

Pathways for Energy Efficiency in Virginia

Model User Manual

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Description:

Energy Futures Group, Inc. (EFG) has developed an Excel-based modeling tool that facilitates development of different combinations of programs and savings levels that can lead Dominion to achieve its Virginia Clean Economy Act (VCEA) targets. The model projects multi-year total portfolio energy savings by summing savings from 1) Dominion’s approved and proposed programs described in its 2020 Integrated Resource Plan, and 2) user-selected base¹ and equity-focused energy efficiency programs from utilities comparable to Dominion.

The model allows users to alter inputs for certain variables (penetration rate, ramp up period, and state/end date) that will change the level of savings achieved from the base and equity programs (within given parameters) to calculate multi-year energy savings. This allows the user to create and consider scenarios using varying levels of savings from different programs that will reflect possible pathways for Dominion to achieve the VCEA targets. The model indicates whether the inputs reflect a scenario in which Dominion would achieve its 2022-2025 targets and illustrates incremental annual savings² and total annual savings³ in future years through 2031.

Model Tabs:

The **Inputs-Start Here** tab is where the user can make adjustments to the model. The user can select penetration rate, length of ramp up (years), and program start and end year on this tab (variables explained below). The resulting savings are reported on this tab as well – including if Dominion meets the VCEA target and the 15% low- and moderate-income (LMI) investment requirement. The total annual savings achieved from LMI programs is also reported here as a percent of total portfolio savings. The chart on this tab displays total annual savings broken out by base program.

¹ The term “base programs” as used here, refers to common program types from which program administrators achieve most of their portfolio savings. For residential programs, the base programs include appliances and lighting, HVAC, whole house-retrofit, new construction, market rate multifamily, and behavioral. Non-residential base program categories include prescriptive, custom, new construction, small business, and large energy users.

² Incremental annual savings are annual savings from equipment installed or activities conducted in a given year, or the difference between the energy use of the measure in that year and the energy use of the measure they are replacing (i.e., the baseline). Incremental annual savings do not include savings from measures installed in earlier years that are still in place.

³ Total annual savings are the savings in a particular year from new measures installed in that year plus the savings still persisting from measures installed in prior years.

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There are **12 base program tabs**, each with the same structure with the exception of the LMI tab, which has three programs in the tab. No inputs are needed here. The base programs are common program types from which program administrators from peer utilities⁴ achieve most of their portfolio savings. The tool uses these base programs to illustrate likely avenues that would lead Dominion to achieve the majority of its savings in the proposed scenarios.

Following the **Inputs-Start Here** tab is the **Savings Output tab**, which compiles total annual savings and incremental annual savings from each of the 12 base programs. The **Cost Output tab** is a compilation of the total program implementation costs (\$/year) for each year. This tab also displays the percent of costs allocated to LMI programs. The **Cost Comparison tab** compares the costs (\$/MWh) in 2025 of the user's scenario with the comparison utilities as well as scenarios developed by EFG. This includes the following scenarios:

- High Residential: A portfolio that focuses on savings achieved from residential programs that provide significant savings to families, including residential HVAC, whole house retrofits, new construction, market rate multifamily, and, to some extent, appliances and lighting (reflecting changing standards and market maturity for screw-based LED lighting).
- Balanced Lower Cost: A balanced portfolio of programs that reflects the lower end of potential program spending necessary for Dominion to meet VCEA targets through 2025.
- High Small Business: A portfolio that places an emphasis on providing energy savings for small business customers, while putting moderate emphasis on non-residential prescriptive, custom, and new construction categories.
- Enhanced LMI: A portfolio that places an emphasis on providing higher levels of energy savings for LMI customers.

In addition, there are the **Index_Penetration**, **Index_Cost**, and **Index_EUL** tabs, which contain metrics from the 12 comparison utilities and serve as the reference for the numbers used in the

⁴ In order to develop realistic scenarios for Dominion to achieve its VCEA targets, the model included savings and costs data from similar utilities. The 12 utilities included were those achieving at least one percent incremental annual savings in relatively similar geographies, including utilities located in the Southeast or Midwest. These include AEP Ohio, Ameren Missouri, Baltimore Gas and Electric, Commonwealth Edison, Consumers Energy, Duke Energy Carolinas, DTE Electric, Duke Energy Ohio, Entergy Arkansas, MidAmerican Energy, Ohio Edison, and Xcel Minnesota. Data for each utility come from their 2018 DSM filings.

