social-psychological factors found in Section 3’s Energy Vision [“consumers are empowered,” “increased self-reliance,” “high quality jobs,” “tourist friendly,” “skilled workforce,” “informed consumer base,” “customers of all income levels,” “adds value to the lives of residents,” “residents greater peace of mind,” “residents of all ages” (pp. 24-25)]. In essence, there is an EMPOWERMENT GAP between the Vision section 3 and the recommendations in section 5. This is an important theme that I emphasize in the policy comments below.

A deep flaw with this report may at first seem to be trivial semantics. While the so-called “economic” and “technical” gaps are a useful way at looking resource potentials (pp. 27-28), the names of these gaps are incorrect. As noted on p. 27 “the gap between market potential and economic potential can be attributed to limitations of policies, regulations, market inefficiency and consumer awareness.” NONE of these factors are explicitly economic! This is a **MARKET GAP** (or “policy gap”). These are factors that policy makers can influence, and the so-called “economic gap” objectives are achievable under current economic conditions (e.g., “economically justified”). In other words, it is not an economic issue but a policy and education/awareness issue that is holding back achievement of these energy objectives.

Likewise the so-called “technical gap” is actually an **ECONOMIC GAP**. In the words of the Strategy, “the gap between the economic potential and the technical potential can be attributed to the cost of the technology, factoring in the relative price of fuels and competing technologies” (p.28). Or “technically achievable” but with an economic gap as the figures in Section 4 show. The true technical gap between “Resource” and “Technical” is not explicitly examined in the Strategy.

Relabeling these two gaps as “market gap” and “economic gap,” and carefully editing section 4 (pp. 27-40) will add substantial clarity to this section. The Strategy needs to underscore that the dark brown bars of billions Btus in energy savings and other objectives in Figures 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, 4-9, 4-9 and 4-10 are, if accurate, already “economically justified.” There is no economic gap for these billions of Btus! The gap comes from other factors.

Associated with this market gap, the Strategy needs more focus on improving New Hampshire consumers’ (citizens’) lack of awareness about energy options, inability to access authoritative energy information, inability to properly value sustainable energy options, and lack of procedural knowledge in making sustainable energy choices themselves. This is an EMPOWERMENT GAP that is a major component of the market gap, and the treatment of this empowerment gap is weak in both Sections 4 and 5.

Along these lines, there should be an overlay on Figure 5-1 that emphasizes the key role of programs that empower consumers (citizens) for all five of the key drivers. Relatedly, policy makers need to recognize that “policies” extend beyond rules, regulations and incentives. In the words of “Driving Demand for Home Energy Improvements:” (Lawrence Berkeley National Laboratory, Sept. 2010, pp. 1 & 4, <http://emp.lbl.gov/sites/all/files/REPORT%20low%20res%20bnl-3960e.pdf>)

When policy makers ask what energy efficiency can do, the answers usually revolve around the technical and economic potential of energy efficiency—they rarely hone in on the element of energy demand that matters most for changing energy usage in existing homes: the consumer. ... How can millions of Americans be persuaded to divert valued time and resources into upgrading their homes to eliminate energy waste, avoid high utility bills, and spur the economy? ... Success will require multifaceted approaches that acknowledge a deeper understanding of what motivates homeowners and contractors. Effective programs will tend to be tailored to the location, thoughtfully researched and piloted, personalized to the target audience, and more labor-intensive than simple incentive programs.

Following this overall change, the five drivers in section 5 each need a specific subsection addressing empowerment, discussing programs such as building public awareness, education, training, and market research. The most deficient discussion in this respect is section 5.1 Energy Efficiency. In section 5.1, it is indeed true that “New Hampshire is not taking advantage of cost-effective savings from efficiency” (p.41). These energy efficiency improvements are already cost-effective, but they are not well known, nor do consumers (citizens) significantly appreciate their value. This gap is largely a perceptual and informational gap, rather than an economic or technical one.

