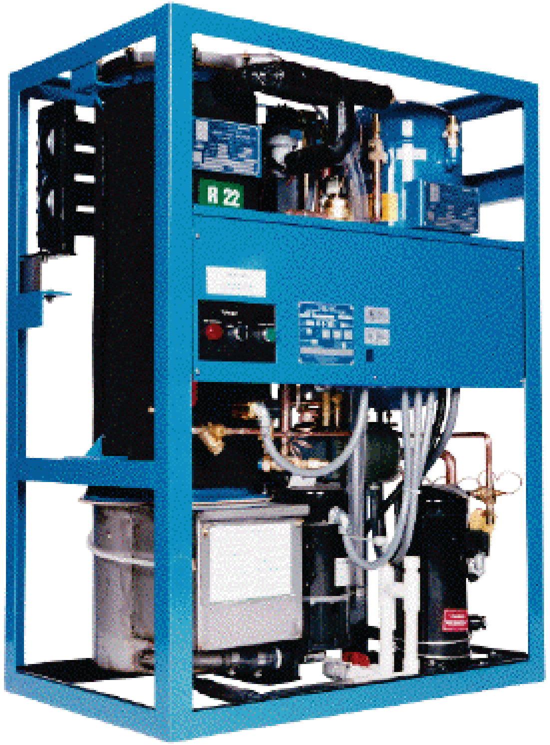

Energy Conservation Standards Preliminary Analysis Public Meeting for Automatic Commercial Ice Makers

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February 16, 2012

Welcome & Introductions

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

- 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

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

9:00 am – 9:30 am	Welcome
9:30 am – 9:40 am	Overview & Test Procedure Final Rule
9:40 am – 10:40 am	Market/Technology, Screening & Engineering Analysis
10:40 am – 11:20 am	Markups, Energy Use, Life-Cycle & Payback Analysis
11:20 am – 11:50 am	Shipments Analysis & National Impact Analysis
11:50 am – 12:05 pm	Manufacturer Impact Analysis
12:05 pm – 1:00 pm	Lunch
1:00 pm – 1:30 pm	Notice of Proposed Rulemaking Analyses
1:30 pm – 2:00 pm	Next Steps & Closing Remarks

Request for Comment

Issue Box: DOE welcomes comment regarding the Notice of Public Meeting and Availability of the Preliminary Technical Support Document. Throughout this presentation, specific issues will be raised for discussion in yellow issue boxes. However, comments concerning any part of the document or presentation are welcome.

Public Meeting Agenda

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

1. Overview & Test Procedure Final Rule
2. Market/Technology, Screening & Engineering Analysis
3. Markups, Energy Use, Life-Cycle & Payback Analysis
4. Shipments Analysis & National Impact Analysis
5. Manufacturer Impact Analysis
6. Notice Of Proposed Rulemaking Analyses
7. Closing Remarks

