# Faith Alliance for Climate Solutions
# Comments on Fairfax County CECAP Documents Provided for the March 31 Task Force Meeting

The Faith Alliance for Climate Solutions (FACS) appreciates the opportunity to provide input into the planning process. We have several concerns about the draft CECAP planning documents. We offer several recommendations for improving the preliminary models that we hope will improve the County's likelihood of reaching an 80% reduction by 2050. We believe a much more ambitious goal for CECAP should be set: net neutrality by 2045 if not sooner.

The GHG estimates do not appear consistent between Fairfax's GHG emissions inventory and two MWCOG estimates. Fairfax County's 2013 GHG inventory, the MWCOG's Fairfax County GHG Inventory Fact Sheet and MWCOG's CECAP draft emissions scenario document scenario planning document are inconsistent. Fairfax's GHG inventory and MWCOG GHG estimates for the same year differ as much as 23%. The two MWCOG documents differ by 7.5% to 8.5%. Fairfax's trash incinerator GHGs reported to the EPA are more than 4 times greater than the CECAP planning documents. Other emissions estimates in the draft MWCOG documents appear to undercount or omit sources of GHGs.

The draft emission scenarios (v.2) appear to unnecessarily limit potential sources of emissions reductions from the planning models. Although the scant statistical methodology in Methodology Report makes it difficult to replicate each model's projections, we are concerned that major sources of GHG emissions do not seem to be included in even the most aggressive model E. Fossil fuel-based heating of residential and commercial buildings and all vehicles other than passenger light duty vehicles appear to be arbitrarily excluded from the models. All sources of GHGs must be on the policy table if the county hopes to reach ambitious GHG reduction goals.

We attempted to independently simulate the five MWCOG models using the Energy Policy Simulator (EPS). The Simulator is an online, open source, research-based tool that was developed by Energy Innovation Policy and Technology in partnership with MIT, Stanford, Argonne National Laboratory, the National Renewable Energy Laboratory, Lawrence Berkeley National laboratory and others. Our simulations attempting to replicate the policies in the five MWCOG models suggest that actions by the state will be necessary to supplement vigorous, comprehensive action locally to achieve significant GHG reduction goals. Action by the county on all sources of GHGs will need to be included, as well. In an attachment, the Faith Alliance for Climate Solutions presents our simulations of the five models and suggestions of actions at the County, State and Federal level that could give Fairfax a better chance of achieving net GHG neutrality by 2045 or sooner.

## Emissions estimates are inconsistent.

Fairfax County's GHG inventory estimated its county-wide GHG emissions were 11.84 MMTCO2e in 2006. The MWCOG Fairfax County GHG Fact Sheet estimates 14.63 MMTCO2e in 2005. The MWCOG CECAP planning documents show Fairfax's 2005 GHGs were 13.63 MMTCO2e. There is a 23% difference between the county's GHG estimate in 2006 and MWCOG's Fairfax fact sheet and a 7.5% difference between the two MWCOG estimates. In the CECAP planning document, MWCOG estimates Fairfax GHG emissions in 2015 at 12.21 MMTCO2e. In MWCOG's Fairfax GHG Factsheet, the estimate was 13.24 MMTCO2e. There is an 8.5% difference.

## CECAP GHG estimates undercount actual emissions.

Covanta Fairfax is the County's sole trash incinerator. MWCOG reports that waste accounted for 213,737 MTCO2e in 2018. The EPA's 2018 eGRID and NEI show that the Covanta Fairfax emitted 1,166,305 MTCO2, 1,507 tons of NOX and 35.34 tons of methane. The EPA Emissions & Generation Resource Integrated Database (eGRID) and the National Emissions Inventory (NEI) are comprehensive sources of data on the environmental characteristics of almost all electric power generated in the United States. The EPA and IPCC rate NOX as 298 times more potent a GHG as CO2, and methane as 25 times more potent. Including 1,507 MTNOX and 35.34 tons of methane increases the 2018 Covanta Fairfax total by 449,970 MTCO2e. The total emissions for 2018 were 1,616,275 MTCO2e. The MWCOG estimate is only 13% of the eGRID and NEI GHG emissions for Covanta Fairfax.

