



# Energy Storage and Renewables

---

# Energy Storage Options – The Holy Grail

FARM POWERED FOOD WASTE RECYCLING

- PUMP – liquid or compressed gas
- THERMAL – chilling tanks and super-heating furnaces
- FLYWHEEL – Great promise
- BATTERY – V 2.0
- TANK – CNG & LNG

# Vanguard Renewables & Brightfields Development – Solar, Storage and RNG

FARM POWERED FOOD WASTE RECYCLING



**BRIGHTFIELDS**

DEVELOPMENT LLC

- Founded in 2009
- Award winning solar, canopy and storage developer
- Industry leader in Brownfield solar at utility scale
- First utility scale storage system in the east (CT - 5MWhr)



- Founded in 2013
- Five Massachusetts farm-based digesters with over 600 tons of capacity per day
- Currently developing new AD systems in Vermont, New York, and Pennsylvania
- Strategic Alliance with Dairy Farmers of America





# Brightfields Development

- Founded in 2009 to develop renewable energy and energy storage projects; specializing in deployment on distressed and contaminated properties
- Massachusetts-based company
- Preferred solar vendor for the Archdiocese of Boston, Eversource & CMEEC, and developing programs with the other 3 Massachusetts diocese, Archdiocese of Chicago, and District of Columbia
- Proven programmatic multi-site development experience for Solar, Battery Storage & Electric Vehicle Charging Stations



**2014 Photovoltaic Project of Distinction**  
**Award recipient**  
**2014 Environmental Impact Award winner**



**BRIGHTFIELDS**  
DEVELOPMENT LLC

# Solar Program Overview

- Collaborate with interested companies, churches, municipalities and schools to craft customized solar installations
- Provide a beneficial revenue stream for host entities
- Repurposing low value or unusable land
- Important PUC approvals for the inclusion of solar, EV charging and storage



*Rooftop Solar Array*



*Solar Canopy*



*EV Charging Stations*





# Brightfields is Eversource's canopy program manager



*Eversource Westwood headquarters canopy project (360 kW) with 6 EV chargers*



**BRIGHTFIELDS**  
DEVELOPMENT LLC

# Community Solar + Battery Deployment

*CMEEC Solar + battery deployment within ISO New England*



- 20 MW<sub>DC</sub> solar + 1.5 MW / 6 MWh battery storage
- Installation at distribution feeders across 8 sites
- Largest PV-paired storage system in Northeast
- Use Cases:
  - CMEEC peak demand reduction
  - ISO-NE coincident peak load reduction
- Other Benefits include:
  - Reduction in capacity tags
  - Opportunity to integrate as a microgrid