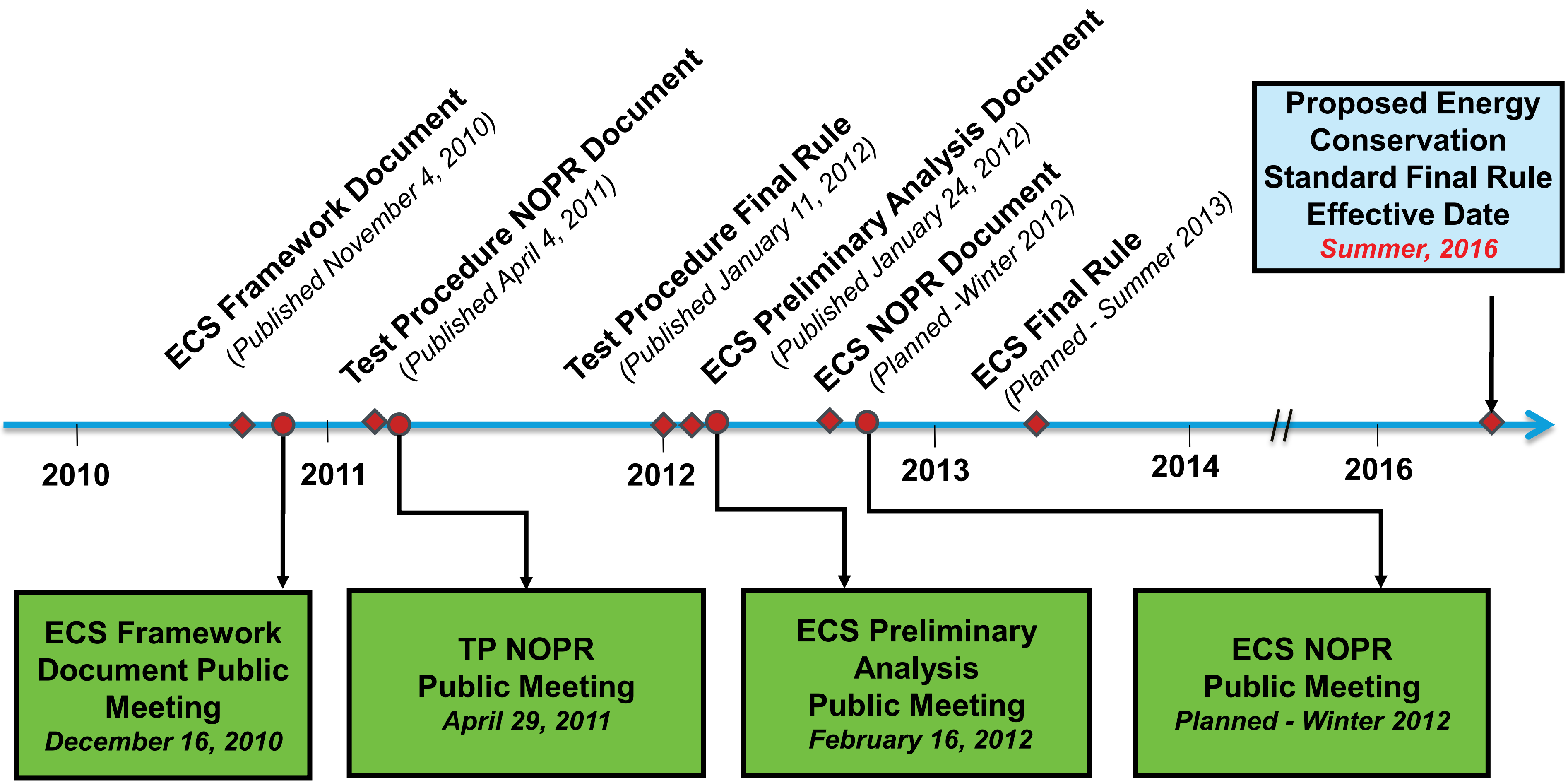
Purpose of this Public Meeting

- To inform all interested parties and to facilitate this rulemaking process
- Present the procedural and analytical approaches to evaluate energy conservation standards (ECS) for automatic commercial ice makers (ACIM)
- Provide a forum for public discussions and comments on the rulemaking issues and rulemaking presentation
- Encourage interested parties to submit data, information, and written comments

