Energy Conservation Standards for Commercial Clothes Washers: Framework Public Meeting

September 24, 2012

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Department of Energy
Energy Efficiency & Renewable Energy

Welcome and Introduction

- **Introductions**
- **Role of the Facilitator**
- **Ground Rules (Norms)**
  - Listen as an ally
  - Use short, succinct statements/keep to the point
  - Hold sidebar conversations outside the room
  - Focus on issues, not personalities
  - One person speak at a time (raise hand to be recognized; state your name for the record)
  - Set cell phones to silent/vibrate
- **Housekeeping Items**
- **Agenda Review**
- **Opening Remarks**

Morning Agenda

9:00 – 9:15 am	**Welcome, Opening Remarks, and Agenda Review** *Doug Brookman*
9:15 – 9:20 am	**Rulemaking Introduction** *Stephen Witkowski*
9:20 – 9:45 am	**Regulatory History, Test Procedure Issues, Rulemaking Process Overview** *Timothy Sutherland*
9:45 – 10:20 am	**Market and Technology Assessment, Screening Analysis, and Engineering Analysis** *Timothy Sutherland*
10:20 – 10:30 am	**Manufacturer Impact Analysis** *Ben Barrington*
10:30 – 10:45 am	**Break**
10:45 – 11:45 am	**Markups Analysis, Energy and Water Use Analysis, Life-Cycle Cost and Payback Period Analysis, Shipments Analysis, National Impact Analysis, Consumer Subgroup Analysis, Utility Impact Analysis, Employment Impact Analysis, Emissions Analysis, and Regulatory Impact Analysis** *Maithili Iyer*
11:45 – 12:00 pm	**Other Issues and Comments, Closing Remarks** *Stephen Witkowski*

Opening Remarks

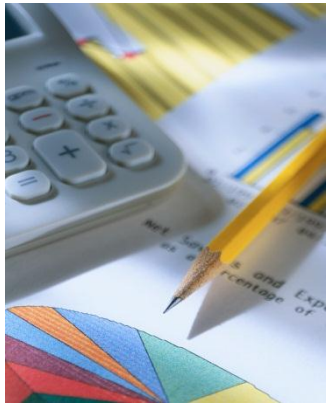
Interested parties who contacted DOE to request an opportunity to issue an opening statement should speak now.

Public Meeting Agenda

1. Introduction
2. Regulatory History
3. Test Procedure
4. Rulemaking Process Overview
5. NOPR Analyses
6. Closing Remarks

Purpose of the Framework Document Public Meeting

- Present the analytical approaches to be used to evaluate energy conservation standards for commercial clothes washers



- Provide a forum for public discussion of rulemaking issues

- Encourage interested parties to submit data, information, and written comments

Requests for Comment

DOE solicits comment on a range of specific issues throughout the Framework Document.

- Throughout this presentation, these issues will be highlighted for discussion in comment boxes such as this.
- Comment numbers correspond to those in the Framework Document.
- DOE welcomes comments concerning these specific issues and any other issues related to the this rulemaking.

Instructions for Submitting Comments

- **In all correspondence, please refer to this Commercial Clothes Washer Rulemaking by:**
  - Docket # EERE-2012-BT-STD-0020, and/or RIN 1904-AC77
- **Email: CommClothesWashers-2012-STD-0020@ee.doe.gov**
- **Postal Mail:** Ms. Brenda Edwards
  U.S. Department of Energy
  Building Technologies Program, Mailstop EE-2J
  1000 Independence Avenue, SW.
  Washington, D.C. 20585-0121
- **Courier:** Ms. Brenda Edwards, 950 L'Enfant Plaza, SW., Suite 600
- **Phone:** (202) 586-2945

Comment period closes October 12, 2012

Public Meeting Agenda

1. Introduction
2. **Regulatory History**
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Legislative History

- **The Energy Policy Act of 2005 (EPACT 2005) amended the Energy Policy and Conservation Act of 1975 (EPCA) to include commercial clothes washers (CCW) as a covered product.**
  - Established first energy conservation standards for CCWs
  - Required DOE to complete two rulemaking cycles to determine whether to amend CCW standards:
    - **First final rule required by Jan. 1, 2010**
      - Issued Dec. 18, 2009 (75 FR 1122, Jan. 8, 2010)
    - **Second final rule required by Jan. 1, 2015**

Current rulemaking

Definition of Covered Products

- **EPACT 2005 defines commercial clothes washers as follows:**

The term "commercial clothes washer" means a **soft-mount** front-loading or soft-mount top-loading clothes washer that—

(A) has a clothes container compartment that—

(i) for horizontal-axis clothes washers, is not more than **3.5 cubic feet**; and

(ii) for vertical-axis clothes washers, is not more than **4.0 cubic feet**; and

(B) is designed for use in—

(i) applications in which the occupants of more than one household will be using the clothes washer, such as **multi-family housing common areas and coin laundries**; or

(ii) other commercial applications. (42 U.S.C. 6311(21))

Energy Conservation Standards History

- **EPACT 2005 established the following standards for CCW, effective Jan. 1, 2007:**

Metric	Standard
Modified Energy Factor (MEF) [*ft^3/kwh/cycle*]	1.26 (minimum)
Water Factor (WF) [*gal/cycle/ft^3*]	9.5 (maximum)

- **The first DOE rulemaking cycle amended these standards according to product class, effective Jan. 8, 2013:**

Product Class	MEF (minimum)	WF (maximum)
Top-Loading	1.60	8.5
Front-Loading	2.00	5.5

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DOE Test Procedure

- **EPCA requires that commercial clothes washers use the same test procedures as residential clothes washers. (42 U.S.C. 6314(a)(8))**
- **On March 7, 2012, DOE published a final rule amending its test procedures for residential clothes washers. (77 FR 13888)**
  - Minor amendments to Appendix J1
  - New test procedure at Appendix J2
- **Appendix J2 retains MEF/WF metrics and establishes new metrics:**

Integrated modified energy factor (IMEF): incorporates standby power

Integrated water factor (IWF): incorporates water consumption from all wash temperatures, rather than only the cold wash/cold rinse cycle.

Appendix J2 Test Procedure

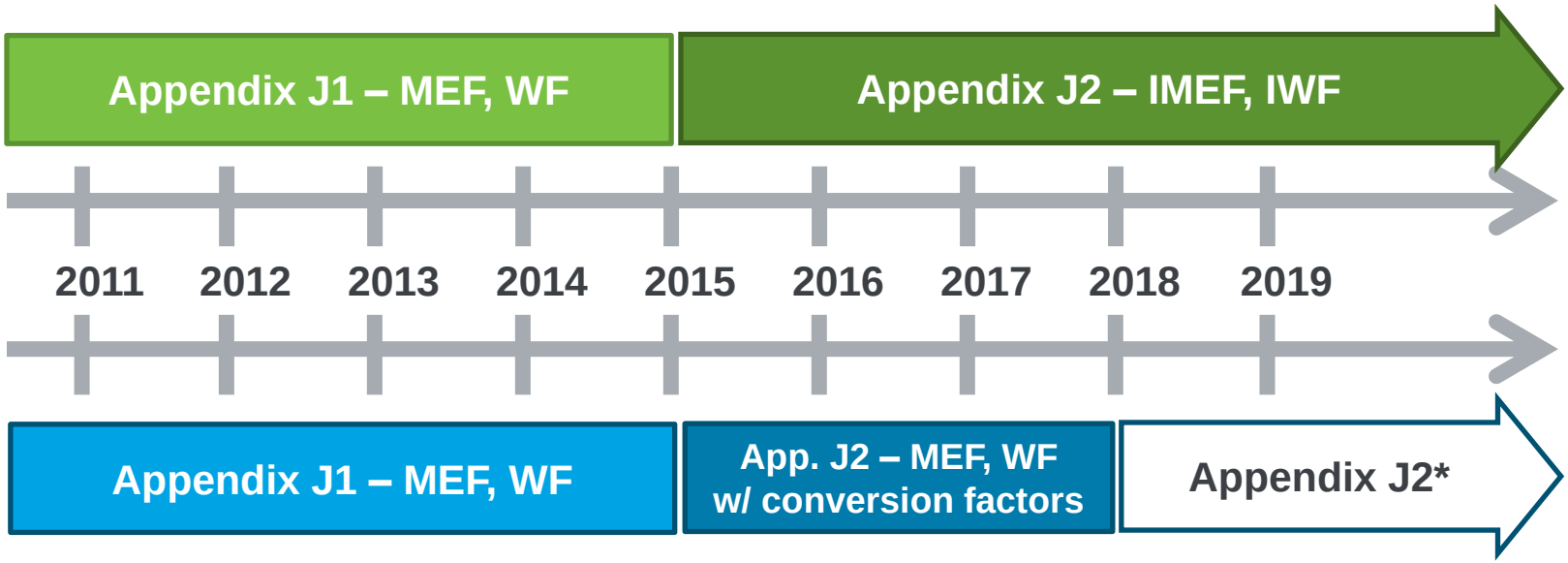
- **Use of Appendix J2 will be required beginning March 7, 2015**
  - Applies to both residential clothes washers and CCWs
- **Current CCW standards are based on MEF and WF as measured according to Appendix J1**

Appendix J1 MEF/WF	≠	Appendix J2 MEF/WF

- **DOE is considering developing correction factors for translating Appendix J1 MEF/WF values into Appendix J2 MEF/WF values**
  - Would apply beginning March 7, 2015 to determine compliance with 2013 standard levels.
  - Would remain effective until the date of any new standards from the current rulemaking

Test Procedures and Standards Timeline

RESIDENTIAL CLOTHES WASHERS



COMMERCIAL CLOTHES WASHERS

*** Metrics for 2018 standards, if amended, to be determined during the course of this rulemaking (MEF or IMEF; WF or IWF)**

Request for Comment

- **Item 1-1: DOE invites comment on developing correction factors for translating Appendix J1 MEF/WF values into Appendix J2 MEF/WF values that would apply beginning March 7, 2015, at which time CCW manufacturers will be required to use the Appendix J2 test procedure.**

  DOE also welcomes any data on the appropriate correction factors.

Request for Comment

- **Item 1-2: DOE invites comment on whether to establish new energy efficiency standards for CCWs based on the IMEF metric, which would incorporate standby and off mode power.**

- **Item 1-3: DOE invites comment on its whether to establish new water efficiency standards based on the IWF metric, which would incorporate water consumption from all the temperature cycles included as part of the energy test cycle in Appendix J2.**

Additional Note

- **DOE will consider any other test procedure issues relating to the use of Appendix J2 for commercial clothes washers.**

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Technological Feasibility and Economic Justification

- New or amended standards must be designed to achieve the maximum improvement in energy or water efficiency that is technologically feasible and economically justified.
- DOE performs the following analyses to determine technological feasibility:

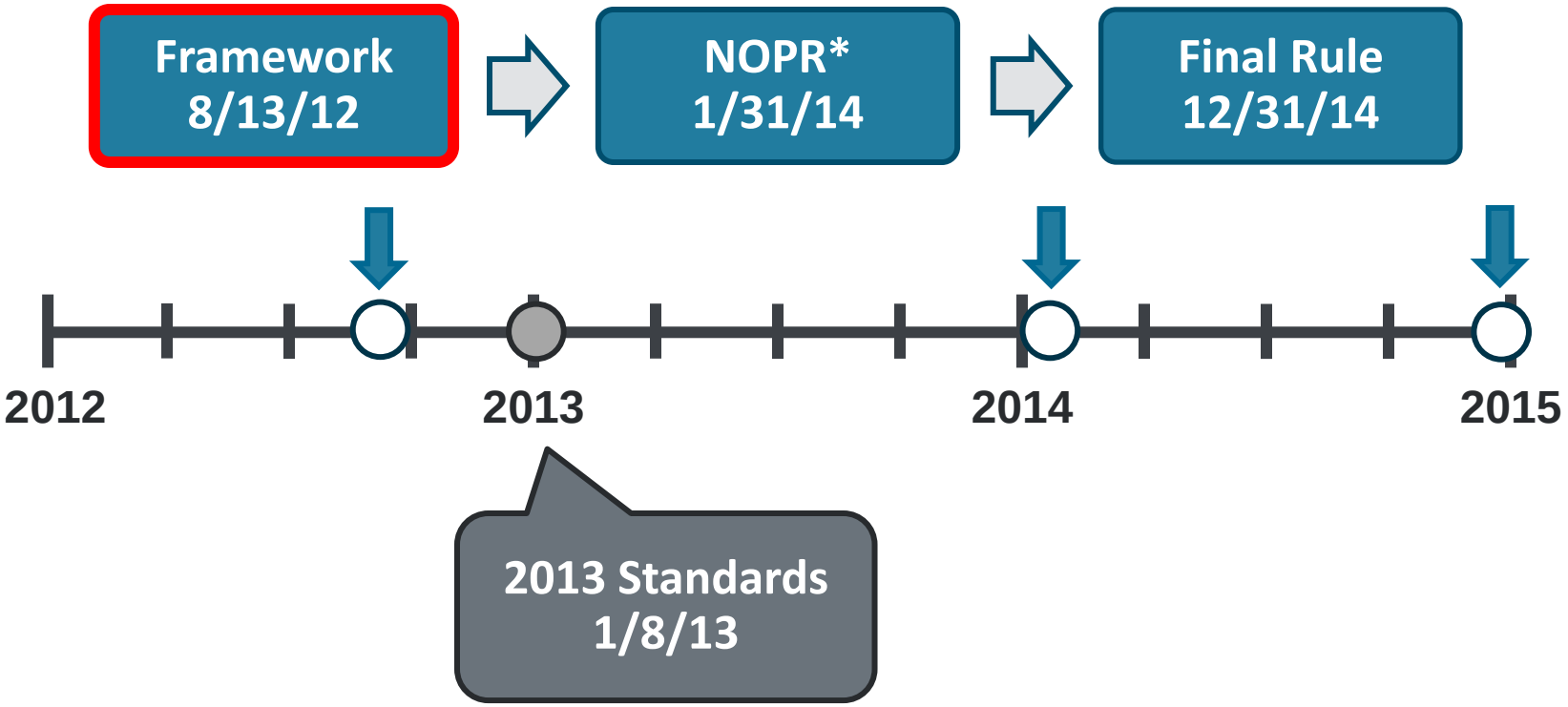
EPCA Requirement	Corresponding DOE Analyses
Technological Feasibility	• Market and Technology Assessment • Screening Analysis • Engineering Analysis

Rulemaking Process Overview

- **DOE must consider seven factors to determine whether new or amended standards are economically justified:**

EPCA Requirement	Corresponding DOE Analyses
1. Economic impact on consumers and manufacturers	• Life-Cycle Cost Analysis • Manufacturer Impact Analysis
2. Lifetime operating cost savings compared to increased product cost	• Life-Cycle Cost Analysis
3. Total projected energy savings	• National Impact Analysis
4. Impact on utility or performance	• Engineering Analysis • Screening Analysis
5. Impact of any lessening of competition	• Manufacturer Impact Analysis
6. Need for national energy conservation	• National Impact Analysis
7. Other factors the Secretary considers relevant	• Environmental Assessment • Utility Impact Analysis • Employment Impact Analysis

Commercial Clothes Washer Rulemaking Schedule



- DOE plans to leverage the analyses performed during the previous CCW rulemaking to proceed directly to the NOPR stage.

