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Memorandum

To: Steve Klein, Legislative Joint Fiscal Office
From: Tom Kavet, Aidan Davis, JFO
CC: Janet Ancel, Chair, House Ways & Means Committee; Sara Teachout, JFO
Date: February 23, 2015
Re: H.40 - Preliminary Economic and Fiscal Review to Date

OVERVIEW

H.40 is a major piece of energy legislation, designed to replace the troubled SPEED program enacted in 2005 with a broader renewable energy program and associated system of renewable energy credits (RECs) that are more closely harmonized with other states in the region. The fiscal impacts of this legislation are relatively limited, since program costs are primarily borne through utility-collected electric rates, not State taxes. In turn, utilities are expected to sell, administer and manage many of the beneficial activities expected to occur as a result of this legislation.¹

The full economic impacts of the program have yet to be modelled – and could produce further downstream fiscal impacts, both positive and negative. Without additional program information² and time, we have yet to perform such analyses, nor has the Department of Public Service (DPS). Cursory regional economic model runs by DPS indicated positive long-term economic impacts,³ but these are sensitive to relative energy prices, the mix of assumed renewable energy investments, uncertainty regarding actual vs. projected savings per investment, program participation rates and investment timing.

¹ Under this program, utilities will be encouraged to do this in partnership with other entities such as Efficiency Vermont, etc..

² Only three pages of descriptive written information were provided regarding the program design and operation, critical assumptions made in analyzing it and source documentation for these assumptions. Although we are currently reviewing internal PSD spreadsheets used in their analysis, we cannot verify or necessarily endorse these assumptions as being reasonable without further review.

³ Based on limited REMI model specification and runs, DPS estimated the creation of more than 1,000 jobs, \$275 million in net energy bill savings and reductions in greenhouse gas emissions of approximately 15 million metric tons by 2032. We only received requested DPS REMI model files today, and will be reviewing it in greater depth later this week. Our initial review indicates this to be a very cursory economic impact run and that its results should not be given undue reliance.

Net State fiscal impacts from direct program expenditures are likely to be roughly offsetting, representing less than plus or minus \$2 million per year, depending upon assumptions. These impacts consist of reductions in fossil fuel-based Fuel Gross Receipts and Gasoline tax revenues, and offsetting increases in electricity-based Fuel Gross Receipts, Motor Vehicle Purchase and Use, Sales & Use, and Property tax increases. Without running a full economic impact analysis, fiscal gains or losses from secondary impacts are impossible to estimate, but would probably be negative in the initial years (when the investment outlays are made) and positive in later years, as net energy expenditure savings are realized.

Any more comprehensive economic impact analysis would also be complicated by the uncertainty surrounding a “base case” against which to measure this legislation. Current problems associated with the treatment of RECs in the SPEED program have depressed the value of these RECs to the point that a “current law” baseline analysis would probably need to assume significant future electricity price increases. This both underscores the imperative for program change and elevates positive impacts of the proposed legislation relative to this baseline. The volatility and wide possible price ranges associated with near and longer-term energy prices, upon which this analysis is sensitive, also makes baseline assumptions highly uncertain.

CRITICAL ASSUMPTIONS

The assumptions employed in the PSD analysis to date assume that combined public and private expenditures for a wide array of energy saving investments will result in longer-term net savings to Vermonters of approximately \$275 million through 2032 and reduce greenhouse gas emissions by approximately 15 million tons over the same period.

The most important assumptions behind these estimates, and potential projection risks, include the following:

- **Energy Prices:** The energy price assumptions in the PSD analysis assume a constant dollar 2015 home heating oil price of \$3.25 and an equivalent electricity price of \$0.15/kWh. These prices were based on forecasts prepared in the summer and fall of 2014. The dramatic swing in fuel oil prices over the past nine months, however, illustrates the vulnerability of any analysis dependent upon these prices. The U.S. Energy Information Administration (EIA), which is one of the most credible sources of energy price estimates, draws attention to the inherent volatility in energy prices and the wide confidence intervals that exist in making even near-term energy projections⁴. For longer term projections, such as those used in the subject

⁴ See, for example, http://www.eia.gov/forecasts/steo/special/pdf/2009_sp_05.pdf

analysis to 2032, market uncertainty leads to possible outcome ranges that can be extremely wide. Given the importance of energy price assumptions in calculating the long term return on investment (ROI), and depending upon the mix of energy saving measures pursued, it may be beneficial to run various pricing scenarios so as to generate a range of potential cost/benefit outcomes in evaluating program risks.

