Entergy New Orleans DSM Potential Study Overview

2015 IRP Technical Conference

June 27, 2014

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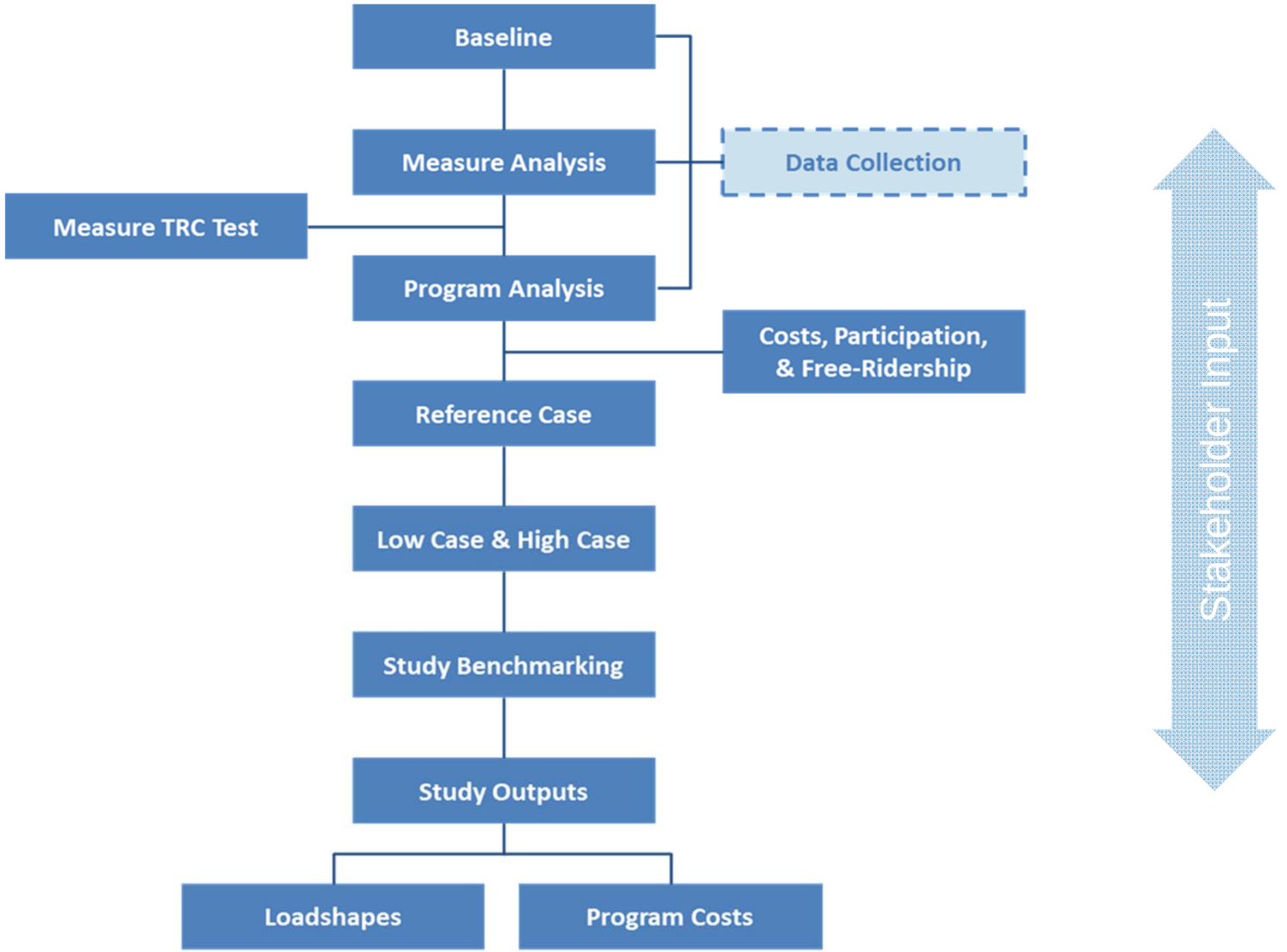
Objectives of the Study

- Develop high-level, achievable DSM program potential estimates for ENO appropriate for inclusion in IRP analyses.
- Develop hourly load-shapes and program cost projections[(1)] representing three levels of achievable DSM (low, reference, and high) over 20 years (2015-2034).