*NOPR: Notice of Proposed Rulemaking

Analyses Conducted to Develop NOPR

NOPR Analyses

- Market and Technology Assessment
- Screening Analysis
- Engineering Analysis
- Markups Analysis
- Energy and Water Use Analysis
- Life Cycle Cost and Payback Period Analysis
- Shipments Analysis
- National Impact Analysis
- Consumer Sub-group Analysis
- Manufacturer Impact Analysis
- Utility Impact Analysis
- Employment Impact Analysis
- Emissions Analysis
- Regulatory Impact Analysis

NOPR Publication

- Preliminary determination of whether standards should be amended, and if so, the proposed new levels
- Results of NOPR analyses presented in Technical Support Document (TSD)
- Public meeting and comment period following NOPR publication

Final Rule Analyses

- Revision of NOPR analyses as necessary based on public comments
- Consideration of Department of Justice determination of impacts on market competition

Final Rule Publication

- Final determination of whether standards should be amended, and if so, the new standard levels
- Compliance date of any new standards
- Results of Final Rule analyses presented in Technical Support Document (TSD)

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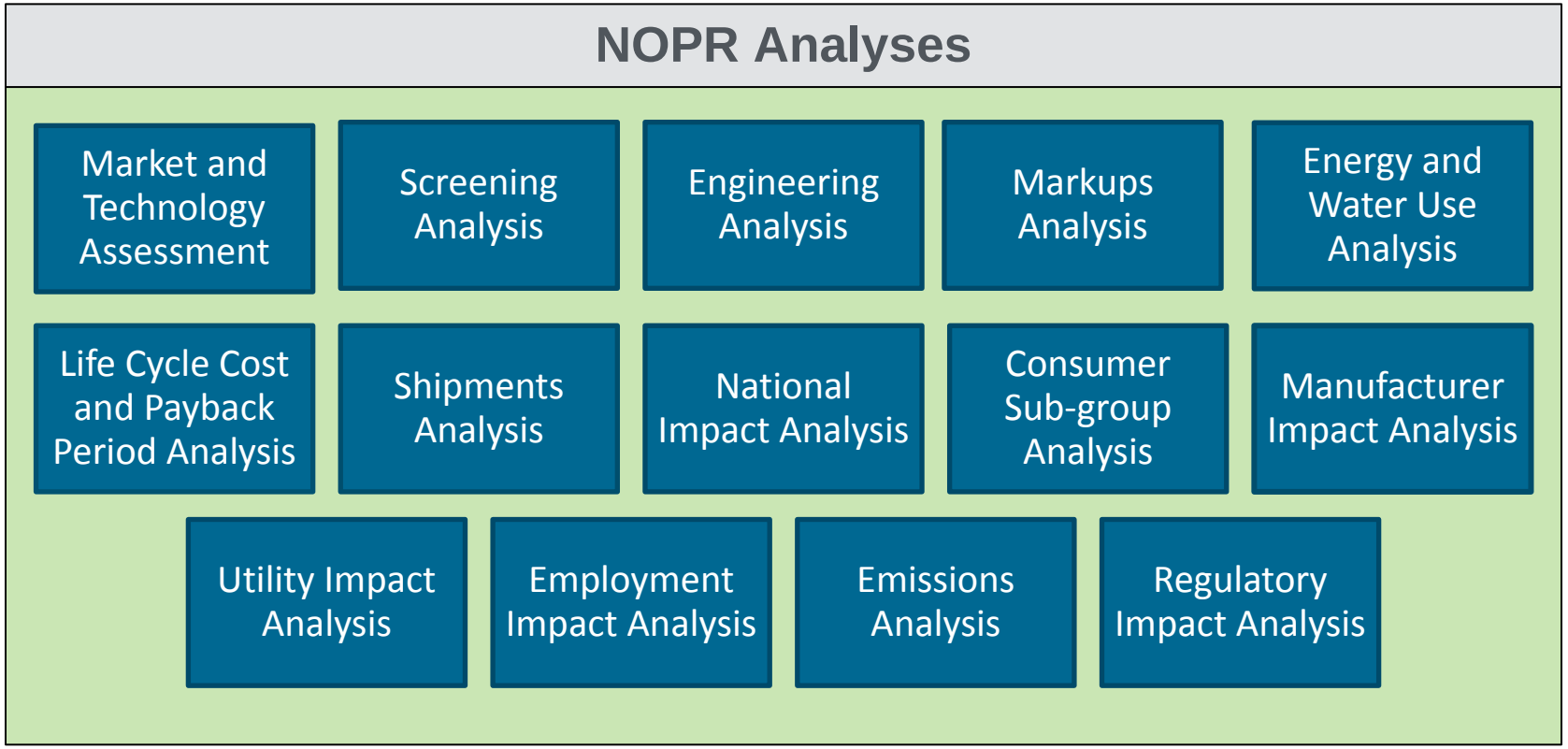
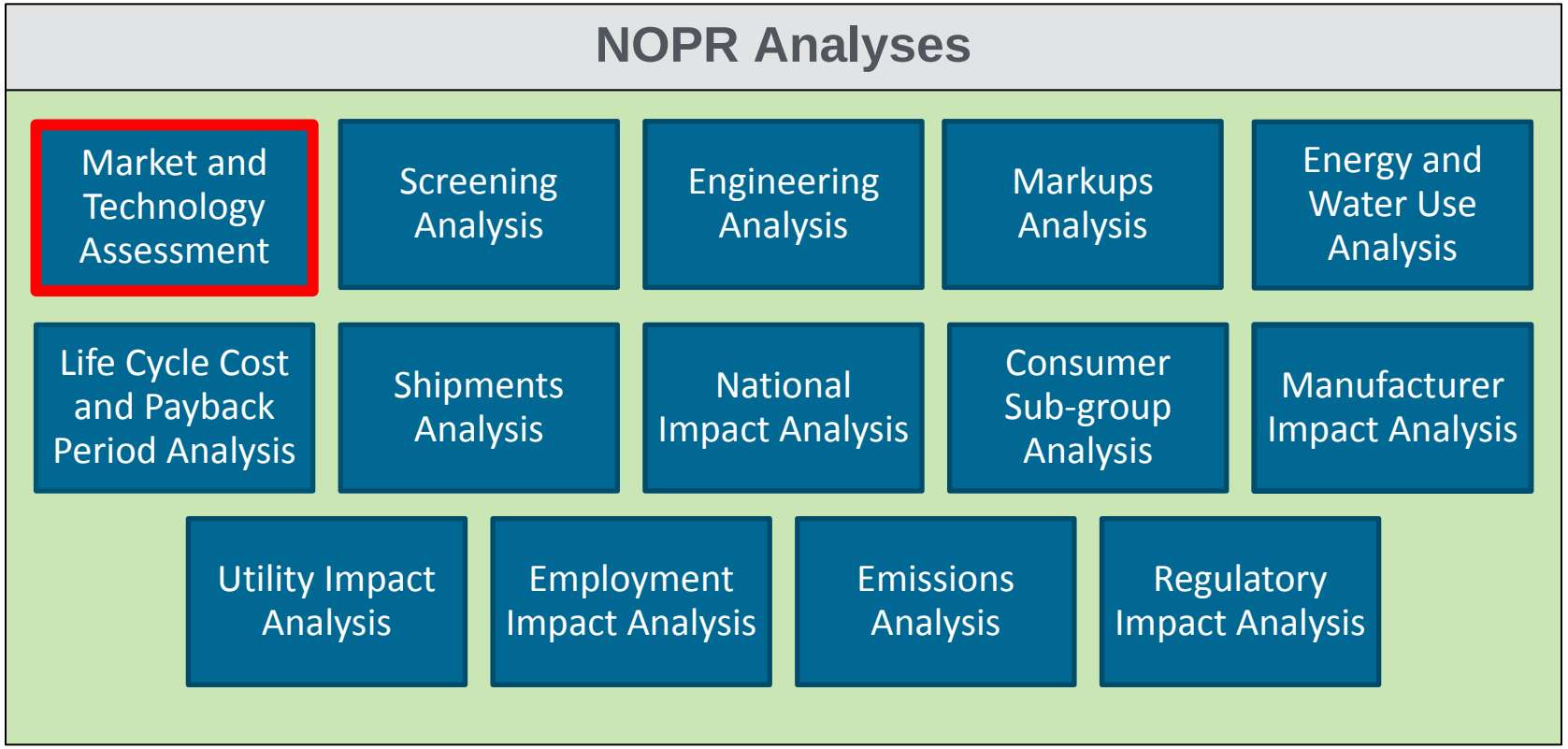
5. **NOPR Analyses**
6. Closing Remarks

Analyses Conducted to Develop NOPR

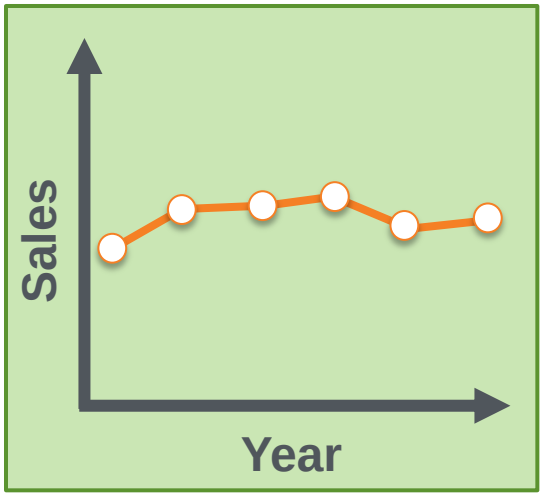


Market and Technology Assessment



Market and Technology Assessment

- **Purpose:**
  - Characterize CCW industry and market
  - Gather historical shipments and other relevant data
  - Identify technology options for improving efficiency



Request for Comment

- **Item 3-1: DOE requests information that would contribute to the market assessment for commercial clothes washers covered in this rulemaking, including:**
  - Current product features and efficiencies
  - Product feature and efficiency trends
  - Historical product shipments and prices

Product Classes

- **In the 2010 CCW standards rulemaking, DOE established two separate product classes:**
  - Top-Loading
  - Front-Loading

- **DOE considering retaining these two product classes during this rulemaking**

Request for Comment

- **Item 3-2: DOE seeks comment on the merits of retaining two product classes for commercial clothes washers based on the location of access:**
  - Top-Loading
  - Front-Loading

Technology Assessment

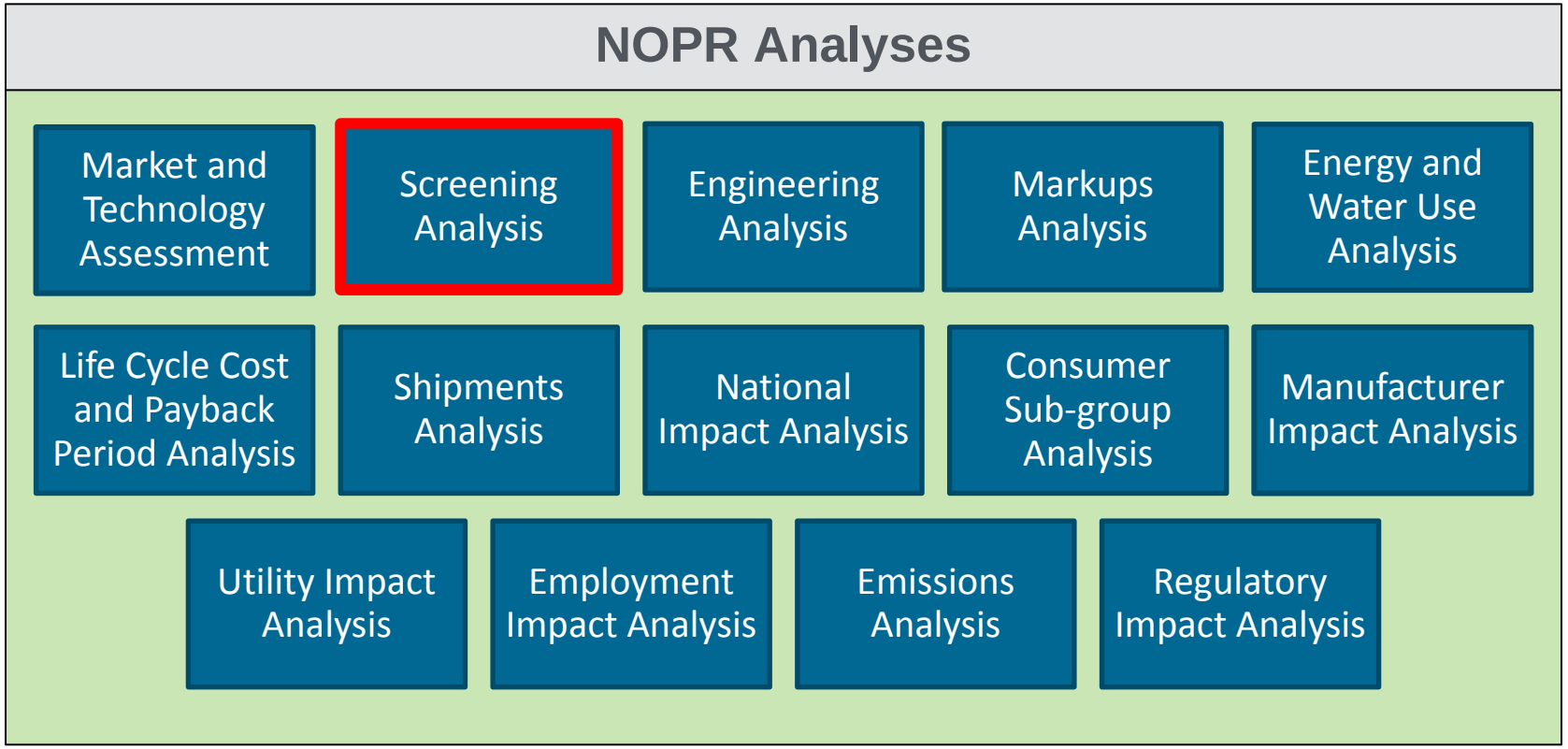
- **DOE will consider technology options from previous rulemaking, plus any new available technologies**

Adaptive water fill	Polymer bead cleaning
Advanced agitation concepts for top-loading washers	Spray rinse or similar water-reducing rinse technology
Capacity increase	Thermostatically controlled mixing valves
Direct-drive motor	Water extraction improvements to reduce remaining moisture content
Motor efficiency improvements	Water fill sensors with greater accuracy/precision
Ozonated laundering	Water recirculation loop

Request for Comment

- **Item 3-3: DOE seeks comment on whether any of the technologies listed in the table should be removed from consideration, or whether any other technologies not listed in the table should be considered.**

Screening Analysis



Screening Analysis

- **Purpose:**
  - Screen out technology options that DOE will not consider during the rulemaking