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base program tabs. Dominion's Category 1 Programs and Category 1 Savings are displayed in tabs with their respective names and are used as inputs for each of the base program tabs.⁵

How to Use the Modeling Tool:

1. On the **Inputs-Start Here** tab, start by selecting INPUTs for the set of programs you want to include in Dominion's portfolio:
 - *Penetration rate*- this variable is the level of uptake of a program, represented by a percent of Dominion's sector sales. The options for input for penetration rate are zero, low, medium, and high. Each option represents a specified level of savings as a percent of sector sales. The percentages vary by base program and will reflect the range of program achievement by comparable utilities and program administrators. This sets an upper boundary on what can be incorporated into the model, as the input for the model cannot go any higher than what has been demonstrated to be feasible by the comparable program administrators.
 - *Ramp up period (years)*- this variable describes the period of time a program requires to reach its full annual savings level. The ramp up savings increase linearly, and the input can be between one to five years.
 - *Start year and end year of each program* - these variables incorporate a program's implementation life, indicating how long a new program will achieve incremental annual savings. New proposed programs will start in or after 2022 (though Category 1 savings are also shown for 2020 and 2021) and the model will project new annual and persisting savings through 2031, to incorporate 10 years of savings from 2022, when the first modeled programs are instituted.

Note: these other variables won't change, but they help drive the results:

- *Estimated useful measure life*- this variable is the number of years that a measure will last. After this time has passed, contributions toward total annual savings will stop, and expired savings begin to be taken out. This has been calculated based on a survey of comparable utilities for each base program and cannot be altered.
- *First year/maximum program savings (MWh)*- these variables will automatically be calculated when the penetration rate and ramp up rate are selected. These variables are

⁵ Category 1 programs include all Dominion energy efficiency programs approved by the State Corporation Commission through 2020. To forecast energy savings from Dominion's Category 1 programs in the model, select a penetration rate of "zero" for all programs in the "Inputs-Start Here" tab.

the energy savings in megawatt hours achieved by a program during its first year of implementation and when the program is fully implemented.

- *Costs (\$/MWh)*- this variable has been calculated based on a survey of program costs of comparable utilities for each base program. Cost is not a variable that can be altered.

2. Look at the OUTPUTS:

The model provides a snapshot of outputs on the **Input** tab; the full outputs are on the **Savings Output** and **Cost Output** tabs

- *Costs (\$)*- sum of costs from all base programs, combined with Dominion's Category 1 programs, for years 2020 to 2031 in nominal \$, based on 2018 reported program costs.
 - *Assessment if LMI 15% investment requirement is met* - comparison of costs allocated to LMI programs to total costs and "yes/no" if this is above or below 15%.
- *Incremental annual savings*- sum of incremental annual savings from all base programs, combined with Dominion's Category 1 programs, shown as MWh saved and as a percent of 2019 retail sales. The percentage will turn red above 2%. This reflects the fact that this is a level of savings not currently achieved by comparison utilities.
- *Total annual savings*- sum of total annual savings from all base programs including as MWh saved and as a percent of 2019 retail sales.
 - *Assessment if VCEA 2022-2025 targets are met* - comparison of total annual savings from all programs to the VCEA targets of the respective year and "yes/no" depending on if the target is met.

As the user alters the input tab, the outputs will change.

3. Modify inputs as needed to achieve desired scenarios.

If the user creates a scenario that does not meet the VCEA or LMI targets, consider first increasing the penetration rate input to alter the scenario. The next step would be to alter the ramp up rate.

4. Save your work.

If the user creates a scenario that they want to keep, they should save it as a new, separate workbook. This will enable the user to keep the scenario while maintaining the ability to alter the model for different scenarios.