ACIM Regulatory History

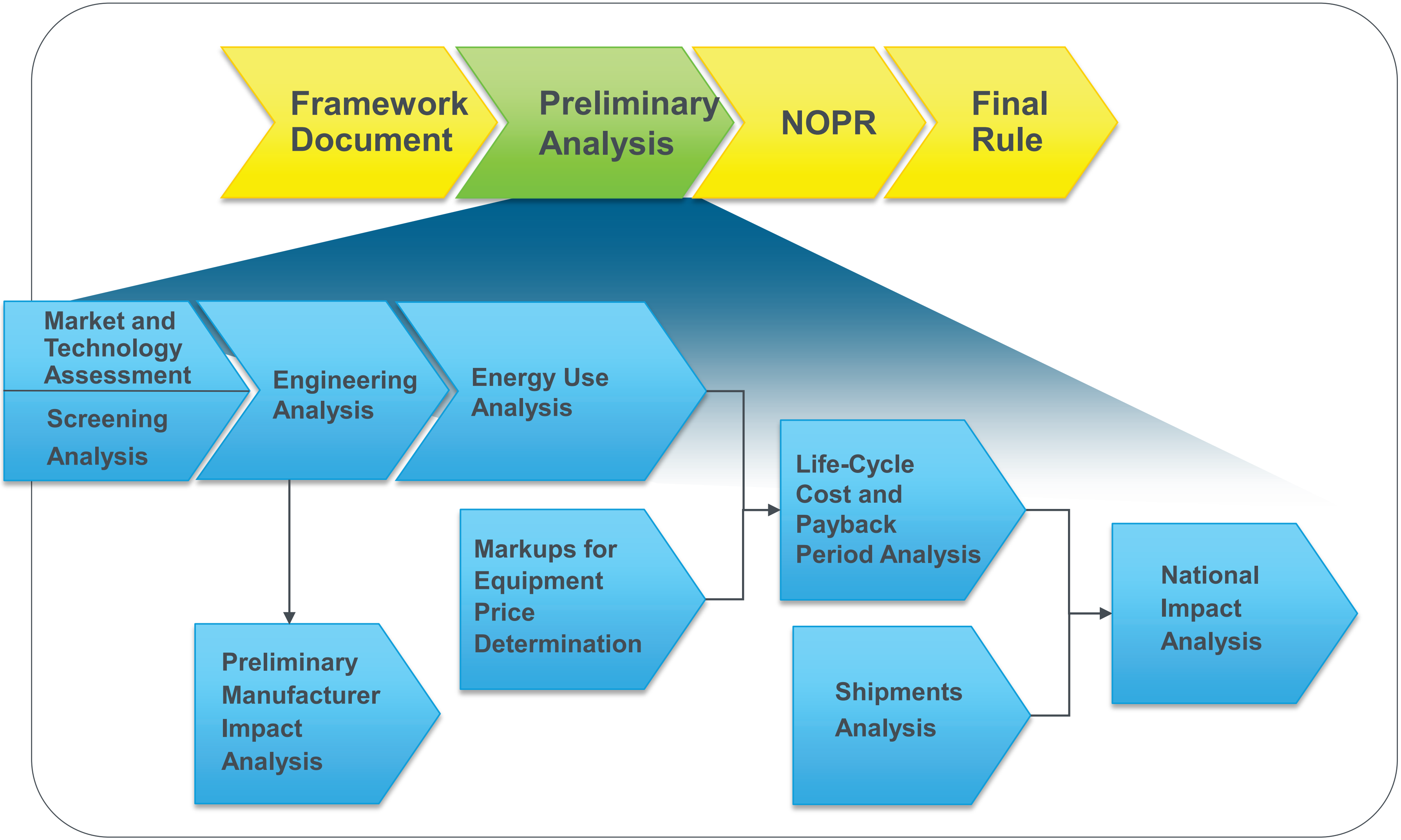
- Energy Policy Act (EPACT) 2005 amended the Energy Policy and Conservation Act (EPCA) to:
  - Prescribe standards for cube ice makers with capacities between 50 and 2,500 lb/24 hours, effective January 1, 2010
  - Authorize DOE to issue standards for other types of automatic commercial ice makers that are not covered by the cube ice standards
  - Direct DOE to issue a final rule, that is technologically feasible and economically justified, no later than January 1, 2015
- Test Procedure Final Rule published 77 FR 1591
  - Federal Register Publication on January 11, 2012
  - Effective date of this rule is February 10, 2012
  - Mandatory for all ACIM testing starting January 7, 2013

ACIM Rulemaking Timeline



Overview & Test Procedure Final Rule

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy



Interested Parties' Opening Statements

At this time DOE welcomes opening remarks on the preliminary analysis for automatic commercial ice makers.

Public Meeting Agenda

1. Overview & Test Procedure Final Rule
2. **Market/Technology, Screening & Engineering Analysis**
3. Markups, Energy Use, Life-Cycle & Payback Analysis
4. Shipments Analysis & National Impact Analysis
5. Manufacturer Impact Analysis
6. Notice Of Proposed Rulemaking Analyses
7. Closing Remarks

Market Assessment

- Purpose
  - Characterize the ACIM equipment market and manufacturers
  - Determine scope of coverage
  - Determine appropriate equipment classes
- Method
  - Identify manufacturers of ACIM equipment and their product offerings by conducting a study of the ACIM market
  - Use available shipment data to characterize market trends
  - Develop appropriate equipment classes to classify covered equipment
- A detailed description of methodology and results is contained in chapter 3 of the preliminary technical support document (TSD)

Equipment Classes

- EPCA, as amended by EPACT 2005, prescribed standards for automatic commercial ice makers, effective January 1, 2010 (42 U.S.C. 6313(d)(1))
  - Thirteen covered classes for ice makers that produce cube-type ice
    - Four equipment families: ice-making head (IMH), self-contained unit (SCU), and remote condensing unit (RCU) with and without remote compressors
    - Air or water cooled
    - Two to three divisions by ice-making capacity, from 50 to 2,500 lb/day
  - Continuous ice makers were not covered by standards
- For this rulemaking, DOE is considering a total of 25 covered classes for *batch* and *continuous* ice makers up to 4,000 lb/day
  - The test procedure rule established new definitions for batch and continuous ice maker types (77 FR 1591)
  - Preliminary TSD chapter 3 contains a full listing of equipment classes