To its credit the Strategy maps “Consumer outreach associated with the above mentioned programs” as a relevant policy connected with a vision element on Figure 5-3. Likewise in the summary Figure 5-5 “Energy Efficiency Recommendations,” one of the summary strategy recommendations is:

“Market the value of high efficiency buildings to consumers. A portion of the budget of each program should be allocated to marketing and consumer education, and not subject to cost-benefit tests. Messaging should focus on the financial benefits and increased comfort of high efficiency buildings.” (p. 52)

Any summary should be a summation of more detailed information. This summary item gets virtually no attention in the pp. 42-51 text of 5.1.3 “Achieving the Energy Efficiency Vision,” (compared to 2 1/2 pages discussing financing options for energy efficiency improvements that are already cost-effective).

Furthermore, this summary recommendation is necessary but not sufficient in scope. For energy efficiency and extending to all five key energy drivers, New Hampshire policy makers need to put in place a comprehensive State-sponsored program that would also:

- Implement a public awareness campaign that is not tied with any business, utility or organization to elevate the “energy IQ” of New Hampshire consumers (citizens) and promote sustainable energy options. Other states are doing so, and the State even has a plan for this in the 2011 “New Hampshire Office of Energy and Planning Communications Plan” prepared by Burgess, and available on the NHOEP web site.)
- Provide an authoritative, unbiased one-stop resource for all things energy efficiency (utility efficiency programs, low-income weatherization assistance programs, financing programs, government incentives, qualified contractor finder, procedural information for DIYers, basic energy information, questions answered, etc.). This can extend to all topics in the Strategy.
- Work with sustainable energy businesses to provide cooperative advertising, skills training and marketing training opportunities.
- Improve energy education, particularly in grade schools so that young citizens (future consumers) will effortlessly value the benefits of energy efficiency and sustainable energy.
- Adopt and foster the use of tools such as a building energy asset labeling program that would provide a MPG-type rating of residential and commercial building performance (such as the Home Energy Rating System, the US DOE-sponsored Home Energy Score, and ENERGY STAR’s Portfolio Manager for commercial buildings). This is in addition to fostering tools such as smart meters and smart building technology that improve information about operational energy use and conservation.
- Continue and expand building energy code outreach programs, with a short-term emphasis on ramping up to the new 2015 IECC energy code, and concurrently educating builders, municipal officials, home buyers, real estate professionals, and others that a high performance energy code-built home is a better home. Energy code compliance in rural areas is weaker than it should be, in large part due to the empowerment gap.
- Tailor messaging and programs to specific allied professionals, such as builders, real estate brokers, heating ventilation and air conditioning (HVAC) tradespeople, home inspectors, municipal building code officials, appraisers, building supply store staff, and similar targeted audiences. Other targeted messaging could go to: historical building owners, renters, initial home buyers, new construction home buyers, institutional, commercial and industrial facility managers.

This empowerment gap is largely due to the lack of leadership by the State of New Hampshire. It has resulted in a cacophony of other entities that are vying for the attention of New Hampshire consumers (citizens). Many of these other entities (businesses, environmental organizations, utilities, trade associations, financing authorities, etc.) have agendas that are narrower than the general public interest that we entrust to our State of New Hampshire government. A statewide, State-lead program will be imminently more cost-effective than the scattershot present efforts. Funding can come from dedicated sources such as RGGI, the System Benefits Charge, as well as grant and general revenue sources.

It is encouraging that well-written subsections entitled “Consumer Behavior” and “Demand Response” are found on pp. 55-56 in section 5.2 “Grid Modernization,” discussing smart meters and related behavioral programs. A notable quote: “these strategies are based around consumer education and engagement. Although smart grid technology can enable and empower consumers, proper education is key to success” (p. 56). This theme, and this same level of detail about consumer (citizen) empowerment should be found in every section of section 5. In sections 5.3 – 5.5, this includes:

- Increasing awareness about options and providing procedural information to consumers (citizens) to produce renewable power themselves (pp. 59-60)

