Green Energy

Strategies & Trends for Small Transit Agencies

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ASSOCIATE
Center for Transportation & the Environment

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About CTE

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About CTE

WHO WE ARE

501(c)(3) nonprofit engineering and planning firm

OUR MISSION

Improve the health of our climate and communities by bringing people together to develop and commercialize clean, efficient, and sustainable transportation technologies

PORTFOLIO

$571 million

- *Research, demonstration, deployment*
- *90 Active Projects totaling over $316 million*

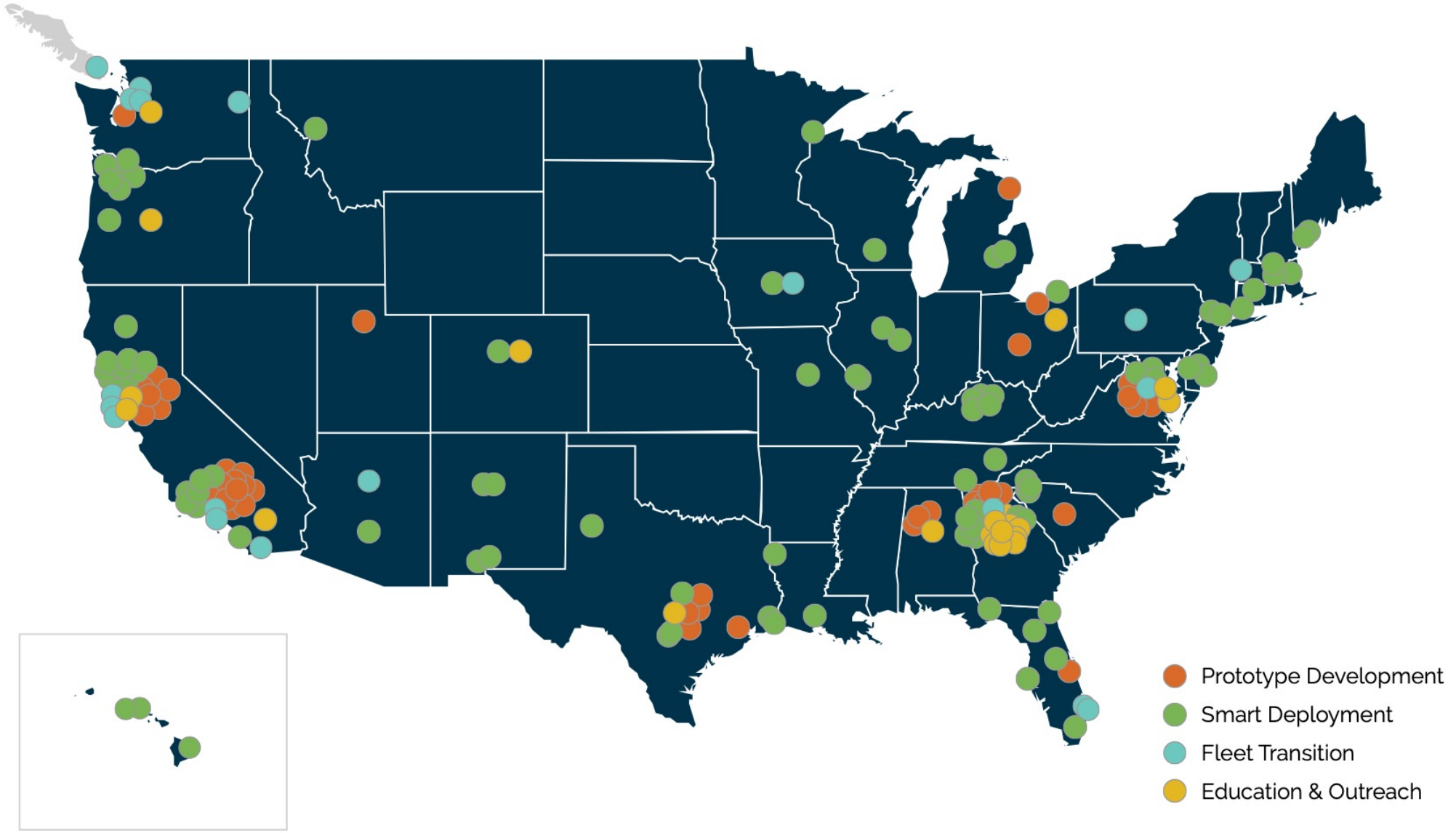
OUR FOCUS

Zero-Emission Transportation Technologies

NATIONAL PRESENCE

Atlanta, Berkeley, Los Angeles, St. Paul

CTE Projects



Our Four Service Areas

Prototype Development & Demonstration

We support technology providers through technology research, development, and demonstration.

