

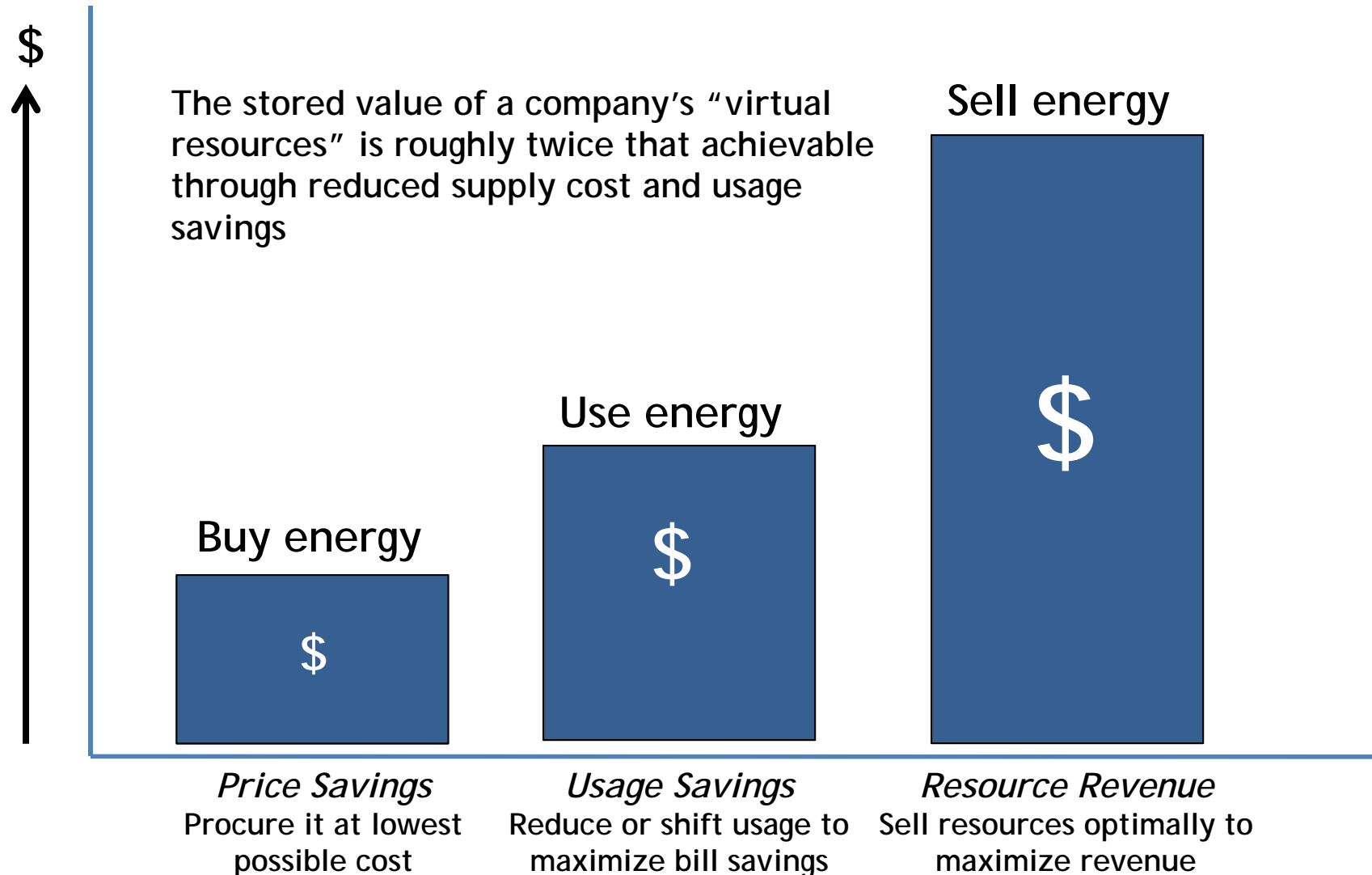


ADVANCED ENERGY 2010

Impact of Energy Markets on Transit Systems

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Large energy users that ignore the full market value of their energy resources leave money on the table



U.S. Organized Electricity Markets with Demand Response (DR)