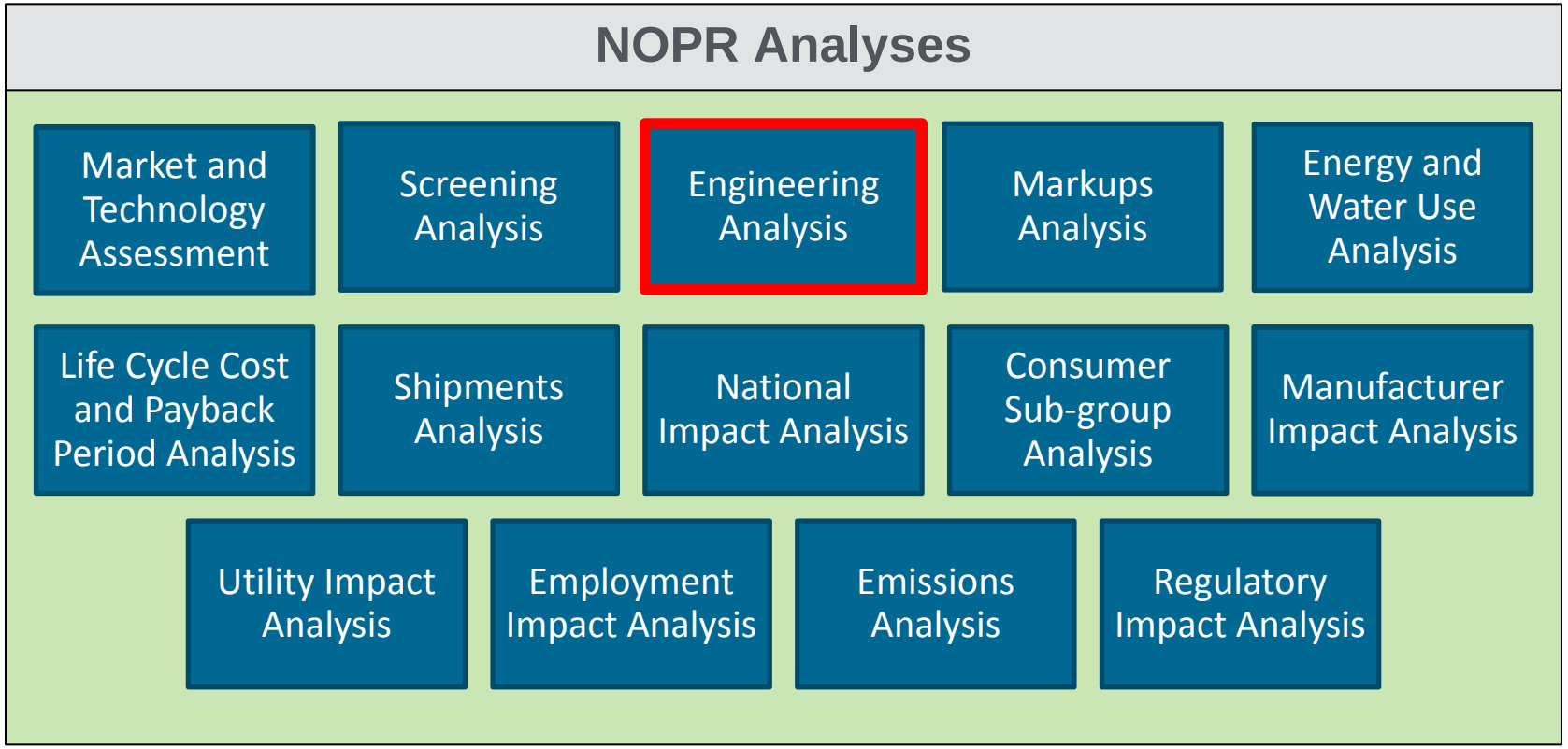
- **Criteria:**
  - Technological feasibility
  - Practicability to manufacture, install, and service
  - Adverse impacts on product utility or availability
  - Adverse impacts on health or safety

Request for Comment

- **Item 4-1: DOE seeks comment on whether any of the technologies listed should be removed from consideration based on any of the screening criteria.**

  If so, please provide details regarding specific screening criteria that would preclude DOE from considering such technology options.

Engineering Analysis



Engineering Analysis

- **Purpose:**
  - Determine the relationship between manufacturer cost and energy efficiency

Efficiency Levels for Consideration

- **Top-Loading:** DOE is unaware of any top-loading CCWs on the market that exceed the Jan. 2013 baseline efficiency level.

Level	Description	MEF	WF
Baseline	2013 DOE Standard	1.60	8.5

- **Front-Loading:**

Level	Description	MEF	WF
Baseline	2013 DOE Standard	2.00	5.5
Level 1	CEE* Tier 2	2.20	4.5
Level 2	CEE Tier 3	2.40	4.0
Level 3	Maximum Available	2.60	3.7

***CEE: Consortium for Energy Efficiency**

Request for Comment

- **Item 5-1: DOE seeks input on whether the January 8, 2013 amended standard levels are appropriate for characterizing the baseline efficiency levels for this rulemaking.**

- **Item 5-2: DOE seeks input on whether any higher efficiency levels should be considered for top-loading commercial clothes washers, and if so, the basis for such consideration.**

Request for Comment

- **Item 5-3: DOE seeks input on the appropriateness of the higher efficiency levels identified for front-loading commercial clothes washers.**

- **Item 5-4: DOE seeks input on appropriate maximum technologically feasible efficiency levels and the basis for why those levels should be selected.**

Approach for Determining Cost-Efficiency Relationship

- **"Efficiency-Level Approach"**
  - Solicit industry-aggregated incremental manufacturing costs for achieving each higher efficiency level

- **"Design-Option Approach"**
  - DOE will perform reverse-engineering teardowns to validate cost-efficiency relationships

- **Proprietary designs will only be considered if they do not present a unique path to a given efficiency level.**

Image source: http://genuineaid.com/wp-content/uploads/speed-queen/aws44nw-diagram.jpg

Request for Comment

- **Item 5-5: DOE requests feedback on the use of an efficiency-level approach to determine the cost-efficiency relationship for CCWs, supplemented, as needed, by a design-option approach.**

- **Item 5-6: Are there proprietary designs or technologies for CCWs of which DOE should be aware in this rulemaking? If so, what are these designs or technologies and how should DOE acquire the cost data necessary for evaluating them?**

Impacts on Consumer Utility

- **EPCA requires DOE to consider any lessening of utility or performance likely to result from a new standard.**
  (42 USC 6295(o)(2)(B)(i)(IV), 42 USC 6316(a))

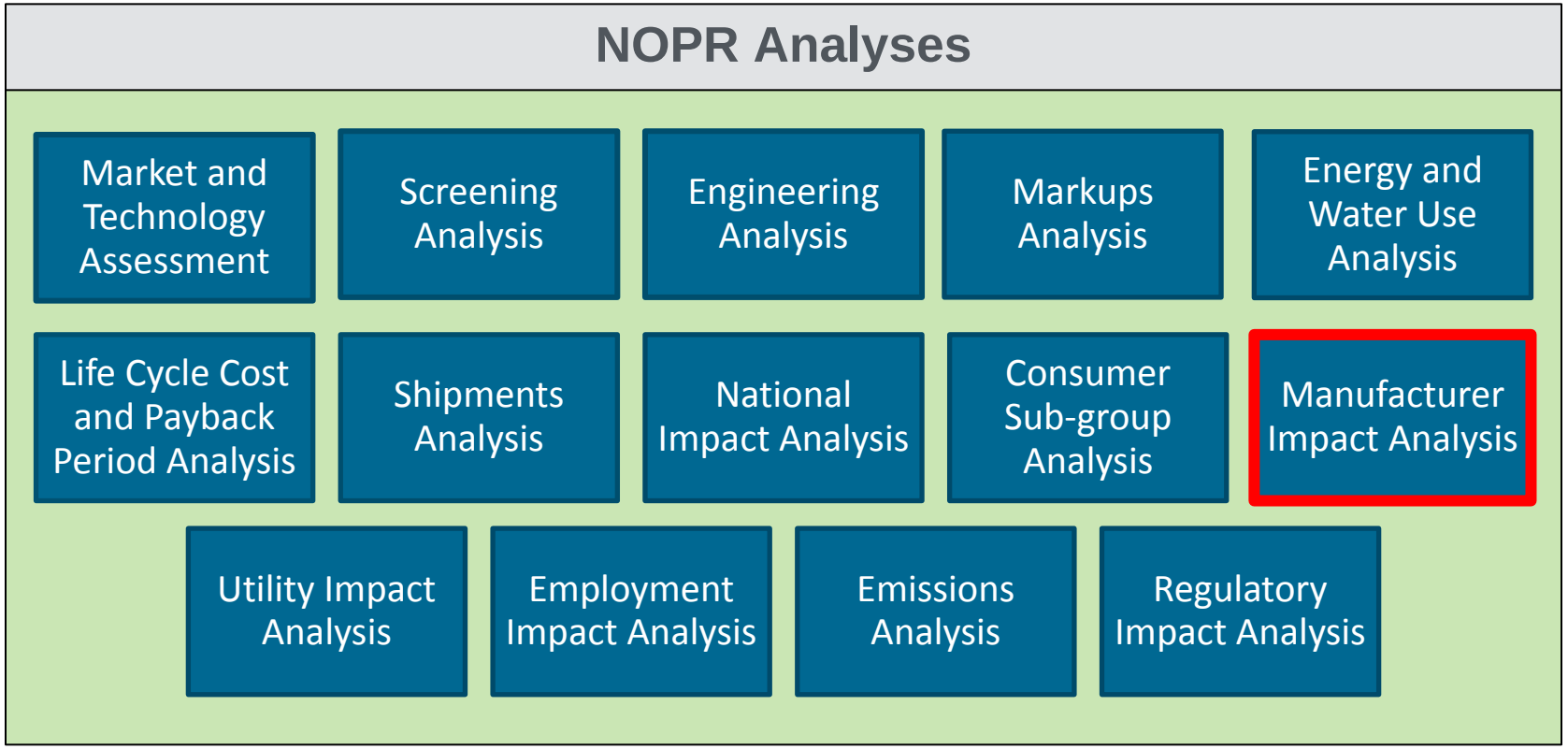
- **DOE will consider whether new standards may impact consumer utility of commercial clothes washers.**

Request for Comment

- **Item 5-7: DOE seeks comment on whether any new standards may impact the utility of commercial clothes washers.**

  If such impacts exist, can the effects be quantified? If so, how?

Manufacturer Impact Analysis



Legislative Requirements

- **The Manufacturer Impact Analysis (MIA) partially fulfills EPCA requirement to determine if a proposed standard is economically justified:**
  - Economic impact of standards on manufacturers
  - Impacts of any lessening of competition in the industry
- **MIA format changes described in the 2006 report to Congress, at:**

  http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/congressional_report_013106.pdf

MIA Methodology

- **Industry Profile**
  - Identify current and past industry structure
  - Evaluate market characteristics and current trends
  - Develop industry average financial parameters using publicly available information
  - Identify manufacturer sub-groups including small business manufacturers
- **Framework for Analysis**
  - DOE will tailor the Governmental Regulatory Impact Model (GRIM) to reflect the industry structure
  - DOE will use this framework to determine what additional information is required to fully analyze the potential impacts to manufacturers

MIA Methodology

MIA Interview Guides

- DOE will develop an interview guide designed to collect responses that will help inform further analyses and develop key inputs to the GRIM
- Topics include: key issues, market share, markup structure, shipments, financial parameters, capital and non-capital expenditures, cumulative regulatory burden, direct employment, manufacturing capacity, and the anticipated impacts to competition and manufacturer subgroups

MIA Interviews

- DOE will conduct confidential interviews with manufacturers to discuss the topics outlined in the interview guide, as well as any other topics that manufacturers would like to address that pertain to preparing the analysis

MIA Methodology

- **Impacts to Industry**
  - DOE evaluates the impact to industry both quantitatively and qualitatively
  - Key quantitative metrics include the estimated impacts to industry net-present value (INPV) and domestic employment
  - Additionally, DOE will assess the cumulative regulatory burden associated with this rulemaking, the effect of the rulemaking on competition in the industry, and the disproportionate effects of the rulemaking on any previously identified manufacturer subgroups including small-business manufacturers

Manufacturer Subgroups

- **Groups of manufacturers that may be disproportionately affected by efficiency standards:**
  - DOE has identified one small business manufacturer of commercial clothes washers
  - DOE has identified one low-volume manufacturer of commercial clothes washers

Cumulative Regulatory Burden

- **Regulations that could affect the industries impacted by this rulemaking include:**
  - DOE standards for residential clothes washers, clothes dryers, and room air conditioners (existing and upcoming)
  - Reduction of Hazardous Substances (RoHS) directive

Request for Comment

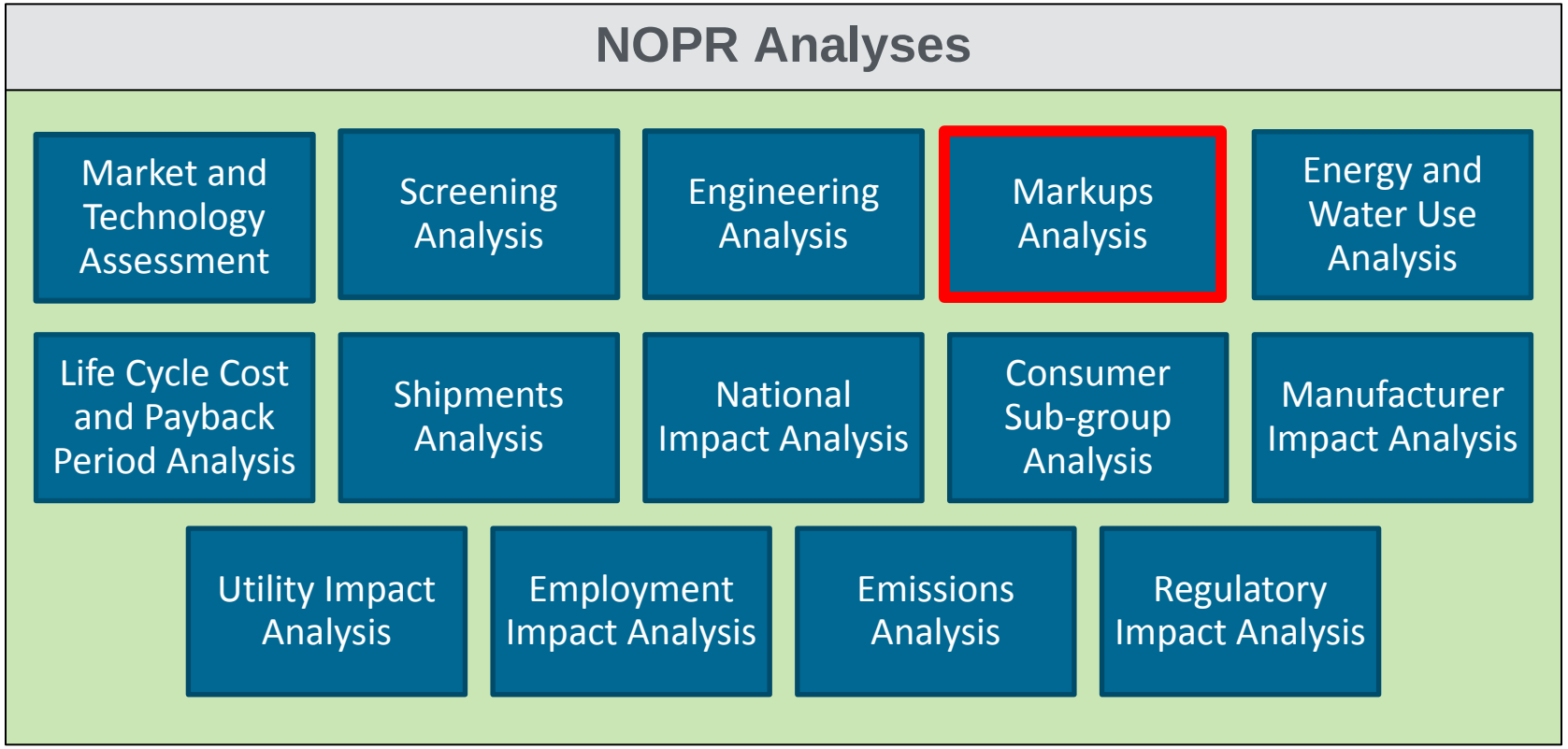
- **Item 12-1: DOE seeks to identify small businesses and low volume manufacturers that could be impacted by energy conservation standards for commercial clothes washers.**