| Plant state abbreviation | Plant name | Unit unadjusted ozone season heat input (MMBtu) | Unit unadjusted annual NOx emissions (tons) | Unit unadjusted ozone season NOx emissions (tons) | Unit unadjusted annual SO2 emissions (tons) | Unit unadjusted annual CO2 emissions (tons) |
|---|---|---|---|---|---|---|
| PSTATABB | PNAME | HTIOZ | NOXAN | NOXOZ | SO2AN | CO2AN |
| VA | Covanta Fairfax Energy | 1,156,390 | 384.4 | 150.3 | 19.1 | 294,615.0 |
| VA | Covanta Fairfax Energy | 1,169,121 | 369.2 | 146.1 | 12.1 | 294,331.8 |
| VA | Covanta Fairfax Energy | 1,267,883 | 399.5 | 164.8 | 45.8 | 306,286.5 |
| VA | Covanta Fairfax Energy | 1,117,696 | 353.6 | 145.3 | 6.0 | 271,071.8 |
| | | 4,711,090 | 1,507 | 607 | 83 | 1,166,305 |

## County emissions may be undercounted:

Direct county emissions may be undercounted by a factor of 4. The chart on slide 30 indicates total county operations emissions were **562,439** MTCO2e. The total includes 213,737 MTCO2e for solid waste facilities and 4,095 MTCO2e from wastewater.

There are three sources of undercounting. First, as noted above, Covanta Fairfax GHG emissions reported to EPA eGRID and NEI in 2018 were 1,616,274 MTCO2e. Second, Noman Cole Wastewater Treatment Plant emissions of 312 MTCO2 and 27 tons of NOX , the equivalent of 8,358 MTCO2e. Finally, wastewater treatment emissions from the facilities handling 58% of Fairfax's wastewater are not included. Fairfax sends 58% of its liquid waste to facilities not included in the inventory (Alexandria Renew treats 32.4 million gallons per day or 20%; Blue Plains Treatment Plant treats 31 million gallons per day or 19%; Upper Occoquan Sewage Authority treats 27.6 million gallons per day or 17%; and Arlington Water Pollution Control

Plant treats 3 million gallons per day or 1.9%. None of the emissions from the 58% of wastewater treatment is counted in the Fairfax totals. It would be reasonable to include a proportion of the emissions from these wastewater treatment facilities.

Using these figures and data from Fairfax and FCPS energy websites yields the following:

Direct emissions from Fairfax government operations in 2017: 128,246 MTCO2e
Direct emissions from FCPS operations: 171,083 MTCO2e
Covanta Fairfax 2018 (from the 2018 eGRID and NEI): 1,616,274 MTCO2e
Noman Cole emissions: 8,358 MTCO2e
Total emissions from county operations: **1,923,961 MTCO2e**

## Planning models exclude important building emissions.

The planning models explicitly exclude nearly a quarter (24%) of the county's direct GHG emissions from buildings. Residential and commercial heating derived from natural gas, propane, oil and kerosene is not included in the GHG reduction models. By excluding heating, the models fail to include 1,094,325 MTCO2e of the 2,943,213 MTCO2e in residential GHGs. The models fail to include 438,305 MTCO2e of the 3,442,575 MTCO2e from commercial buildings. For the county to reach its GHG reduction goals, it will be necessary to drive down fossil fuel use to heat and cool buildings. Policies to strengthen building energy efficiency standards and to shift HVAC from natural gas and oil to zero emissions sources ought to be modeled for new and renovated buildings.

## Planning models exclude important transportation emissions.

The draft models explicitly exclude large classes of vehicles. Heavy duty vehicles, buses, mass transit, airplanes and off-road vehicles are not included. Although it is not possible to derive estimates directly from the MWCOG data, data from Fairfax county's 2013 GHG inventory provides some insight into the size of vehicle emissions excluded from the MWCOG models. Passenger vehicles, the only type of vehicle included in the MWCOG planning models, accounted for 2.936 MMTCO2e in 2010, according to the Fairfax inventory. Light duty vehicles added 0.505 MMTCO2, heavy vehicles 0.587 MMTCO2, metro and light rail 0.058 MMTCO2e, and off-road 0.488. We understand from county staff that the regional airports were excluded in the planning models, and no figures were easily accessible to determine the amount of GHGs emitted from airplanes, facilities and ground vehicles. Together, these excluded classes of vehicles accounted for 1.618 MMTCO2e. That is more than (55%) as much as passenger vehicles.