Exchanges
(ICE, NYMEX)



Financial Markets
Regulatory agencies: SEC,
CFTC

RTO Markets
Grid Operators

Generation

Transmission

Wholesale Physical Markets
Regulatory agency: FERC

Sell

Buy

Retail Markets
Regulatory agencies: states

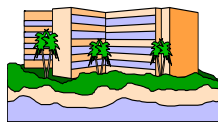
Distribution Utilities
Retail Energy Suppliers

Sell

Sell

Sell

Load

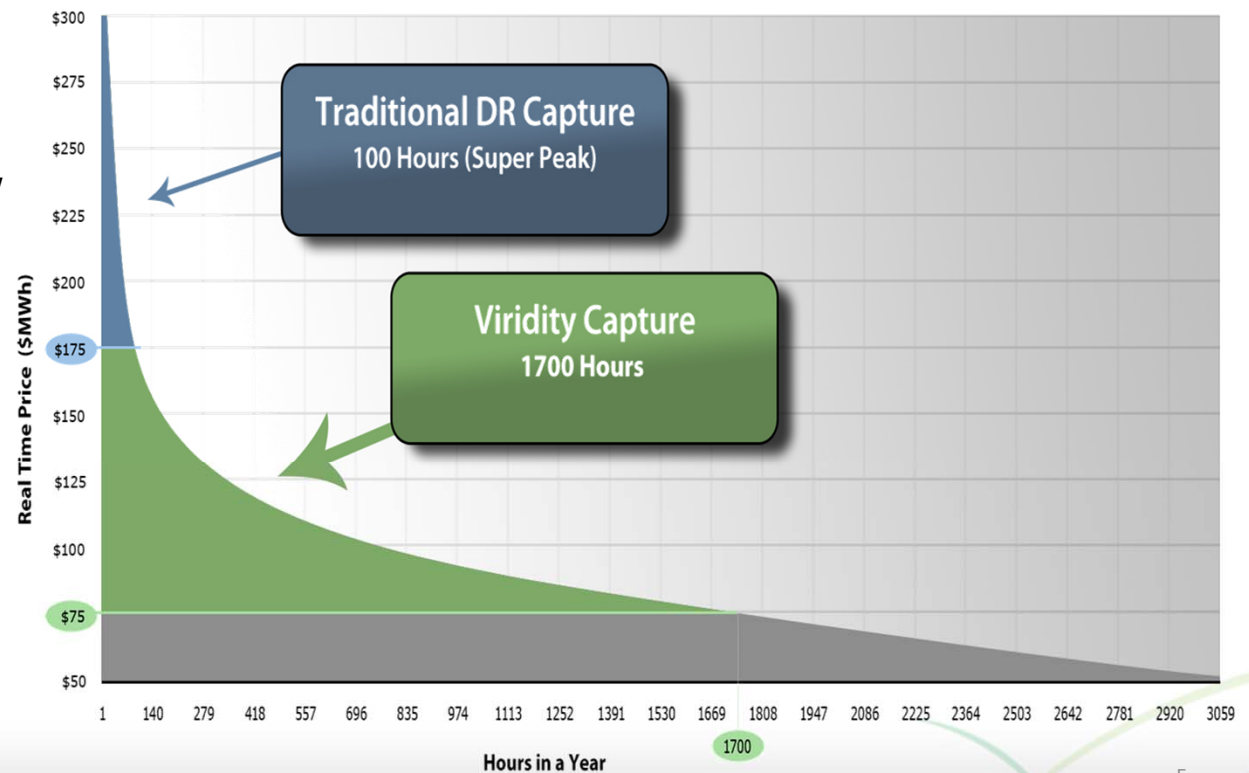




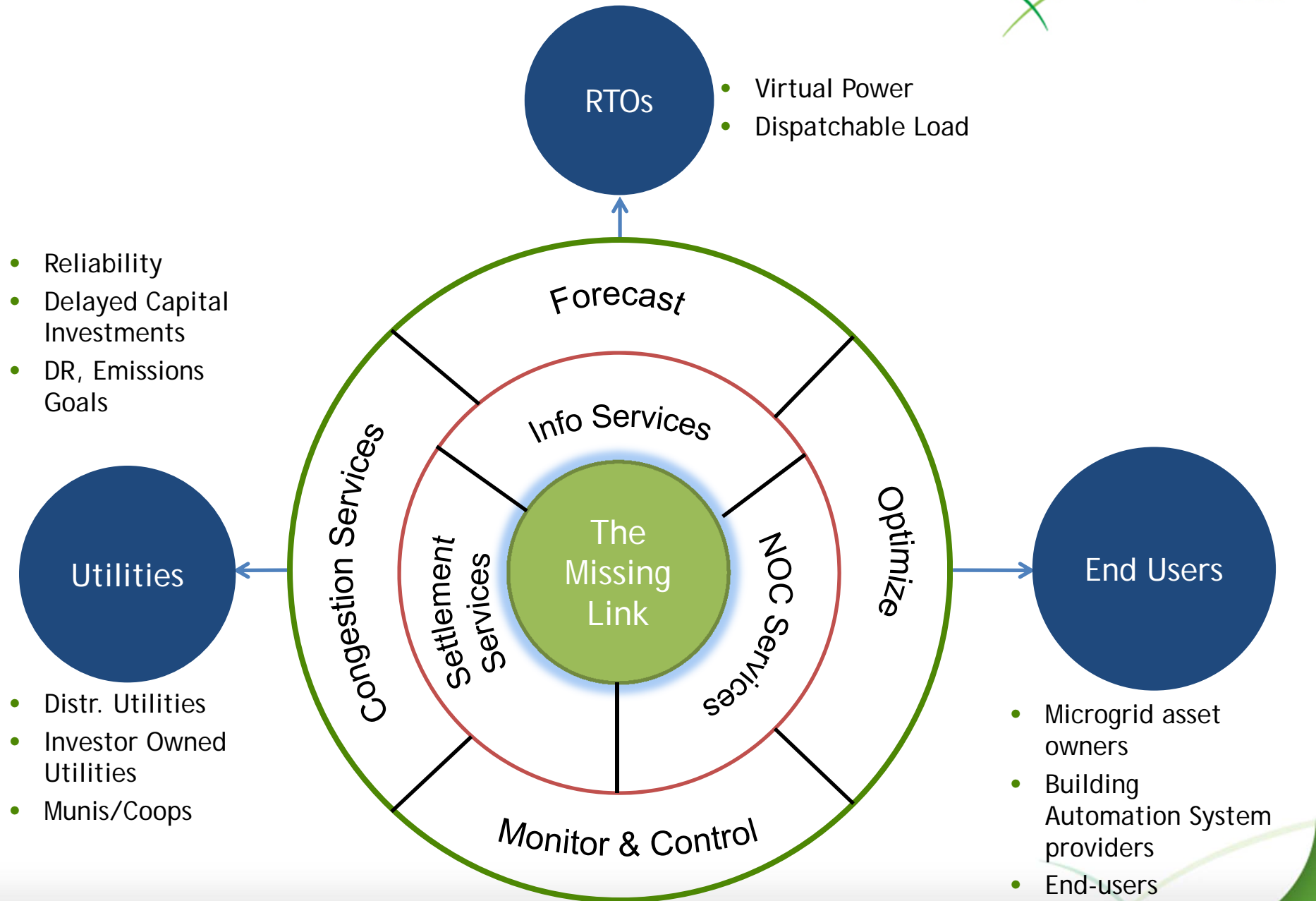
Viridity Energy: Key Facts



- ✓ Helps clients to minimize electric power expenses by optimizing their energy usage and simultaneously to gain revenues from selling energy back to the wholesale power markets.
- ✓ Focuses on large energy customers (public agencies, universities, hospitals, commercial buildings, transit agencies, water utilities, military).
- ✓ Based near Philadelphia
- ✓ Founded in 2009 by former PJM executives
- ✓ >30 employees