- **Item 12-2: DOE seeks comment on any additional manufacturer subgroups, if any, that DOE should consider in a manufacturer subgroup analysis for commercial clothes washers. DOE seeks to understand how the impact of potential standards may differ for each subgroup.**

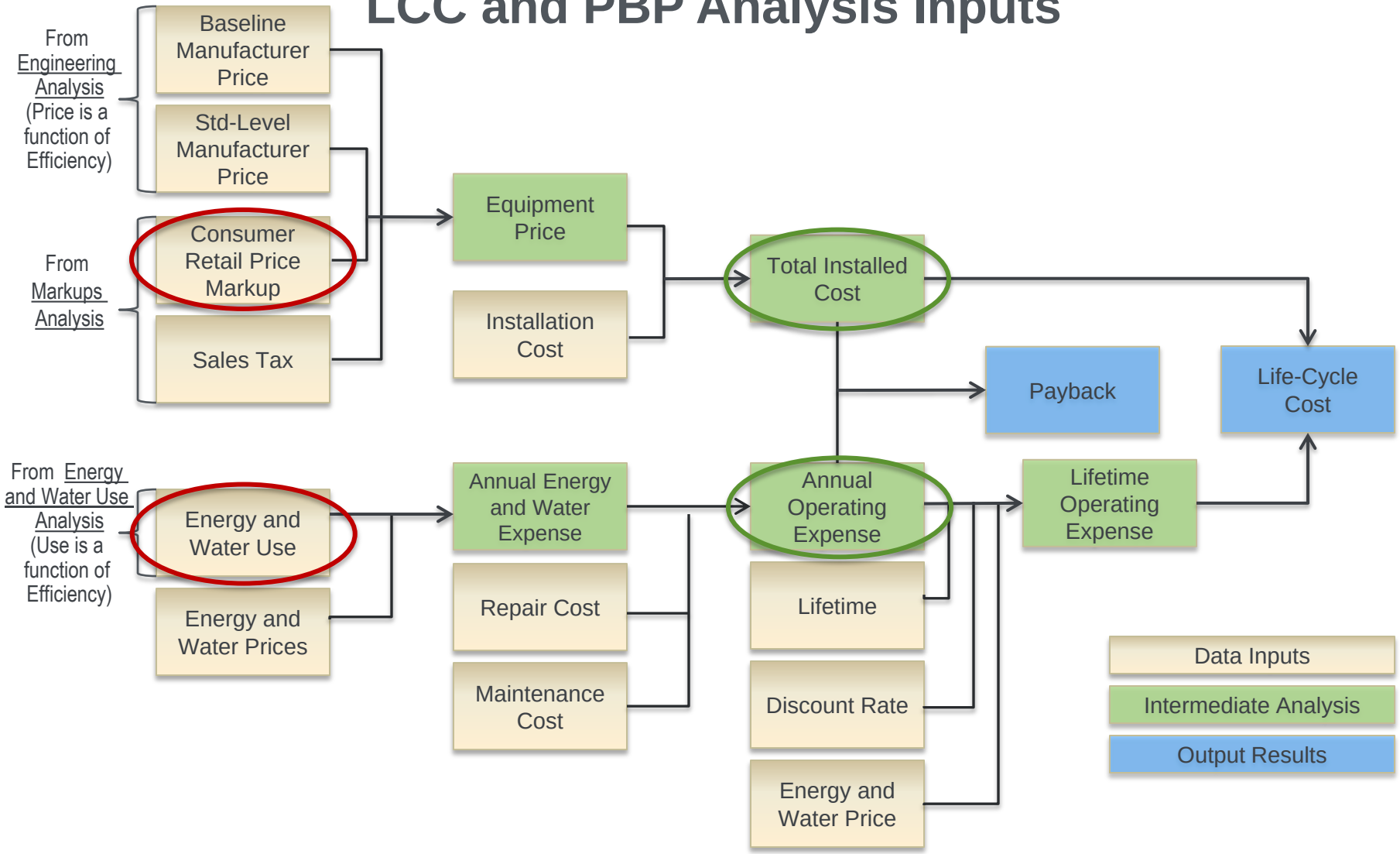
Request for Comment

- **Item 12-3: What other regulations or pending regulations should DOE consider in its examination of cumulative regulatory burden?**

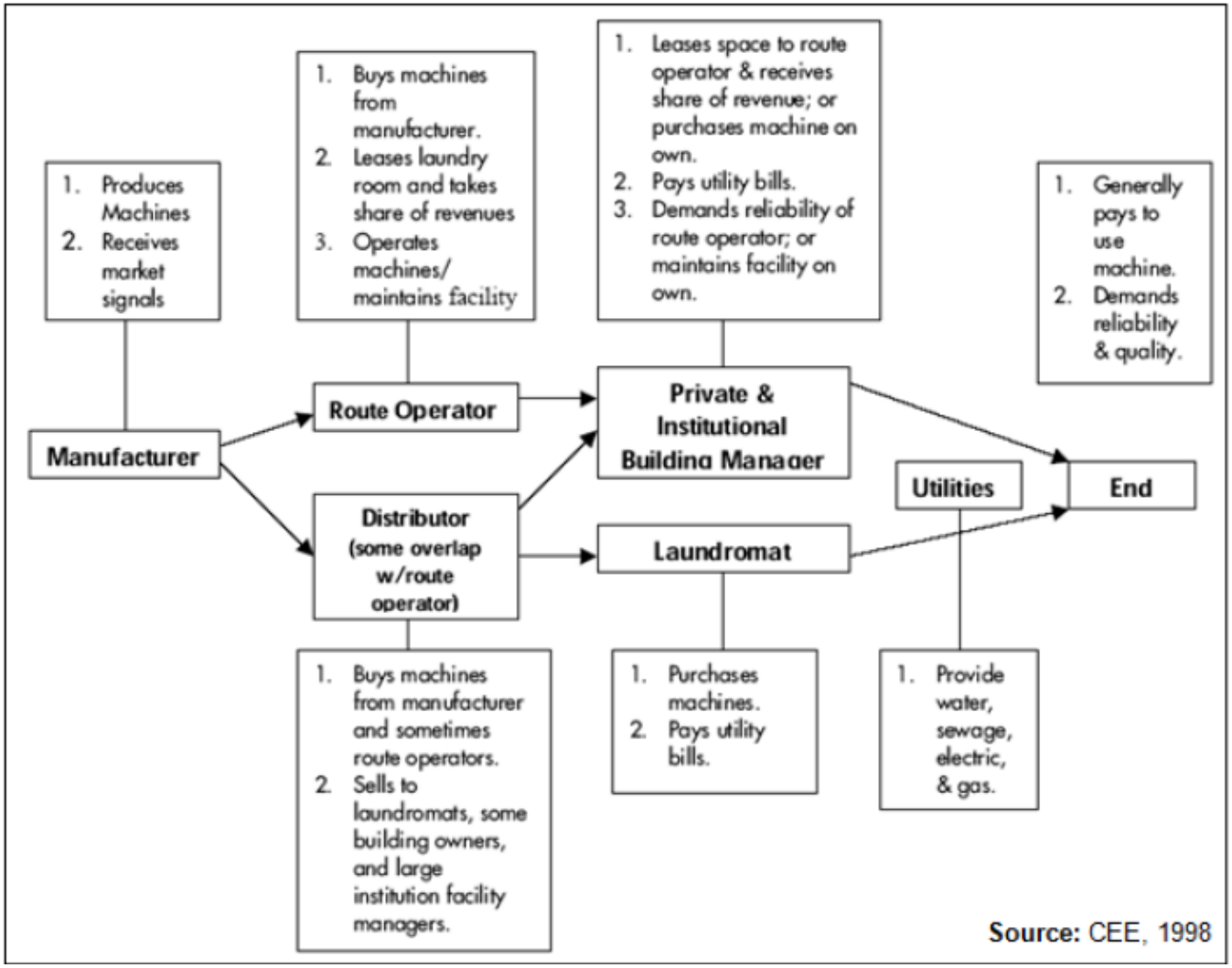
Markups Analysis



LCC and PBP Analysis Inputs



Distribution Channel for CCW



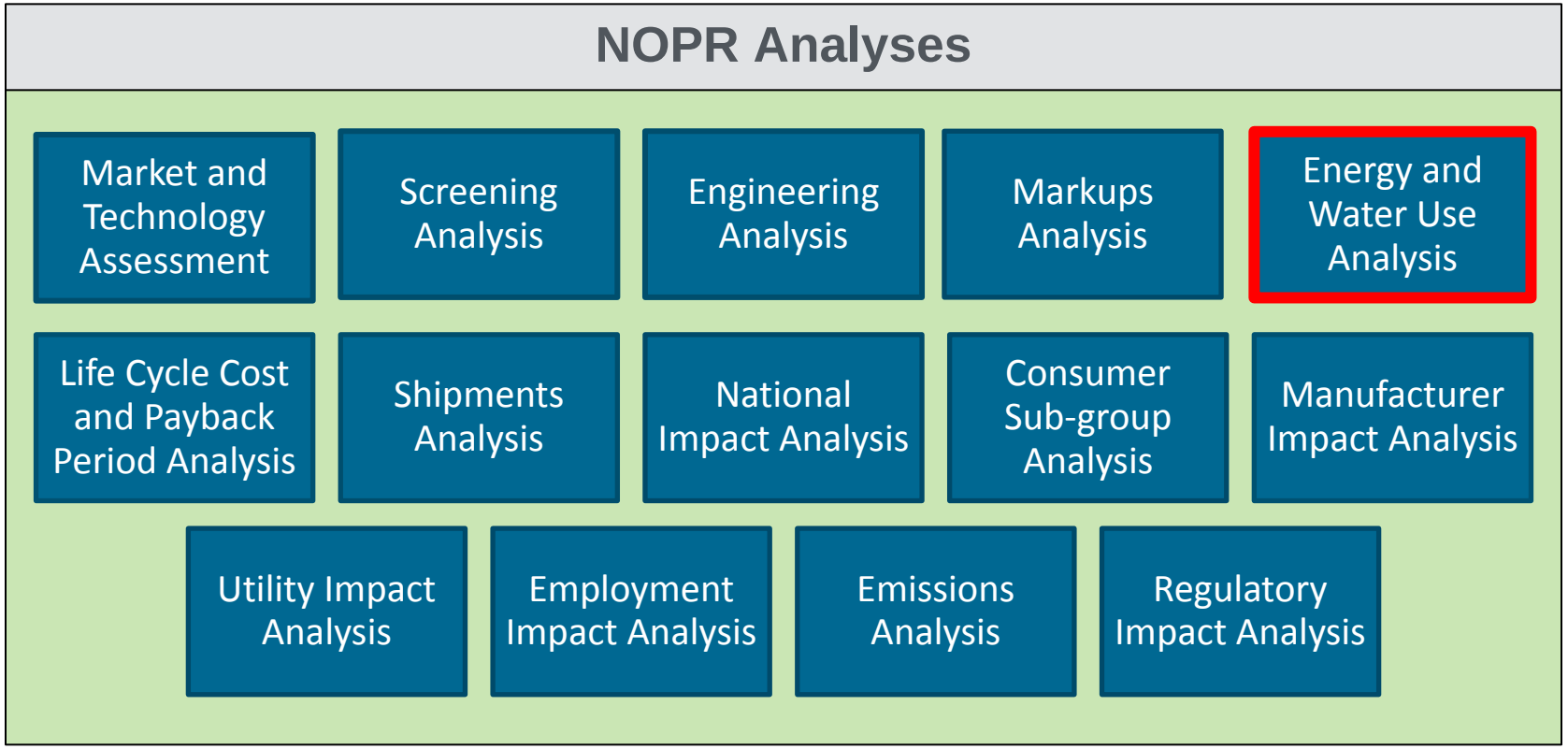
Types of Markups in Distribution Chain

- **Baseline Markups:**
  - Markups relate consumer price to cost of goods sold (CGS).
  - Baseline markups relate price to cost prior to a change in efficiency.
  - Baseline markups indicate a consumer price that covers all of a distributor's or contractor's expenses plus profit
- **Incremental Markups:**
  - Incremental markups relate the incremental change in consumer price to the incremental change in CGS.
  - Certain costs, such as direct labor costs (salaries, payroll, rental and occupancy), do not vary with efficiency induced changes in CGS and remain constant in the calculation of incremental markups.
  - Incremental markups cover only expenses that vary with CGS – expenses that increase due to an increase in equipment efficiency

Request for Comment

- **Item 7-1: DOE welcomes comments on whether the distribution channels described above are the same.**
- **Item 7-2: DOE seeks input on data sources for establishing the mark-ups.**

Markups Analysis



Energy and Water Use Analysis

- **Purpose:**
  - Develop annual energy and water use data for the life-cycle cost and payback period analyses to calculate annual operating costs.
- **Method:**
  - DOE will develop average energy and water use values.
  - Test procedure utilizes single value based on residential use
  - DOE will establish appropriate range of usage specific to CCW in the field for two applications:
    - Multi-family buildings
    - Laundromats
  - DOE will investigate variability.

Energy and Water Use Analysis

- **DOE requests per-cycle energy and water use for each efficiency level.**

Front-Loading Clothes Washers:

Level	Efficiency Level Source	Efficiency Level		Energy Use (kWh/cycle)			Water Use (gal/cycle)
		MEF	Water Factor	Hot Water	Machine	Dryer	
Baseline	DOE Standard	2.0	5.5				
1	CEE Tier 2	2.2	4.5				
2	CEE Tier 3	2.4	4.0				
3	Maximum Available*	2.6	3.7				

* Provide the clothes container volume in cubic feet

Top-Loading Clothes Washers:

Level	Efficiency Level Source	Efficiency Level		Energy Use (kWh/cycle)			Water Use (gal/cycle)
		MEF	Water Factor	Hot Water	Machine	Dryer	
Baseline	DOE Standard	1.60	8.5				

- **Convert per-cycle values into annual values using cycles per year**
  - Multi-Housing: Multi-housing Laundry Association (MLA) provides various sources to establish cycles/day (1-11 cycles/day).
  - Laundromats: Coin Laundry Association (CLA) provides 3-8 cycles/day.
  - DOE may investigate other establishments with on-site laundry facilities.