Automatic Commercial Ice Maker Equipment Classes

Equipment Type	Type of Cooling	Harvest Capacity Rate *lb/24 hours*	Type of Ice Maker	Equipment Class Nomenclature
Ice-Making Head (IMH)	Water	≥50 and <500	Batch	IMH-W-Small-B
		≥500 and <1,436	Batch	IMH-W-Medium-B
		≥1,436 and ≤4,000	Batch	IMH-W-Large-B
	Air	≥50 and <450	Batch	IMH-A-Small-B
		≥450 and ≤4,000	Batch	IMH-A-Large-B
Remote Condensing (RCU) (but not remote compressor)	Air	≥50 and <1,000	Batch	RCU-NRC-Small-B
		≥1,000 and ≤4,000	Batch	RCU-NRC-Large-B
Remote Condensing (RCU) and Remote Compressor	Air	≥50 and <934	Batch	RCU-RC-Small-B
		≥934 and ≤4,000	Batch	RCU-RC-Large-B
Self-Contained Unit (SCU)	Water	≥50 and <200	Batch	SCU-W-Small-B
		≥200 and ≤4,000	Batch	SCU-W-Large-B
	Air	≥50 and <175	Batch	SCU-A-Small-B
		≥175 and ≤4,000	Batch	SCU-A-Large-B
Ice-Making Head (IMH)	Water	≥50 and <1000	Continuous	IMH-W-Small-C
		≥1,000 and ≤4,000	Continuous	IMH-W-Large-C
	Air	≥50 and <1000	Continuous	IMH-A-Small-C
		≥1,000 and ≤4,000	Continuous	IMH-A-Large-C
Remote Condensing (RCU) (but not remote compressor)	Air	≥50 and <1000	Continuous	RCU-NRC-Small-C
		≥1,000 and ≤4,000	Continuous	RCU-NRC-Large-C
Remote Condensing (RCU) and Remote Compressor	Air	≥50 and <1000	Continuous	RCU-RC-Small-C
		≥1,000 and ≤4,000	Continuous	RCU-RC-Large-C
Self-Contained Unit (SCU)	Water	≥50 and <175	Continuous	SCU-W-Small-C
		≥175 and ≤4,000	Continuous	SCU-W-Large-C
	Air	≥50 and <175	Continuous	SCU-A-Small-C
		≥175 and ≤4,000	Continuous	SCU-A-Large-C

Item 3: Equipment Classes

DOE seeks comment regarding the suggested equipment classes.

Item A: Equipment Classes

DOE would like to know if there are different types of equipment with significant annual shipments that do not fall under any of the equipment classes considered for the preliminary analysis.

Technology Assessment

- Purpose
  - To develop a preliminary list of technology options that could improve the efficiency of automatic commercial ice makers
- Method
  - DOE identified technology options from:
    - Literature review
    - Manufacturer brochures and specification sheets for commercially available equipment
    - Comments and input from stakeholders
- All technology options are described in chapter 3 of the preliminary TSD

Technology Options for Automatic Commercial Ice Makers

Technology Options		Batch Ice Makers	Continuous Ice Makers	Notes
Compressor	Improved compressor efficiency	√	√	
	Part-load operation	√	√	
Condenser	Increased surface area	√	√	
	Enhanced fin surfaces	√	√	Air-cooled only
	Increased air flow	√	√	Air-cooled only
	Increased water flow	√	√	Water-cooled only
	Brazed plate condenser	√	√	Water-cooled only
Fans and Fan Motor	Higher efficiency condenser fans and fan motors	√	√	Air-cooled only
Other Motors	Improved auger motor efficiency		√	
	Improved pump motor efficiency	√		
Evaporator	Increased surface area	√	√	
	Design options which reduce energy loss due to evaporator thermal cycling	√		
	Design options which reduce harvest meltage or reduce harvest time	√		
Insulation	Improved or thicker insulation	√	√	
Refrigeration Line	Larger diameter suction line	√	√	Primarily remote compressor equipment
Potable Water	Reduced potable water flow	√		
	Drain water thermal exchange	√		

Item B: Technologies

DOE asks interested parties to comment on other technologies that DOE should consider.

Screening Analysis

- Purpose
  - To determine technology options considered in downstream analyses by screening out options if they
    - Are not technologically feasible
    - Are not practicable to manufacture, install, and service
    - Have adverse impacts on equipment utility or availability to customers
    - Have adverse impacts on health or safety
- DOE also removed from consideration technologies that do not affect calculated energy consumption as measured by the DOE test procedure
- The methodology and results are presented in detail in chapter 4 of the preliminary TSD