Note: The Potential Study should not be applied directly to short-term DSM planning activities, such as program implementation plans or utility goal setting, but can serve as one of the inputs into the more detailed analysis necessary to support such planning.

[(1)]Utility costs include: incentives and administrative (and if applicable installation and ongoing cost paid by ENO)

Study Approach



Fuels covered

- *Electricity.* Focus of this technical conference and presentation

- *Natural Gas.* Potential Study proposed approach:
  - Conduct a joint electric/gas DSM potential study reflecting synergies in delivery
  - DSM inputs to IRP
    - Electric measure load shapes
    - Electric portion of DSM program costs
  - Potential study report
    - Provide estimates of joint electric/gas program cost-effectiveness

Achievable Potential Scenarios – working definitions

- **Reference case potential**. The realistic level of cost-effective savings that could be achieved by utility programs given ENO's existing programs and the best information available at the time of the Potential Study. Incentive levels typically between 25% and 75% of incremental cost (with exception of hard-to-reach markets, e.g., small business, where incentives may need to be different).

- **High case potential.** The level of cost-effective savings that could be achieved by utility programs at maximum incentive levels. Incentive levels set to 100% where possible.

- **Low case potential.** The level of cost-effective savings that could be achieved at lower incentive levels. In most cases incentives would be capped at 25%.

Key Updates from 2012 Study

- Input Assumptions
  - Eligible stock
  - Measures
  - Avoided energy cost and avoided capacity cost
- Approach
  - Measure TRC testing
  - IRP inputs

Key Residential Modeling Updates

Input	2012 Data	2015 Data
Residential customer counts	2011 Entergy data and forecast	2014 Entergy data and forecast
Residential building characteristics and efficiency saturation	Post-Katrina Study by GCR (2008); 2009 Residential Energy Consumption Survey (RECS), U.S. Dept. of Energy (DOE)	Post-Katrina Study by GCR (2008); 2009 RECS; Some updates to specific measures using primary data collected more recently in other jurisdictions
Residential measure assumptions	ENO Deemed Savings (2008); ICF building simulations and engineering calculations	AR Technical Reference Manual (TRM) v3; OK TRM; IL TRM; adjustments to CDD & HDD* made for weather sensitive measures. ENO evaluations

**Cooling degree days; heating degree days*

Key Commercial Modeling Updates

Input	2012 Data	2015 Data
Commercial customer counts	2011 Entergy data and forecast	2014 Entergy data and forecast
Commercial building characteristics and efficiency saturation	2003 Commercial Buildings Energy Consumption Survey (CBECS), U.S. DOE	2003 CBECS; Commercial Building Institute (CBI) data
Commercial measure assumptions	AR TRM v1; adjustments to CDD/HDD made for weather sensitive measures; ICF building simulations	AR TRM v3; OK TRM; IL TRM; adjustments to CDD/HDD made for weather sensitive measures, ENO evaluations

Key Industrial Modeling Updates

Input	2012 Data	2015 Data
Industrial customer counts, usage and forecast	2011 Entergy and Large Customer data and forecasts	2014 Entergy and Large Customer data and forecasts
End use saturation and measure applicability	2006 Manufacturing Energy Consumption Survey (MECS), U.S. DOE	2010 MECS
Industrial measure assumptions	CA Industrial Potential Study; ICF estimates	DOE studies; EPA studies; LBNL studies; other published studies; ICF estimates

Programs types

- Energy efficiency
  - Program types likely similar to those included in 2012 study, using cost-effective, commercially available measures; all sectors covered, including hard to reach (e.g., small business, multifamily, low income)
- Demand response
  - Residential
    - AC Direct Load Control
    - Dynamic Pricing without Enabling Technology
      - Assumes no AMI meter deployment
  - Non-Residential
    - Dynamic Pricing without Enabling Technology
      - Assumes no AMI meter deployment
- Solar Hot Water

