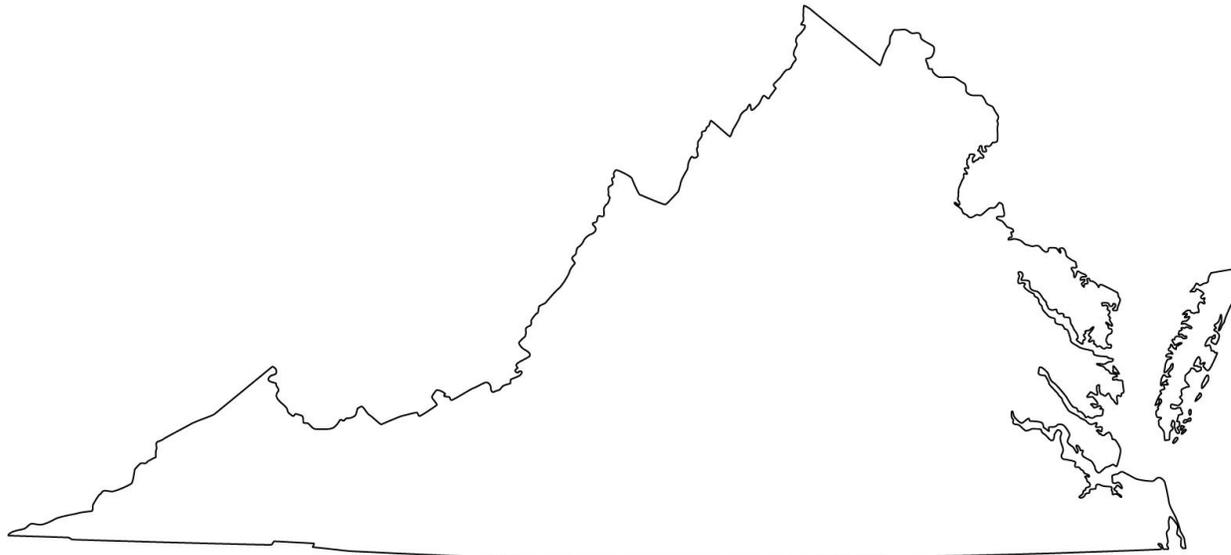


Interpreting and tracking progress toward the 2014 Virginia Energy Plan electricity conservation goal



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Governor's Executive Committee on Energy Efficiency
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Presentation Topics

- Review from last meeting
- Utility data: average usage per customer
- Interpreting and tracking progress towards meeting the 10 percent conservation goal

2007 and 2014 Virginia energy consumption goals

- Statute: 2007 Acts of Assembly, Chapter 933, Clause 3:
“The Commonwealth shall have a stated **goal of reducing the consumption of electric energy by retail customers ... by the year 2022 by an amount equal to ten percent of the amount of electric energy consumed by retail customers in 2006.**”

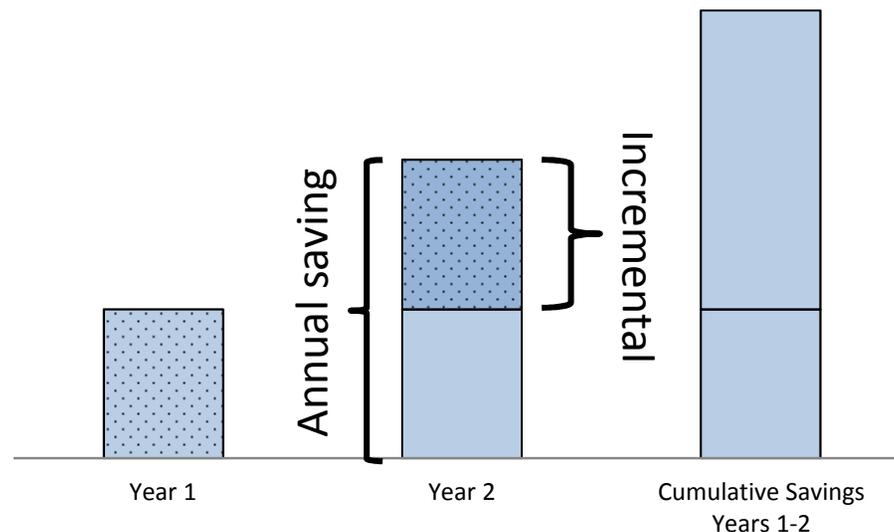
- 2014 Virginia Energy Plan:
“**Establish the Board on Energy Efficiency [Governor’s Executive Committee on Energy Efficiency] to develop a strategic plan to achieve the voluntary goal of reducing energy consumption by 10% by 2020, accelerating the 2007 Virginia Energy Plan goal by two years.**”

