# Maryland BPS Policy Design: Building Stock Analysis Highlights

Overview of Building Stock Analysis

- Characterize the building stock (size, type, and energy use for each bldg)
- Scenarios for potential BPS policies (metrics, targets, timing)
- Predict energy reductions under each scenario

Building Type, Size, Age
Tax database

Energy/Emissions
Bx data, utility bills
Est. via EIA,BPD,...

Asset characteristics
Audits, permit data
Est. via EIA,BPD,...

Current Stock
Energy/Emiss.

BPS targets
scenarios

Future Stock
Energy/Emiss.

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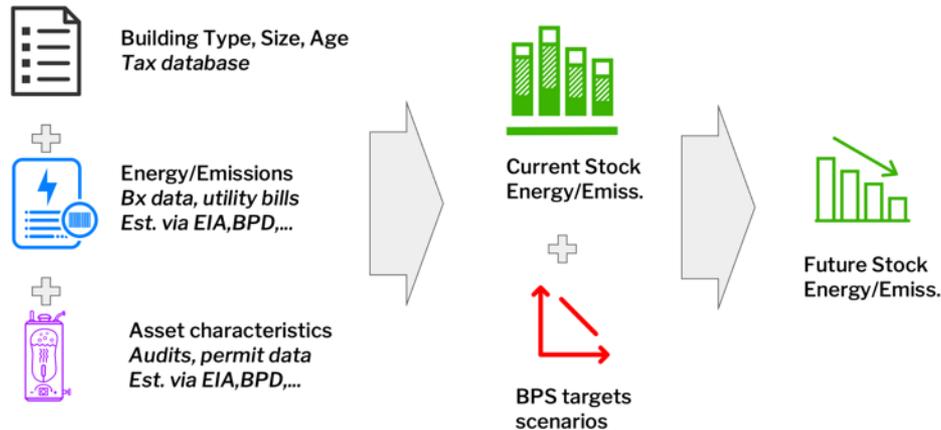
Data Sources and Modeling Methodology

- Data Sources
  - Building types and sizes from Maryland Covered Building List (CBL) (~8500 bldgs >35k sqft)
  - Site EUI and electric/site ratio from EPA dataset
  - Ratio of fuel used for space and water heating from Com/ResStock
  - Projected grid emissions factors from Maryland analysis
  - Site EUI targets from Montgomery County (MoCo) potential targets

- Model: Reduce energy use to meet EUI targets
  - 3 cycles of 5 years (ending in 2030, 2035, 2040) – actual compliance cycle TBD by MDE
  - First: Try to meet direct emissions target with efficiency
  - Next: Electrify space heating, water heating, other uses, until direct emissions target met
 - Last: Reduce electric use until site EUI target met