Electric Energy End Uses

Sector	End Use
Residential	Lighting
	Consumer Electronics
	Appliances
	HVAC
	Hot Water
	Shell
	Other (e.g., home energy use benchmarking)
Commercial	Lighting
	HVAC
	Refrigeration
	Hot Water
	Food Service Equipment
	Other (including RCx, Data Center)

Measures included in study:

- Retrofit, replace on burnout, new construction
- Represent commercially available measure types for each end use
- Start with comprehensive list
- Test each for cost-effectiveness
- Include in DSM potential estimates only measures with TRC of at least 1.0, with possible exceptions

Electric Energy End Uses – cont.

Sector	End Use
Industrial	Machine Drive
	Pumps
	Fans
	Compressors
	Other applications
	Process Heating
	Process Cooling and Refrigeration
	Other Process Uses
	Electro-Chemical
	Facility HVAC
	Facility Lighting
	Other non-process use

DSM Inputs to IRP

Input	2012	2015
Loadshape format	Hourly (load savings estimates for every hour of every year over the 20 year time horizon)	Hourly (load savings estimates for every hour of every year over the 20 year time horizon)
Savings inputs	Bundled Program loadshapes: Program loadshapes were bundled (combined) by like PAC result and program type (e.g., EE & DR)	Program loadshapes not bundled. Load shapes provided for each program for each scenario.
Cost inputs	Total electric program costs, by program by year	Total electric program costs, by program by year

Measure TRC Testing

Input/Approach	2012	2015
Measure TRC costs	Incremental equipment costs	Incremental equipment costs
Measure TRC benefits	Avoided kW, kWh, Therms	Avoided kW, kWh, Therms
Measure TRC test year	Program year 1 (2012)	Program year 1 (2015) for measures with baselines changing in near-term (e.g., CACs); Program year 8 (2022) for all other measures

Some key baseline efficiency improvements–screw-in light bulbs, impacts of EISA 2007*

Baseline Product Wattage

Year	0–309 lumens 25 w equiv.	310–749 lumens (40 w equiv.)	750–1,049 lumens (60 w equiv.)	1,050–1,489 lumens (75 w equiv.)	1,490–2,600 lumens (100 w equiv.)
2011 (pre-EISA 2007)	25	40	60	75	100
2012	25	40	60	75	100
2013	25	40	60	75	72
2014	25	40	60	58	72
2015	25	33	49	58	72
2016	25	33	49	58	72
2017	25	33	49	58	72
2018	25	33	49	58	72
2019	25	33	49	58	72
2020 and after	25	12	20	28	45

Bulbs affected by EISA 18%-28% more efficient than pre-EISA

EISA 2007 Tier 1 (in effect)

First year of IRP forecast

EISA 2007 Tier 2 takes effect

Bulbs affected by EISA 55%-70% more efficient than pre-EISA

**U.S. Energy Independence and Security Act of 2007*

Sources: Compilation of Lighting program plans, reports, and forecasts nationwide; EISA 2007.

Some key baseline improvements– screw-in light bulbs, impacts of EISA 2007, cont.

- The next EISA milestone, Tier 2, will not take effect until 2020. This phase will require that light bulbs manufactured are up to 70% more efficient than before EISA took effect.
- Lighting industry experts and energy efficiency program planners expect the new baselines to remain relatively stable until the next Tier of EISA takes effect in 2020.
- Future of standard screw-in bulb measures highly uncertain post-2020
  - EISA 2007 does not impact specialty bulbs (e.g., reflector LEDs)

Some key baseline improvements-cont.