- Providing and publicizing a clear pathway for consumers (citizens) to easily participate in the Renewable Energy Credit (REC) market themselves (p. 60)
- Facilitating improved communication and dialogue about the siting of large-scale wind power facilities, transmission lines and other siting issues associated with renewable power generation (pp. 62-63)
- Providing training to land owners about micro-hydro and other renewable energy options (p. 63)
- Improving information availability and facilitating the process for cost-effective expansion of the natural gas service areas in New Hampshire, as well as capacity expansion from out of state (pp. 65-66)
- Generating greater market awareness and provide technical assistance to residential, commercial and industrial energy users to facilitate lower-cost fuel choices such as CNG, heat pumps, biomass and solar thermal (pp. 67-72), as recommended on p. 73.
- Not only adopting the CA-LEV standards, but publicizing State adoption with co-marketing programs with automobile dealerships (pp. 74-75).
- Increasing awareness of options with electric and natural gas vehicles, and provide technical assistance for fleet managers and others (pp.76-78).
- Publicizing and promoting mass transit, telecommuting, ride-sharing and other practical strategies to reduce VMTs (pp. 78-80).
- Increasing awareness beyond the local level to all state citizens about the benefits of smart growth (pp. 79-81)

In summary, I urge the State Energy Council to instruct its consultant Navigant to better reflect its Vision in the section 5 recommendations with specific education and awareness building strategies to overcome the empowerment gap in all five key drivers.

Technical Comments

Overall, reference citation information was inconsistent, and often only referred to a web address. Cited references, at the least, should include a full title and date.

Section 4: Resource Potential Analysis

The methodology in Section 4 “Resource Potential Analysis” needs greater clarity. For example, under 4.4.1.2 “Biomass” statements such as “the technical potential was further reduced based on thermal load and technical fit...” are vague. The calculations leading to the technical and economic potentials should be provided in an appendix. Appendix F now only repeats as numbers the results shown on graphs in section 4, while adding the mysterious “BAU.”

In fact “BAU” in Appendix F is never defined, nor adequately mentioned in the body of the Strategy. Only after reading the March 14 slides does it become clear that BAU represents the baseline 2025 forecast of energy savings. An explanation of BAU needs to be included in Section 4. While it is appropriate to focus on the “technical” and “economic” gaps, failing to acknowledge that substantial and widely varying amounts of savings/generation/etc. will occur in the baseline scenario creates an information deficit.

In section 4.4.1.2, assuming that only pre-1989 commercial buildings are suitable for conversion to biomass heat is unnecessarily limiting. The key factor here is the cost of fuel (e.g., oil/propane vs. biomass), not the age of the building.

In section 4.4.1.3 and the Ground Source Heat Pump subsection of 5.4.2, the assumptions are distorted. Only buildings with ducted systems should be eligible, the \$7,000 incremental cost is too low in New

Hampshire, and a 3-year payback is too low (vs. 20 year payback for solar thermal heating!). Figure 5-15 implies GSHP installations are closed-loop, while most residential GSHP are open-loop systems using a standing column of water in a well or similar. Savings should be based on actual NH coefficient of performance (COPs) for utility-sponsored GSHP projects in New Hampshire.

In section 4.4.1.4 the so-called “economic” gap is unnecessarily constrained to “the fraction of housing stock with existing ducted heating systems” (p.32). In fact, the key growth sector now for residential and small commercial cold-climate air source heat pumps (ASHPs) is the ductless mini-split market in homes with no duct work.

In this section 4.4.1.4 section, as do other sections, assume a fixed 2014 technology or price to 2025, when instead there has been a clear trend towards improved technology and/or a price trend. In this case the trend is towards more efficient cold-climate ASHPs. It is more of a fallacy to assume that the current ASHP technology will be static for 10 years than assume, conservatively, a continuing trend towards more efficient ASHPs.

In section 4.5.1 there is insufficient discussion of environmental, aesthetic and societal factors (e.g., siting concerns) that are quite important components of the so-called “economic” gap for terrestrial wind, offshore wind, hydroelectric, biomass and other power generation options.

