



# Innovative Solar Solutions

John Masiello

Director, Demand Side Management &  
Alternative Energy Strategies





# Overview

- PEF Proven DSM Performance
- Leveraging Traditional DSM
- Innovation for Tomorrow



# Proven Performance & Execution of DSM Implementation

- 25 yrs of Industry Leading Experience in DSM
- DSM Portfolio
  - ◆ 14 programs, over 100 measures
  - ◆ 2007 Implementation of 39 new measures & 2 new programs
  - ◆ addressing the largest demand contributions in both residential homes and commercial facilities
  - ◆ includes innovative Renewable Energy Neighborhood Energy Saver Programs



# Proven Performance of DSM Implementation

## Reduced Energy Use



- ❖ Power the city of Orlando for over 2 years
- ❖ Customers have saved almost \$870 Million since 1981
- ❖ Annual savings potential of \$504 for average home

## Reduced Energy Demand



- ❖ Since 1981, over 1,500 MW demand reduction
- ❖ Eliminates the need for 17 peaking power plants
- ❖ Residential Load Management credit of up to \$147<sup>1</sup> annually

## Reduced Emissions



- ❖ Reduced carbon dioxide by 7,500,000 tons
- ❖ Or equal to removing almost 1,900,000 cars off roads<sup>2</sup>
- ❖ Or equal to planting over 1,900,000 acres of trees



# Leveraging Traditional DSM

Developing DSM Programs



# The Approach

- **Combine the efficiency of solar energy with the benefits of a demand response program**
  - ◆ Created Cross-Departmental Team
  - ◆ Formed Advisory Committee
  - ◆ Educated Stakeholders
  - ◆ Coordinated Media Event to Launch Program





# Progress Energy Florida

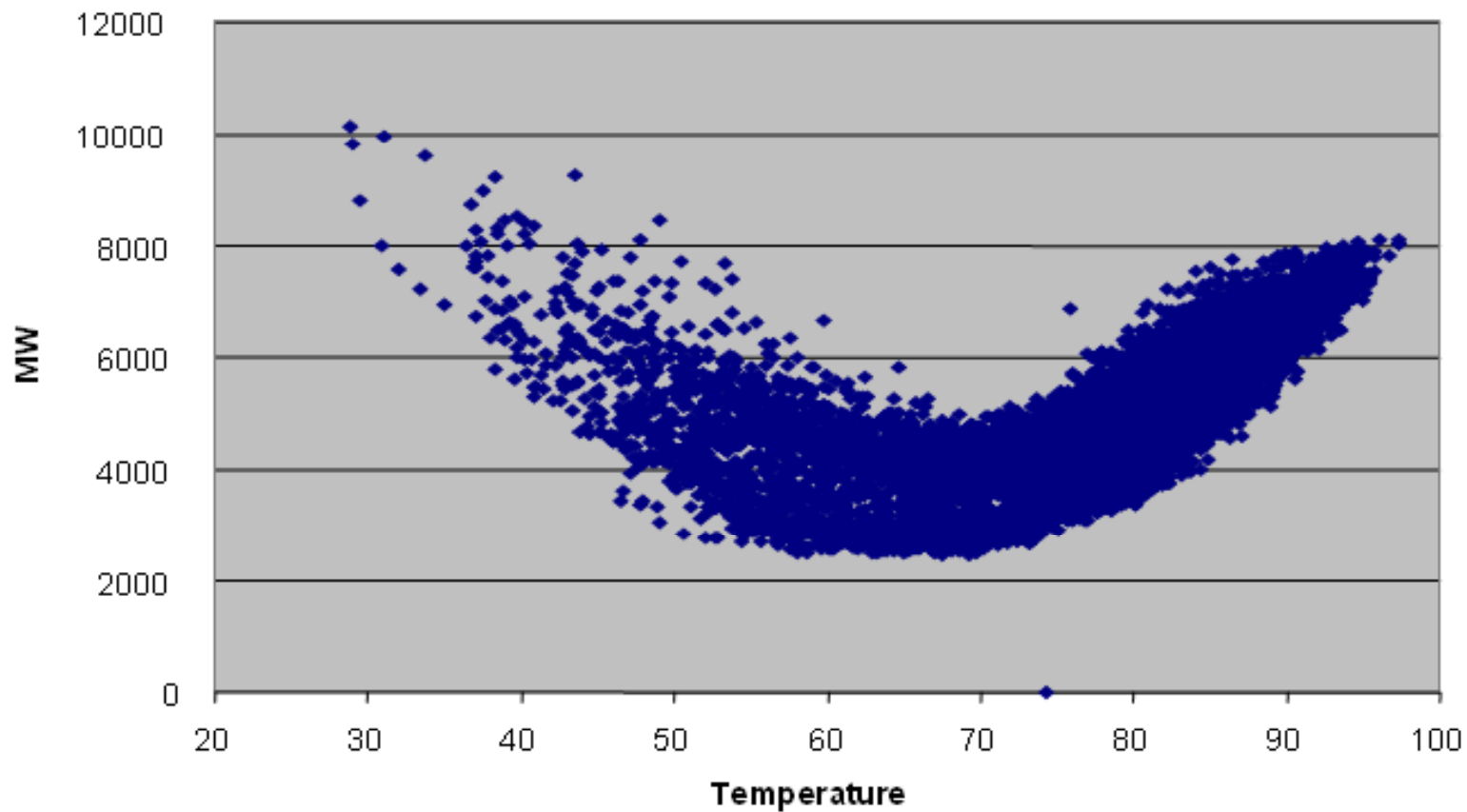
- **Historically a Winter Peaking Utility**