What we do



VPower™ Redefines Power Economics



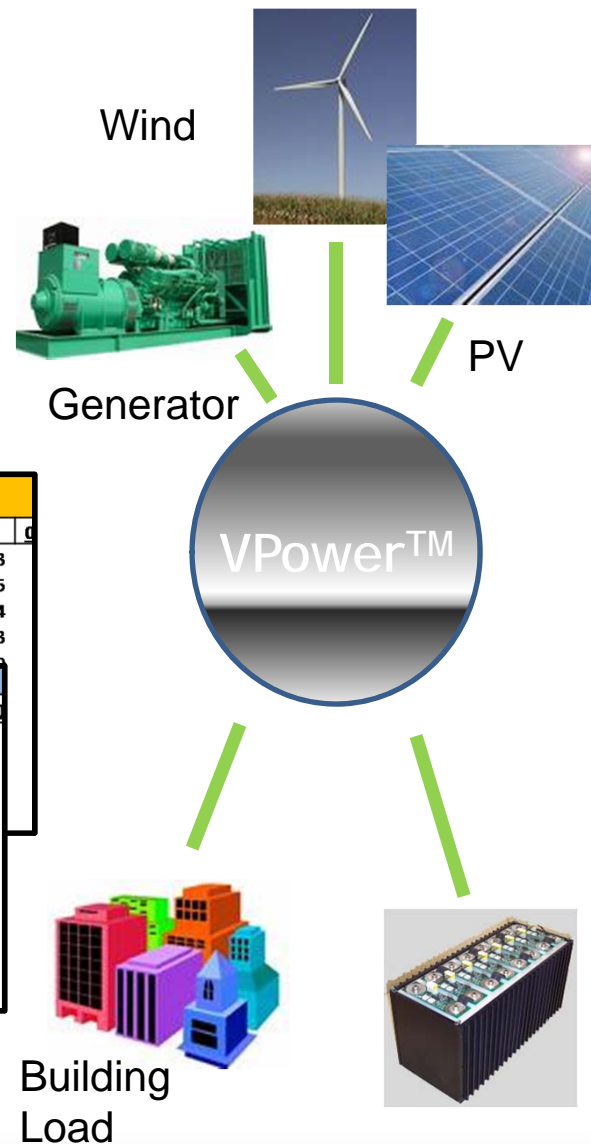
Inputs:

- Load Forecasts
- Weather Forecasts
- Pricing Forecasts

WHOLESALE POWER PRICES					
Date	0100	0200	0300	0400	0500
7/1/2007	\$ 55.00	\$ 50.00	\$ 54.00	\$ 64.00	\$ 66.00
7/2/2007	\$ 56.00	\$ 55.00	\$ 57.00	\$ 66.00	\$ 66.00
7/3/2007	\$ 67.00	\$ 66.00	\$ 65.00	\$ 71.00	\$ 71.00
7/4/2007	\$ 45.00	\$ 45.00	\$ 45.00	\$ 48.00	\$ 48.00
7/5/2007	\$ 54.00	\$ 56.00	\$ 53.00	\$ 61.00	\$ 61.00
7/6/2007	\$ 66.00	\$ 64.00	\$ 66.00	\$ 66.00	\$ 66.00

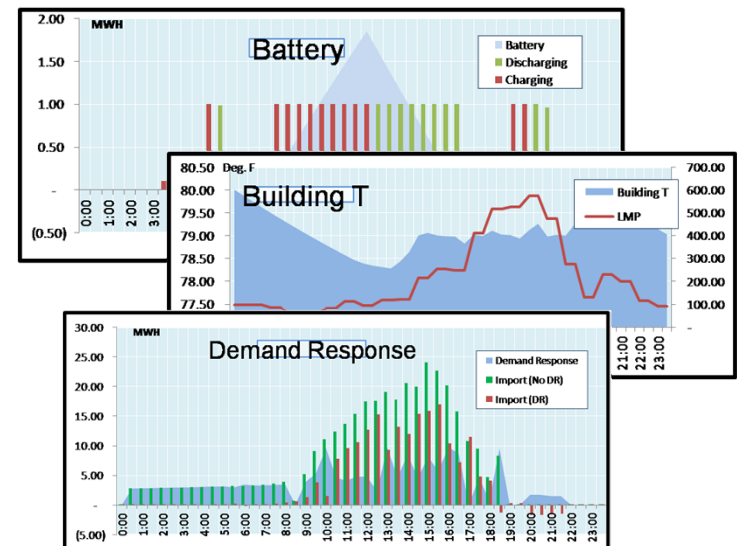
WEATHER FORECAST					
Date	0100	0200	0300	0400	0500
7/1/2007	76	73	73	73	73
7/2/2007	77	75	74	75	75
7/3/2007	78	78	76	74	74
7/4/2007	75	74	74	73	73
7/5/2007	72	72	71	70	70