Approach

Annual Usage per Application Type (cycles/year)

X

Machine, Water Heater & Dryer Fuel Types Consumption Per Cycle

Annual Energy Use by Efficiency Level and Application Type

$$CW_{CYCLE} = \frac{HE_T}{e} \times c + ME_T + D_E$$

where:

CW_{CYCLE} =	Total commercial clothes washer per-cycle energy consumption,
HE_T =	Per-cycle water heating consumption (kWh/cycle),
e =	Efficiency of electric water heater (100%) or gas water heater (75%),
c =	Conversion factor if water heater is gas (3,412 Btu/kWh),
ME_T =	Per-cycle machine electrical energy consumption (kWh/cycle), and
D_E =	Per-cycle energy consumption for removal of moisture from test load, i.e. dryer energy consumption (kWh/cycle).

$$CW_{ANNUAL} = CW_{CYCLE} \times N$$

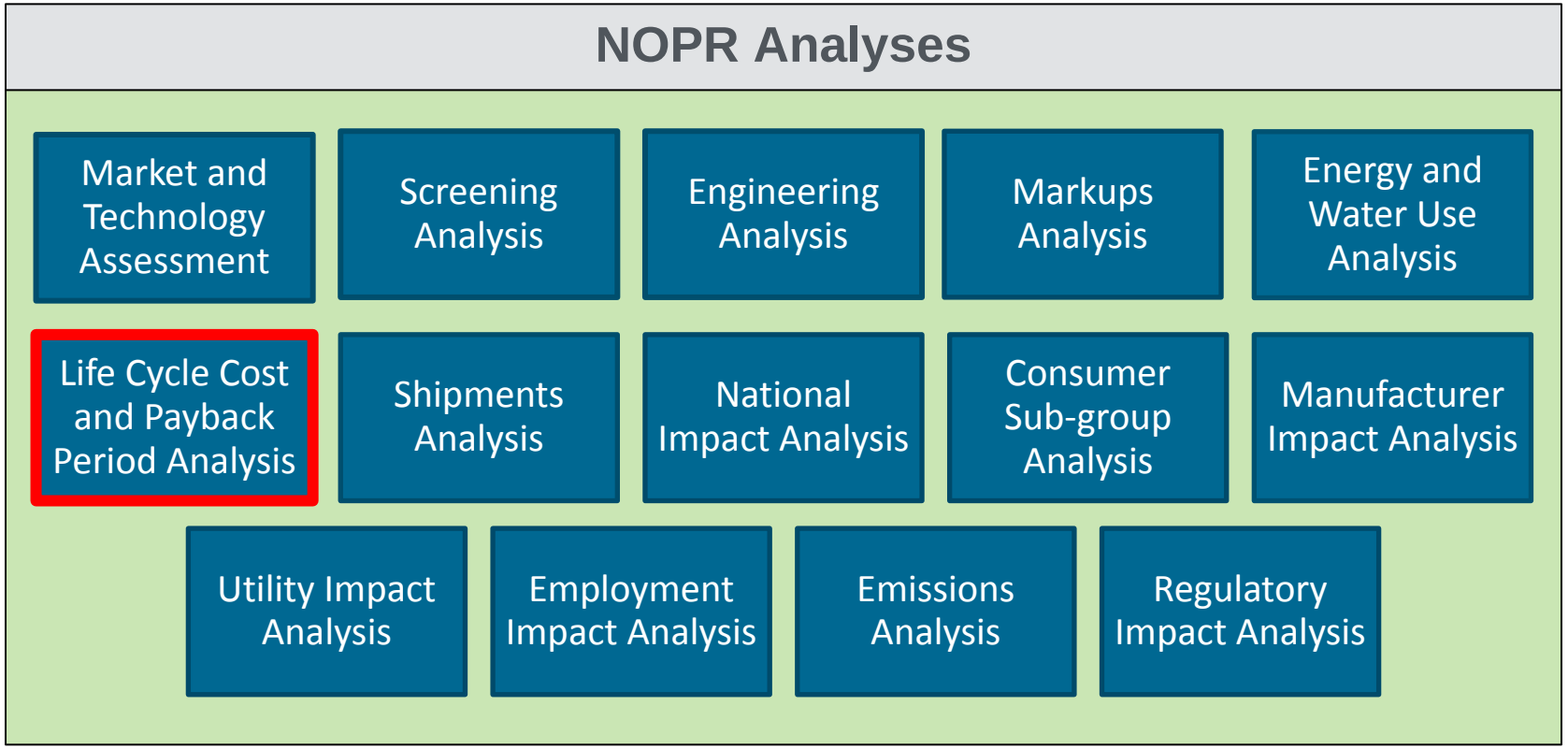
where:

CW_{ANNUAL} =	Total annual commercial clothes washer energy consumption, and
N =	Representative average commercial clothes washer use.

Request for Comment

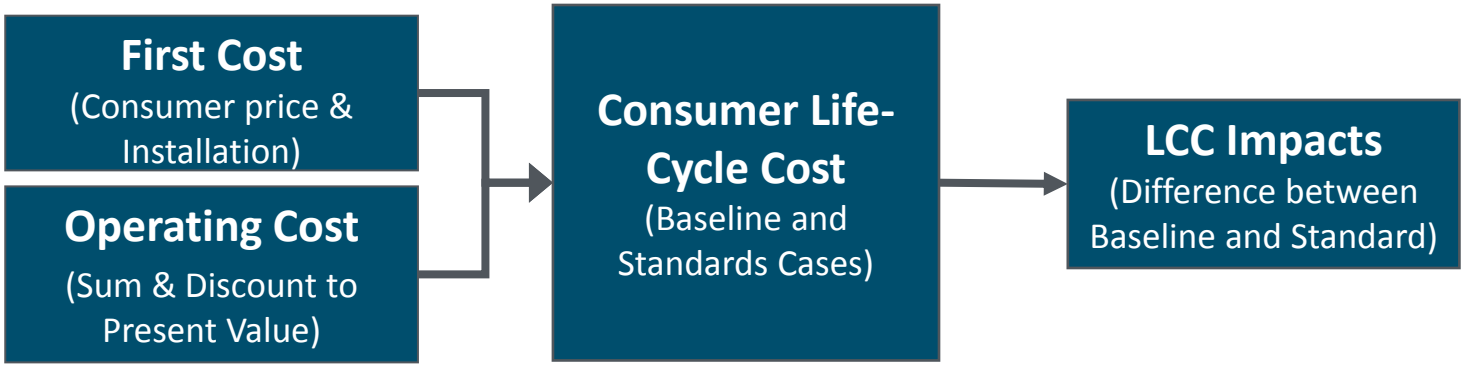
- **Item 6-1: DOE seeks stakeholder input on the approaches considered for specifying the typical annual energy and water consumption. Most importantly, DOE is interested in new sources of data that can assist in characterizing the cycles per year for commercial clothes washers.**

Life-Cycle Cost and Payback Period Analysis



LCC and PBP Analysis

- **Purpose:**
  - Assess the net life-cycle cost (LCC) impacts of differing efficiency levels on the consumer.



- **Method:**
  - LCC equals consumer price plus the sum of annual operating costs (including repair and maintenance costs) discounted to a particular base year.
  - Economic evaluation from the consumer perspective.
  - Analysis implemented in an Excel® spreadsheet.
  - Results are expressed as LCC difference (baseline minus standard level).
  - Payback Period (PBP) is also calculated and reported in this analysis.
  - Simple payback equals the incremental first cost divided by the operating cost savings for 1 year.

Approach

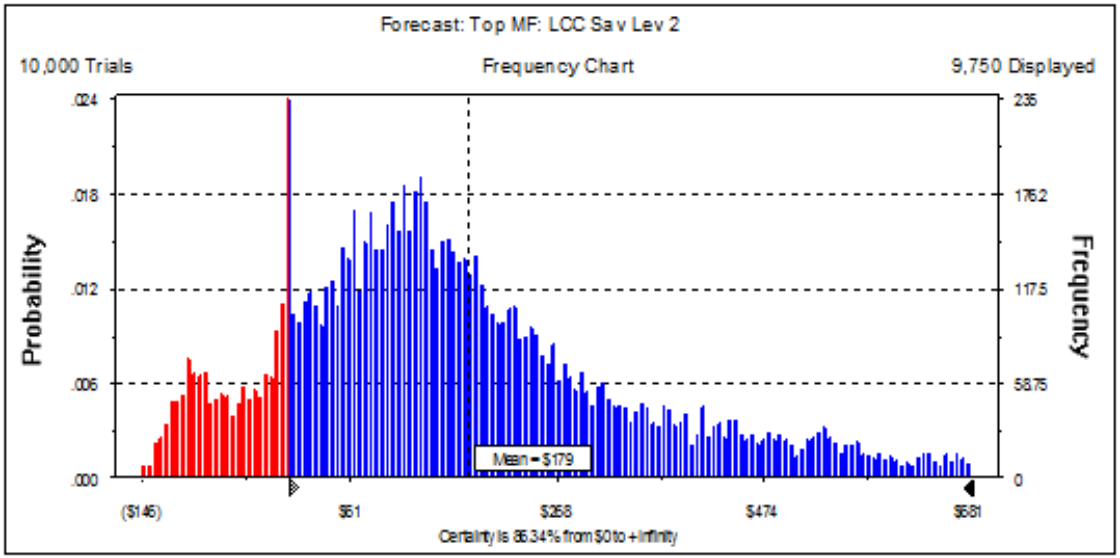
- **Monte Carlo simulation analysis to be used**
  - Characterize the variability and uncertainty associated with the inputs using probability distributions.
  - Studies will be used to characterize the variability in washer usage in Multi-family and Laundromat applications.
  - Probability distributions will be used to characterize the uncertainty in other operating cost inputs (e.g., discount rates, equipment lifetimes) and manufacturing costs.
- **One LCC and PBP analysis result per product class**
  - Analysis to be conducted for each proposed product class to be analyzed in detail in the Engineering Analysis.
- **Develop base case efficiency distributions to avoid overstating the benefits from increasing product efficiency.**
  - Market share data (or base case efficiency distributions) show the percentage of consumers already purchasing efficient products.
  - DOE will develop efficiency distributions based on historical data.

Request for Comment

- **Item 8-1: DOE seeks input on the extent to which purchasers of CCWs are able to either pass on the higher purchase costs of more efficient CCWs, or otherwise recover those costs.**

- **Item 8-6: DOE requests data from interested parties to characterize the current mix of commercial clothes washer efficiencies in the market.**

Efficiency Distributions Example from 2010 CCW LCC Analysis



CSL	MEF/WF	Life-Cycle Cost			Life-Cycle Cost Savings				Payback Period (years)	
		Average Installed Price	Average Operating Cost	Average LCC	Average Savings	Households with Net Cost	Households with No Impact	Households with Net Benefit	Median	Average
Baseline	1.26/9.50	$760	$3,263	$4,023	-	-	-	-	-	-
1	1.42/9.50	$883	$3,153	$4,036	-$8.1	43.3%	35.3%	21.5%	11.7	17.3
2	1.60/8.50	$974	$2,873	$3,847	$178.6	13.8%	1.2%	85.0%	4.6	5.6

Energy Prices

- Electricity, Natural Gas and Oil prices are used to convert energy use to energy costs.
- DOE will develop electricity prices from DOE-Energy Information Administration (EIA) Form 861 data.
- DOE will develop natural gas and oil prices from *"Natural Gas Monthly"* and *"Petroleum Navigator."*
- DOE will use the DOE-EIA *Annual Energy Outlook (AEO)* for projections of future average energy prices (reference, high, and low scenarios).
- DOE may evaluate other quantitative price projections provided by stakeholders as sensitivities.

Water and Wastewater Prices

- Water and Wastewater prices are used to convert water use to water costs.
- DOE will develop water and wastewater prices from AWWA and Raftelis Financial Consultants (RFC).
- DOE will use historical Bureau of Labor's Consumer Price Index for Water and Sewerage for projections of future average water prices and historical RFC data.
- DOE may evaluate other quantitative price projections provided by stakeholders as sensitivities.

Request for Comment

- **Item 8-2: DOE seeks input from interested parties on the planned approach for estimating current and forecasted energy, water, and wastewater prices.**

Discount Rates

- **DOE uses discount rates (DR) to discount future operating costs savings.**
- **DOE will use similar approach as for other commercial product standards rulemakings.**
  - Derived from estimates of the cost of capital for companies that purchase commercial clothes washers.
- **Finance cost based on:**
  - Financial cost of any debt incurred to purchase products (e.g., debt and equity capital)
  - Opportunity cost of any equity to purchase products
  - Damodaran Online and Ibbotson's Associates are sources for much of the equity and debt data.

Request for Comment

- **Item 8-5: DOE seeks stakeholder input on the planned approach for estimating discount rates for commercial customers.**

Maintenance, Repair, Installation Costs

- DOE does not currently have information indicating that routine repair and maintenance costs are different for more and less efficient commercial clothes washers.
- DOE assumes that increases in installation costs are negligible for more efficient units.

