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# **New York Statewide Residential Appliance Metering Study**

**June 22, 2015**



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# Participating Program Administrators

<b>Program Administrators</b>
Central Hudson
Con Edison
National Grid
NYSEG/RG&E
NYSERDA
Orange and Rockland
<b>Other Stakeholders</b>
NY ISO
DPS Staff

\*PSEG/LI may be a future participant in Phase 2

# Phase 1

The overall objective of the Phase 1 pilot (located in a National Grid and Con Edison territory) is to determine the feasibility, design and cost of a statewide load research study.

## High Level Goals:

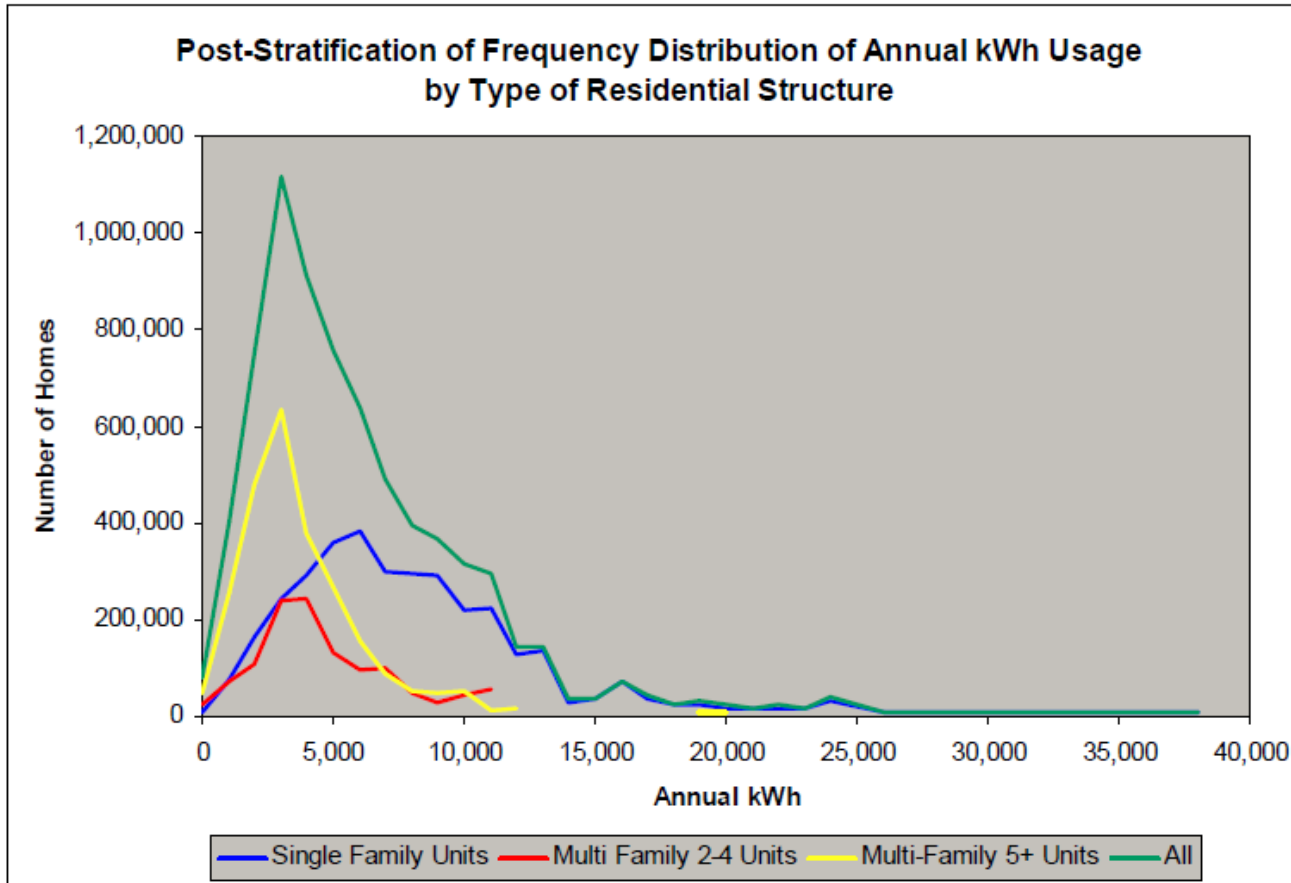
- Test the Enetics NILM device and plug-load device (intrusive) within single family and multi-family households
- Develop the sampling strategy for Phase 1 and the larger Phase 2 study
- Identify, document, manage and mitigate any foreseen and unforeseen issues
- Present Phase 1 findings to the E2 Working Group with recommendations for implementation of Phase 2