- ◆ Large winter delta vs. summer  
Primarily electric heat
- ◆ 1/3 strip heat
- ◆ Customer behavior raising temperature in a.m.
- ◆ Water heater demand is high



# System Load/Temperature Profile

Typical PEF System Load

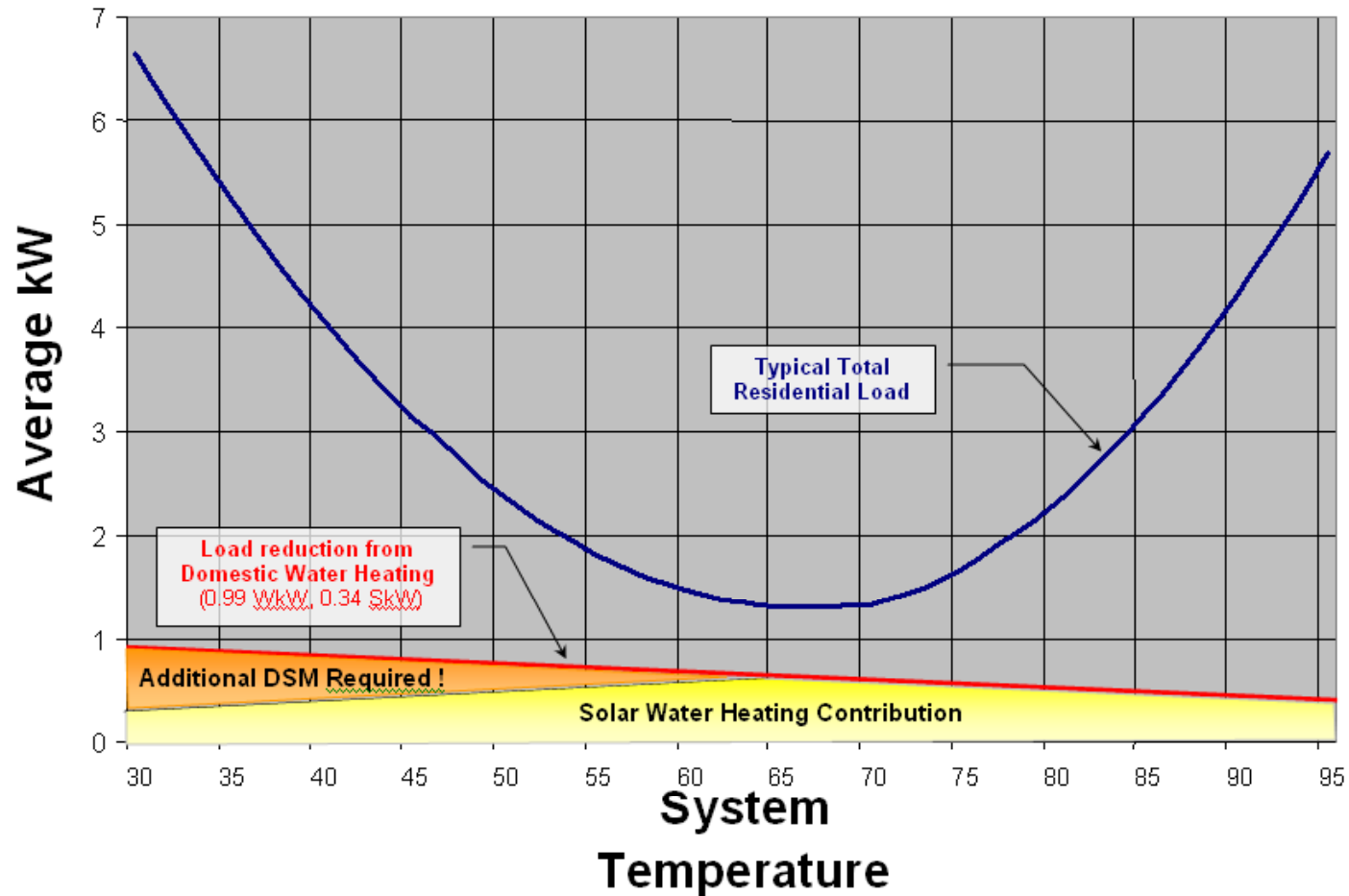






# Single Home Load Profile

## Single Family Home - Load versus Temperature





# Load Management Integration Benefits

- Provides for peak demand reduction, summer and winter
- Cost-effective RIM benefits
- Is cost effective to participant
- Combining hot water & heating control creates win/win
- Enables a solar water heater measure to promote renewable energy



## Solar Water Heating w/ Load Management Program Design

- Customer must have load management on water heater and heat and air
- Customer receives 25% of their load management credits
- Customer receives \$450 incentive toward solar water heater
- Customer must remain on load management for minimum of three years or payback portion of incentive



# Solar Water Heating Economics

- 2,780 kWh for water heating for single family home  
3 or more occupants
- If 80% solar (2,224 kWh/yr savings) @ \$.12 per kWh  
\$267/year in savings
- \$4,500 investment, 16.8 year payback
- Incentives – \$1,200 federal, \$500 state  
\$2,800 net investment, 10.5 year payback
- \$450 from PEF, nets \$2,485 (reduces Federal credit)  
9.3 year payback



# Integration Benefits

## ● Residential Load Management

- ◆ Heat, Air and Water Heater control during times of system peaks
- ◆ 2.14 winter kW and 1.17 summer kW average load reduction

## ● Solar Water Heating

- ◆ Customer has hot water during control period
- ◆ Provides fuel and O&M and T&D savings
- ◆ Water heater load limited by load management control



# Cost-Effectiveness

## Solar Thermal Water Heating Cost Effectiveness Analysis

Rate Impact Measure Test			Participant Test			Total Resource Cost Test		