Request for Comment

- **Item 8-3: DOE seeks stakeholder input on whether it is correct to assume that changes in maintenance, repair, and installation costs will be negligible for more efficient commercial clothes washers. If it is incorrect, DOE is interested in the reasons why this is so and specific ways to correct this assumption.**

Product Lifetimes

- **Past DOE analyses have used the following lifetimes:**
  - Laundromats (7.13)
  - Multi-family Laundry (11.25 years)

Based on the following sources:

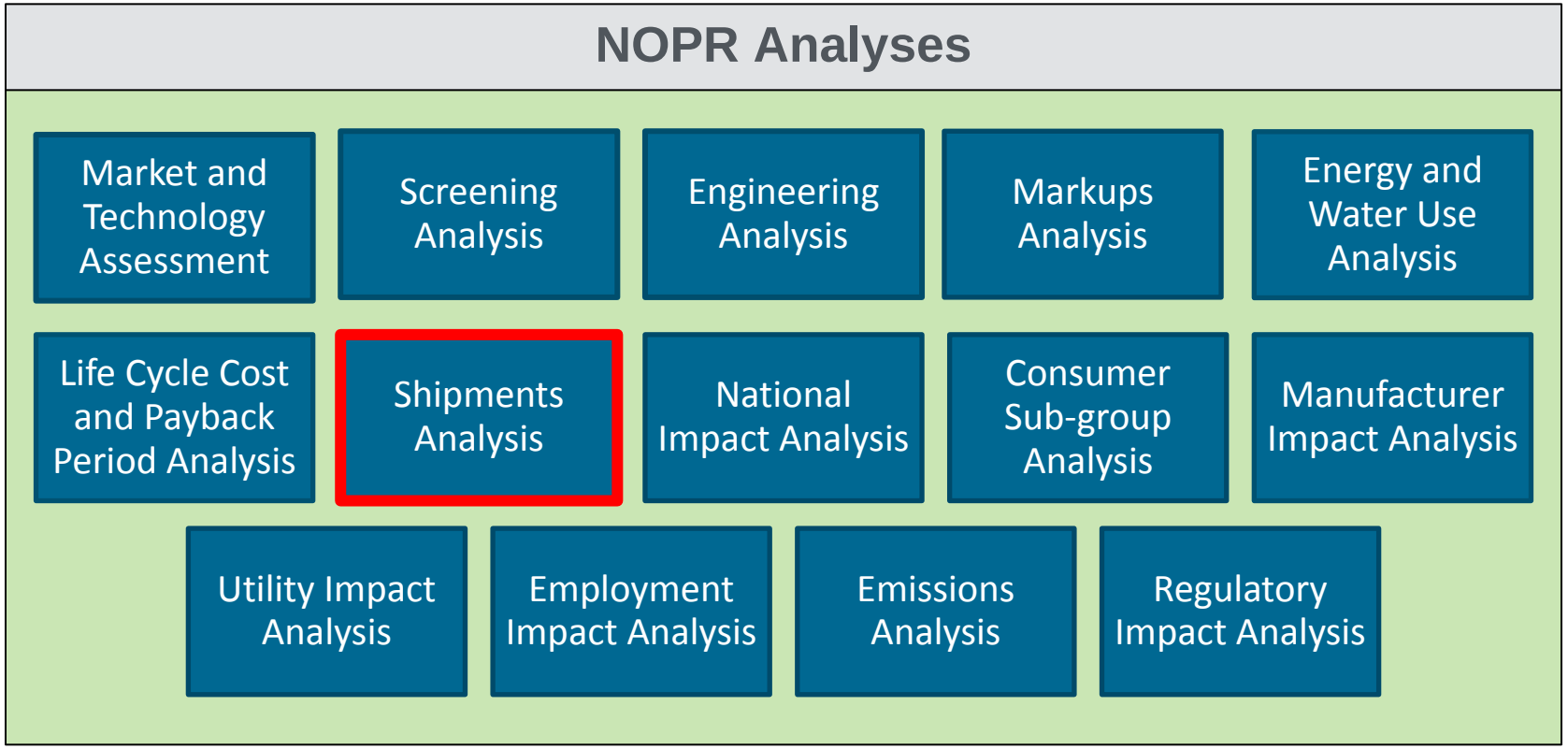
Lifetime (years)	Source
7 to 10	CEE (1998)
Top-Loading (12 to 14 lbs.): 5 to 8[a] **Front-Loading (18 to 50 lbs.): 10 to 15[b]**	Coin Laundry Association. Industry Overview. Downers Grove, IL.
8 to 9[c]	ACEEE (2001)
5 (high-use)[a] to 13 (low-use)[b]	Southern California Edison (2000)
15[b] †	California Measurement Advisory Committee (CALMAC) (2000)

[a] Used to establish Laundromat lifetime only; [b] Used to establish multi-family lifetime only; [c]Depending on the usage rate, the life can be shorter; † Based on engineering judgment.

Request for Comment

- **Item 8-4: DOE seeks stakeholder input on appropriate lifetimes for the commercial clothes washer classes covered in this rulemaking.**

Shipments Analysis



Shipments Analysis

- **Purpose:**
  - Quantify changes in product shipments due to potential new energy efficiency standards.

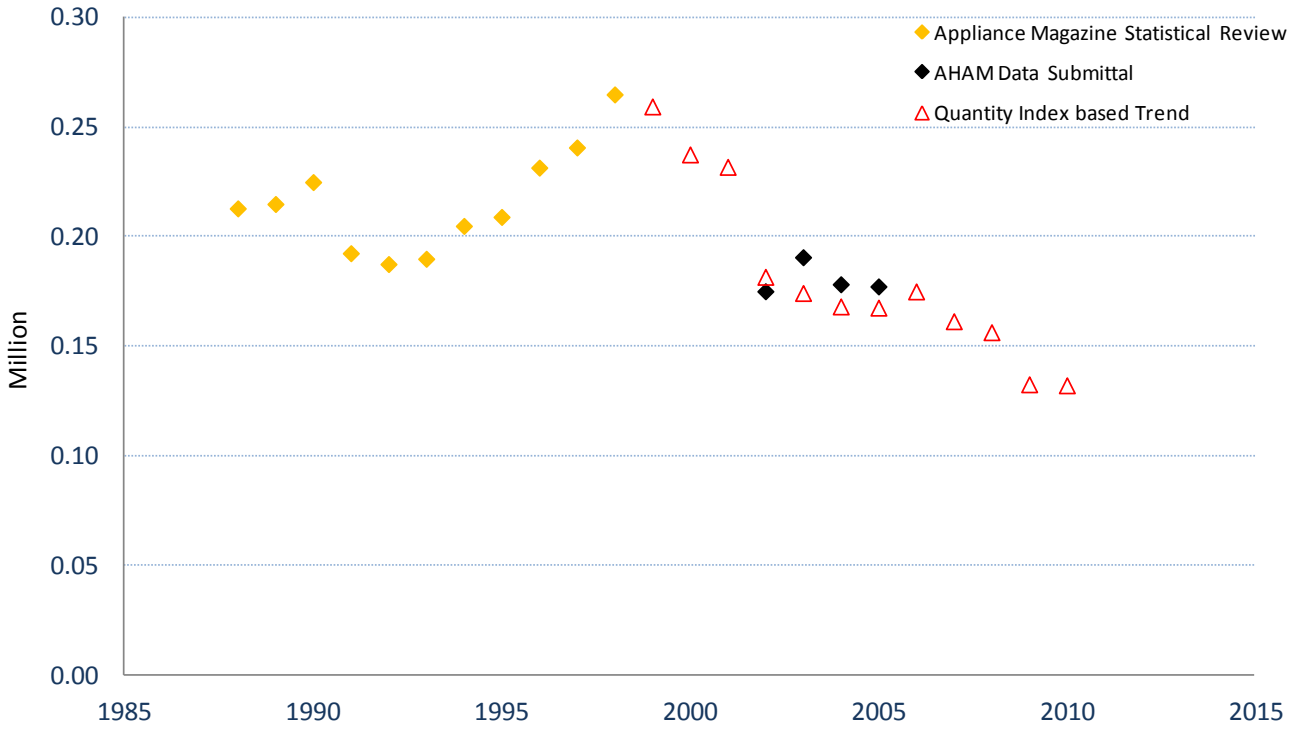
- **Method:**
  - The shipments model will rely on a range of data sources.
  - The model will only consider shipments of covered products.

Approach – Accounting Methodology

- **The base case projection:**
  - Depicts the situation where new standards are not adopted
  - Serves as a reference point from which to evaluate the impacts of standards
  - Projection accounts for products going to replace failed units, and those going to establishments due to new construction
- **Data needed to develop base case projection:**
  - Historical shipments
  - Historical saturation rates to properly account for existing stock of products.
  - Market share efficiencies

Historical Shipments Data

Based on publicly-available data sources



- **DOE projected flat shipments in the last rulemaking due to a decline observed in the data.**

Historical Sales Data

- DOE requests historical shipment data.

Year	Shipments, Domestic + Imports	
	Top-Loading (Thousands of Units)	Front-Loading (Thousands of Units)
1990		
1991		
↓	↓	↓
2011		

- DOE requests market share efficiency data.

Top-Loading					Front-Loading				
Efficiency Bins		Market Share (Percent)			Efficiency Bins		Market Share (Percent)		
(MEF)	(WF)	2009	2010	2011	(MEF)	(WF)	2009	2010	2011
< 1.42	> 9.5				< 2.0	>5.5			
1.42 – 1.6	9.5 – 8.5				2.0 – 2.2	5.5 – 4.5			
> 1.6	< 8.5				2.2 – 2.4	4.5 – 4.2			
					2.4 – 2.6	4.2 – 3.7			
					>2.6	<3.7			

Request for Comment

- **Item 9-1: DOE seeks historical shipments data broken down by product class.**
- **Item 9-2: DOE seeks input on whether conversions from apartments to condos/townhouses are still occurring.**

Standards Impacts on Product Shipments

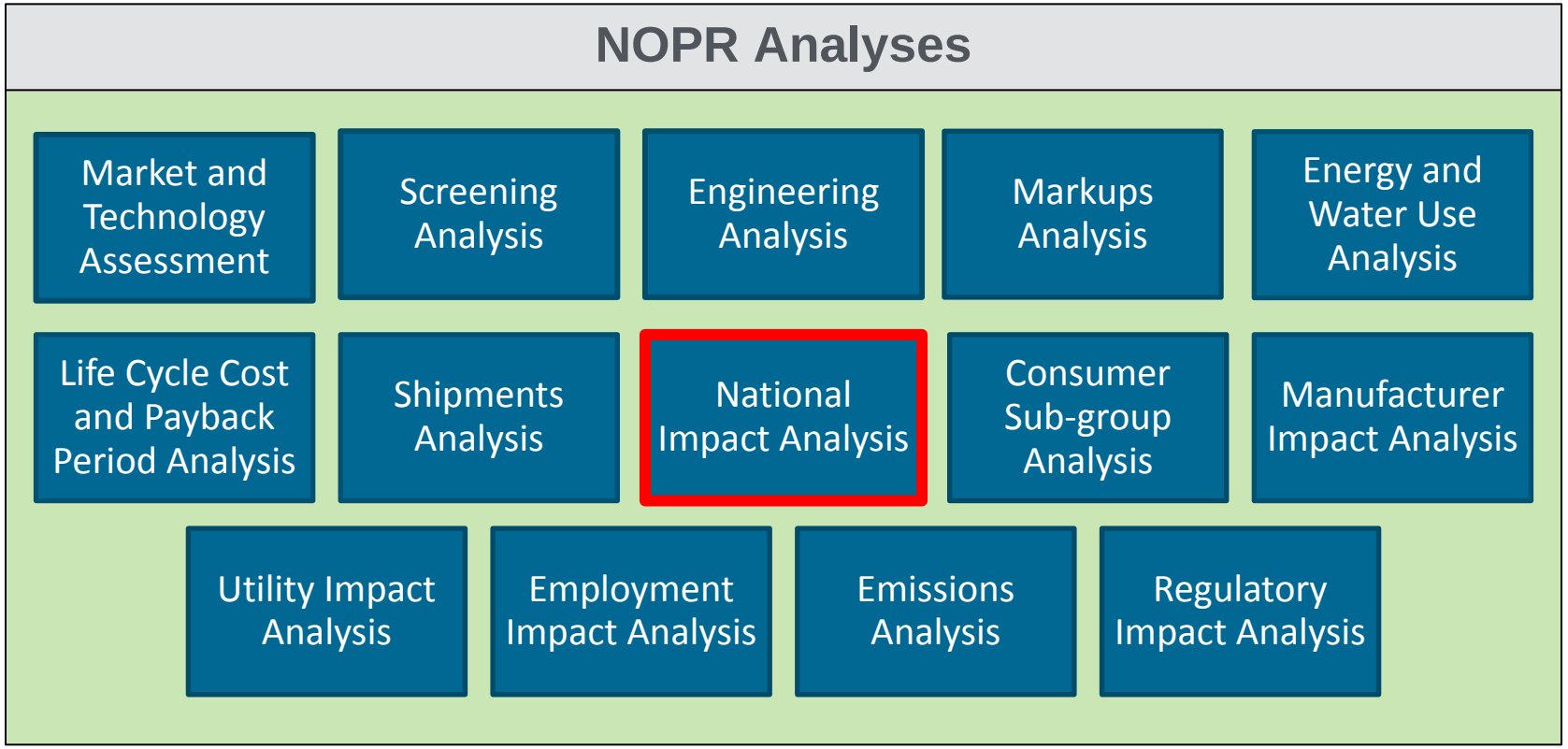
- **DOE develops Standards Case Projections from the same data it used to develop the Base Case Projections.**
- **Standards Case Projections also use purchase price increases and operating cost savings to estimate shipments impacts.**
  - DOE may utilize RCW elasticities if no new data becomes available
- **It is difficult to obtain data showing sensitivity of shipments to purchase price and operating costs.**
  - DOE may estimate Standards Case shipments projections with scenarios (i.e., specific percentage drops in annual shipments for particular efficiency levels).
  - DOE will consider cross-price elasticity to project changes in market shares across product classes

Request for Comment

- **Item 9-3: DOE requests input from manufacturers and other stakeholders on historical shipments by efficiency, historical prices of CCW for specific product categories.**

- **Item 9-4: DOE seeks input from manufacturers and other stakeholders on the potential impact of amended CCW energy conservation standards on equipment shipments, and whether the elasticities developed for RCW would be appropriate for CCW.**