# Phase 2

## Overall Objectives of Phase 2 (Statewide Study):

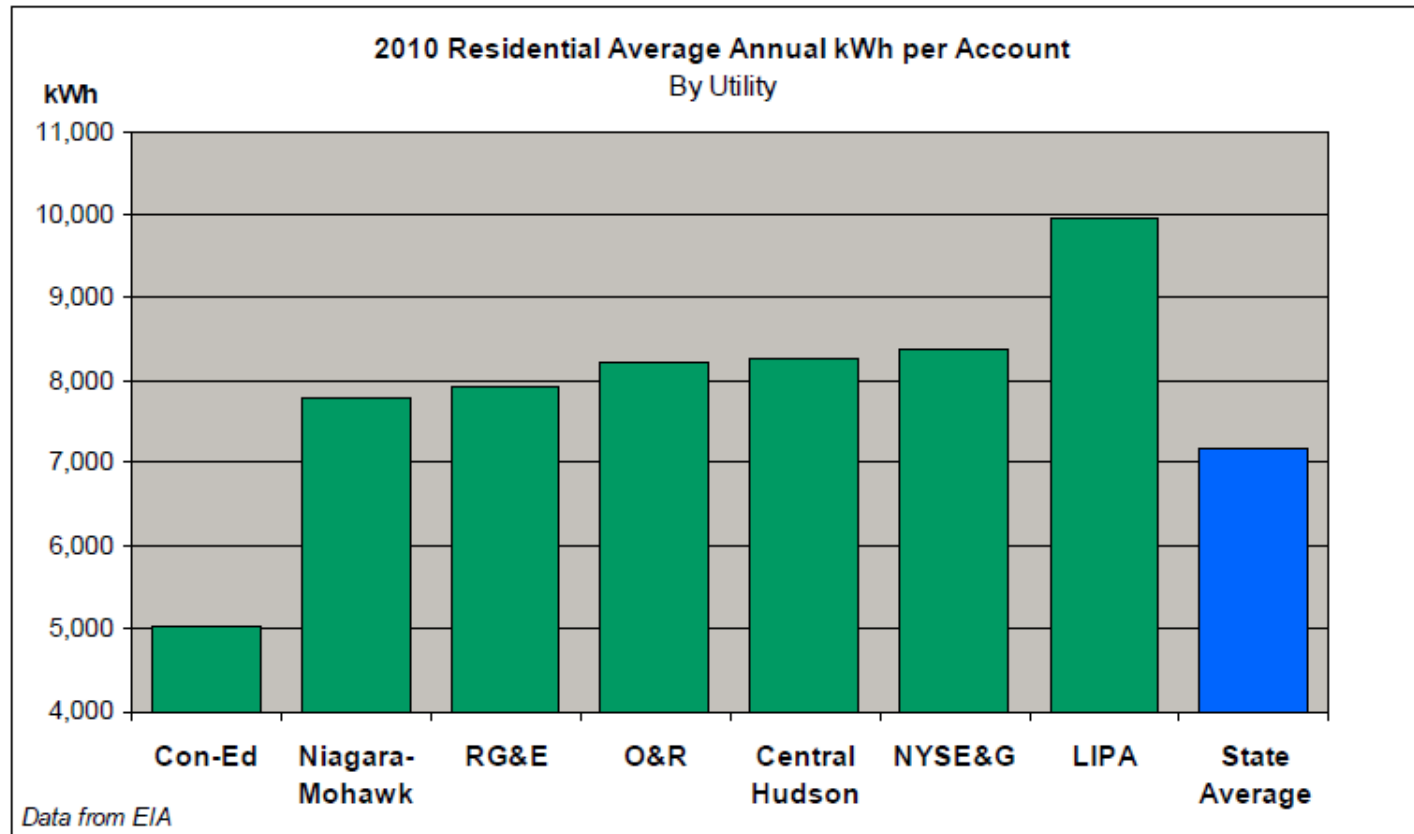
- Premise-level and major household appliance usage patterns for residential customers throughout New York State.
- Determine weather-sensitivity of residential appliances, with applications for long-term and real-time load forecasting, system planning and rate design.
- Update residential load profiles for smart grid investment, demand response programs and retail access purposes.
- Provide information for customer service inquires about typical appliance energy usage characteristics.
- Provide support for future planning of energy efficiency programs and potential studies.