Governor's Executive Committee tasks

- **Develop measurement and verification method to track consumption and determine Virginia's progress towards meeting goal**
- Identify barriers and opportunities to meet goal
- Review best practices in cost recovery and incentives to utilities
- Plan outreach efforts
- Identify financing tools
- Recommend new programs or policy changes to support energy efficiency upgrades for low-income Virginians especially in Southside and Southwest Virginia
- Review existing Virginia-specific studies

Terminology

- Incremental savings: NEW savings in avoided energy consumption for a given year
- Annual savings: Savings in avoided energy consumption for a given year (including prior year savings that are still within useful life)
- Cumulative savings: Sum of annual savings



There are several ways to characterize the 2014 Goal

1. Reduce total consumption to 10% below amount consumed in the baseline year

2. Reduce baseline “intensity measure” by 10%

3. Achieve an **annual** savings of 10% of the baseline year (2006) consumption **in** the target date (2020)

4. Achieve a **cumulative** savings of 10% of the baseline year (2006) consumption **by** the target date (2020)

Top-down
evaluation

**Measure:
consumption**

Bottom-up
evaluation
relies on
determining
savings at a
more granular
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**Measure:
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Presentation Topics

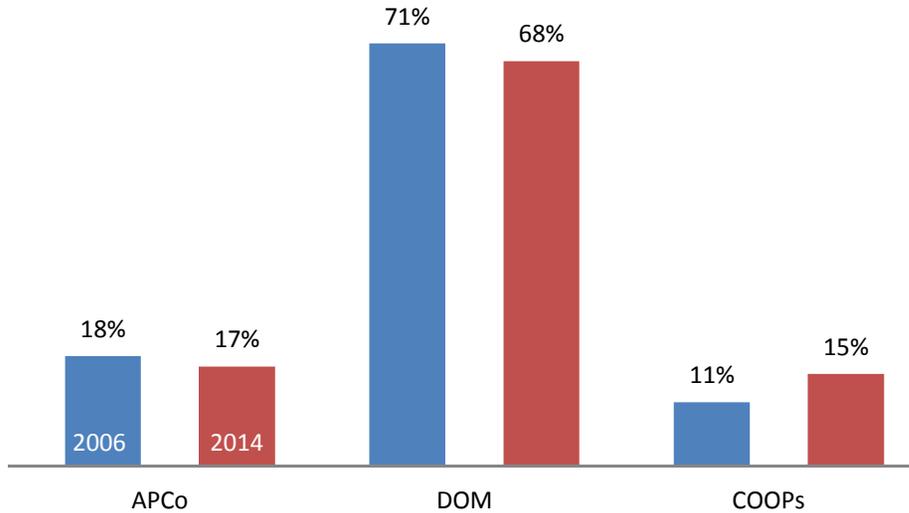
- Review from last meeting
- **Utility data: average usage per customer**
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Utility Data