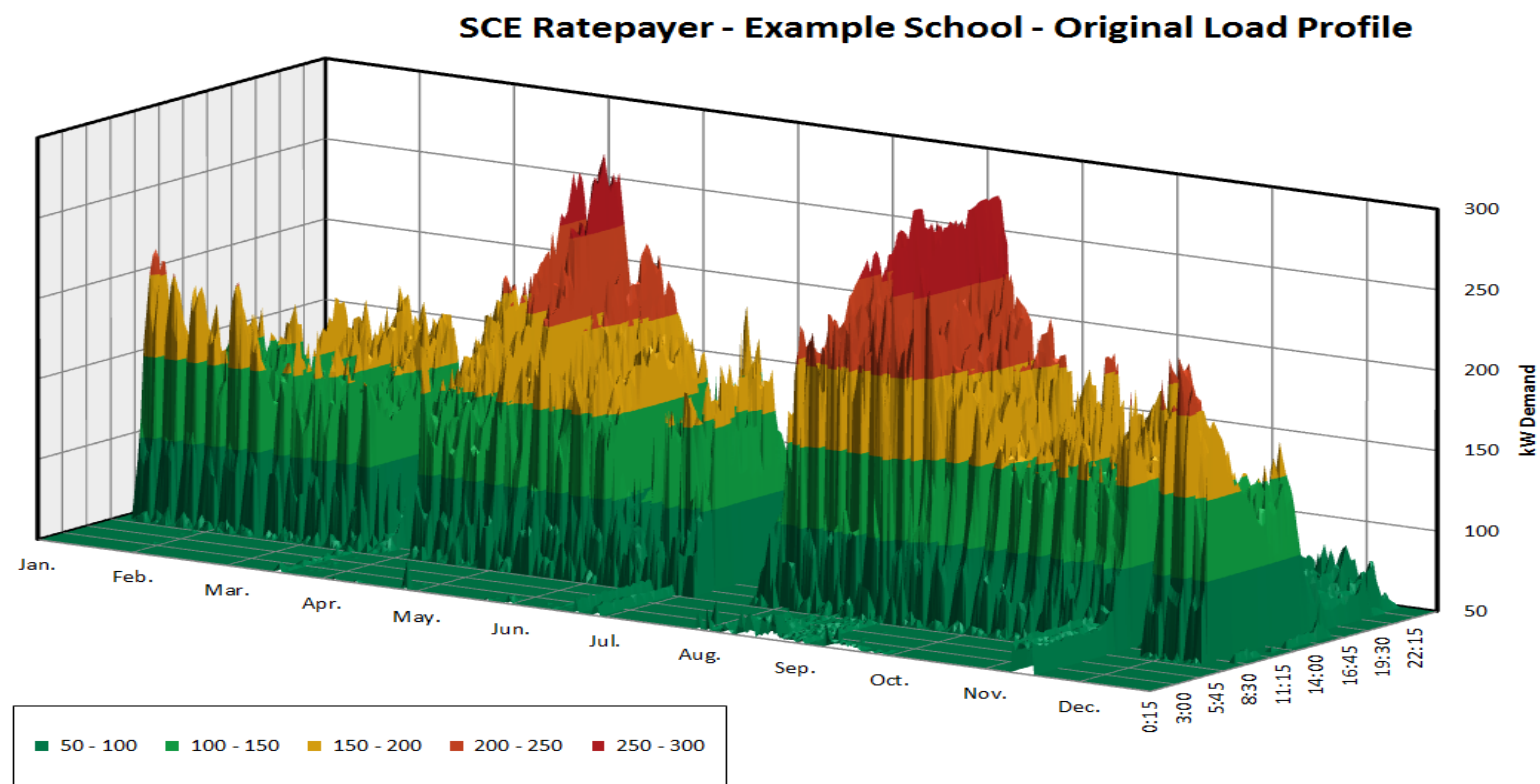