- Residential central air conditioners and heat pumps:
  - Current baseline: SEER 13

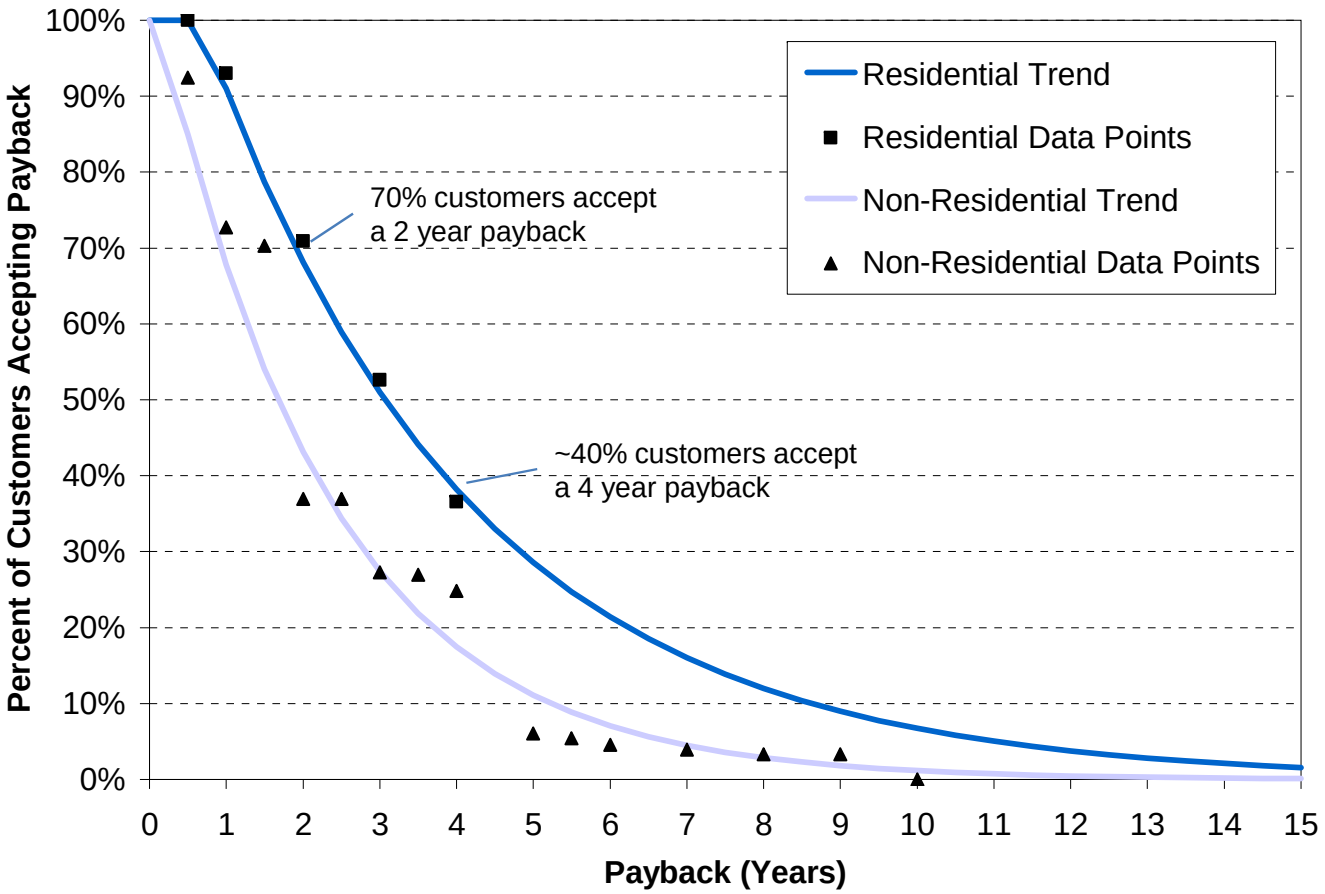
  Per recent settlement between DOE and HVAC lobby:
  - Baseline change to SEER 14 moved from 2015 to 2016

- T8/T5 linear florescent lighting
  - EPACT 2005 went into effect in 2012: requires 30%-40% efficiency improvement for florescent tubes (lamps)
    - Manufacturers now producing minimally compliant T12s