**Table 7: GHG emissions in Million $MTCO_2e$ by mobile source and year, 2006 – 2010**

| Source | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| **Total Vehicles** | | | | | |
| Total Passenger | 2.822 | 2.845 | 2.880 | 2.923 | 2.936 |
| Total Light Duty | 0.486 | 0.502 | 0.507 | 0.497 | 0.505 |
| Total Heavy Duty | 0.596 | 0.567 | 0.578 | 0.544 | 0.587 |
| **Total Vehicle** | **3.905** | **3.914** | **3.965** | **3.964** | **4.028** |
| **Transient Vehicles** | | | | | |
| Passenger | 1.456 | 1.474 | 1.507 | 1.532 | 1.545 |
| Light Duty | 0.251 | 0.260 | 0.265 | 0.261 | 0.266 |
| Heavy Duty | 0.308 | 0.294 | 0.302 | 0.285 | 0.309 |
| **Total Transient** | **2.015** | **2.027** | **2.075** | **2.078** | **2.120** |
| **Local Vehicles** | | | | | |
| Passenger | 1.366 | 1.371 | 1.373 | 1.391 | 1.391 |
| Light Duty | 0.235 | 0.242 | 0.242 | 0.237 | 0.239 |
| Heavy Duty | 0.288 | 0.273 | 0.275 | 0.259 | 0.278 |
| **Total Local** | **1.890** | **1.886** | **1.890** | **1.886** | **1.908** |
| **Local Rail** | | | | | |
| Metrorail | 0.053 | 0.052 | 0.050 | 0.048 | 0.054 |
| VRE | 0.002 | 0.004 | 0.005 | 0.004 | 0.004 |
| **Total Local Rail** | **0.055** | **0.056** | **0.055** | **0.052** | **0.058** |
| **Other Mobile Units** | | | | | |
| Off-Road | 0.429 | 0.438 | 0.448 | 0.458 | 0.468 |
| | | | | | |
| **Mobile Total** | **4.388** | **4.408** | **4.467** | **4.474** | **4.554** |

## Planning models likely underestimate water-related emissions.

The models only include nitrous oxide emissions from wastewater treatment. Considerable energy is needed to purify and pump water throughout the County. The county incinerates several hundred thousand tons of sludge annually. The EPA 2014 GHG emissions inventory shows Noman Cole Waste Treatment facility emits about 312 tons of CO2 and 27 tons of NOX. There are no estimates provided for the wastewater treatment facilities other than Noman Cole that handle 58% of the county's wastewater.

## Consumption-related emissions are important to include.

Although direct energy use is the most obvious target for CECAP, we should consider GHG reduction strategies that include consumption-related emissions. Much of the GHG emissions that could be attributed to Fairfax are emitted elsewhere. The production, distribution and elimination of items consumed here in Fairfax generate GHG elsewhere. Meat production is most obvious, but also the concrete and steel, plastics, cellphones, computers, fruits and vegetables, paper, etc. consumed in Fairfax are produced elsewhere, transported here and eliminated elsewhere. The C-40 cities have shown that consumption-based emissions account for 60% or more of urban GHG emissions. It seems fair that Fairfax planning to cut GHG emissions ought to consider emissions for the goods and services we consume.

## Models do not consider actively drawing down emissions.

To cut GHGs, it will be necessary to include strategies to actively drawdown GHGs. The book Drawdown summarizes research into more than 80 strategies for actively reducing GHGs. For each solution, the Drawdown research team projected global GHG reductions, costs to implement the strategy, the economic benefits accrued, and estimates of adoption rates over a 30-year horizon. At least 40 Drawdown strategies could be relevant to CECAP in Fairfax (listed at the end of this document). Potentially fruitful drawdown strategies include home and commercial recycling, reduction of food waste, expansion of tree canopy, changes towards plant-rich diets, biodigesters and mass transit-, bike- and pedestrian-oriented high-density redevelopment.