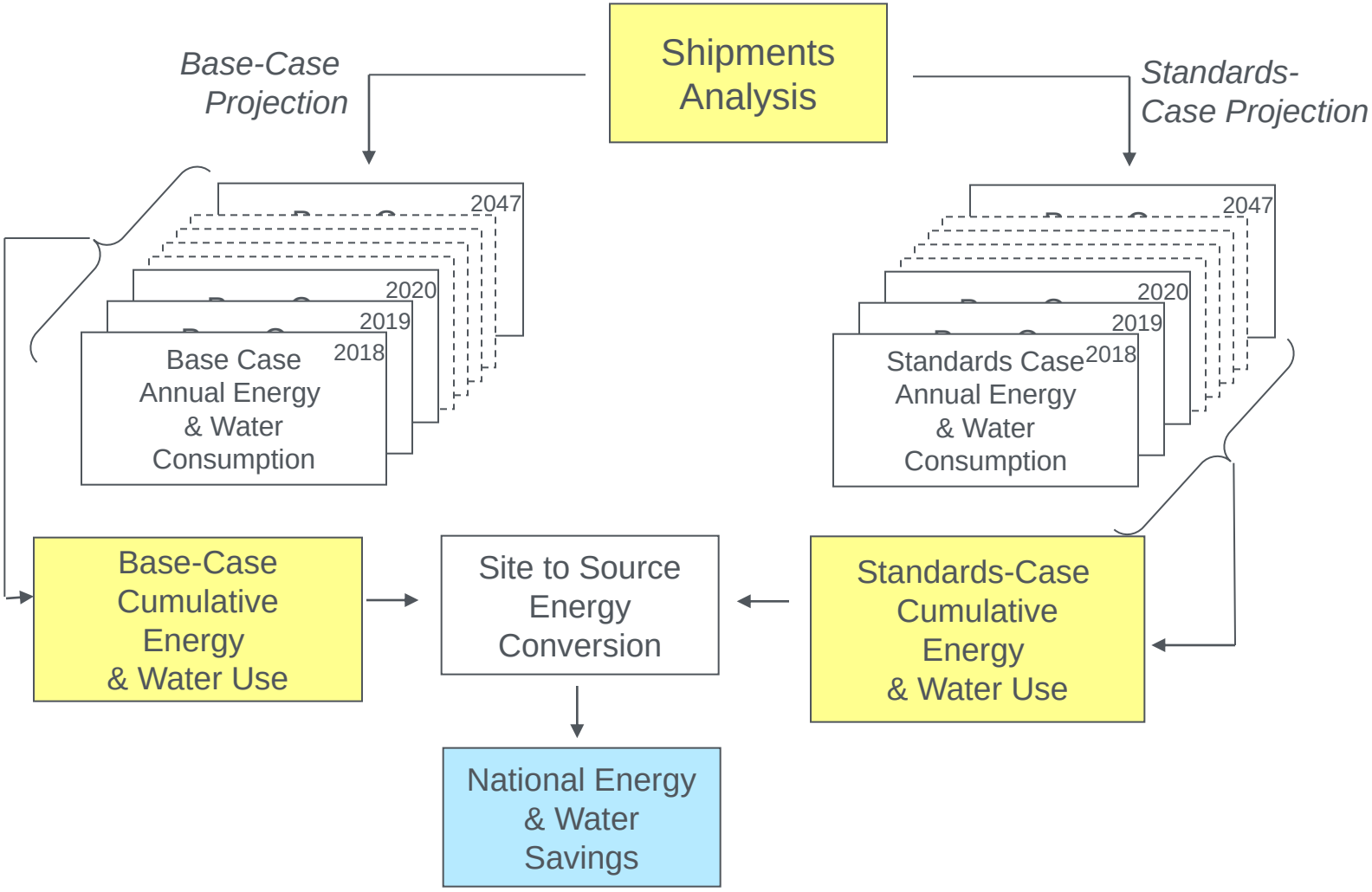
National Impact Analysis



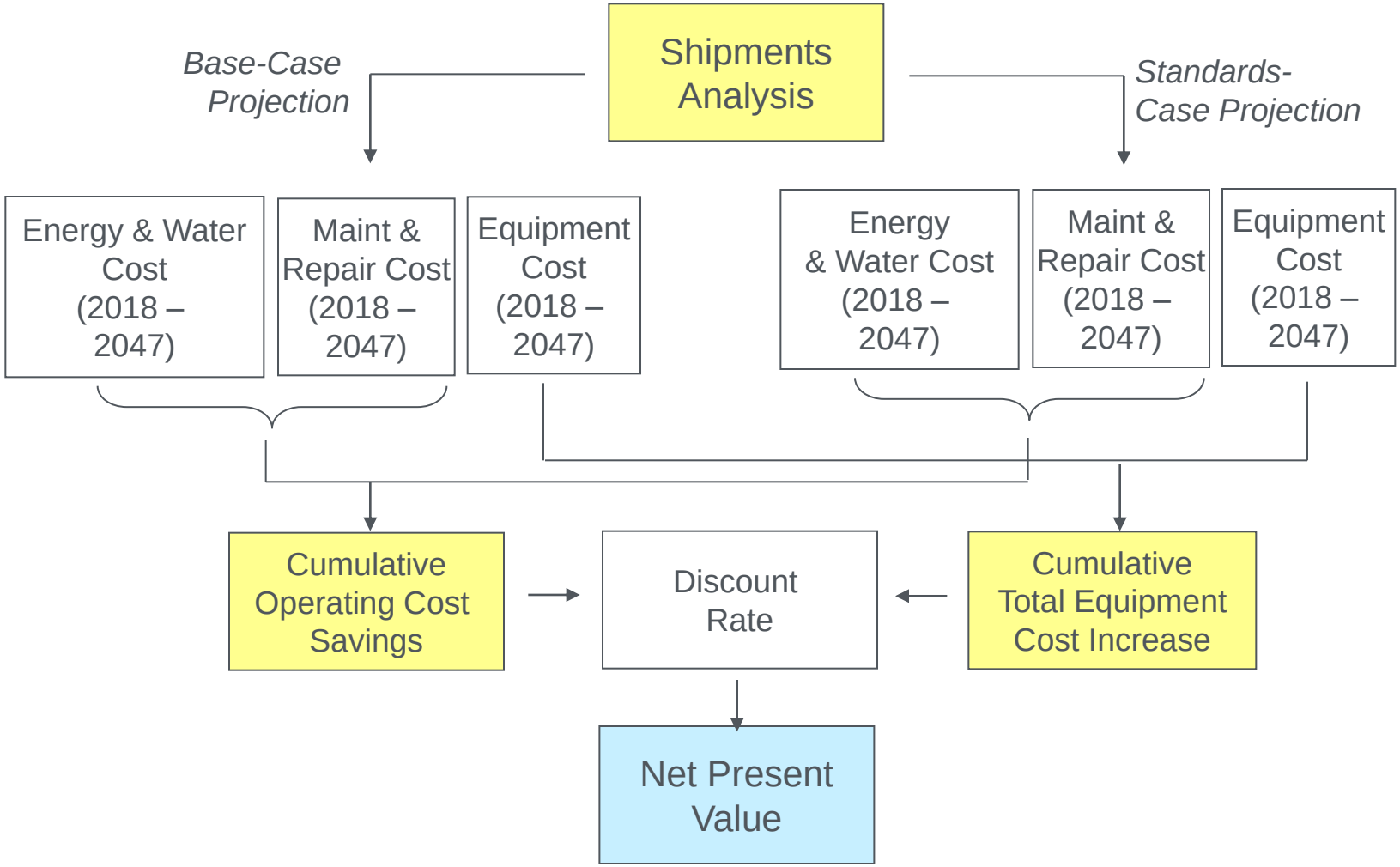
National Impact Analysis

- **Purpose:**
  - Determine the projected national energy, water, and wastewater savings and consumer national net present value.
- **Method:**
  - Develop annual series of national energy, water, and wastewater and economic impacts.
  - Utilize the shipments model to estimate the total stock of appliances in service each year.
  - Utilize the LCC to estimate cost and energy and water use per unit in any given year.
  - Aggregate the costs and energy and water use for all years in the analysis period.
  - Report national energy savings (NES) and national water savings (NWS).
  - Report estimates for economic impact as change in consumer National Net Present Value (NPV) (in constant year dollars).
  - Account for the time-value of money though defined discount rates.

National Energy and Water Savings Flow Diagram



National Consumer Net Present Value Flow Diagram



Shipment-Weighted Efficiency and Market Share Efficiency Data

- **Shipment-weighted efficiency data:**
  - Key components of the national impact analysis are dependent on shipment-weighted efficiencies.
    - Per-unit annual energy and water consumption—needed to determine NES, NWS.
    - Retail price and per-unit annual operating costs—needed to determine NPV.
  - Historical trends in product efficiency help project future product efficiencies for the base-case.
    - DOE may consider impacts from market pull programs
- **Market share efficiency data:**
  - Historical market share efficiency data help estimate how standards will impact base-case efficiencies.
  - Market share data (or base-case efficiency distributions) will also be used in the national impact analysis.
    - DOE has assumed a “roll up” scenario to project standards impacts in past standards rulemakings.

National Impact Analysis

- **Full fuel cycle (FFC) measure of energy and greenhouse gas and other emissions will now be measured in this and future conservation standards rulemakings.**
  - NEMS will be the model used to determine FFC
  - FFC multipliers will be presented and discussed in the NOPR TSD.

Commercial Clothes Washer Historical Efficiency Data

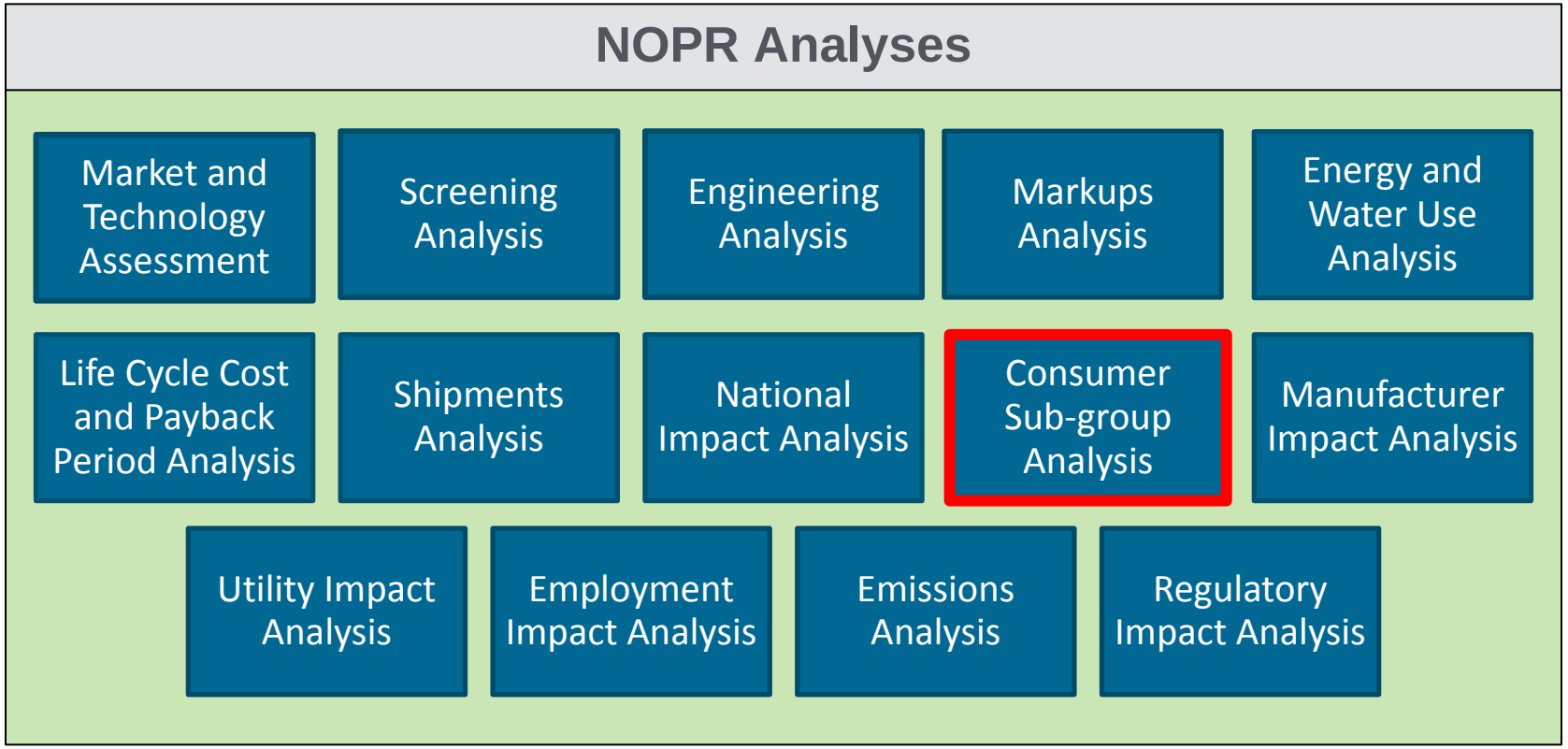
- DOE requests historical shipment-weighted average efficiency data by product class in order to calculate NES, NWS, and NPV.

Year	Shipment-Weighted Average Efficiency			
	Top-Loading		Front-Loading	
	(MEF)	(WF)	(MEF)	(WF)
1997				
1998				
1999				
2000				
2001				
2002				
2003				
2004				
2006				
2007				
2008				
2009				
2010				
2011				

Request for Comment

- **Item 10-1: DOE seeks historical SWEF data by product class. DOE also seeks historical market share data showing the percentage of equipment shipments by efficiency level for as many product classes as possible.**

Consumer Subgroup Analysis



Consumer Subgroup Analysis

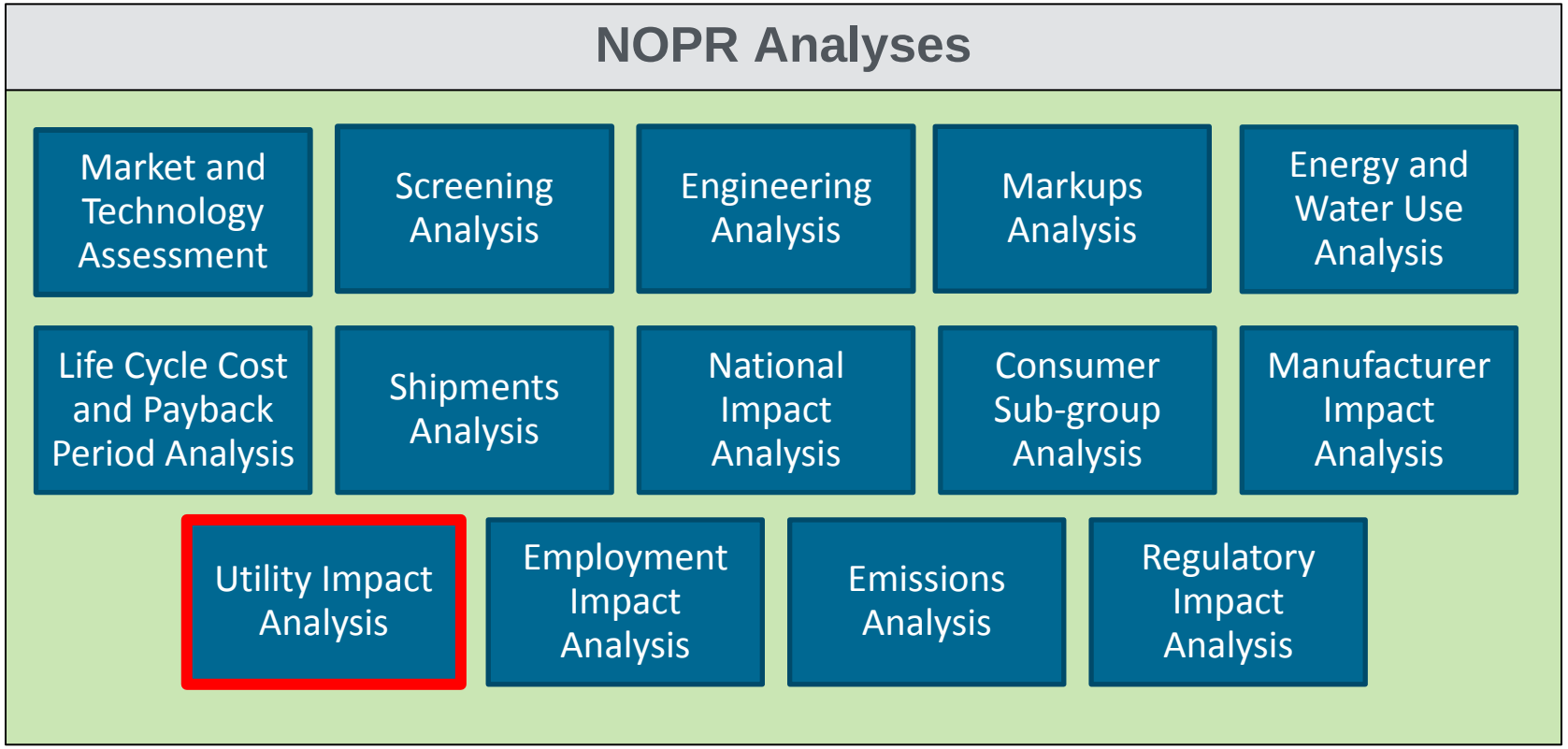
- **Purpose:**
  - Analyze the economic impacts of standards on consumers, including subgroups who may be disproportionately impacted compared with the general user population.
- **Method:**
  - Extend the LCC analysis to examine the impacts for defined subgroups.

Consumer Subgroup Analysis

Request for Comment

- **Item 11-1: DOE requests input on any consumer subgroups it should consider when analyzing standards for commercial clothes washers.**

Utility Impact Analysis



Utility Impact Analysis

- **Purpose:**
  - Assess the overall impacts on domestic energy supplies that would result from the imposition of standards.