The MW scale on Figure 4-10 is misleading (p. 39). The bars look quite large compared to the bars on Figure 4-8, also in MW. They should be adjusted to reflect the relatively small MW capacity compared to 4-8.

Section 5: Policy Evaluation and Strategy Recommendations

For Table 1 (p. 43) and the untitled table on p. 46, the funding sources should be added as another column. In addition, the programs should be either divided into “current” and “non-current,” or the non-current programs be removed. Programs funded by ARRA Stimulus and NH RGGI (Better Buildings, Giving Power Back, Municipal Energy Reduction Fund, and Pay for Performance) are either inactive or not receiving ongoing funding.

On Table 1, the “CORE Energy Efficiency Programs” are so diverse that they should be listed in more detail. For example, the bulk of funding for low-income weatherization programs is in the form of the Home Energy Assistance program from utility-sourced System Benefits Charge, rather than the US DOE-funded Weatherization Assistance Program funding through NH OEP as listed.

In the first paragraph on p. 44, benefits of the CORE program extend to the commercial *and industrial* sector, or C&I as it is commonly called.

On p. 44, federal (US DOE) funding for energy efficiency should also be listed. This is primarily in the form of the low income Weatherization Assistance Program, which to my understanding is currently receiving less funding now than pre-ARRA funding.

Section 5.1’s summary “Energy Efficiency Strategy” table on p. 52 should list as a challenge the diminishing energy savings and increasing costs to achieve “deep” energy savings (e.g. energy efficiency savings over 40%) resulting in longer payback periods for deep energy retrofits. The concept of a “deep energy retrofit” is not adequately defined nor discussed.

Many of the subsections in section 5.4 “Fuel Choice and Availability” are too cursory. The “Air Source Heat Pump” subsection (pp. 69-70) does not provide a clear picture of the future trajectory of ASHPs which could become a game-changer in terms of fuel choices.

For being “the biggest economically viable alternative fuel for residential heating in New Hampshire,” the biomass section does not explore key issues with biomass, such as integration with existing heating

systems for whole-house application, environmental (air pollution) issues, pellets vs. solid wood alternatives, reliability, efficiency, and user convenience / maintenance.

Missing Information

Mostly missing (except section 5.2) is a policy evaluation and recommendations to increase consumer (citizen) awareness and overcome decision-making barriers for sustainable energy choices that are already cost-effective. The failure to recognize this empowerment gap is a glaring omission in the policy recommendations, as discussed above.

There is no information about nor recommendations related to State of New Hampshire administrative structural capabilities and leadership in energy. Helpful data would include State of New Hampshire energy agency spending per capita compared to other states, as well as the scope of State New Hampshire energy programs in comparison to other states. Nor is there any discussion or recommendations about the scope and/or centralization of energy programs at the NH Office of Energy and Planning, versus energy programs at other state agencies including the Public Utilities Commission, Department of Environmental Services, Department of Resources and Economic Development, etc. At issue here is whether the current State energy administrative structure is capable of exercising sufficient leadership to fulfill the State Energy Council's vision?

Discussion of recommended policies such as an Energy Efficiency Resource Standard, thermal energy efficiency as well as fuel choice, fail to adequately incorporate the disparity between regulated fuels (electricity and natural gas), and unregulated fuels (heating oil, propane, biomass, etc.). There is no discussion of incorporating a System Benefits Charge or its equivalent for unregulated fuels, and the implications of a fuel-neutral playing field for thermal fuel choice and energy efficiency.

Income and regional differences are mentioned in section 3's Vision, but are largely ignored in sections 2, 4 and 5. For example, there are no charts or graphs showing regional energy differences in New Hampshire. In addition, LIHEAP (the Low Income Home Energy Assistance Program) is not mentioned anywhere in the Strategy. It is worth noting that New Hampshire also has one of the lowest rates in the country of utilization of LIHEAP funds for Weatherization Assistance Program energy efficiency improvements.

The Vision also mentions "creating high quality jobs" but workforce and economic development aspects are given scant coverage in section 5.

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