Smart Deployment

We support early adopters by providing the best technical solutions for initial deployments.

Fleet Transition

We help fleet operators implement strategic plans for full electrification.

Education & Outreach

We help organizations of all shapes and sizes stay ahead of the technology curve.

About N-CATT

About N-CATT

- Walking small agencies through the technology landscape
- Producing resources on adopting emerging technologies
  - Zero-emission vehicles, green infrastructure, data management, new software decision-making
  - Lessons learned, trends, strategies
- Providing in-depth technical assistance to adopting new technologies
  - Strike Teams and State Summits
  - Enabling technology transfer
- Developing hands-on workshops to understand how different technologies can be applied
  - Data Management, Digital Tools for Redesigns

Find us at: n-catt.org

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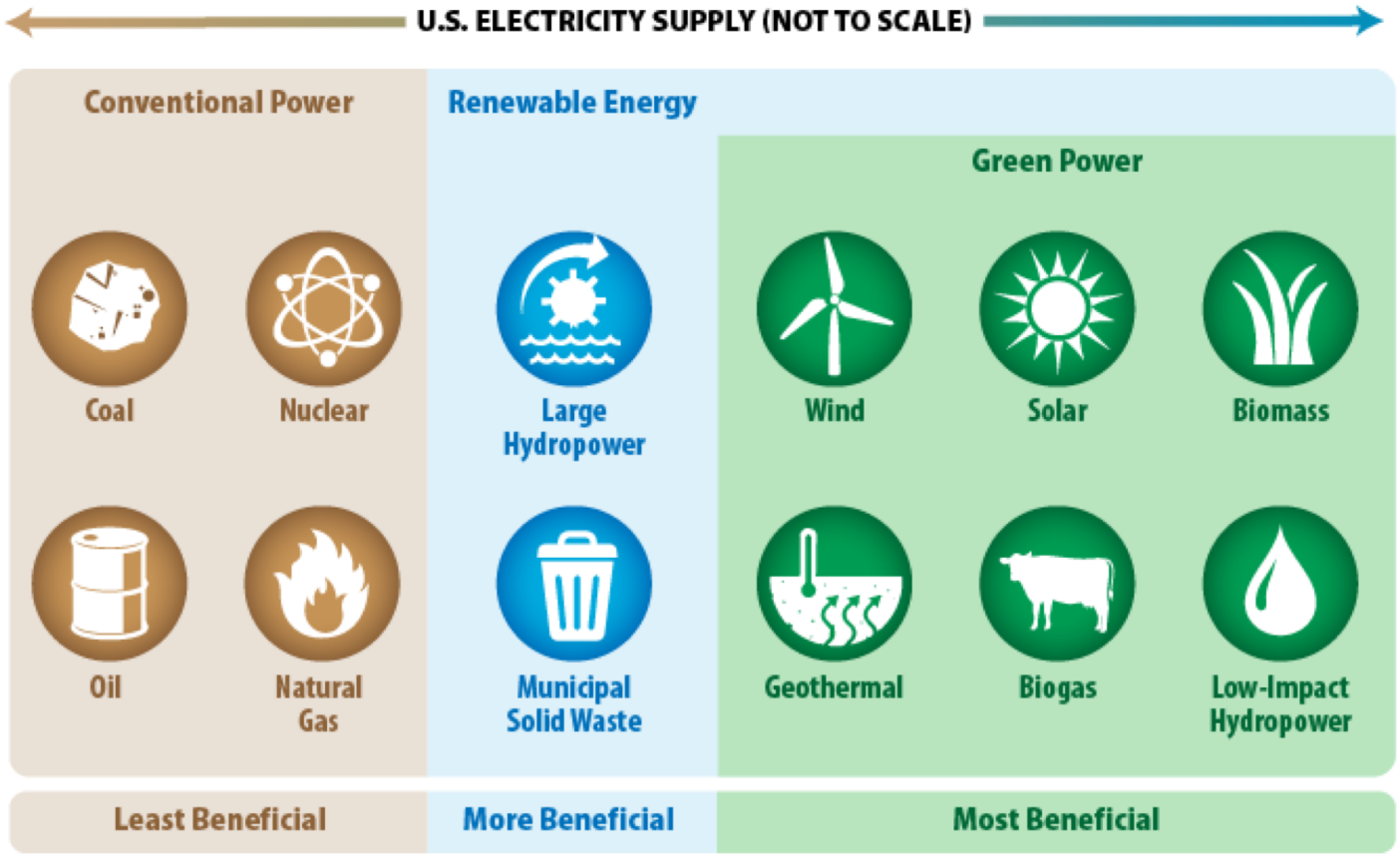
Green Energy Guide for Transit Agencies

What is green power?