- Take a “deeper dive” into consumption data
- Utilities provided DMME with sales data from 2005-2014
- Different customer classes:
 - Residential
 - Small commercial/industrial (usually under 1,000kVA)
 - Large commercial/industrial (usually over 1,000kVA)
 - Public authorities/outdoor lighting
 - Churches/synagogues/places of worship (some utilities broke this out, others included it in the residential sector)
- Differences in categories required aggregation:
 - Residential, Commercial and Industrial, Other

Although investor-owned utilities comprise over 90% of electricity sales, electric cooperative comprise a growing share of Virginia's electricity market

Electricity sales as a proportion of total

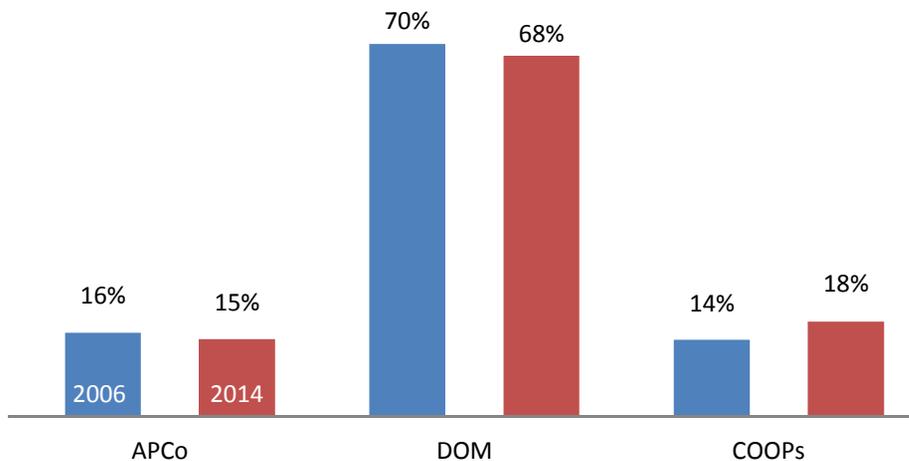


2014 Total Electricity Sales: 95,900 GWh

+10% increase

2006 Total Electricity Sales: 87,200 GWh

Electricity customers as a proportion of total



2014 Total Customers: 3.48 million

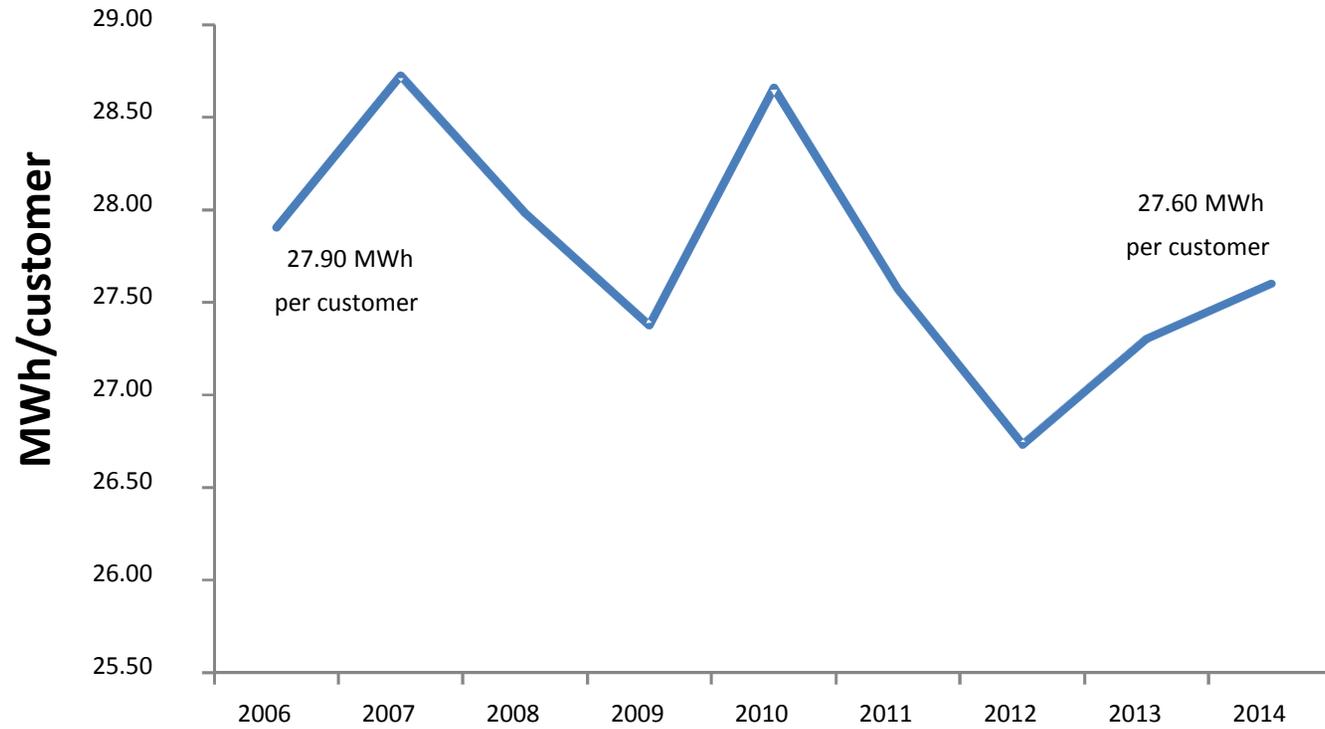
+11% increase

2006 Total Customers: 3.13 million

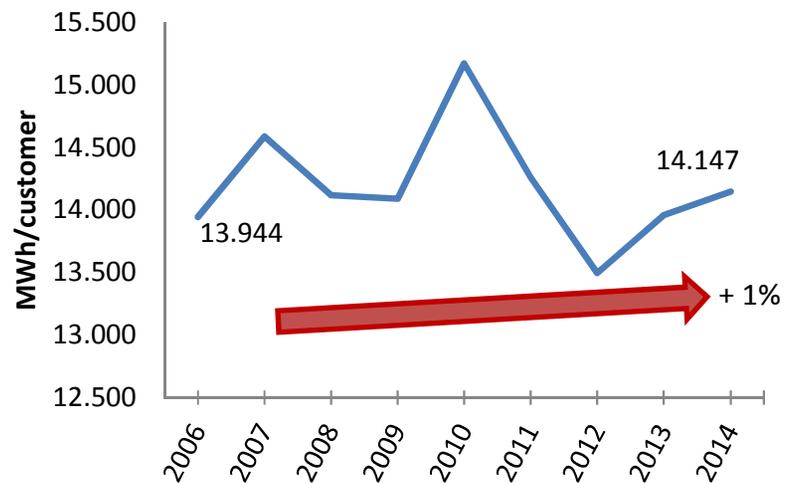
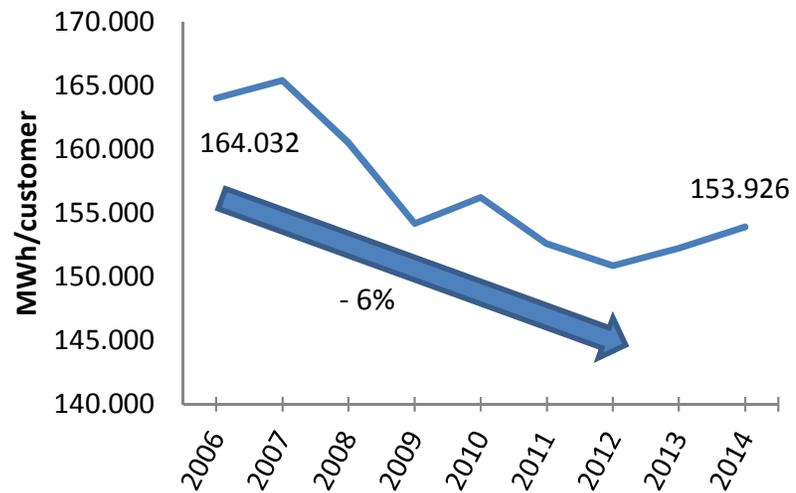
What the utility data tell us about customer types