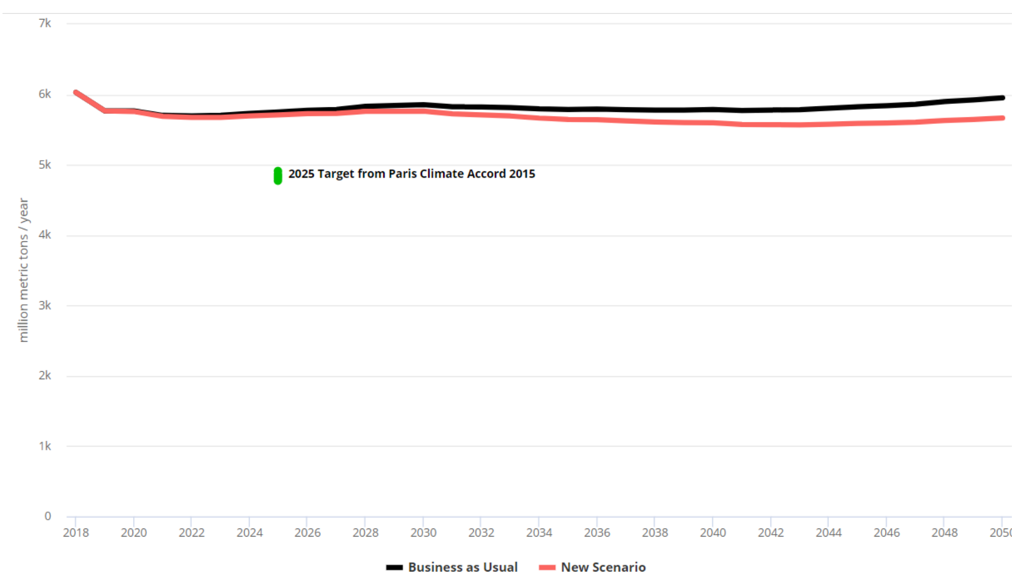
## FACS Simulation of MWCOG's models.

The MWCOG materials provide a general orientation to the methodology used to model five options. FACS attempted to independently simulate each model using the Energy Policy Simulator (EPS). It is important to note that the EPS models US emissions. As an open source tool, the Simulator can be adapted to Fairfax, NOVA or MWCOG region using locally available data for a very modest investment[i].

## MWCOG Scenario A- Low-Moderate

Models potential emissions reductions of modest energy efficiency improvements combined with moderate grid/renewables improvements. By 2030 – Models emissions reductions from modest energy efficiency-grid/renewables improvements (30% by 2030); 20% modest low carbon transportation improvements in light duty sector; Modest low carbon transportation combined with the energy components above. By 2050 - 52% models emissions reductions from improvement in energy efficiency grid/renewables; Growth in low carbon transportation improvements (41% for light duty); Growth in low carbon transportation combined with the improved energy component.

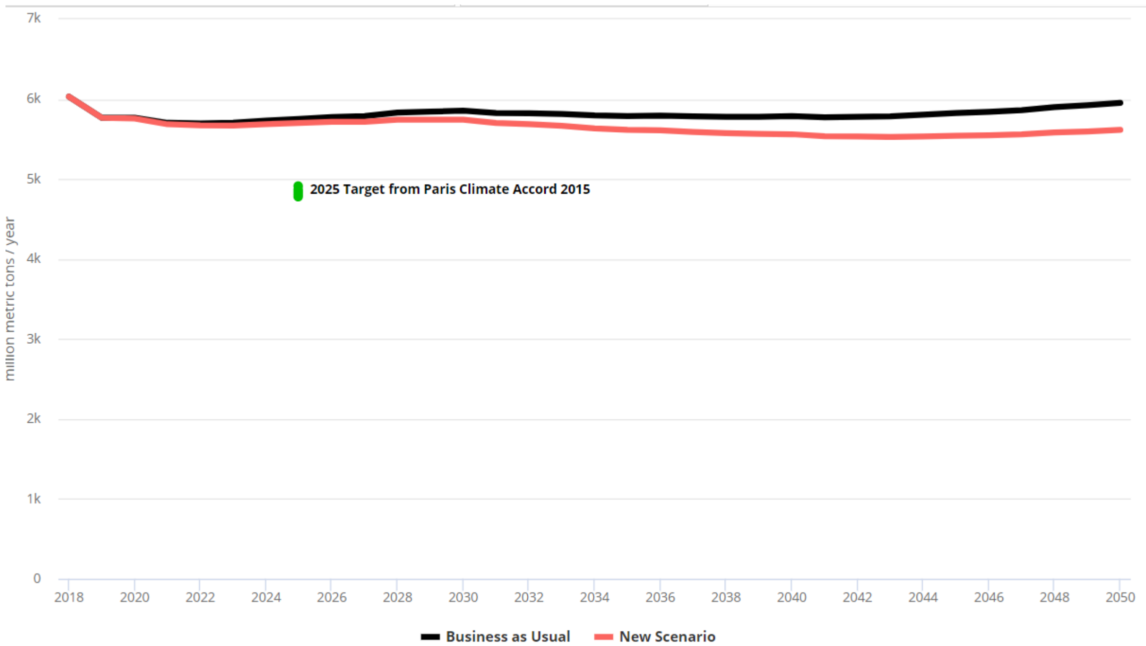
The Energy Policy Simulator indicates a tiny reduction in GHGs (orange line) compared to business as usual (black line).