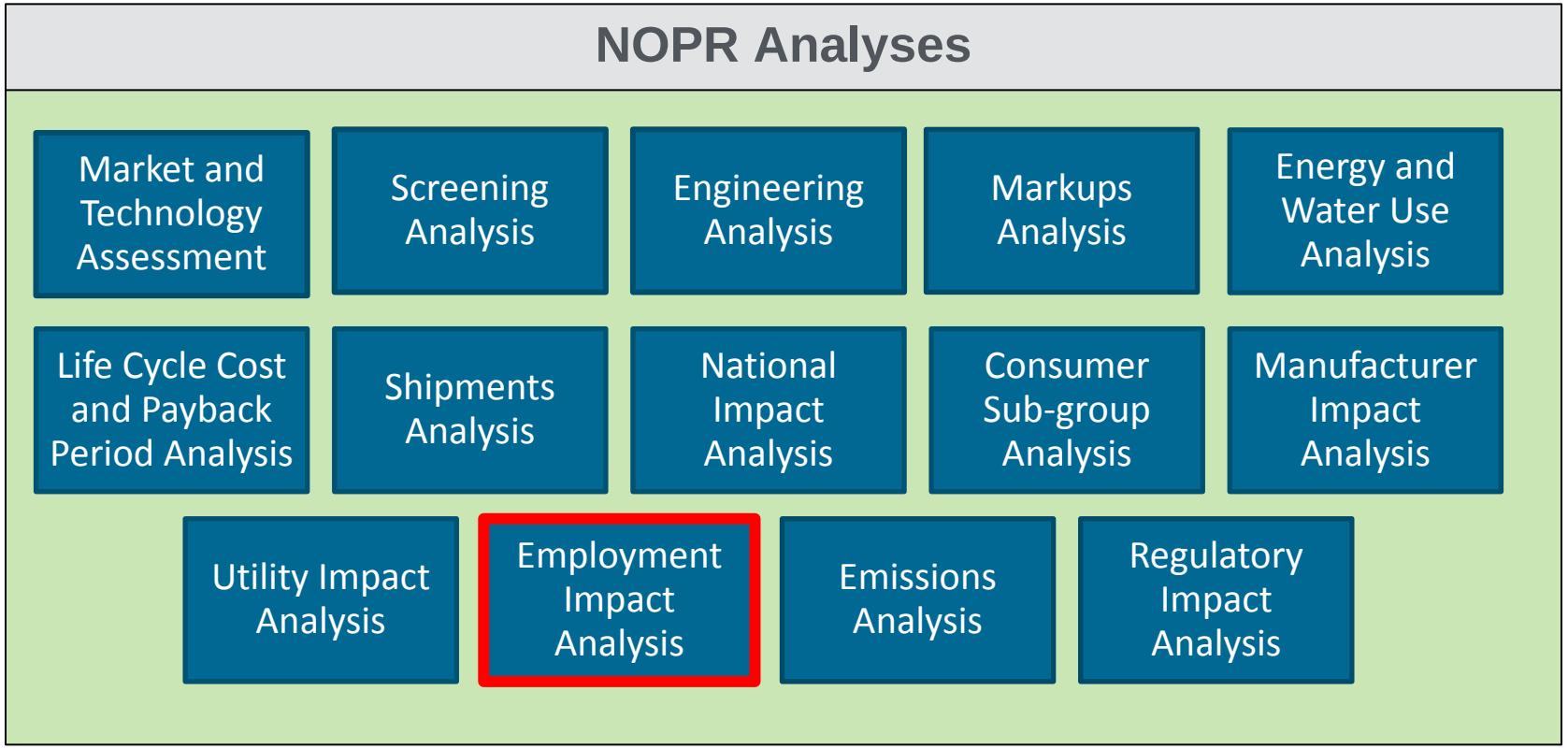
- **Method:**
  - Uses NEMS-BT, a variant of the NEMS (National Energy Modeling System) developed and used by DOE/EIA for their Annual Energy Outlook (AEO).
  - Analysis consists of a comparison between model results for the most recent AEO Reference Case and for cases in which energy use is decremented to reflect the impact of standards.

Utility Impact Analysis

Request for Comment

- **Item 13-1: DOE seeks input from stakeholders regarding its plan to use NEMS-BT to conduct the utility impact analysis. Is the NEMS-BT model appropriate for assessing utility impacts of energy conservation standards? If not, why? What would be a more appropriate model for DOE to use?**

Employment Impact Analysis



Employment Impact Analysis

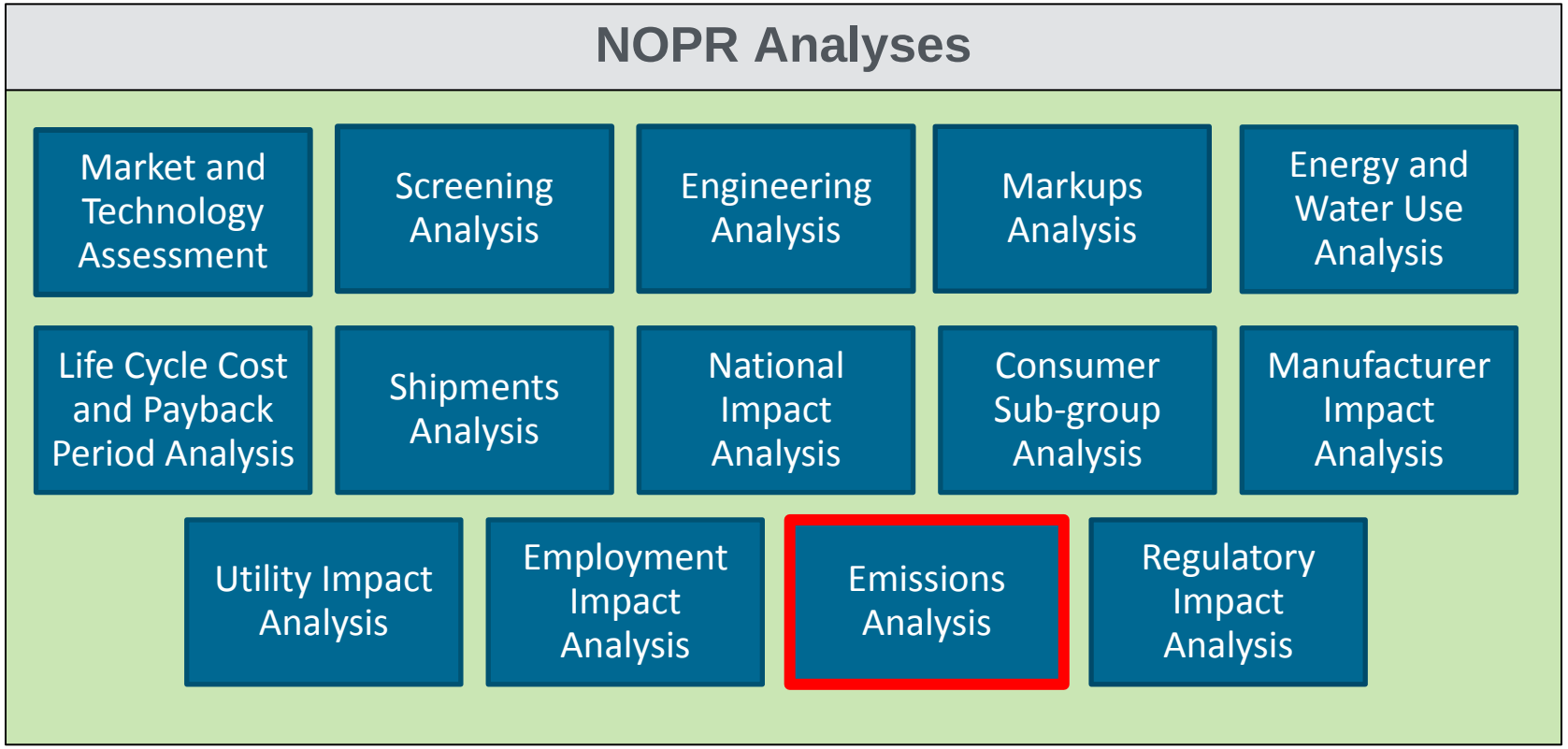
- **Purpose:**
  - Assess the overall impact on national employment from the imposition of efficiency standards at differing levels.
  - Include both direct and indirect employment impacts.
    - Direct employment impacts are estimated in the manufacturer impact analysis.
    - Indirect employment impacts result from shifting consumer expenditures among goods and services (“substitution effect”) and changing equipment and energy costs (“income effect”).
- **Method:**
  - DOE intends to use the ImSET (Impact of Sector Energy Technologies) model for the evaluation of indirect employment impacts.

Employment Impact Analysis

Request for Comment

- **Item 14-1: DOE welcomes feedback on its approach to assessing national employment impacts.**

Emissions Analysis



Emissions Analysis

- **Purpose:**
  - Estimate emissions impacts from amended energy conservation standards for commercial clothes washers, including changes in Full Fuel Cycle (FFC) emissions as well as site emissions from use of gas and oil (for water heating)
- **Method:**
  - DOE bases the emission factors for FFC on EIA's Annual Energy Outlook, supplemented by data from other sources. The following emissions are assessed:
    - Carbon dioxide (CO2)
    - Sulfur dioxide (SO2)
      - SO2 emissions from affected electric generating units are subject to nationwide and regional emissions cap and trading programs; thus no impact from standards
    - Nitrogen oxides (NOx)
      - Clean Air Interstate Rule (CAIR) permanently caps NOx emissions in 28 eastern States and DC; DOE considers impacts in remaining States
    - Methane (CH4)
    - Nitrous Oxide (N2O)
    - Mercury (Hg)

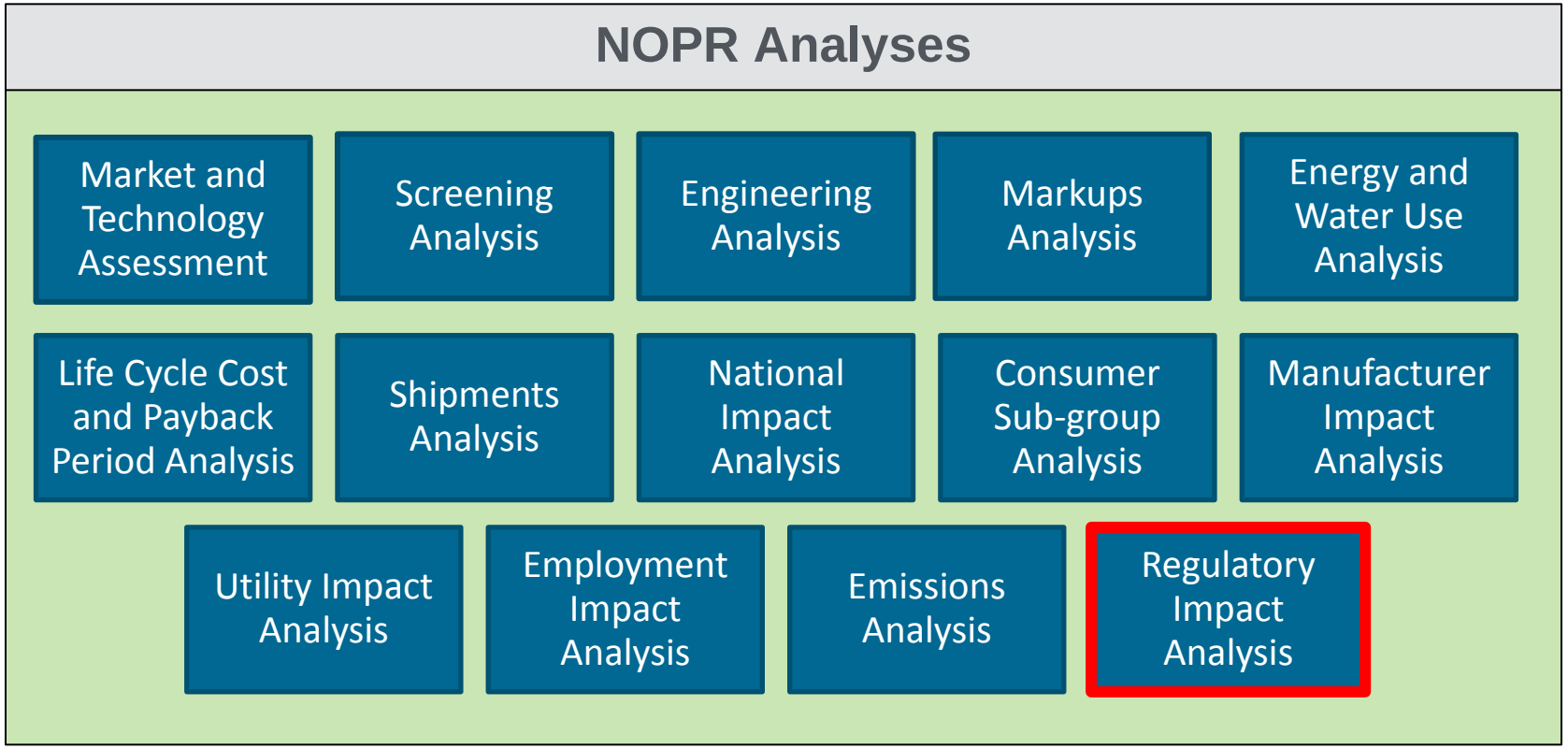
Monetization of Emission Reductions

- **DOE intends to use the most current Social Cost of Carbon (SCC) values developed by interagency reviews.**
  - SCC is intended to be a monetary measure of the incremental damage resulting from greenhouse gas (GHG) emissions, including but not limited to agricultural productivity loss, human health effects, property damage from rising sea level, and changes in the ecosystem.
- **At present, the most recent interagency estimates of the potential global benefits resulting from reduced CO2 emissions in 2015, expressed in 2011$, were $6.1, $25.4, $41.0, and $77.7 per metric ton avoided.**
  - For emission reductions that occur in later years, these values grow in real terms over time.
- **DOE will also estimate the potential monetary benefit of reduced NOx emissions resulting from the considered standard levels.**

Request for Comment

- **Item 15-1: DOE seeks input on its plans to use NEMS-BT and other sources to analyze emissions impacts of potential standards on commercial clothes washers.**

Regulatory Impact Analysis



Regulatory Impact Analysis

- **This analysis estimates the potential for non-regulatory approaches to supplant or augment efficiency standards to improve product efficiency.**
- **DOE will evaluate past, existing, and expected non-regulatory programs.**

Public Meeting Agenda

1	Introduction
2	Regulatory History
3	Test Procedure
4	Rulemaking Process Overview
5	NOPR Analyses
6	**Closing Remarks**

Instructions for Submitting Comments

- **In all correspondence, please refer to this Commercial Clothes Washer Rulemaking by:**
  - Docket # EERE-2012-BT-STD-0020, and/or RIN 1904-AC77
- **Email: CommClothesWashers-2012-STD-0020@ee.doe.gov**
- **Postal Mail:** Ms. Brenda Edwards
  U.S. Department of Energy
  Building Technologies Program, Mailstop EE-2J
  1000 Independence Avenue, SW.
  Washington, D.C. 20585-0121
- **Courier:** Ms. Brenda Edwards, 950 L'Enfant Plaza, SW., Suite 600
- **Phone:** (202) 586-2945

Comment period closes October 12, 2012