Technologies Removed from Consideration

Design Option	EPCA Criteria for Screening Out				Not Considered in the Analysis for Other Reasons		
	Technological Feasibility	Practicability to Manufacture, Install, and Service	Adverse Impacts on Product Utility	Adverse Impacts on Health and Safety	No Energy Savings or Savings not Measurable	Test Procedure Efficiency Metric does not capture Savings	Proprietary Technology
Compressor Part Load Operation	√					√	
Increased Surface Area for Water-Cooled Condensers in Batch Ice Makers			√		√		
Enhanced Fin Surfaces					√		
Increased Condenser Water Flow			√				
Brazed Plate Condenser					√		
Increased Evaporator Surface Area (Batch Ice Makers)			√				
Technology Options to Reduce Evaporator Thermal Cycling							√
Technology Options Which Reduce Harvest Meltage or Reduce Harvest Time					√		
Improved or Thicker Insulation					√		
Larger Diameter Suction Line			√				
Reduced Potable Water Flow			√				
Drain Water Thermal Exchange			√				

Item 8: Proprietary Evaporator Designs

DOE requests information regarding the proprietary status of low-thermal-mass evaporator designs, such as the designs found in Hoshizaki batch ice makers. Specifically, DOE seeks input on which relevant patents are still active, and what other forms of intellectual property ownership might be associated with such designs. DOE also seeks input on whether proprietary status is the key reason that other manufacturers would not be able to adopt such designs.

Engineering Analysis

- Purpose
  - To establish cost-efficiency curves, or the relationship between the manufacturer production cost and energy consumption associated with each efficiency level in each equipment class

