Demand-Side Program Design and Implementation

Presented to:
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Overview

- Market Transformation
- Program Frameworks
- Program Design
- Program Planning
- Program Implementation
- Examples of Successful Programs
- Monitoring & Verification

Demand Side Program Objectives

- The primary objective of nearly all demand-side programs is to “move the market” towards higher efficiency by addressing barriers such as:
  - Higher incremental costs for energy-efficient equipment
  - Lack of information
  - Codes and standards
  - Poor distribution or availability of products
- The primary objective is achieved ***over time*** by employing a variety of program types tailored to meet the needs of the region
- Programs are adjusted as the market responds
- Short-term projects without clearly defined objectives may actually harm the market transformation effort by introducing uncertainty and volatility

Flow of Demand-Side Planning

- Phase 1: Framework Selection
- Phase 2: Program Planning
- Phase 3: Program Design
- Examples
- Phase 4: Implementation
- Phase 5: Monitoring and Verification

Phase 1: Program Frameworks

- Programs are designed and implemented within a specific framework
- Selection of the framework is important before program planning and design proceeds
- Types of frameworks include:
  - Utility programs
    - Usually driven by regulatory mandates and Integrated Resource Planning (IRP) process
    - Tend to address market "silos" and utility planning requirements rather than broader objectives
    - Occasionally include incentives
  - Government programs
    - Driven by legislation and implementing regulations
    - May be part of a broader planning process
  - "Efficiency Utility" programs
    - Public/private model
    - Market driven with incentives tied to performance
    - Not restricted to specific fuels or market segments
- Implementation is driven by the type of framework

Phase 2: Program Planning

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- Planning is the critical element!
- Program design should not proceed without a review of the goals and needs of the area
- Planning should minimally include:
  - Assessment of residential, commercial and industrial demographics
  - Population and economic growth estimates
  - Energy consumption forecasts
  - Efficiency trends in the region
  - Selection of target markets, end users, and/or specific end-use equipment based on market research
- Ideally, planning should also include:
  - Technical and economic potential estimates
- The purpose of planning is to ensure that programs are selected that address the key issues for the area as cost-effectively as possible
  - Example – High saturation of central air conditioning and aging housing stock indicate that incentives for high efficiency A/C are appropriate
  - Example – Incentives may be inappropriate for commercial lighting since the payback is typically less than 2 years; information programs may be a better alternative

Phase 3: Program Design Basics

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- Program selection should be based on the information collected during the planning phase
- Individual programs should not be designed in isolation, but as part of a suite of programs to address broader market and societal objectives
- Programs should always have specific market transformation goals in mind
- Program design should always include the means to collect and analyze program performance with respect to the goals
- Monitoring and verification should be designed up front as a transparent function with appropriate oversight
- Programs should be inherently flexible to accommodate changing market conditions, revised objectives, etc.

Phase 3: Program Design – Types of Programs

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- Programs can be designed specifically or broadly
- Individual demand-side programs can be categorized in several ways:
  - Education and Outreach
  - Auditing
  - Codes and Standards
  - Low Income and Weatherization
  - Prescriptive Rebate Programs
    - Specific incentives are assigned to specific efficiency measures
    - Example – High efficiency furnaces with AFUE > 92% eligible for $250 rebate
  - Custom Rebate Programs
    - Incentives are calculated based on defined cost-effectiveness criteria for each applicant
    - Example – Industrial process improvements that reduce both electricity and gas consumption
- Programs can be selected and combined to address specific segments
  - Utility market segments (residential, small commercial, large commercial, industrial, etc.)
  - End-user market segment (new construction, retrofit, single family homes, multi-family, hotels, schools, industrial processes, etc.)
  - End-use equipment (lighting, air conditioning, heating, motors, appliances, etc.)
  - Fuels (electricity, gas, oil, etc.)

Phase 3: Program Design Structure

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- The best programs do not try to compartmentalize end uses, but allow flexibility for the end users

- Each program should have the following elements:
  - Target market and type of program
  - Statement of goals and objectives
  - Program description and how it addresses a planning element
  - Detailed budget
  - Detailed implementation plan
  - Analysis of incentives (types, amounts, basis, etc.) if used
  - Marketing and promotion plan
  - Monitoring and verification plan

Prescriptive Program Characteristics

- Intended to be simple to implement for large numbers of transactions
- Address common *individual* efficiency measures that do not require significant analysis:
  - Appliances
  - Specific common lighting fixtures
  - Residential and small commercial HVAC equipment
  - Motors
- Incentives may be payable to the customer, distributor, or contractor
- Some appliance programs may include pick-up and disposal of old units (e.g., refrigerators and window A/C)