### Scenario B- More Aggressive

More aggressive energy efficiency improvements combined with moderate grid/renewables improvements. By 2030 – Models emissions reductions from more aggressive grid/renewables improvements (41% by 2030); Higher penetration of low carbon transportation improvements in light duty sector (30%); Higher low carbon transportation combined with the improved energy components above. By 2050 – Models emissions reductions from more aggressive grid/renewables improvements (52% by 2050); More rapid expansion of low carbon transportation for light duty sector (47%); More rapid expansion of low carbon transportation for light duty sector combined with aggressive renewables.

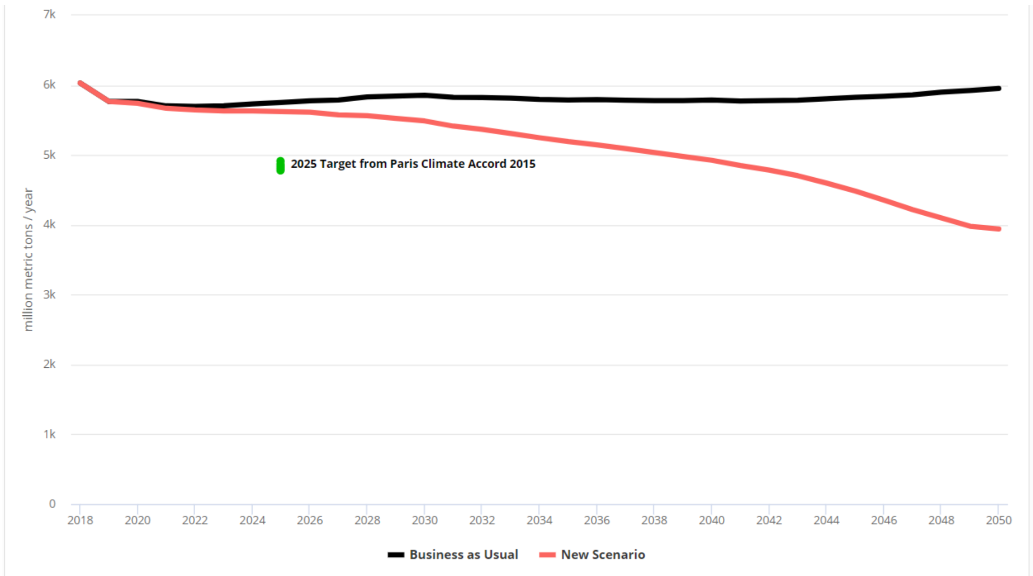
The Simulator indicates very little difference between Model A and B.




### Scenario C- Net Zero Grid, Low/High Penetration of Low Carbon Gas and Low Carbon Transportation Scenario

By 2050 - Net Zero Grid (100% by 2050); Low and high penetration of low carbon gas providing a net reduction in carbon emissions(15 to 35% by 2050); Near complete expansion of low carbon transportation for light duty sector (85%); Near complete expansion of low carbon transportation for light duty sector combined with net zero grid and low carbon gas.