LOAD FORECAST					
Date	0600	0700	0800	0900	1000
7/1/2007	2.10	2.20	2.50	2.50	2.50
7/2/2007	2.10	2.20	2.60	2.50	2.50
7/3/2007	2.00	2.20	2.50	2.60	2.60
7/4/2007	1.90	2.10	2.50	2.60	2.60
7/5/2007	2.00	2.10	2.40	2.50	2.50
7/6/2007	2.00	2.00	2.40	2.50	2.50
7/7/2007	2.10	2.10	2.50	2.60	2.60
7/8/2007	2.10	2.20	2.50	2.50	2.50
7/9/2007	2.10	2.20	2.50	2.60	2.60
7/10/2007	2.00	2.10	2.50	2.50	2.50



Outputs:

- Optimized Energy Asset Operating Schedules
- Market Revenues and Retail Savings



Battery Optimization Example



Load

- ✓ Day: 1.25 MW
- ✓ Evening: 0.75 MW
- ✓ Night: 0.65 MW

Battery

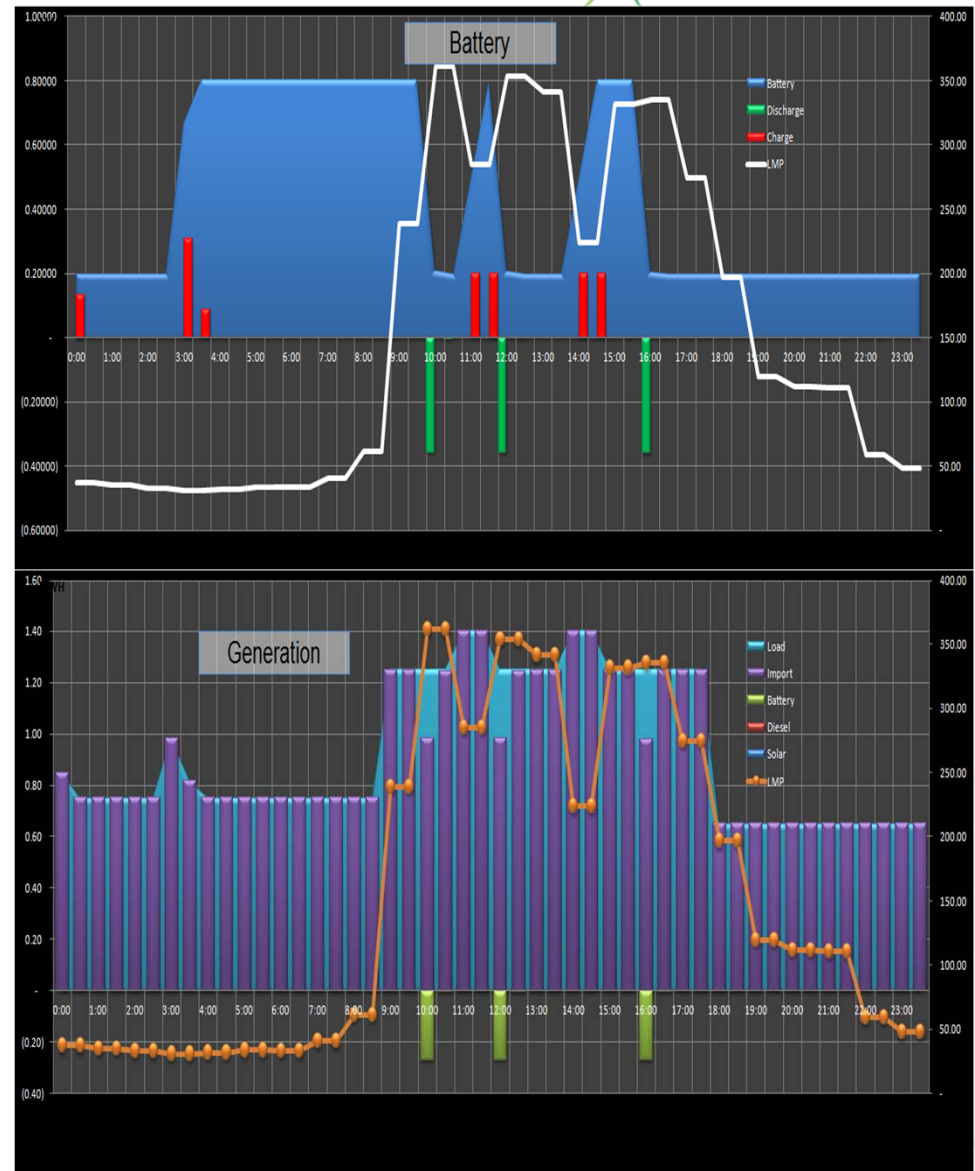
- ✓ Inverter capacity: 1.5 MW
- ✓ Storage Capacity: 1.0 MWH
- ✓ Round Trip Efficiency: 91%
- ✓ Reserve > 0.2 MWH (adjustable)
- ✓ Headroom < 0.8 MWH (adjustable)