	2006		2014		% Δ
	Consumption				
Commercial and Industrial	46,700 GWh	53.5%	50,400 GWh	52.6%	+8% ↑
Residential	39,500 GWh	45.3%	44,400 GWh	46.2%	+12% ↑
Other	1,060 GWh	1.2%	1,140 GWh	1.2%	+8% ↑
	87,200 GWh		95,900 GWh		+10% ↑
	Average Customer Count				
Commercial and Industrial	0.28 million	9.1%	0.33 million	9.4%	+15% ↑
Residential	2.8 million	90.6%	3.14 million	90.2%	+11% ↑
Other	0.01 million	0.3%	0.01 million	0.4%	+17% ↑
	3.13 million		3.48 million		+11% ↑
	Average Usage Per Customer				
Commercial and Industrial	164.0 MWh/customer		153.9 MWh/customer		-6% ↓
Residential	13.9 MWh/customer		14.1 MWh/customer		+1% ↑
Other	99.6 MWh/customer		91.7 MWh/customer		-8% ↓
	27.9 MWh/customer		27.6 MWh/customer		-1% ↓

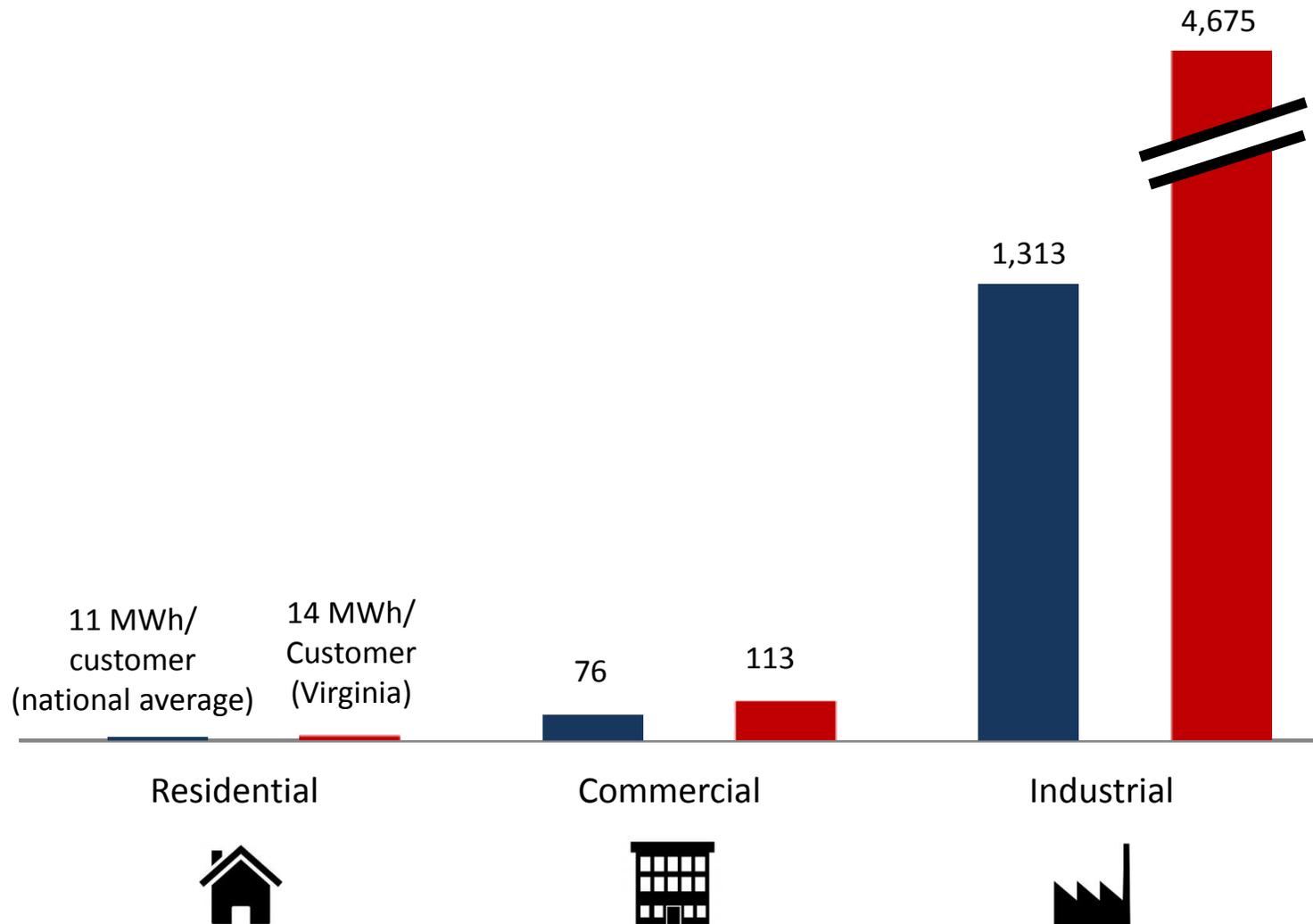
Total electricity usage per customer declined
from 2006 to 2014 by about 1%