# Annual kWh Usage by Residential Type



Source: Statewide Residential Metering Project - Scoping Study Report, NY ISO November 2012

# Residential Avg Annual kWh per Account



# Benefits of the study

- Provide a year-one baseline and two additional years of residential usage patterns for annual and monthly energy consumption, seasonal peak demands, and hourly load profiles. Both premise-level usage and major appliance usage patterns would be available.
- Compare energy efficiency program participant and non-program participant energy usage at the whole-home and appliance level, to obtain impact evaluation data for both annual energy and seasonal peaks, and for future energy efficiency program design and planning.
- Determine the weather-sensitivity of residential appliances, with applications for long-term and real-time load forecasting, system planning and rate design.
- Update residential load profiles for smart grid investment, demand response programs and retail access purposes.
- Provide information for customer service inquires about typical appliance energy usage characteristics.

**Source:** *Benefits of a Residential End-Use Metering Project for New York*, New York Independent System Operator, March, 2013



# Benefits of this study (cont'd)

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- The results of this study will also help future planning for:
  - Demand Response Programs
  - Energy Efficiency Programs
  - Reforming Energy Vision (REV)
  - Clean Energy Fund (CEF)

# Non-Intrusive Meter Device Details

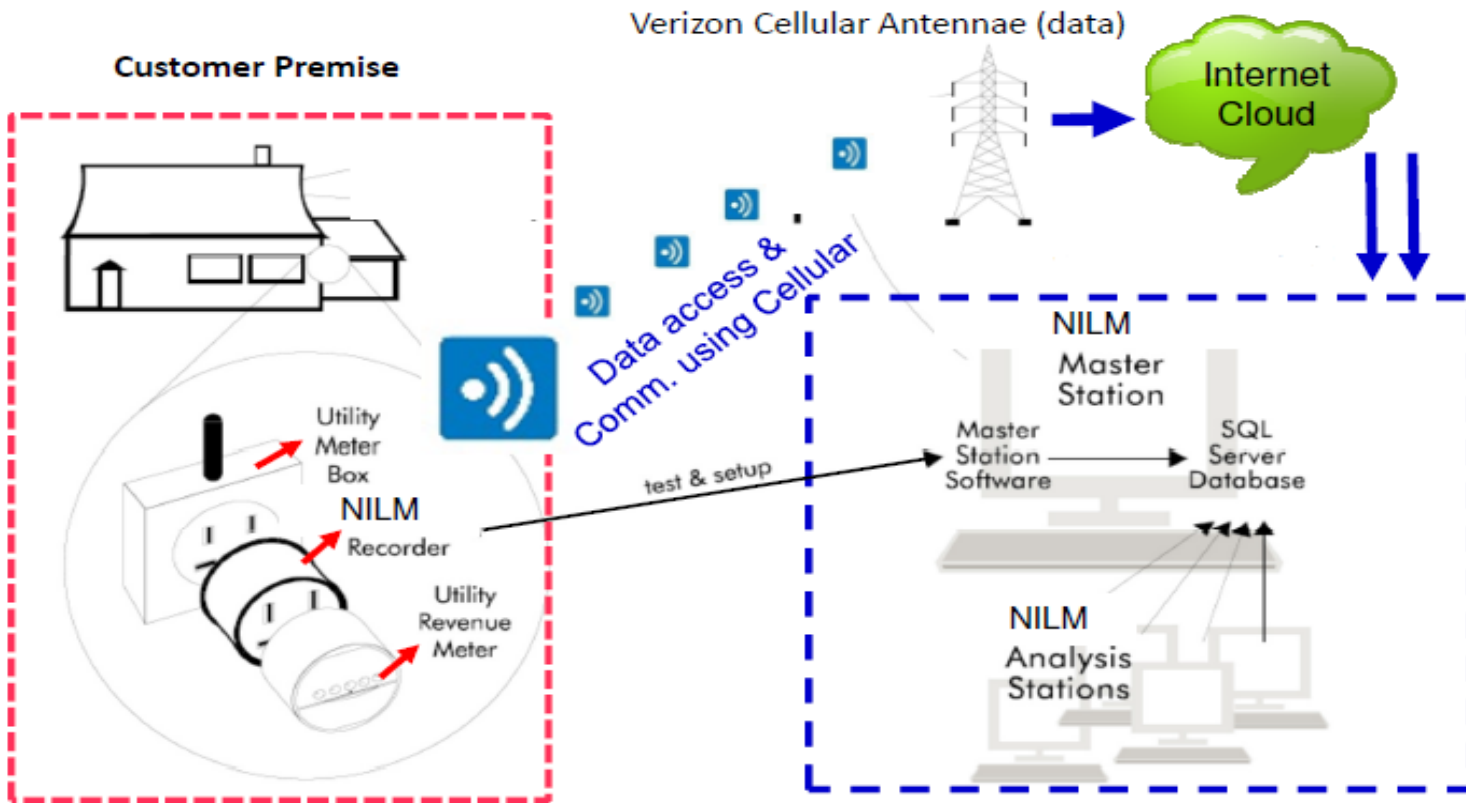
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- Installed on the outside of the home like an ordinary revenue meter, yet is able to measure individual appliance loads
- Records volts and amps in millisecond time-steps and can aggregate the data at intervals such as 1 minute, five-minute, fifteen-minute and hourly, as well as daily, weekly and monthly
- Individual appliance usage can be detected by pattern recognition algorithms based on instantaneous changes in voltage and current
- The meter can report both watts and vars, so that power quality and transient analyses may also be performed.