Markets

- ✓ Energy:
 - PJM LMPs at PECO node
 - G+T Charge: 60 \$/MWH
 - Retail Rate: 90 \$/MWH (Flat)
- ✓ Regulation:
 - \$32.29 \$/MWH (Ave. 2008 - 2009)

Revenues (July 6, 2010)

- ✓ Regulation: \$846
- ✓ Energy: \$233



SEPTA Recycled Energy and Optimization Project

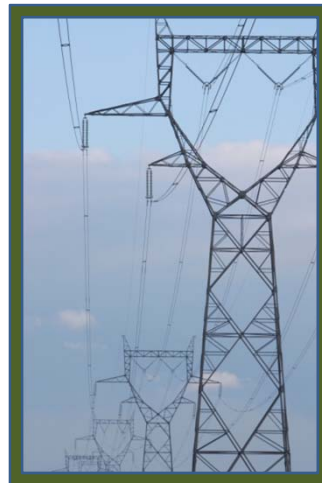


- ✓ Viridity Energy has been awarded a \$900,000 grant by the Pennsylvania Energy Development Authority to optimize SEPTA's power and voltage quality. SEPTA is the nation's 6th largest public transportation system and the 5th largest electricity user in the Philadelphia, PA metro region.
- ✓ SEPTA uses regenerative braking to produce electric power. It is estimated that 50 - 70% of that energy is wasted in order to keep track voltage within reasonable limits.
- ✓ Viridity will store this energy in a battery with the capacity to store 1 MWh of electric energy and the capability to produce 1.5 MW of power.
- ✓ The battery state-of-charge will be optimized to participate in PJM's regulation and energy markets
- ✓ Project duration: 17 months

SEPTA Recycled Energy & Optimization Project

- 1 Regenerative brake power charges battery
- 2 Viridity optimizes battery charge and discharge
- 3 Viridity integrates battery operation with PECO distribution system and PJM wholesale power market

PECO Power Grid

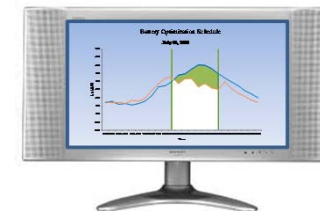


PJM Power Market

Battery Storage System



viridityenergy



Train Station



Benefits

- ✓ SEPTA improves quality, saves money, cuts carbon
- ✓ SEPTA generates new income
- ✓ Region's power grid more reliable, efficient, green

SEPTA Recycled Energy and Optimization Project



- Pilot project to be installed at the Letterly Substation
- Expected annual savings
 - 1,380 MWh
 - Supply costs reduction: \$45,450
 - Carbon emissions reduction: 1,258 tons
- Expected annual revenues
 - Capacity market: \$6,424
 - Regulation market: \$440,014
 - Energy market: \$64,094
- Projected annual benefits if solution deployed to all 37 SEPTA substations
 - Supply costs reduction: \$1,664,833
 - Market revenues: \$18,700,820
 - Carbon emissions reduction: 46,080 tons



Thank You.