Usage per customer by commercial and industrial users has declined more than it has for residential customers from 2005 to 2014

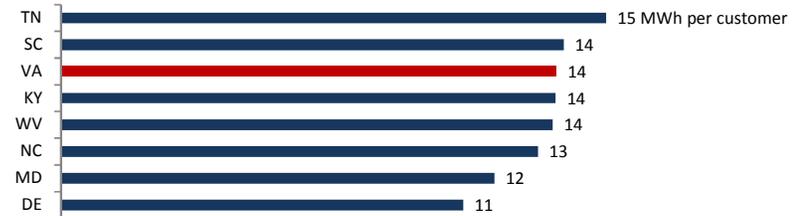


2014 electricity consumption per customer in Virginia is higher in all categories when compared to the national average (EIA Data)

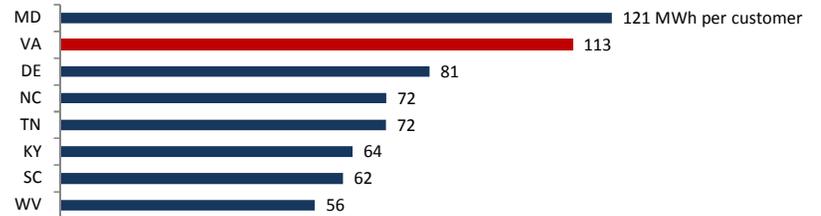


Electricity consumption per customer in Virginia is higher in most categories compared to other states in similar geographic region in 2014 (EIA Data)

Residential customers



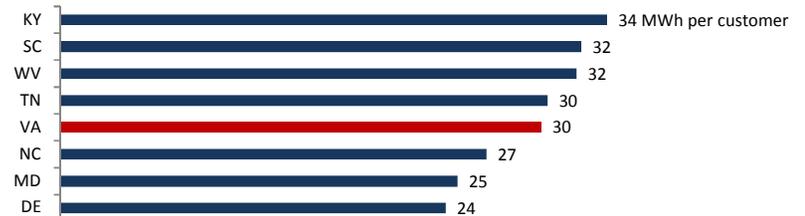
Commercial customers



Industrial customers



All customers



Conclusions

- Electricity consumption per customer in each utility depends on its customer base
- Appears to be some opportunity for electricity savings in the all sectors, particularly among residential customers
- Analyzing usage per customer has some limitations
 - Categories are not too detailed and can be defined differently by reporting entities
 - Customers relate to number of meters which can be different than number of actual users (i.e. one commercial meter serving multiple commercial tenants)