> **Electricity supplied from a subset of renewable resources that provide the highest environmental benefit**

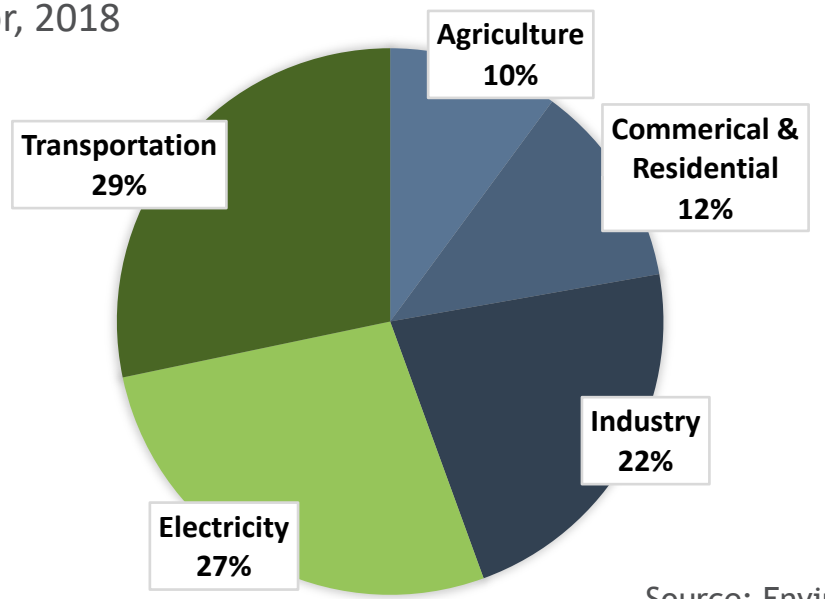


Source: Environmental Protection Agency (2018) *Guide to Purchasing Green Power*

Why is green power important for transit agencies?

> **Transportation and Electricity account for more than half of total greenhouse gas (GHG) emissions in the United States.**

Total U.S. Greenhouse Gas Emissions
by Economic Sector, 2018



Source: Environmental Protection Agency (2018)

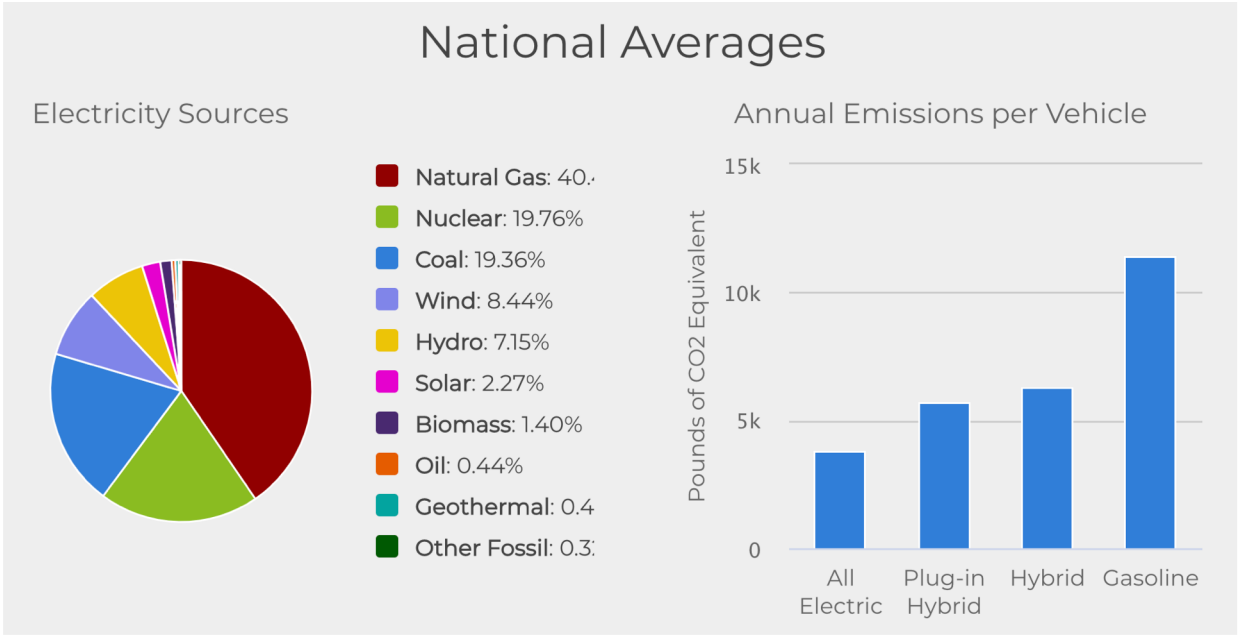
Well-to-Wheel Emissions

- Includes all emissions related to fuel production, processing, distribution, and use