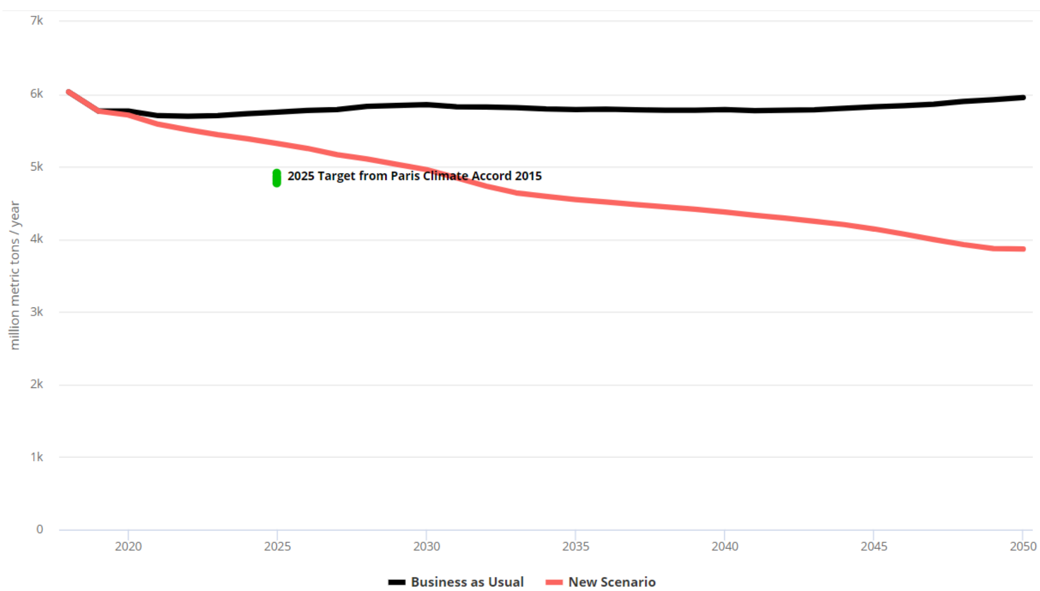
The Simulator indicates a much more substantial.




## Scenario D- Net Zero Grid and Low Carbon Transport

Achieve a zero-carbon emission grid by 2050 combined with substantial penetration of zero emissions vehicles in the light duty fleet. By 2050 - Net Zero Grid (100% by 2050), matching Virginia's Clean Economy Act's mandate; Near complete expansion of low carbon transportation for light duty sector (85%); Near complete expansion of low carbon transportation for light duty sector combined with net zero.

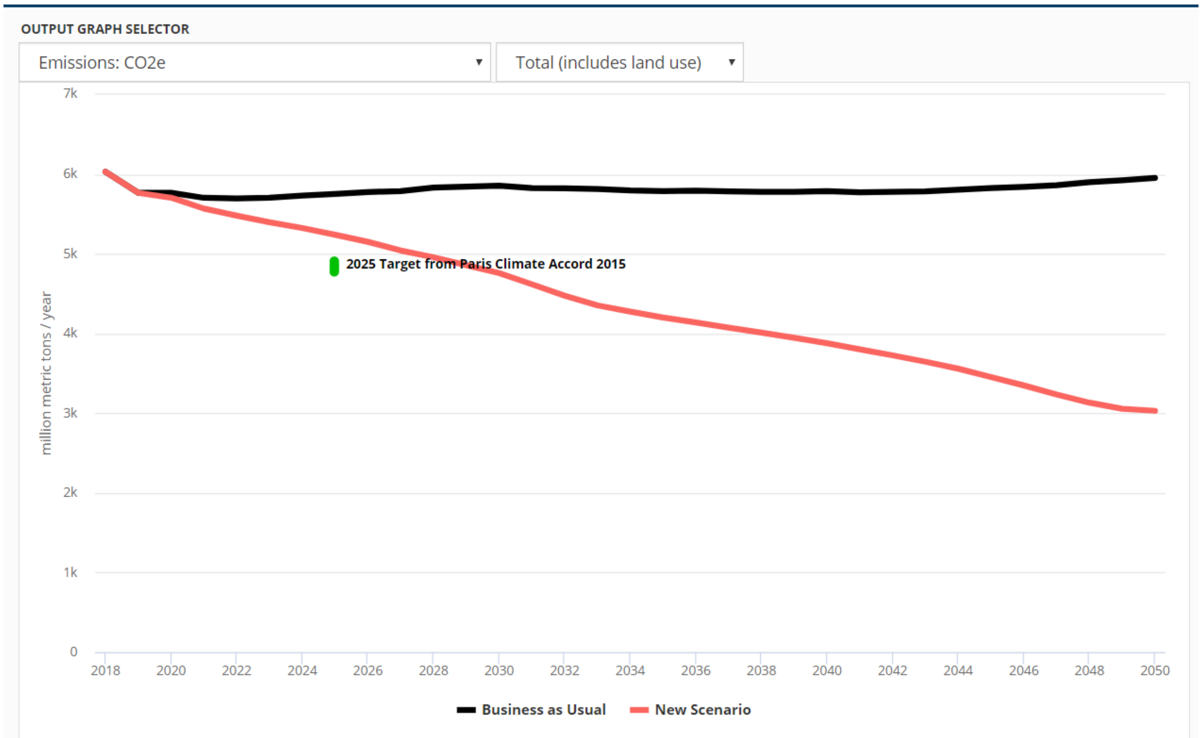
The Simulation reaches about one-third to Net Zero.