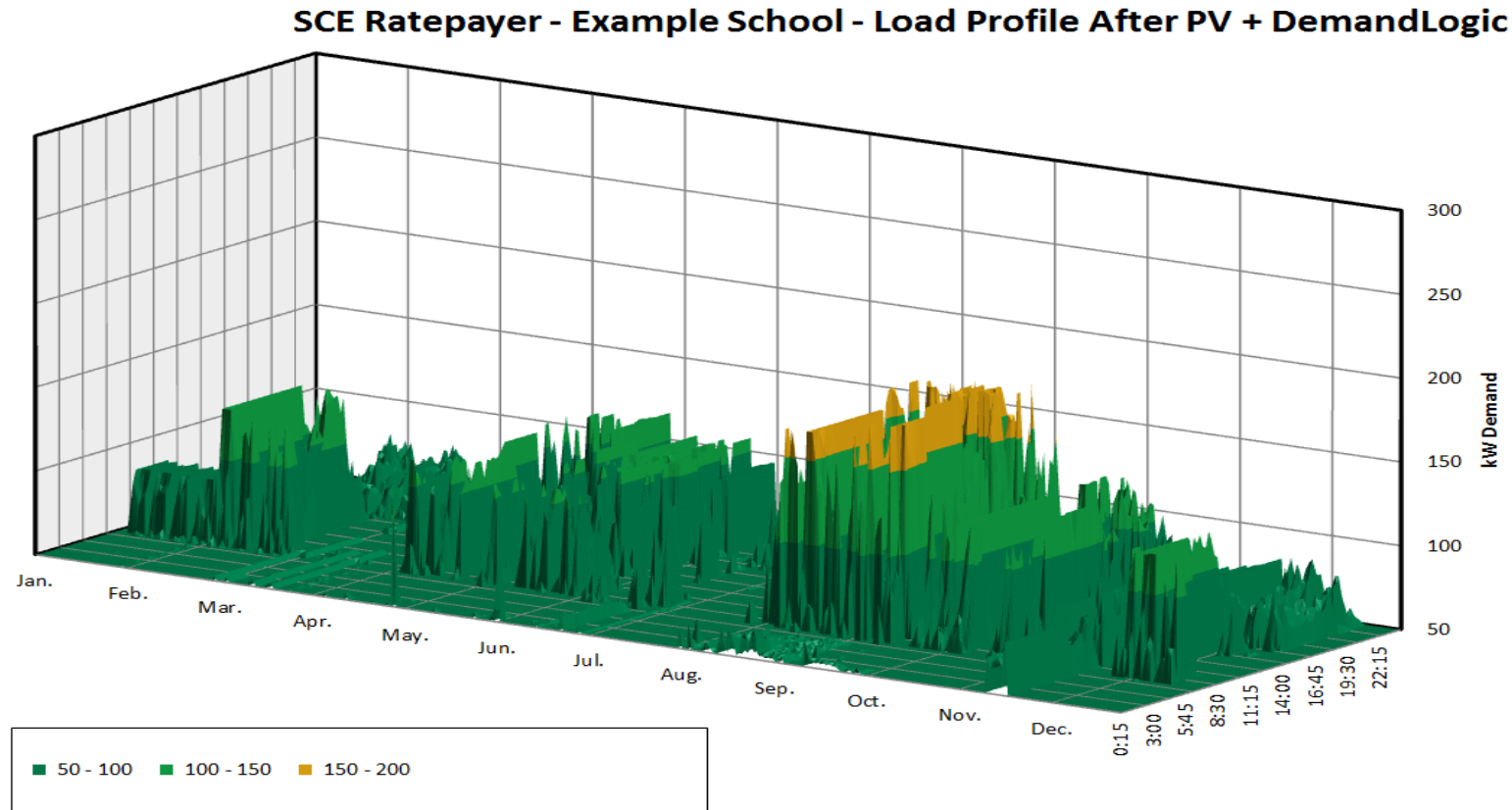
# K-12 – Original Load Profile.