Green power

=

Well-to-wheel emissions



Source: US Department of Energy

Benefits of Green Power

- Environmental
- Operational
- Financial

Considering green power options

Transit Agency Goals & Constraints

Environmental

Operational

Financial

Green Power Procurement Options

Utility green power programs

Energy-as-a-service

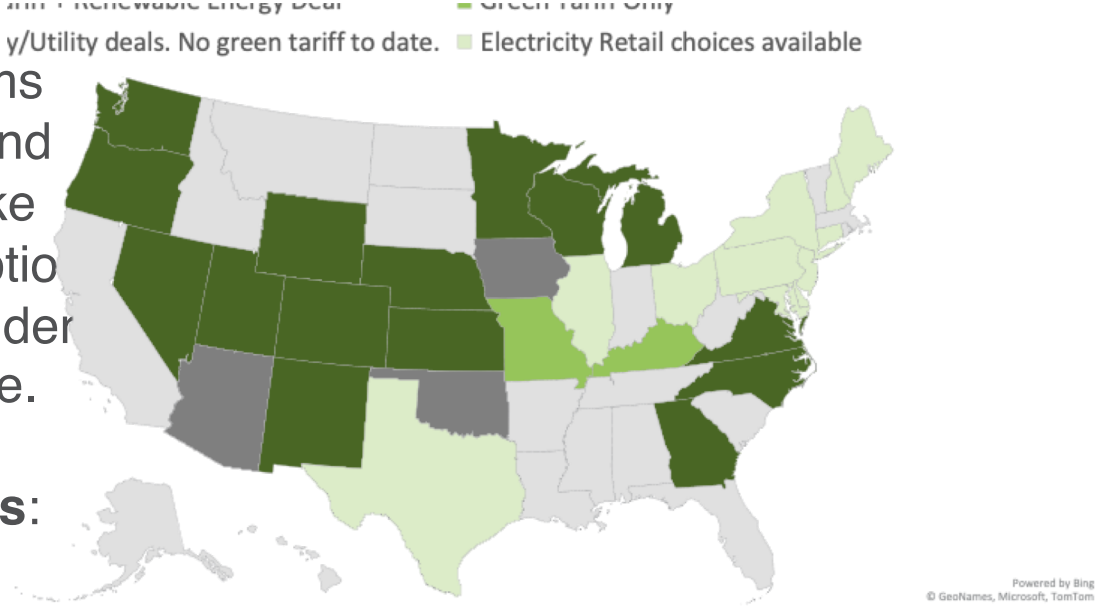
On-site green power generation

Utility green power programs

One of the easiest ways to start exploring green energy procurement options is exploring what your local electric utility or electric provider offers.

Green Tariffs: Programs that offer commercial and industrial customers, like transit agencies, the optio to buy green energy under a special utility tariff rate.

Green Power Products: Shorter-term programs through which customers pay a cost premium on their utility bill to support the supply of electricity from a mix of renewable or green energy sources.



Source: World Resources Institute

Energy-as-a-service (EaaS)

Energy as-a-service (EaaS) is a category of business models that can provide green power to customers beyond what the local utility might offer. Green energy project developers build and operate energy infrastructure and sell the power to a transit agency under various contractual terms:

- **Solar leasing –** Third party installs and maintains the solar system at the customer's facility at no upfront cost, supplying electricity for duration of the contract.
- **Community solar —**a subscription model in which customers subscribe for solar energy delivery from a nearby solar (or other green energy) project. The community solar project is typically developed, owned, and operated by a solar company.
- **Power purchase agreements—** a financial agreement where a third party (e.g. a solar generation company) usually owns, operates, and maintains an electricity generation system, and enters into an agreement with the customer