## Scenario E- Achieving an 80% reduction was met under the following scenario

Net zero grid. 50% of all gas therm usage for all residential and commercial sector uses is zero carbon/renewable gas. 75% of all on- and off-road vehicles and fuels are zero or low carbon. All HFCs are phased out and replaced with no global warming potential alternatives. Options to investigate additional potential scenarios for achieving additional reductions beyond the 80% scenario could include: Faster penetration of renewable natural gas Faster reductions in emissions from vehicles and fuels for medium and heavy-duty fleets, and off-road vehicles. Role of purchasing carbon offsets and RECs Electrification of heating and hot water systems Working Draft, subject to changes, v2 5 Full electrification of light duty fleets Waste and sanitation system changes Government operations represents approximately 4-5% of the community wide inventory and presents an unique opportunity to lead by example.

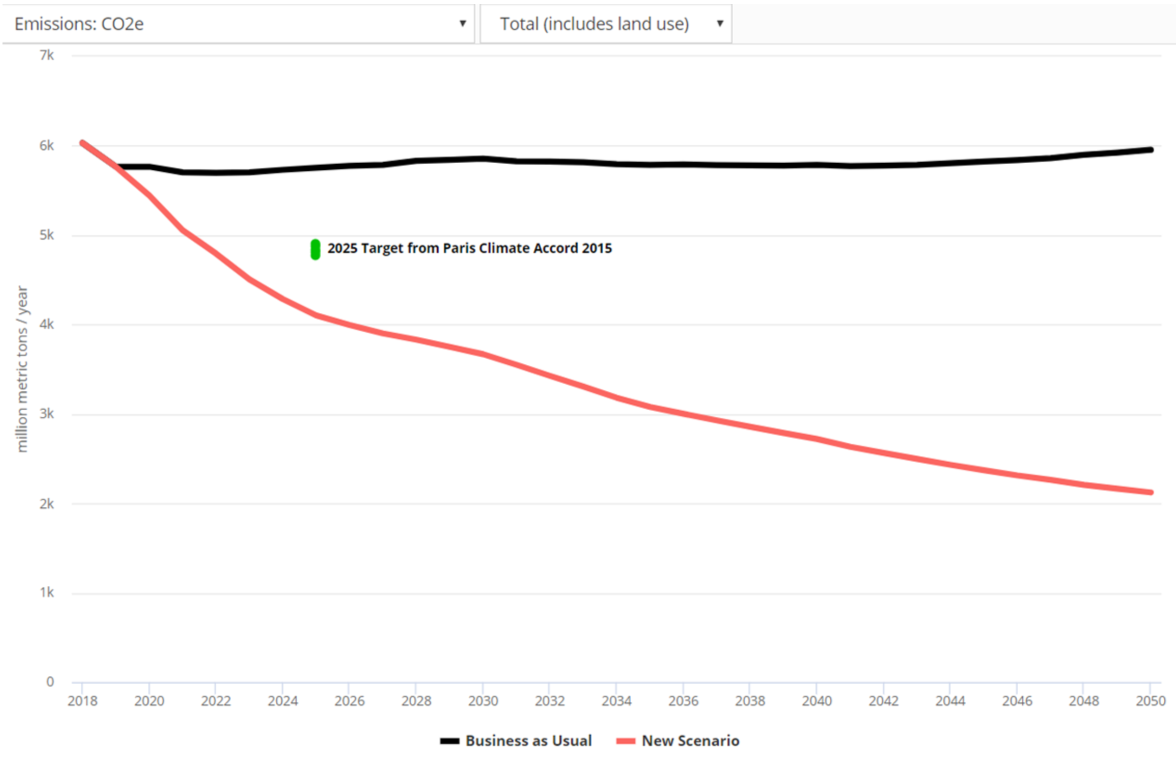
The Simulation indicates that Fairfax would reach about halfway to cutting its GHG emissions to net zero by 2050. Major GHG reductions come from 100% clean electricity and electric vehicle penetration. Driving down emissions in this scenario are reductions in building heating and cooling from fossil fuels and, very importantly, eliminating fluorocarbon refrigerants. Small, noticeable reductions also result from unspecified waste and sanitation system changes.