SCE Ratepayer – Example School – Original Load Profile



# K-12 – Load Profile after DemandLogic

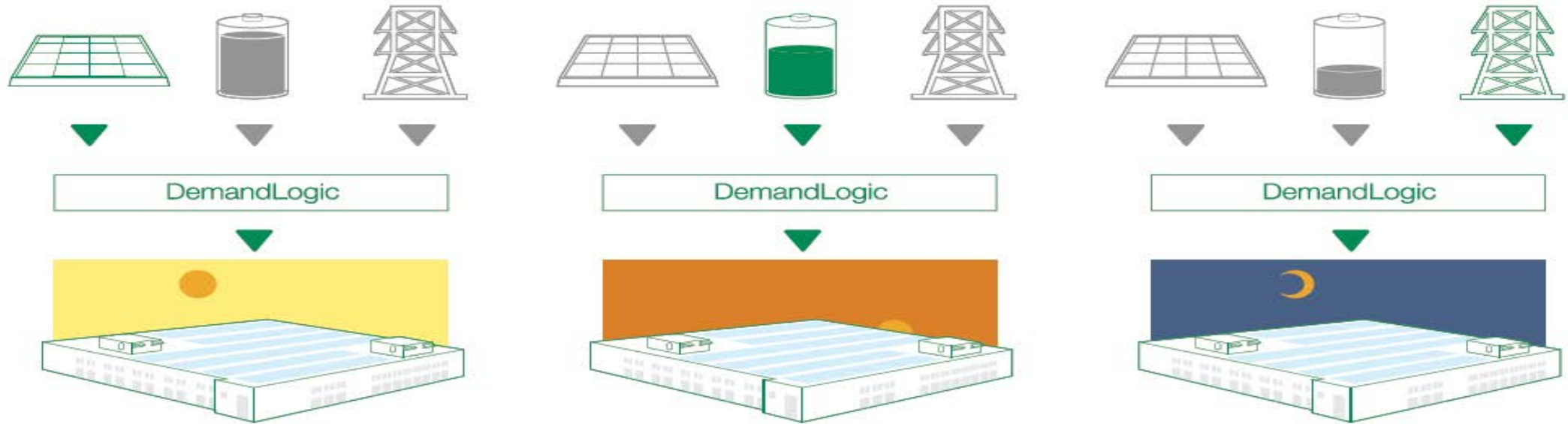
SCE Ratepayer – Example School – Load Profile After PV + DemandLogic





# DemandLogic

## solar + storage for demand charge reduction



12 PM

Your system is at full production, charging your battery and reducing your need for utility power.

5 PM

As solar production decreases, the battery is intelligently discharged to reduce peak demand charges.

10 PM

You draw power from the utility company at night at lower off-peak demand rates.

# Vanguard Renewables – Developers, Owners, Operators

## FARM POWERED FOOD WASTE RECYCLING

- Institutionally funded by mission-drive investors seeking to impact climate change by:
  - Removing food waste from landfills
  - Capturing the latent methane in animal manure
  - Creating Renewable Electricity (RE) and Renewable Natural Gas (RNG)
- Largest food waste recycler in the northeast with capacity to process more than 500 tons of food waste per day
- Five Massachusetts farm-based digesters provide consistent pick up and dependable service for any size feedstock supplier
- Currently developing new AD systems in Vermont, New York, and Pennsylvania
- Strategic Alliance with Dairy Farmers of America