Next Steps

- Deeper look at sub-categories of commercial and industrial customers
- Use other measures like population and counts of businesses instead of customer counts
- Normalize data for weather changes

DMME will work with utilities to make adjustments for weather variation



Heating degree days:

Amount by which the daily average temperature is below 65 degrees Fahrenheit

Cooling degree days:

Amount by which the daily average temperature is above 65 degrees Fahrenheit

Proposals to normalize for weather

- Use heating degree days and cooling degree days as a measure of weather variation
 - Annual figures
 - Rolling averages
- Rolling average of consumption measure over time (i.e. two or three year average)
- Other alternatives?

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Four ways to characterize the 2014 Goal

1. Reduce total consumption to 10% below amount consumed in the baseline year

2. Reduce baseline “intensity measure” by 10%

3. Achieve an **annual** savings of 10% of the baseline year (2006) consumption **in** the target date (2020)

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DMME evaluated each approach using several research activities

- Spoke to staff with utilities and efficiency groups (ACEEE)
- Met with staff at the Virginia State Corporation Commission
- Reviewed prior Virginia “efficiency potential studies”
- Reviewed other literature pertaining to electricity demand side management

DMME analyzed each approach by considering five criteria

- Attributability
- Difficulty
- Distribution of responsibility
- Clean power plan compliance
- Achievability