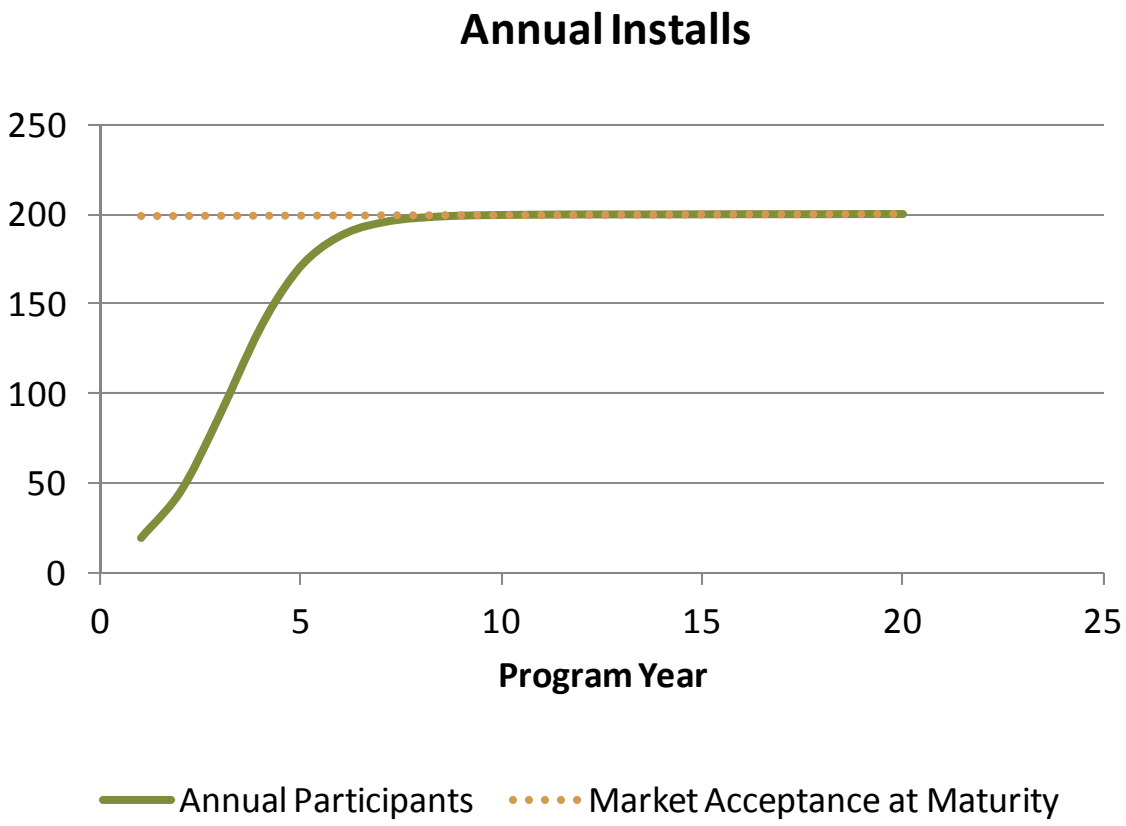
Participation Modeling

- *Eligible stock*. How many units could be replaced in each year?
  - Applicability; current saturation, replace-on-burnout; retrofit; new construction
- *Financial barriers*. Modeled using payback acceptance.
- *Non-financial barriers.* Contractor participation rates; awareness; customer preference, etc.
- *Benchmarking.* Consideration of historical participation rates, particularly in the peer territories

Illustrative Payback Acceptance Curves



Illustrative Measure Participation Curve



Non-Energy Impacts/Benefits

Background:

1. Develop a proposal for tracking reasonably quantifiable non-energy impacts (cost and benefits) from DSM and Supply Side Resources
2. Theoretical examples of non-energy impacts (NEIs) include:
   - Durability
   - Maintenance
   - Health
   - Comfort
   - Safety
   - Utility
   - Government
   - Societal
   - Environment
3. Schedule:
   - Present proposed scope of work and cost estimate at the October 2014 IRP Technical Conference
   - It is not anticipated that non energy impacts will be incorporated in the 2015 IRP