PV Total Benefits (\$000)	PV Total Costs (\$000)	B/C Ratio	PV Total Benefits (\$000)	PV Total Costs (\$000)	B/C Ratio	PV Total Benefits (\$000)	PV Total Costs (\$000)	B/C Ratio
1,408	1,127	1.25	937	539	1.74	1,408	729	1.93



# SolarWise for Schools

Using the energy of the sun to ignite student and community interest in alternative energy solutions

- **SolarWise School Program**
  - ◆ PEF targets PV panels on all schools within our service territory
  - ◆ Every day students & educators will see alternative energy results and the potential for the future
- **Customer partnership**
  - ◆ This partnership represents the ultimate community project



**Uniting two  
of Florida's  
most valuable  
resources.**



# SolarWise for Schools

- **Environmental Stewardship**
  - ◆ Promotes Renewable Energy
  - ◆ Deferred generation through DLC
  - ◆ Goal to install PV systems at all schools within PEF service territory
- **Residential Customer Donations**
  - ◆ Monthly EnergyWise credits accumulate in escrow account
  - ◆ Participants may donate up to \$150/year
  - ◆ Currently 390,000 eligible EnergyWise customers
  - ◆ Expected growth to 450,000 + by 2014
- **Inaugural Installations**
  - ◆ St. Petersburg High – November 30, 2007
  - ◆ Waterford Elementary – December 21, 2007







# Renewable Energy Program

- **Solar Water Heater with EnergyWise**
  - ◆ Offers \$450 rebate plus up to \$60 in annual LM credits
- **SolarWise for Schools**
  - ◆ A fund to promote environmental stewardship and renewable energy education by installing Photovoltaic systems on schools while providing math and science education



**Capture  
the power  
of the sun**

**SolarWise  
for Schools<sup>SM</sup>**  
Help educate future generations about solar energy.



# Innovation for Tomorrow

Leveraging Solar



# Solar Charging for Plug-In Hybrid Electric Vehicles

- **Proposal to FL DEP**

- ◆ Renewable Energy for Plug-In Hybrid Electric Vehicles (PHEVs):
  - ◆ Demonstration and Testing of Solar Charging and Grid Interconnectivity