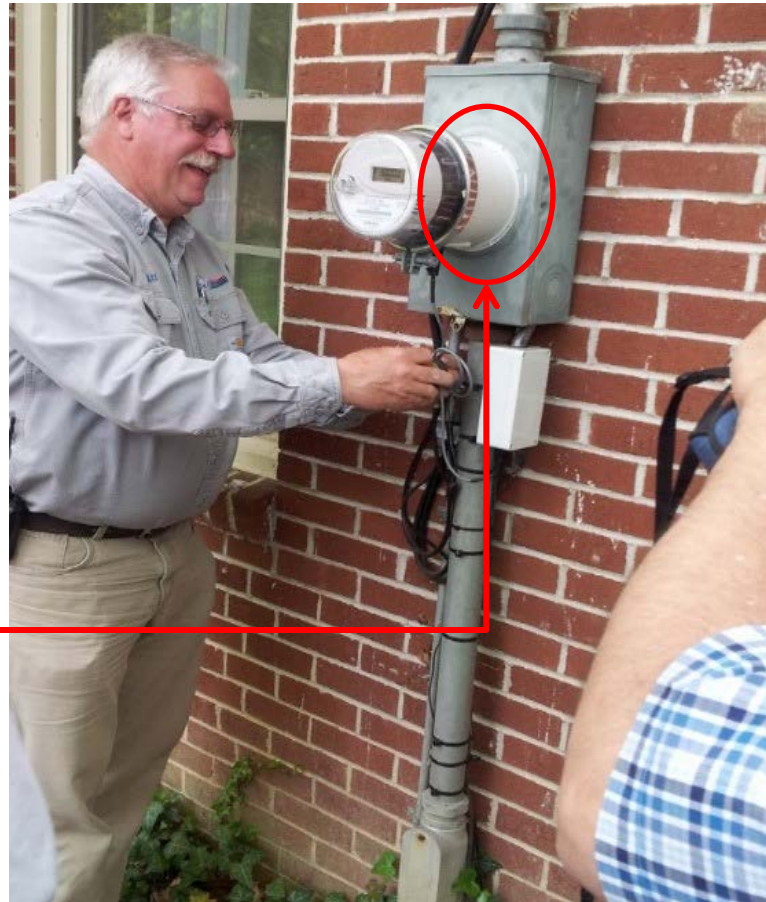
# Enetics Device – How it Works

SPEED : Single Point End Use Energy Disaggregation



# Enetics LD – 1100 NILM Recorder

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**Enetics LD-1100  
NILM Recorder**

# Detectable Loads

- Central A/C
- Window A/C
- Window A/C – 240V
- Heat Pump
- Furnace Blower
- Furnace Oil Pump