Energy and Emissions Reductions

- Majority of emissions savings due to cleaner grid
- Site vs. direct emissions targets: more electric energy savings than emissions
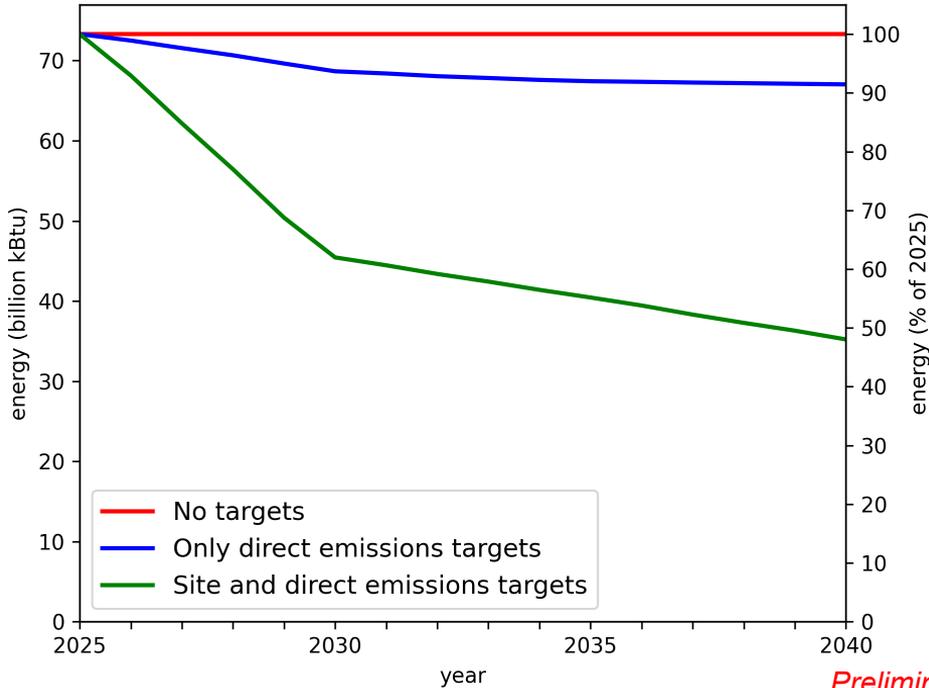
Preliminary results
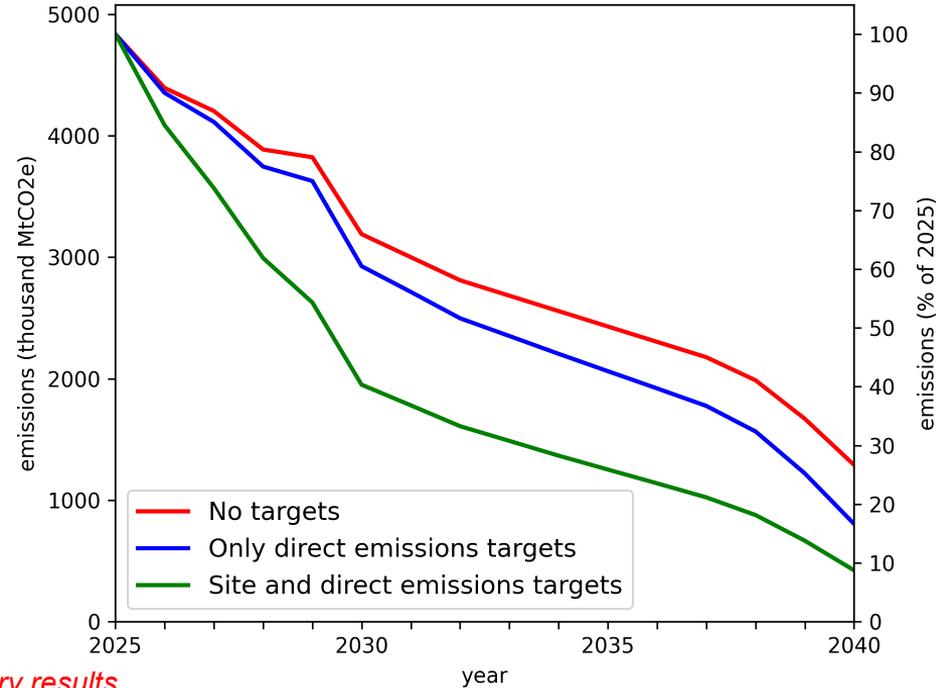
Cumulative Emissions

- Only direct emissions targets vs. no targets: 9.6% decrease
- Site and direct emissions targets vs. no targets: 33% decrease
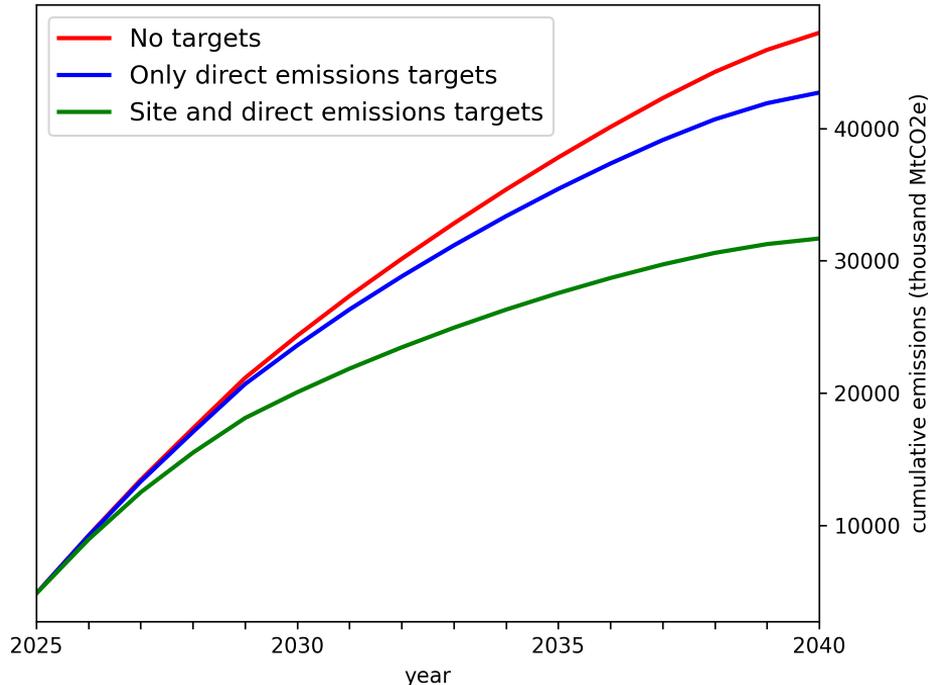
Preliminary results