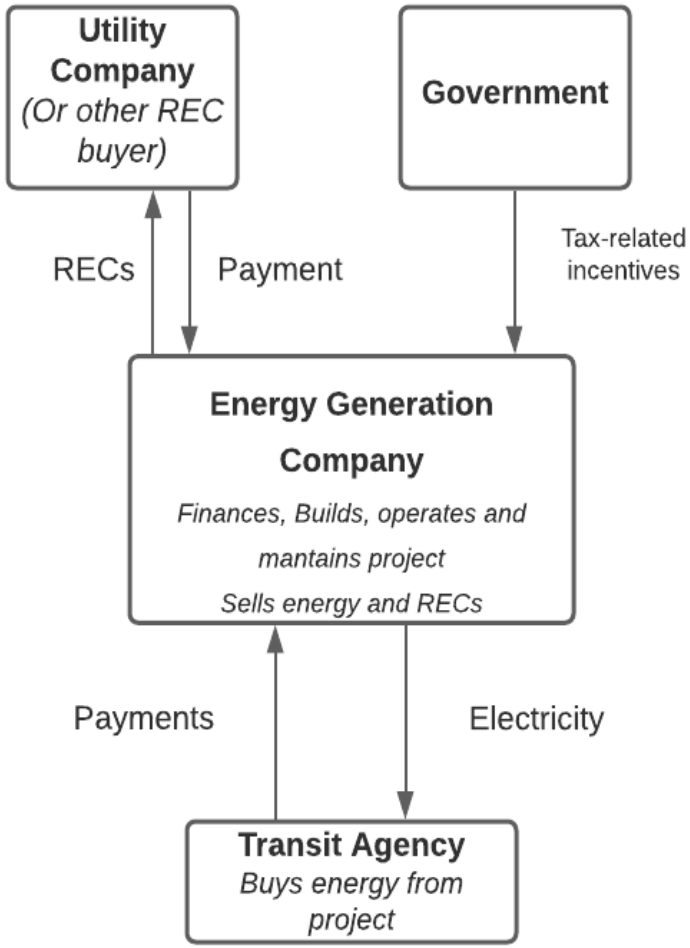
Power purchase agreements

A financial arrangement in which a third-party developer owns, operates, and maintains a green energy generation system, and a host customer agrees to purchase the system's electric output from the project developer for a predetermined period of time (adapted from EPA definition)

PPAs can involve the transfer of **Renewable Energy Credits (RECs)**

- A tracking system that provides a means of distinguishing renewable energy from fossil energy after generation.

  RECs are used for environmental claims and can be used to claim eligibility for programs or financial incentives.



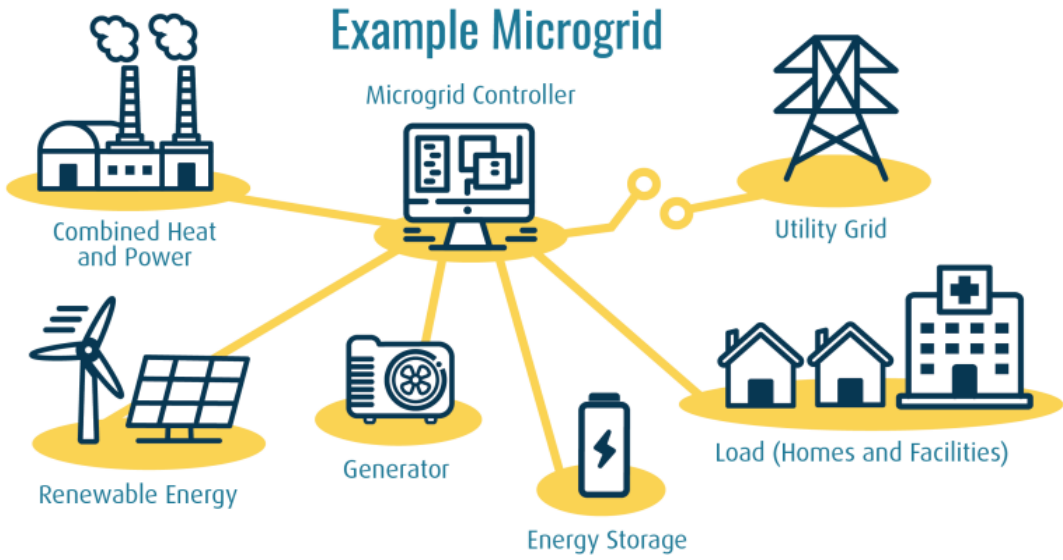
On-site power generation/storage

Energy generation and/or storage infrastructure is installed at a transit agency facility, and power is produced/stored at or near the site of consumption.

Microgrids

Components

- Energy generation
- Energy storage
- Microgrid controller
- Utility service disconnect



Source: National Association of State Energy Officials

Green energy infrastructure and microgrids in transit operations

Q+A with Montgomery County

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Capital Energy Projects
Montgomery County, Department of General Services, Office of Energy and Sustainability

General Q+A