

Integrated Resource Plan

TVA'S ENVIRONMENTAL AND ENERGY FUTURE

Current Energy Efficiency / Demand
Response Portfolio

December 10-11, 2009



Energy Efficiency / Demand Response Portfolio

Background

- ◆ TVA reviewed the recommended programs from PA Consulting for applicability to the TVA market and prioritized programs to be further customized to the demographic and climatic parameters of the Valley
- ◆ Programs are designed to achieve short-term goal of 1,400 MW reduction of summer peak demand by 2012
- ◆ TVA's current energy efficiency / demand response programs are part of a continuously evolving portfolio
 - At this time, no options have been screened or eliminated from contention

Current Portfolio

- ◆ TVA's current portfolio of energy efficiency / demand response programs are grouped into five key categories:
 - Residential
 - Commercial and industrial
 - Demand response
 - Consumer-owned renewable generation
 - Consumer-owned clean generation
- ◆ The table to the right summarizes the projected portfolio demand reduction and annual energy saving by 2030

Category	Summer Peak Demand (MW)	Annual Energy (GWh)
Residential	659	2,528
C&I	410	1,786
Demand Response	2,462	184
Renewables	57	514
Clean Generation	201	1,799
Total	3,789	6,811

Residential

- ◆ Residential programs are focused on improving the efficiency of new and existing building envelopes as well as space cooling appliances

- ◆ Programs include
 - R1: New homes
 - R2: *energy right* home e-valuation
 - R3: Residential In-Home Energy Evaluation (IHEE)
 - R4: Manufactured homes
 - R5: HVAC (Heat pump and high –efficiency air conditioning
 - R6: HVAC maintenance

Commercial and Industrial

- ◆ Commercial programs are focused on space cooling and lighting while industrial programs are target process improvement

- ◆ Programs include
 - C1: Major industrial
 - C2: Industrial efficiency advice and incentives
 - C3: Commercial efficiency advice and incentives
 - C4: Direct installation
 - C5: Retro/Re-commissioning
 - C6: White tags
 - I1: Internal energy efficiency

Demand Response

- ◆ Demand response programs are designed to reduce demand during peak periods of the summer through curtailment, Direct Load Control (DLC), and Conservation Voltage Regulation (CVR)

- ◆ Programs include:
 - D1: Demand response
 - D2/D3: DLC Programs
 - D4: CVR Program

Consumer-Owned Renewable Generation

- ◆ All programs are included in Generation Partners through 2012
 - Eligible technologies include: biomass, landfill gas, large solar, micro hydro, residential solar, wastewater treatment, and wind

Consumer-Owned Clean Generation

- ◆ Programs are not included in Generation Partners; assumes TVA end-use generation will expand current offering to clean technologies after pilot ends in 2012
 - Includes biodiesel, waste heat recovery, combined heat and power, and large co-generation industrial site



Future Portfolio Enhancement

- ◆ TVA's long-term objective is to ensure sustainable energy efficiency / demand reduction programs by stimulating the marketplace
 - Current portfolio is an initial step in fulfilling this objective

- ◆ Program development and improvement will be influenced by many factors including:
 - Measurement and verification of program impacts
 - Economic performance of programs for TVA and all stakeholders
 - Capacity and capability of program delivery infrastructure
 - Input from stakeholders
 - Technology advancement and penetration in the marketplace

- ◆ TVA will focus dollars on the best performing programs and capitalize on expanding infrastructure

◆ Energy efficiency / demand response program development and improvement is an on-going process that will continue to evolve the portfolio



Current Portfolio vs. PA Recommendations

The following table compares programs recommended by PA with TVA’s current portfolio and explains key differences.

PA Recommendations	Current Portfolio	Differences
R-1: Residential New Homes	R-1: <i>energy right</i> New Homes	Significant increases of new home construction are not viable in the short term due to major reductions in activity in this sector; current designs reflect a more gradual growth slope
R-2: Residential On-Line Home Energy Audit	R-2: <i>energy right</i> Home e-valuation	Portfolio item includes paper and on-line version; producing significant impacts; other avenues for delivery of kits being explored such as EnergySmart Memphis seminars
R-3: Residential Comprehensive Existing Homes	R-3: Residential In-Home Energy Evaluation (IHEE) R-6: HVAC Maintenance	PA included HVAC replacement addressed separately in portfolio; proposed incentives were reduced to be consistent with TVA experience
R-4: Residential Manufactured Homes	R-4: Manufactured Homes	PA focused on ENERGY STAR® homes; market conditions in Valley and nation are not conducive to a full shift to ENERGY STAR standards or high penetration numbers
R-5: Residential HVAC	R-5 HVAC (Heat Pump & High-efficiency Air Conditioning)	Design modified to incorporate anticipated participation levels based on 30 years of program experience
R-7: Residential Efficient Appliances and Lighting	Not yet included	Low capacity impacts and high program costs contributed to a low priority ranking; still examining options for program alternatives
R-9: Residential Direct Load Control	D-2: Air conditioner DLC D-3: Water heater DLC	Past experience with one-way communication systems has shown limited value. Because implementation depends on construction of two-communication (AMI) infrastructure, program launch date is delayed

TVA Current Portfolio vs. PA Recommendations (Cont'd)