Electricity and Gas Energy Reductions

- With only direct emissions targets: electricity use increases 5.8%
- With site and direct emissions EUI targets: electricity use decreases 44%
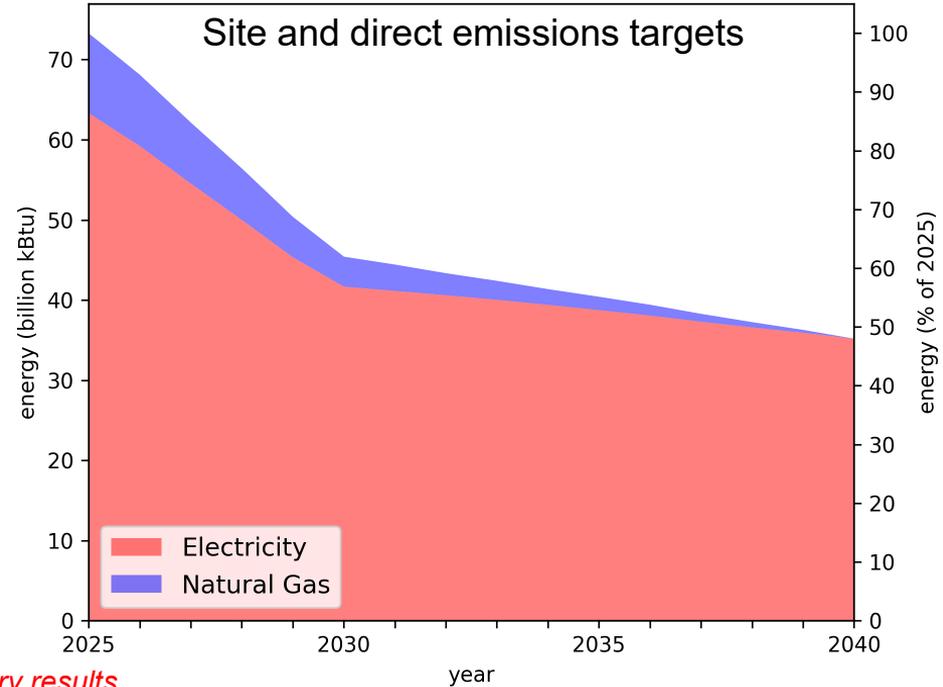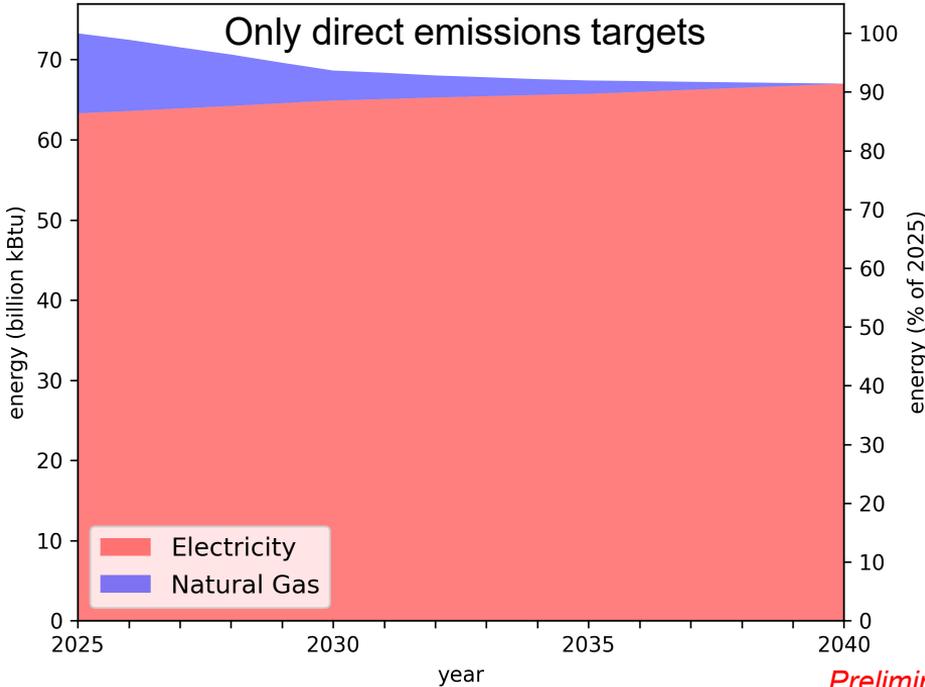
Preliminary results

Model Sensitivity Analyses

- Parameter variations:
  - Direct emissions targets over time (20,40,40% vs. 20,30,50%)
  - Site targets over time (33,33,33% vs. 20,40,40%)
  - Final site targets (MoCo EE vs. ZNC)
  - Max fuel space heating savings by efficiency (10% vs. 20% vs. 30%)
  - Max fuel water heating savings by efficiency (5% vs. 10% vs. 15%)
  - COP when electrifying space heating (2.5 vs. 3.0)
  - COP when electrifying water heating (2.2 vs. 3.0)

- Bottom line: Modeling results are minimally/not sensitive to parameter variations

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