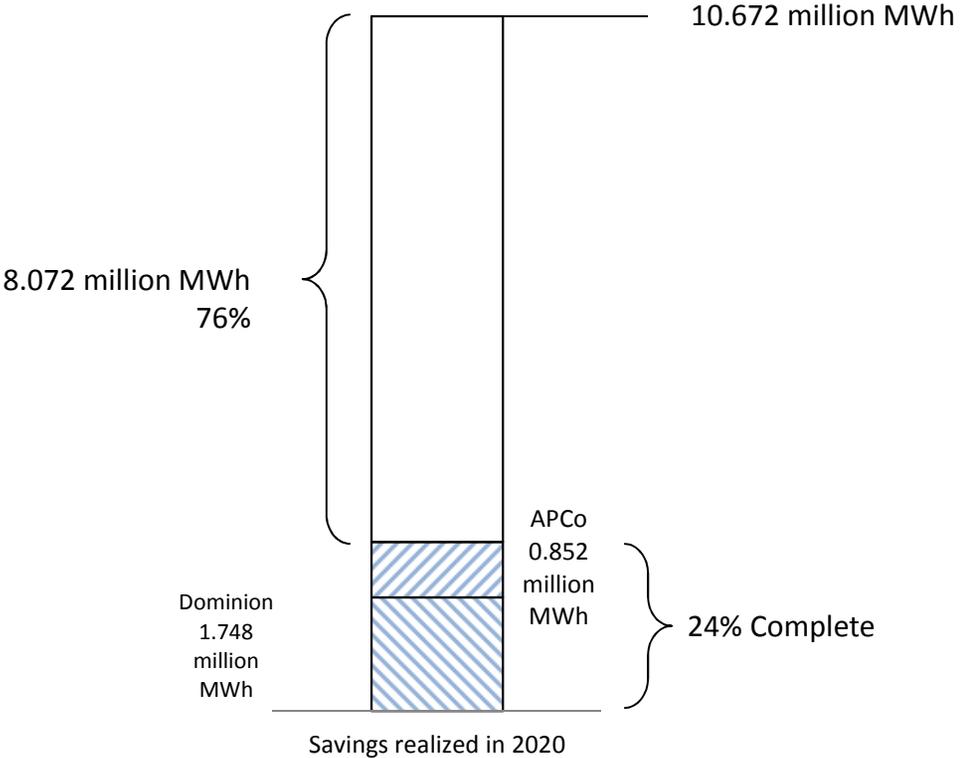
	Attributability	Difficulty	Responsibility	CPP Compliance	Achievability
Approach 1 Total consumption (MWh consumed in 2020)	Poor – Total consumption tells us very little about efficiency.	Low – This is the simplest and easiest way to track progress.	Unclear – Any entity could track total consumption.	None – Little to no M&V requirements that would be acceptable to air quality regulators.	Unlikely – Given present economic and population trends, reducing total consumption by 10% of 2006 levels seems unlikely.
Approach 2(a) Consumption intensity (MWh/person)	Satisfactory – Usage per person accounts for population changes, but not other factors.	Medium – This requires gathering population/customer data from various sources, but is not too difficult.	Shared – Utilities and government will need to share information and responsibility with a heavier emphasis on non-utility programs.	None – Little to no M&V requirements that would be acceptable to air quality regulators.	Likely – Given present trends, the Commonwealth is about 25% of the way towards decreasing this metric by 10% of its 2006 level.
Approach 2(b) (MWh/million \$ gross state product)	Satisfactory – Usage per dollar of gross state product accounts for economic changes, but no changes in population or weather.	Medium – This requires gathering economic data from sources such as the Bureau of Economic Analysis, which is usually delayed by a year, but is not too difficult.	Shared – Utilities and government will need to share information and responsibility with a heavier emphasis on non-utility programs.	None – Little to no M&V requirements that would be acceptable to air quality regulators.	Likely – Given present trends, the Commonwealth is about 33% of the way towards decreasing this metric by 10% of its 2006 level.
Approach 3 Annual savings (MWh/year)	Good – Annual savings reflect the sum of incremental savings that are still within their useful life. This measure is most meaningful in determining how much energy retail consumers are saving each year.	High – This approach means having a means to measure and verify that MWh saved are actually the result of energy efficiency policies and programs and may entail sophisticated statistical analysis and engineering modeling.	Concentrated – Utilities and program administrators will have the responsibility to report savings from their programs and conduct measurement and verification activities.	Most – It is likely that the MWh tracked under this approach would be eligible for use in Virginia’s plan to comply with the upcoming federal greenhouse gas emissions reduction regulations.	Likely – Given the 2015 integrated resource plans of Virginia’s investor-owned utilities, their combination of planned, proposed and approved DSM programs would get Virginia about 24% of the way towards meeting the 10% conservation goal.
Approach 4 Cumulative savings (MWh saved over 4-5 year period)	Good – Requires the same degree of attribution as approach 3.	High – Requires the same measurement and verification practices as approach 3.	Concentrated – Will have the same distribution of responsibility as approach 3.	Some – Although able to track annual savings, cumulative savings are most relevant in determining cost savings as opposed to pollution abatement benefits of efficiency programs and policies.	Very likely – Because this goal is cumulative, annual savings are added together, and this becomes the easiest approach. Dominion’s 2014 IRP containing planned, proposed and approved DSM programs would achieve 85% of required savings by 2020.

Tracking progress from the bottom-up and top-down

- Interpret the goal to mean: achieve an annual savings equivalent to 10.7 million MWh (10% of what was consumed in 2006 according to EIA) in the year 2020 (2014 Virginia Energy Plan)
- Measure conservation from utility and non-utility programs
 - Utility Programs (air conditioning cycling program, home energy check-up program, duct sealing program, appliance recycling program, etc...)
 - Commercial PACE
 - Green Community Program
 - Performance Contracting
 - Information campaigns, appliance standards, building codes, etc...
- Continue to periodically track usage per person, usage per dollar gross state product, peak winter and summer demand
- Next steps will involved determining how much each program category can help Virginia meet the goal

Current progress towards meeting Virginia Energy Plan Goal

What is currently planned by the two major utilities gets Virginia 24% of the way towards meeting the 10% conservation goal. The DSM programs included are programs that have been approved, proposed and planned in the respective utility's integrated resource plan (IRP)



Thank you.

Questions?

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