## 2018 ORGANICS RECYCLER OF THE YEAR





# How Farm Powered™ Anaerobic Digestion Works

FARM POWERED FOOD WASTE RECYCLING

## INPUTS



Cow Manure

Food Waste



## FARM-BASED ANAEROBIC DIGESTION



## OUTPUTS

Renewable Natural Gas or Electricity



Heat



Fertilizer

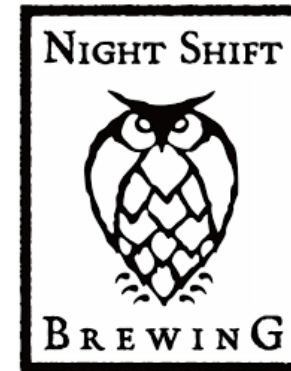


GHG Reduction



# Farm Powered™ Customers

FARM POWERED FOOD WASTE RECYCLING





# Vanguard's Portfolio of Facilities

FARM POWERED FOOD WASTE RECYCLING

**Jordan Dairy Farms**  
Rutland, MA

**Bar-Way Farm, Inc.**  
Deerfield, MA

**Barstows Longview Farm**  
Hadley, MA

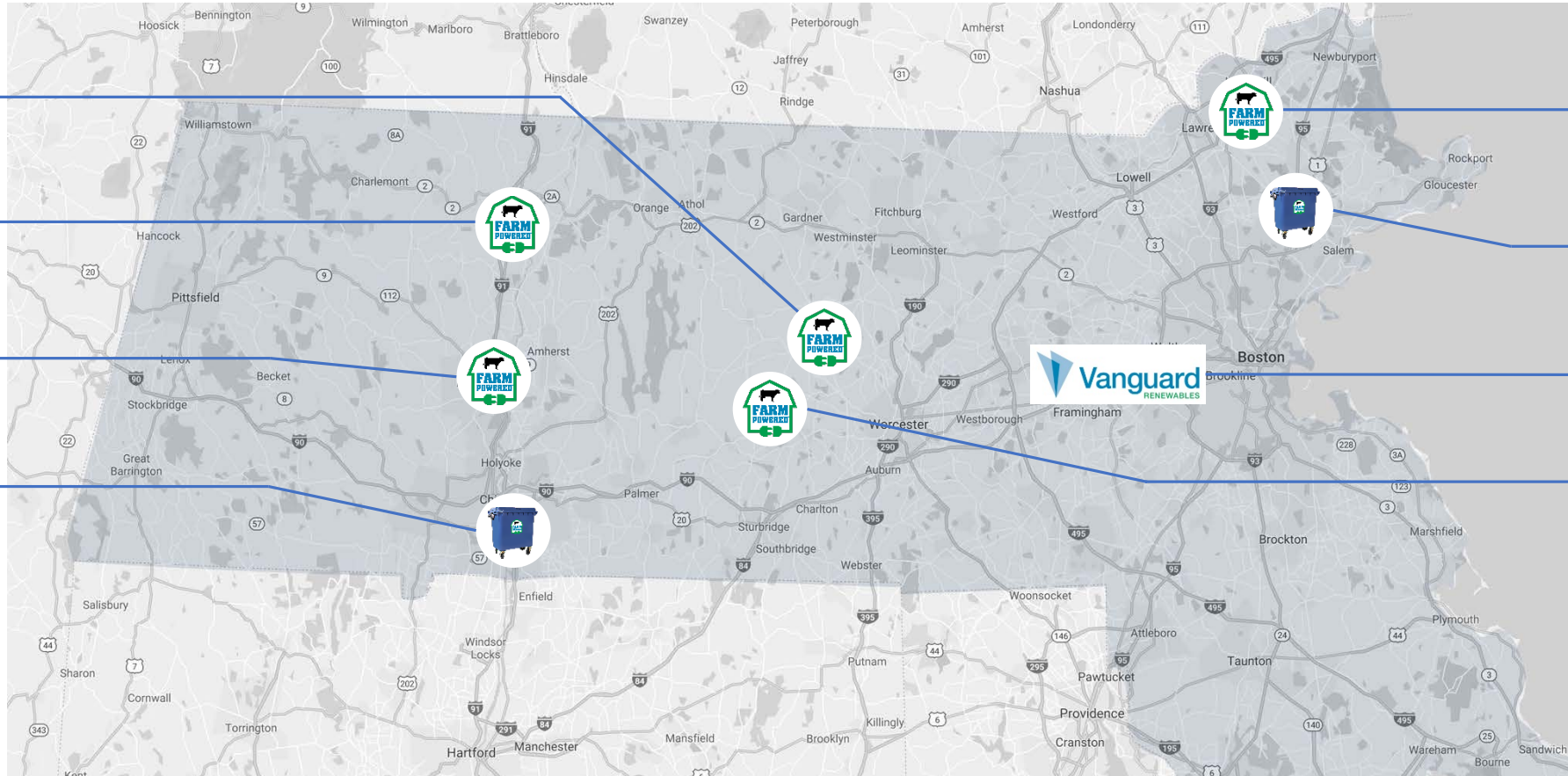
**Organics Recycling/  
Depackaging Facility**  
Springfield, MA

**Crescent Farm**  
Haverhill, MA

**Organics Recycling/  
Depackaging Facility**  
Peabody, MA

**Vanguard Renewables HQ**  
Wellesley, MA

**Jordan Dairy Farms**  
Spencer, MA





John Hanselman

Chairman & CEO

C: 617-480-1448

[jhanselman@vanguardrenewables.com](mailto:jhanselman@vanguardrenewables.com)

## 2018 ORGANICS RECYCLER OF THE YEAR