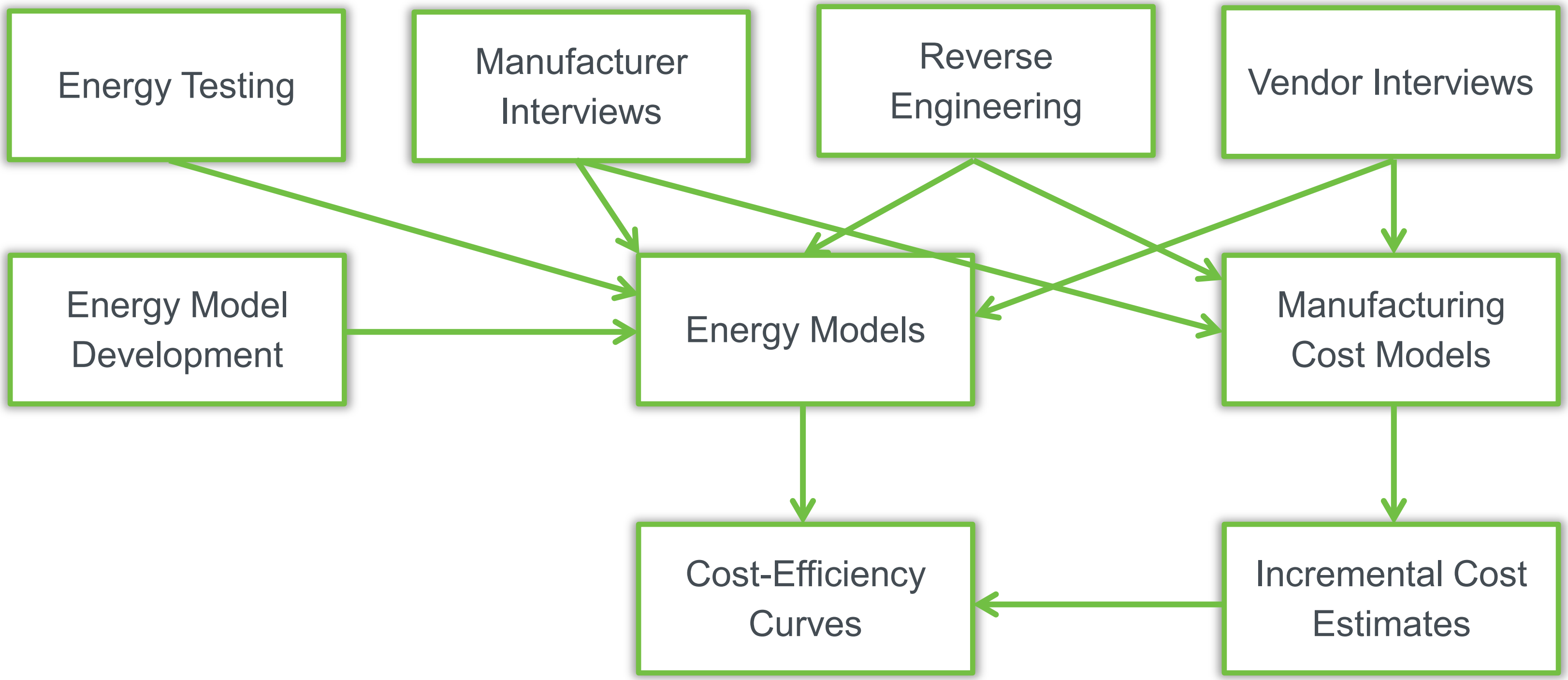
Engineering Analysis

- Methods
  - Conduct reverse engineering on equipment currently being sold in the market: 19 different ice makers belonging to 9 different equipment classes
  - Conduct energy testing per the DOE test procedure; tested 10 of the 19 ice makers
  - Determine the baseline configuration for each equipment class
  - Use results from reverse engineering and energy testing to develop and calibrate energy consumption models for automatic commercial ice makers
  - Determine the impacts of design options on efficiency and cost to develop the cost-efficiency curves
  - Extrapolate results to the full set of equipment classes
- The methodology and results are presented in detail in chapter 5 of the preliminary TSD

Engineering Approach

- DOE used a combined design-option/ efficiency-level/ manufacturing-cost approach to estimate the effect of implementing advanced technologies
  - For a baseline unit, DOE first calculated:
    - Energy consumption to produce 100 pounds of ice
    - Cost
  - DOE added advanced technologies to the baseline and calculated:
    - Reduction in energy consumption to produce 100 pounds of ice
    - Incremental cost
  - Finally, DOE sorted the technologies in order from most to least cost-effective and evaluated costs at preselected efficiency levels
- Result: Cost-Efficiency Curves, as described earlier

Flow Diagram of Engineering Analysis Methodology



Baseline Efficiency Levels

- Baseline Efficiency Levels for Batch Ice Makers
  - Currently covered ice makers: equal to current DOE standards
  - Harvest capacity 2,500 to 4,000 lb/day: constant energy use at current DOE standard level for harvest capacity of 2,500 lb/day

Baseline Efficiency Levels, Continued

- Baseline Efficiency Levels for Continuous Ice Makers
  - Energy use with ice hardness adjustment consistent with the test procedure
  - Harvest capacity "break points" consistent with CEE Tier 2 criteria
    - 1,000 lb/day for IMH and RCU equipment
    - 175 lb/day for SCU equipment (both air- and water-cooled)
  - Baseline energy use levels selected that are met by nearly all products
  - Evaluation based on available energy use data (as of June 2011) and assumptions of ice hardness: 70% for flake; 85% for nugget
  - No distinction within the RCU class based on compressor location
  - Efficiency level equations are presented in chapter 5 of the TSD, and they are plotted with ice maker data in chapter 3

Market/Technology, Screening & Engineering Analysis

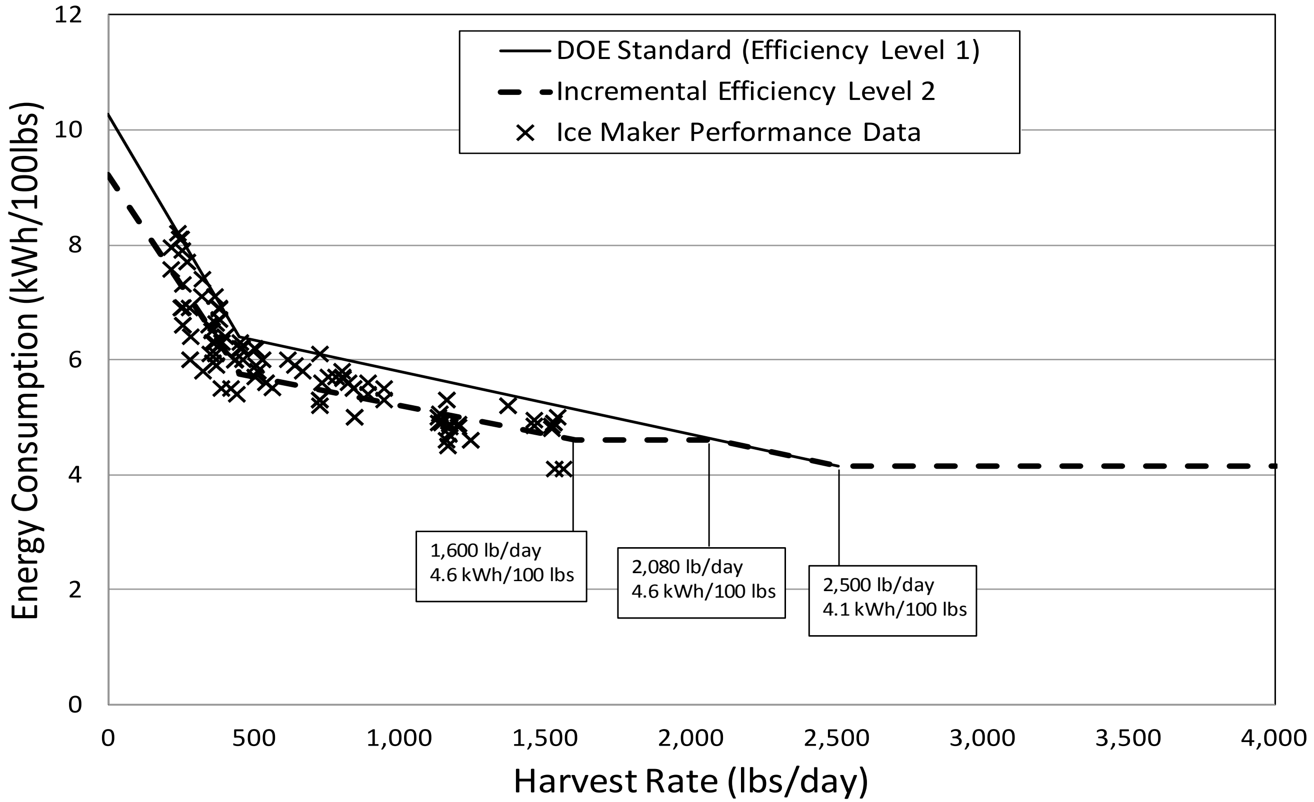
Incremental Efficiency Levels (EL, % energy use less than baseline) for Batch Machines