## Getting to net zero.

Fairfax can significantly reduce its GHG emissions. But it will also need a lot of help from the State and the Federal government. It will be impossible to get more than halfway to GHG neutrality with even the most aggressive policy action by the county. The recommendations below assume Model E as the starting point. Using the Energy Policy Simulator as a guide, FACS suggests CECAP planners consider policy action needed at three levels and determine how to work to achieve and implement these policies.

This is the “all in” simulation. Other sectors that could contribute to reductions were not modeled.  These include changes in industrial processes, e.g., cement and steel manufacturing. Research and development were not modeled.




## County-level policies.

### Transportation:

Expand electric vehicle infrastructure to 300 chargers/100,000 population. Aggressively promote EV use, expanding incentives to purchase and maintain passenger light vehicles, commercial light vehicles, and passenger heavy vehicles. Reduce passenger vehicle use through mass transit, high density development, expansion of mass transit, walking and bicycling infrastructure and incentives to use mass transit.

### Building:

In cooperation with the State, strengthen building efficiency standards for residential and commercial new construction and major renovations. Building efficiency standards should include building envelope, heating and cooling and appliances. incentives such as streamlined permitting, zoning proffers, financing (C-PACE, green bank), tax incentives, benchmarking could be used. Expansion of distributed power, microgrids and community solar should be vigorously supported.

### Waste management and wastewater:

Expansion of recycling, reuse, composting to cut waste stream. Implement alternatives to incineration of trash and sludge, e.g., biodigesters such as Blue Plains Wastewater Treatment

Plant, and cogeneration to use heat from incineration.  Improve methane capture and reuse at county and private landfills, wastewater and sewers.

### Refrigerants:

Move massively through regulation, incentives, policy to eliminate CFCs, HFCs in new construction and renovation, phase out CFCs and HFCs in existing uses.

### Agriculture and diet:

Expand urban tree cover. Incentivize plant-based dietary choices and discourage meat and animal dietary choices.

## State-level policies:

### Transportation:

Support EV infrastructure development. Incentivize electric vehicle purchase. Mandate (as California has done) EV sales requirement. Support reduced passenger vehicle use support of mass transit. Incentivize use of EVs.

### Building:

The state is primarily responsible for commercial and residential building standards. Strengthen building efficiency standards for building envelope, heating and cooling and appliances for residential and commercial new construction and major renovations. Create green financing mechanisms such as statewide C-PACE and green bank. Vigorously support distributed power, microgrids and community solar.

### Energy:

Ban new gas power plants. Require carbon free electricity. Expand demand response power. Retire coal plants early. Expand grid scale energy storage. Subsidize utility scale solar. Subsidize utility scale offshore and onshore wind. Provide solar feed in subsidy. Incentivize cogeneration with waste heat at utilities, waste incinerators, other industrial facilities (e.g., data server farms). Tax carbon in transportation (e.g., gasoline sales tax), electricity and building heating with fossil fuels.  End subsidies for coal, natural gas.

## Federal-level policies:

### Transportation:

Subsidize purchase of electric vehicles. Increase CAFÉ standards for passenger light duty, passenger heavy duty and commercial freight vehicles.

### Energy:

Subsidize distributed solar. Tax carbon in transportation and electricity. End subsidies for coal, oil, natural gas. Invest in Research and Development. Taxing carbon at $150/ton CO2.

Project Drawdown strategies relevant to Fairfax County and Northern Virginia[ii]

Refrigerant Management

Water Saving - Home

Household Recycling

Industrial Recycling

Recycled Paper

Reduced Food Waste

Plant-Rich Diet

Composting

Solar Farms

Rooftop Solar

Methane Digesters (Large)

Cogeneration

Methane Digesters (Small)

Waste-to-Energy

Energy Storage (Distributed)

Energy Storage (Utilities)

Microgrids

District Heating

Insulation

LED Lighting (Household)

LED Lighting (Commercial)

Building Automation

Walkable Cities

Smart Thermostats

Landfill Methane

Bike Infrastructure

Water Distribution

Green Roofs

Net Zero Buildings

Retrofitting

Electric Vehicles

Mass Transit

Cars

Telepresence

Electric Bikes

Trains

Ridesharing

---

[i] Personal communication, Megan Mahajan, Energy Innovation Policy, December 17, 2019.
[ii] [ii] Project Drawdown