- Dehumidifier
- Water Heater
- Well Pump
- Well Pump – 240V
- Pool Pump
- Water Bed
- Lights
- Clothes Dryer
- Clothes Washer
- Refrigerator
- Freezer
- Dishwasher
- Coffee Maker
- Oven
- Large Burner
- Small Burner
- Microwave

# Sample Enetics Meter Load Profile

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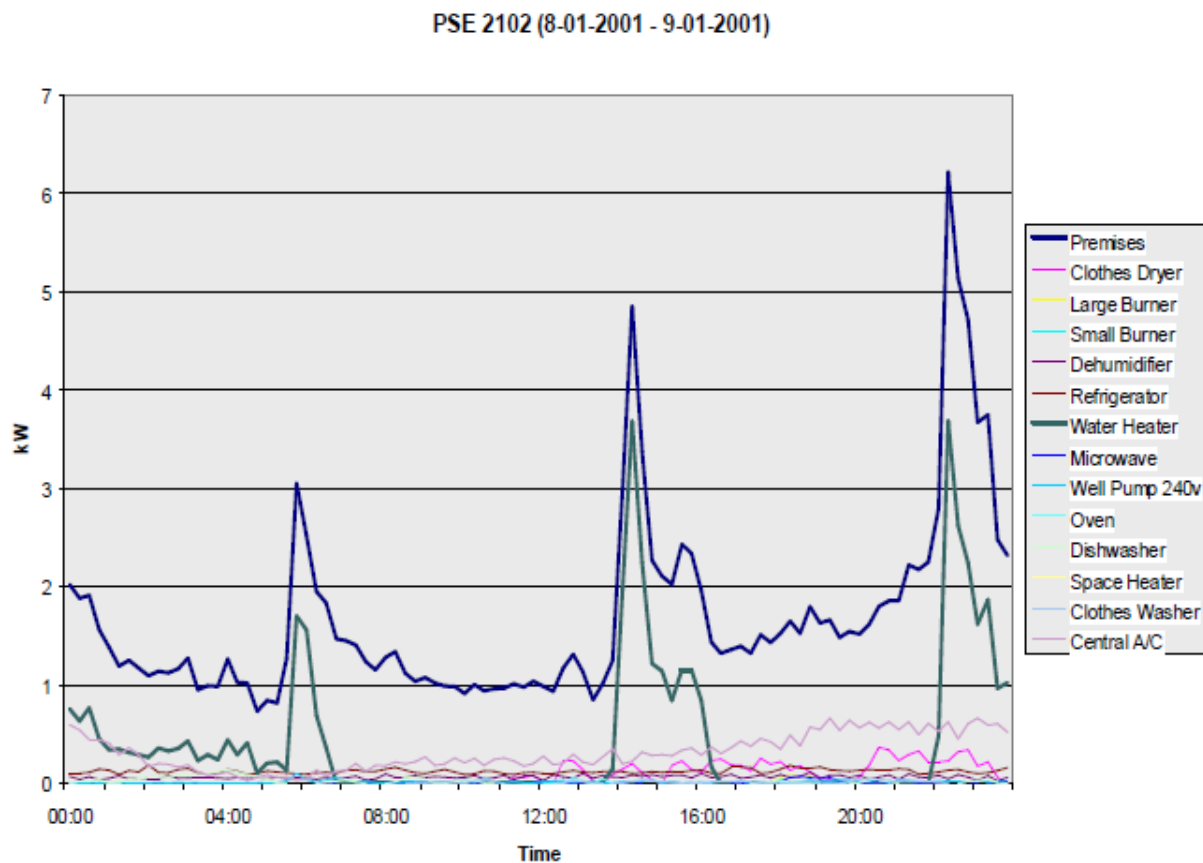