Designation*	Harvest Capacity Range (lb/day)	EL2	EL3	EL4	EL5	EL6	Max. Tech	Max. Available
IMH-W-Small-B	< 500	10%					14%	25%
IMH-W-Med-B	≥ 500 and < 1,436	10%					10%	22%
IMH-W-Large-B	≥ 1,436	10%	15%				11%	23%
IMH-A-Small-B	< 450	10% (E-STAR)	15%	20%			20%	24%
IMH-A-Large-B	≥ 450 and < 1,600	10% (E-STAR)	15%	20%			20%	21%
IMH-A-E-B**	≥ 1,600	10% (E-STAR)	15%	20%			N/A	N/A
RCU-NRC-Small-B	< 1,000	9% (E-STAR)	15%				16.5%	20%
RCU-NRC-Large-B	≥ 1,000	9% (E-STAR)	15%				16.5%	27%
RCU-RC-Small-B	< 934	9% (E-STAR)	15%					12%
RCU-RC-Large-B	≥ 934	9% (E-STAR)	15%					15%
SCU-W-Small-B	< 200	7%	15%	20%			24%	25%
SCU-W-Large-B	≥ 200	7%	15%	20%	25%	30%	39%	28%***
SCU-A-Small-B	< 175	7% (E-STAR)	15%	20%	25%		28%	32%
SCU-A-Large-B	≥ 175	7% (E-STAR)	15%	20%	25%		25%	31%

*ENERGY STAR and CEE labels apply to air-cooled cube machines at the efficiency levels indicated.
** See additional detail on the following slide.
*** This is the max available for “undercounter” self-contained equipment.

Incremental Efficiency Levels

Suggested efficiency levels for IMH-A-Extended-B ice makers have constant energy use above harvest capacities of 1,600 lb/day and 2,500 lb/day, with non-constant intermediate level energy use to avoid backsliding.



Item 5: Remote Condensing Unit Equipment Classes

The current DOE standards for RCU cube ice makers include different energy use levels for equipment with remote compressors and equipment without remote compressors. DOE's initial analysis of the energy use impact of the remote compressor suggests that the 0.2 kWh/100 pounds of ice differential for large-capacity remote compressor ice makers is appropriate (see the discussion on this topic in chapter 5 of the preliminary TSD). DOE requests comment on this analysis and on DOE's intent to maintain separate equipment classes for large-capacity RCU equipment (either batch or continuous) using this same differential. DOE requests data and information showing that this, or an alternative energy use differential, is appropriate.

Item 6: Large Batch Ice Maker Efficiency Levels

DOE requests comment on the following approaches for development of energy standards for large-capacity batch ice makers in the harvest capacity range from 2,500 to 4,000 lb/24 hours.

- For batch ice makers for which the current standard in the highest harvest capacity range is a flat standard that is not dependent on harvest capacity, extend the harvest capacity range up to 4,000 lb/24 hours. DOE is considering setting a standard for the extended range that is equal to the future standard selected for equipment in the current highest-capacity equipment class. This applies to batch ice makers of types IMH-W, RCU, and SCU.
- For batch ice makers of type IMH-A, DOE is considering setting standards based on the modified interim efficiency level description for this harvest capacity range discussed in chapter 5 of the preliminary TSD and illustrated in a previous slide.