Custom Rebate Program Characteristics

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- Custom programs address the diversity and complexity of the commercial and industrial sectors
- Projects are individually analyzed:
  - Must meet specific cost-effectiveness criteria
  - Helps to maximize impacts of rebate dollars
  - Gives much more flexibility to customers
- Very broad range of measures is typical
- Wider participation from important trade allies:
  - Architects and engineers
  - Distributors
  - Contractors and installers
- Requires greater technical expertise and more time
  - Project, system and application analysis
  - Cost/benefit analysis

Program Types - Examples

- Gas Prescriptive:
  - Residential and small commercial customers can select a warm-air furnace and receive rebates based on the efficiency of the furnace
  - The prescriptive rebate amount is determined by a bi-annual analysis of market trends, gas prices, and equipment prices
  - As the market is transformed, rebates and efficiency levels are adjusted
- Electric Prescriptive:
  - Small commercial customers can elect to install lighting, HVAC equipment, motors and other measures for a prescribed rebate per measure
  - Prescriptive rebates are based on incremental equipment costs and avoided electricity costs
- Gas and Electric Custom Programs:
  - Large commercial and industrial customers can perform energy audits and identify several measures to improve efficiency
  - The combined measures are evaluated on the basis of payback and societal benefit-cost ratio
  - If the measures pass the evaluation, rebate amounts are based on the amount of energy saved, demand reduction, and environmental benefits

Program Types - Examples

- Education and Outreach:
  - Bill stuffers
  - Media advertising
  - Point-of-sale advertising
  - Training programs for builders, distributors, engineers, architects, etc.
- Energy Audits:
  - Audits are offered to small commercial and non-profit end users at small or no cost to help identify efficiency opportunities
  - If measures are implemented following the audit, then the cost of the audit (if any) is waived
- Codes and Standards
  - Building energy efficiency codes and standards
  - Building official training
  - Appliance standards

Phase 4: Program Implementation

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- Implementation includes a wide range of operations, depending on the type of program:
  - Marketing
  - Energy Auditing
  - Engineering and Technical Analysis
  - Information System and Management Process Development
  - Economic Analysis
  - Customer Interface
  - Monitoring & Verification (M&V)
  - Reporting
- Implementation is often divided among two or more entities because different skills are needed
- M&V is often a third-party “auditing” function although it can be done internally with good checks and balances

Phase 4: Implementation

- Implementation depends heavily on framework:
  - Utility and state programs may use internal personnel or contractors with PSC or other oversight
  - Efficiency Utility is under contract to the state, but also may use contractors and incentives to implement programs

LIPA Commercial New Construction Program

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- Program covers new construction and major renovations including:
  - HVAC
  - Lighting
  - Building Envelope
  - Refrigeration
  - Motors and Drives
- LIPA plays conventional utility role with internal personnel and contractors
- LIPA's implementation contractors perform the following:
  - Technical analysis of customer applications
  - Economic analysis of individual projects and measures
  - On-site and off-site coordination
  - Customer interface through full-time, on-site presence
  - M&V

LIPA RECAP Program

- RECAP: *Retrofit Energy and Capacity Program*
- Program is targeting 75 MW of load reductions through ESCO incentives:
  - Covers renovations to existing facilities
  - Small and large C&I, municipal governments, school districts, institutional
  - Covers virtually all electric end-uses and efficiency measures
- LIPA plays role of Efficiency Utility
- Program design included:
  - Protocols and automated spreadsheets for audit data collection
  - M&V procedures and manuals
  - Web-base project submittal and approval system
  - RFP for third-party M&V services

Aquila, MERC, KCP&L Rebate Programs

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- Covers:
  - Natural gas customers in Minnesota and Iowa
  - Electric customers in Colorado and Missouri
- Gas programs cover
  - Commercial and industrial audits, HVAC, process heating, energy recovery, hot water systems, etc.
  - Residential space and water heating, insulation, energy audits
- Electric program covers lighting, HVAC, motors, and other electric end-uses
- Utilities play conventional role, but use very few internal personnel
- Implementation contractors provide
  - Program planning
  - Regulatory support
  - Technical and economic analysis of individual projects
  - Project pre-approval/approval
  - Web-based application and information management system
  - Customer interface
  - M&V

Phase 5: Monitoring and Verification

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- M&V is the oversight function that tracks implementation activities to ensure that:
  - Goals are being achieved
  - Budgets are being spent appropriately
  - Problems are identified as soon as possible
- M&V = Accountability
- To maintain objectivity, M&V is usually performed by a third party that is not involved in the direct management of programs or implementation
- M&V usually involves the following:
  - Periodic examination of selected applications
  - Budget review
  - Review of compliance with program design and implementation criteria
  - Reporting
- Although M&V doesn't start until after a program is implemented, it must be included in program design to ensure that appropriate data collection is required

Conclusions

- The framework is extremely important because it defines the context for planning and incorporates the motivations of the organization responsible for implementation
- Good programs are a result of good planning within an appropriate framework
- It is tempting to go straight to the program design and implementation phases, but specific programs should be an *outcome* of the planning process