PA Recommendations	Current Portfolio	Differences
C-1: Commercial New Construction (includes building renovations)	Not yet included	Economic downturn severely curtailed building in this sector; will be added when market revives
C-2: Commercial/Industrial Efficient Equipment Program	C-1: Major Industrial C-2: Industrial Efficiency Advice and Incentives C-3: Commercial Efficiency Advice and Incentives C-4: Small commercial Direct Install	Broken into customer class focus areas and redesigned based on market research input to provide equipment focus and assistance identified as needed in the marketplace
C-3: Commercial/Industrial Building Performance Program	C-5: Commissioning	Revamped based on market research, TVA customer data, and concerns around longevity, degradation, and M&V techniques
C-9: Commercial Industrial Demand Response	D1: Demand Response	After initial pilot, successfully launched as an extensive market test. Moving into second phase negotiations with vendor and exploring parallel operations by PDs and TVA

Additional programs with no PA corollary

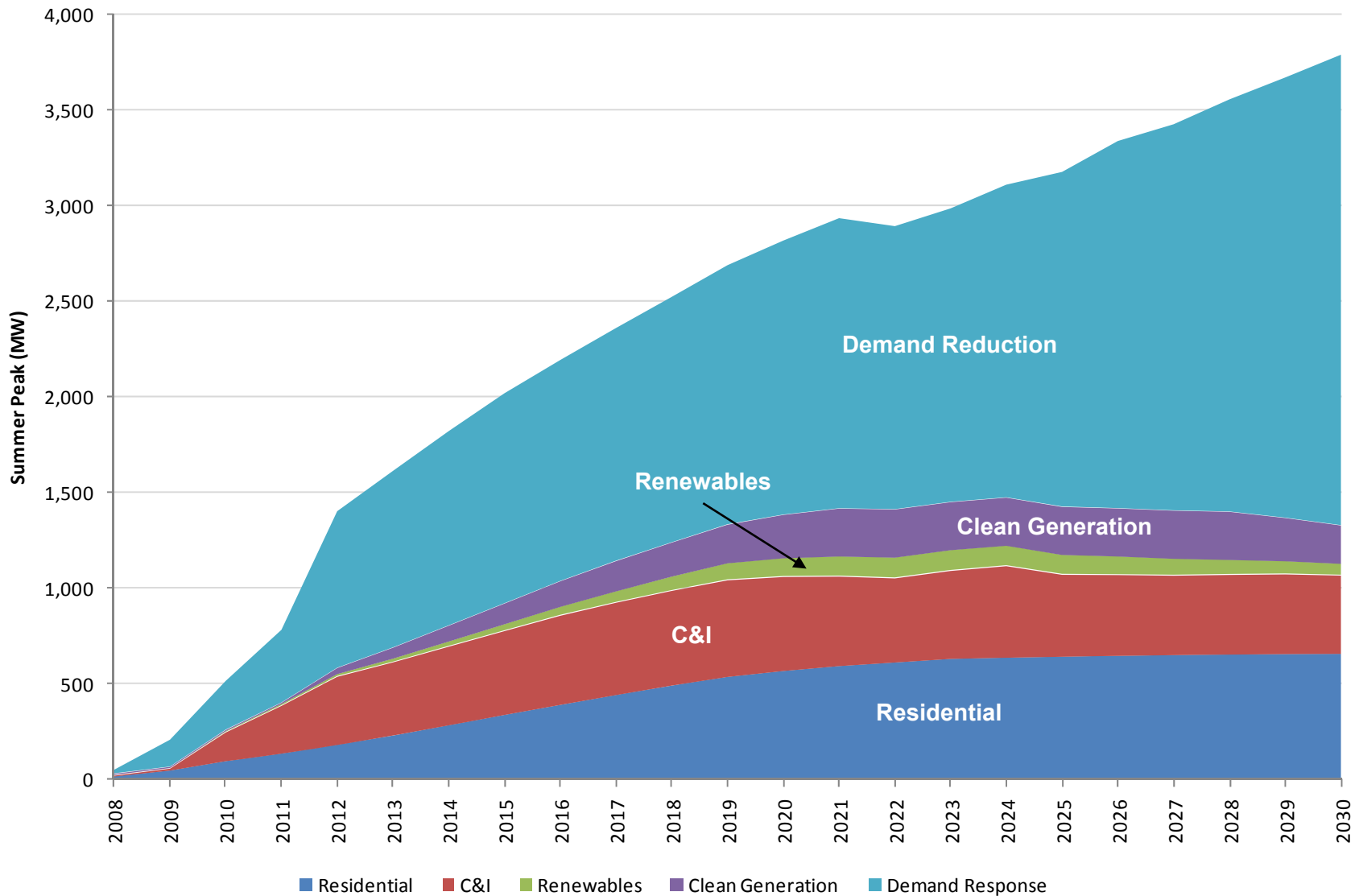
- C6 - White Tags
- D4 - Conservation Voltage Regulation
- I1 - Internal Energy Efficiency
- E1 - Biodiesel Generation
- E2 - Biomass Generation
- E3 - Landfill Gas Generation

- E4 - Large Solar Generation
- E5 - Micro Hydro Generation
- E6 - Residential Solar Generation
- E7 - Wastewater Generation
- E8 - Wind Generation
- E9 - Clean Generation



Current Portfolio – Demand Impacts (MW)

The projected impact of the current portfolio to summer peak demand reduction is shown in the figure below.



TVA Current Portfolio – Annual Energy Savings (GWh)

The figure below illustrates projected annual energy savings of the current portfolio.