- **Partners**

- ◆ UCF, UF, Orange County

- **PHEV Benefits**

- ◆ Revenue source
- ◆ DSM potential
- ◆ Mobile power supply
- ◆ Improved emissions / fuel economy

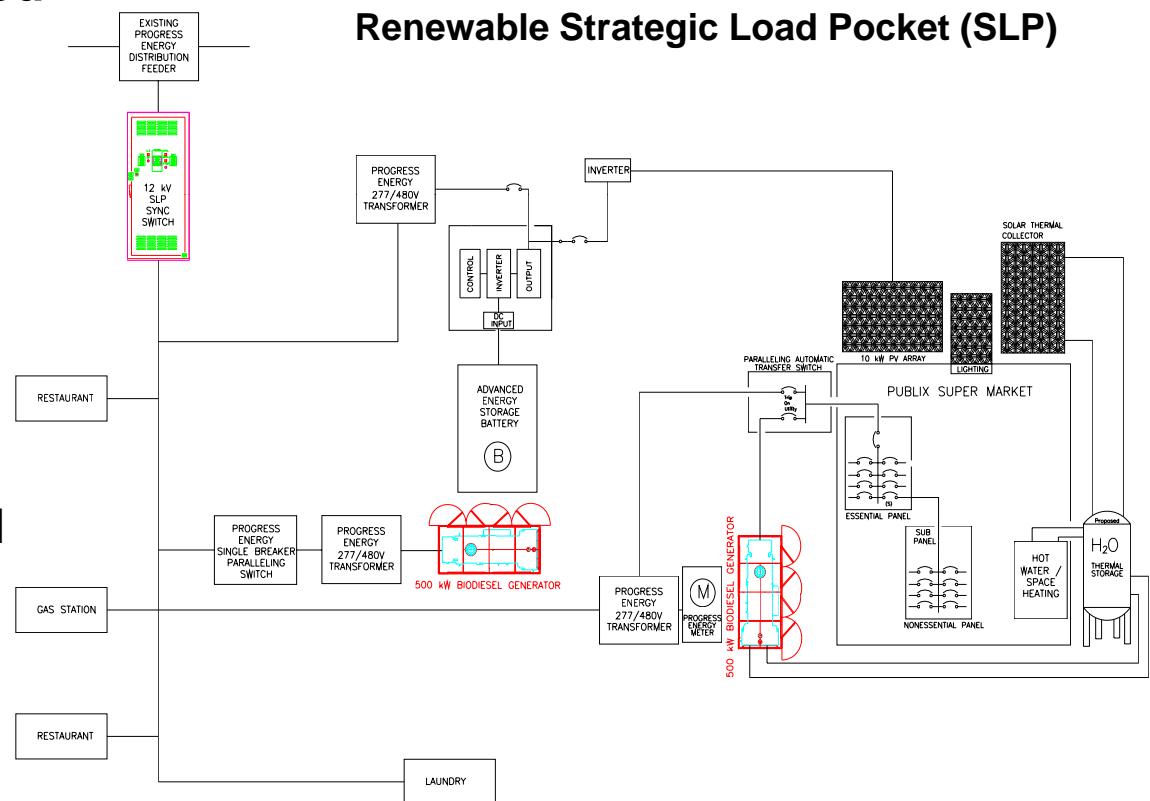




# Smart Grid / Micro Grid: FL DEP Proposal “Renewable Strategic Load Pocket (SLP)”

## ● Solar PV with advanced energy storage

- ◆ Solar thermal
- ◆ Solar hybrid lighting
- ◆ Biodiesel
- ◆ Waste heat
- ◆ Advanced metering
- ◆ Dynamic load control





# Renewable SEEDS (Sustainable Electric Energy Delivery System) for a Clean Power Future

- **Solar charging of Vanadium Redox Battery Energy Storage System (VRB-ESS).**
- **Stored energy will reduce power system peaks.**



- **Two sites in St. Petersburg:**
  - ◆ 5 kW demand per location
  - ◆ USF campus
  - ◆ Albert Whitted Park



# How to Save The Watts



It's your wallet.  
It's your world.  
Save the Watts.

- **Community Awareness Campaign**
- **Interactive mix of media**
- **Designed to engage customers and provide energy solutions**



**SAVE THE WATTS**  
**.COM**