- **Building Efficiency Savings:** The PSD analysis is predicated on an assumed weatherization energy efficiency savings per house of 25%. Only recently (in 2013), however, have there been attempts to measure actual fuel use savings as a result of efficiency investments.⁵ Prior measures of efficacy relied on estimated savings, rather than observed savings. Although the State's electric efficiency programs have very thorough return-on-investment data based on detailed electrical usage from regulated utilities, there is no comparable public access to data on delivered fuels. Without actual data measuring changes in fuel consumption, it is impossible to validate the assumptions that underlie the most important claims associated with future energy savings. The very limited survey analyses performed to date show "realization rates"⁶ that are significantly below estimated savings and variation by income group in actual fuel use reductions.⁷ It will be important to measure actual fuel use reductions with meaningful sample sizes in order to validate assumptions regarding future benefits from this aspect of the program.
- **Diminishing Returns:** There may also be diminishing returns on some efficiency investments as the most inefficient homes are renovated first and the remaining unimproved housing stock offers reduced opportunities for savings. Market penetration assumptions are also reliant upon private sector investment behavior. While we do not find the PSD estimates unreasonable, they will be important to measure and may be more difficult to achieve and/or less impactful as the market becomes increasingly saturated over time.
- **Private Investment Counterfactual:** The PSD analysis assumes that despite the very attractive payback some of these investments are expected to yield, without public intervention and incentives, the investments would not

⁵ See: http://publicservice.vermont.gov/topics/energy_efficiency/eeu_evaluation and, http://publicservice.vermont.gov/sites/psd/files/Topics/Energy_Efficiency/EVT_Performance_Eval/EVTImpactEvaluationFinalReport2013.pdf

⁶ The realization rate is the ratio of evaluated savings to program report savings. A realization rate of 75% indicates that the impact evaluation found 75% of the program reported savings were actually achieved.

⁷ In an analysis of Vermont Gas System's residential retrofit programs over the period 2008-2010, low income households had a realization rate of only 62%, whereas higher income "market rate" households had a rate of 89%. In Efficiency Vermont's Home Performance with ENERGY STAR® Program Impact Evaluation report for the same period, the evaluation results for fossil fuels were based on a sample of 82 homes, primarily consisting of insulation and air sealing measures. Results indicate that participants achieved savings of about 18% of home heating fuel consumption, on average.

otherwise be made by the private sector alone. All savings and benefit ratios assume that without the public incentive, none of the ensuing private investment would take place. In fact, there has been considerable private investment in thermal efficiency in response to relative price increases in home heating oil over the past 40 years and if/when oil prices rebound, are likely to continue this trend. This does not negate *any and all* benefit from the proposed public investments, but would lower some benefit ratios if significant private sector investment would have taken place regardless of public incentive and related expenditures. The levels at which the incentives have been set appear to be similar to other states, but this does not mean they are necessarily optimal for targeted participation levels or optimal for minimization of taxpayer expense.

OTHER INITIAL OBSERVATIONS

- 1) ***Thorough and unbiased ongoing program efficacy measurement is essential.*** Unless there are observable changes in fuel consumption, there is no way to assess the actual benefits of many of the most important program investment expenditures. Without such measurement, program expenditures are guaranteed, while precise program benefits are largely hypothetical. This would require larger scale sampling of building owners, the installation of fuel consumption measurement systems and/or the cooperation of fuel providers to provide ongoing fuel consumption data. There could also be statutory requirements to provide confidential follow-up performance information from one or more of these sources.
- 2) ***The new RECs to be issued as a part of H.40 appear to be harmonized closely enough with those of other states to be marketable.⁸***
- 3) ***There are important differences in the allocation of benefits between the electric efficiency programs the State has very effectively employed and comparable programs aimed at thermal and other efficiency improvements.*** Unlike electric efficiency savings, which accrue to all ratepayers when capital investment in new generation facilities can be avoided through efficiency measures, the financial benefits to thermal and transportation efficiency programs will accrue primarily to the owners of the buildings and vehicles receiving the investments. This creates equity issues if a broad public assessment, either via a tax or rate charge, such as proposed in H.40, is used to finance these investments.

⁸ Based on telephone conversations with both DPS personnel and knowledgeable critics of the prior SPEED-based RECs.

- 4) ***Many of the broad objectives of H.40 could be accomplished with less economic distortion and greater efficiency as a revenue-neutral carbon tax.*** Although this is not a part of the subject legislation, it's difficult to analyze the myriad programs, accumulating incentives and escalating regulations without considering simpler policy options such as this. British Columbia instituted such a program in 2008 (as have about 15 nations to date), which has been generally perceived as effective.⁹ Since implementation, its economic growth has exceeded national rates, it has significantly reduced per capita carbon consumption and it has the lowest personal income tax rates in Canada (since the revenues are returned to taxpayers primarily through income and corporate taxes).

SUMMARY OF REVIEW TO DATE

H.40 offers an expansive program to achieve renewable electric power generation and use goals, avoid significant electric power rate increases from potentially unmarketable SPEED RECs, reduce fossil fuel consumption, and encourage community-scale distributed power generation in the State. While program review is still ongoing, initial JFO analysis indicates significant net potential economic and environmental benefits from the program, subject to fuel price and other program performance assumptions.

Given the magnitude of the expenditures proposed, it is essential to have comprehensive program performance audits in order to verify savings and inform future program adjustments that could optimize the State's return on investment.

⁹ See, for example, a World Bank analysis at: <http://blogs.worldbank.org/climatechange/british-columbia-s-carbon-tax-shift-environmental-and-economic-success>