Figure 2 – Typical Load Profile From an Enetics Meter

# Sample Enetics– Monthly Usage Breakdown

PSE 2102 (8-01-2001 - 9-01-2001)

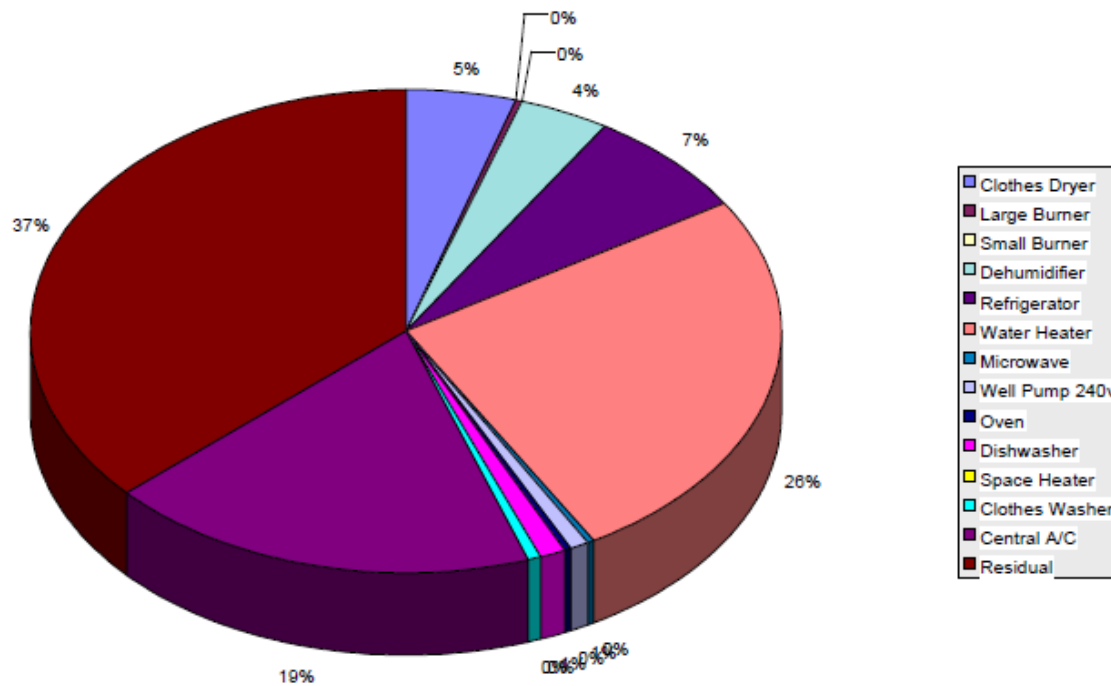


Figure 1 – Monthly Percent Usage for Specific Appliances

# Key Milestones

These dates are estimates and may change through out the project.

- Contract Awarded to DNV GL in February 2015
- Phase 1 Final Results - ~ March 2016
- Phase 2 Begins – ~ June 2016
- Phase 2 Final Results – ~ December 2017/January 2018



# Questions?

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