Visualizing Equitable Energy Transitions with SLOPE

April 26, 2022
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Webinar Speakers

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Visualizing Equitable Energy Transitions with SLOPE
Clean Energy States Alliance
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Megan Day – National Renewable Energy Laboratory
Daren Zigich – New Mexico Energy, Minerals and Natural Resources Department
A free and easy-to-access online platform that helps energy planners at state and local levels make data-driven decisions to achieve their communities’ energy goals.

- **Scenario Planner**: Explore the impacts of different energy transition scenarios on the energy consumption, CO$_2$ emissions, and system costs at county, state, and national scales.
- **Data Viewer**: Dive into city, county, and state data on renewable energy, energy efficiency, and sustainable transportation potential and projections.

[maps.nrel.gov/slope](maps.nrel.gov/slope)

[slope@nrel.gov](slope@nrel.gov)
Scenario Planner: Analysis Architecture

Key Sources
- U.S. Energy Information Administration Data
- Electrification Futures Study
- NREL Models

Buildings (Commercial/Residential)
- Natural Gas Demand (Annual)
- Other Fuels
- Electricity Demand (Hourly/Annual)

On-Road Transportation
- Natural Gas Demand (Annual)
- Other Fuels
- EV Charging (Hourly/Annual)

Industry
- Natural Gas Demand (Annual)
- Electricity Demand (Hourly/Annual)

Scenario Planner Strategy
- Electrification Levels (EnergyPATHWAYS)

Scenario Planner Strategy
- Demand-Side Flexibility Levels

Scenario Planner Strategies from Standard Scenarios
- Grid Decarbonization Trajectories (ReEDS, dGen)*
- Transmission Expansion Availability (ReEDS)*

Outcomes for 25 Unique Scenario Strategy Combinations
- County-level energy consumption through 2050
- County-level CO₂ emissions through 2050
- State-level system cost impacts through 2050
- Annual, State-Level Planning Metrics

*Previous R&D 100 winners

Represents 74% of U.S. primary energy demand in 2015
Localized Energy System Scenarios

To deliver county-level scenario results, the SLOPE team integrated results from five of NREL’s flagship models, along with scenarios from two of NREL’s innovative energy sector analyses:

- **Regional Energy Deployment System (ReEDS)**
- **Distributed Generation Market Demand (dGen™)**
- **ResStock™**
- **ComStock™**
- **Transportation Energy & Mobility Pathway Options™ (TEMPO)**
- **Electrification Futures Study**
- **2021 Standard Scenarios**
New Mexico is developing a grid modernization plan for 100% zero-carbon electricity resources by mid-century in accordance with the Energy Transition Act.

**Economy-wide carbon reduction goal: 45% by 2030**

driving accelerated adoption of:

- Energy efficiency measures in buildings
- Distributed energy resources including storage
- Electric vehicles

**Renewable Energy Goals:**

- Investor-Owned Utilities – 100% by 2045
- Rural Electric Coops – 100% by 2050
New Mexico’s Energy Planning Questions:

- Does electrification of buildings and transportation result in energy savings?
  - Electrification versus energy efficiency
- Does building efficiency or building electrification result in greater greenhouse gas emissions reductions?
- New low-income energy efficiency grant program:
  - How can SLOPE and the Scenario Planner help prioritize communities in need and measures that provide the best results?
Compared to a reference case, widespread electrification reduces energy consumption 6% by 2030 and 28% by 2050 in New Mexico.
Compared to a reference case, best-available energy efficiency in buildings reduces energy consumption 4% by 2030 and 8% by 2050 in New Mexico.
Energy savings: electrification vs. energy efficiency

In New Mexico, a building energy efficiency scenario has a lower total system cost than a widespread electrification scenario.
In 2030, net change in system costs for building energy efficiency relative to business-as-usual is roughly $32.3 million (12%) less than the net change in costs for widespread electrification.
In New Mexico, best-available building energy efficiency strategies could achieve **8% lower emissions in residential sector** and **5% lower emissions in commercial sector** in 2030 compared to strategies for building electrification.
Emissions are reduced 2% more in a widespread electrification scenario than a building efficiency scenario by 2030 and 13% more by 2050.
How can we identify and prioritize communities in need of energy efficiency grants and assistance, and which measures provide the best results?

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**Electricity savings potential for single-family homes**

**Fuel savings potential for single-family homes**
How can we identify and prioritize communities in need of energy efficiency grants and assistance, and which measures provide the best results?

Electricity savings potential for commercial buildings

Fuel savings potential for commercial buildings

Aggregate cost-effective commercial building electricity savings potential in New Mexico: 36%
Aggregate cost-effective commercial building natural gas savings potential: 17%
Thank you for attending our webinar

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