Incremental Efficiency Levels (EL , % energy use less than baseline) for Continuous Machines

Designation*	Harvest Capacity Range (lb/day)	EL2	EL3	EL4	EL5	EL6	Max. Tech	Max. Available
IMH-W-Small-C	< 1,000	10%	15%	20%	25%	30%	33%	35%
IMH-W-Large-C	≥ 1,000	10%	15%	20%			24%	20%
IMH-A-Small-C	< 1,000	10%	15%	20%	25%	30%	42%	37%
IMH-A-Large-C	≥ 1,000	10%	15%	20%	25%	30%	35%	32%
RCU-Small-C	< 1,000	Batch Baseline	10% less than EL2				16.5%	26%
RCU-Large-C	≥ 1,000	7%	17%				16.5%	42%
SCU-W-Small-C	< 175	20% less than batch baseline	25% less than batch baseline	30% less than batch baseline			N/A	N/A
SCU-W-Large-C	≥ 175	3%	10%	16%			18%	15%
SCU-A-Small-C	< 175	7%	15%				18%	11%
SCU-A-Large-C	≥ 175	7%	15%	20%	25%	30%	36%	39%

*ENERGY STAR and CEE labels apply to air-cooled cube machines at the efficiency levels indicated.

Item 4: Efficiency Levels

DOE requests comment on the suggested efficiency levels to be used in the analysis for all of the equipment classes. DOE requests comment on the baseline efficiency levels for continuous ice machines. DOE also requests comment on using the EPACT 2005 standards for cube type equipment as the baseline for all batch equipment. In addition, DOE requests comment on the interim efficiency levels and maximum technology levels for all analyzed equipment classes.

Design Options by Equipment Class

Ice Maker Type	Equipment Class	Compressor Upgrade	Condenser Fan Motors	Pump Motors	Auger Motors	Air-Cooled Condensers	Harvest Assist	Batch Fill
Batch	IMH-W-***-B	✓		✓			*	*
	IMH-A-***-B	✓	✓	✓		✓		
	RCU-***-***-B	✓	✓	✓		✓		
	SCU-W-***-B	✓		✓				
	SCU-A-***-B	✓	✓	✓		✓		
Continuous	IMH-W-***-C	✓			✓			
	IMH-A-***-C	✓	✓		✓	✓		
	RCU-***-***-C	✓	✓		✓	✓		
	SCU-W-***-C	✓			✓			
	SCU-A-***-C	✓	✓		✓	✓		

*Used in a few limited cases where this design option was applicable.

Item 1: Ice Maker Size

Ice maker efficiency could be improved in some cases by increasing the size of heat exchangers (condensers and/or evaporators). Other design options also may require more space within a given ice maker, including some compressor replacements and consideration of drain water heat exchangers. DOE did not consider design options that increase package size in the preliminary analysis, because of the limited space available in many applications for larger products, and because of the importance of the replacement market, for which space restrictions may be dictated by the size of the replaced equipment. This restriction did not extend to remote condensing units, for which end users are expected to have greater flexibility for fitting larger designs. DOE requests comment on whether ice maker package size increase should be considered in this rulemaking. If so, DOE requests comment on how to select reasonable maximum sizes for ice makers in the analysis.

Item 2: Potable Water Use Minimum for Batch Ice Makers

Batch ice maker efficiency is affected by potable water use. However, interested parties have pointed out that very low potable water use increases scaling of wet surfaces in the ice maker, leading to increased maintenance costs and potentially higher energy use in the field. To help DOE determine whether practical energy conservation opportunities associated with potable water use reduction exist, DOE requests input on what levels of potable water use can be considered reasonable minimums for consideration in the analysis, whether the minimums depend on equipment class, and, if so, what this relationship is.

Increase of Condenser Water Use

- Maximum allowable condenser water use is prescribed for currently-covered water-cooled ice makers
- Condenser water use is currently not regulated for continuous ice makers and batch ice makers with harvest capacity above 2,500 lb/24 hours
- Increasing condenser water use could save energy
- DOE will consider increase of condenser water use for all ice makers addressed by this rulemaking
  - Potential increase of maximum allowable condenser water use in currently-covered ice makers
  - DOE may use this approach to set condenser water use levels for ice makers that are not yet covered
  - New levels must be cost-effective, including water use

Increase of Condenser Water Use, Continued

- DOE plans to develop new condenser water use levels by considering the cost-effective balance of energy and water costs in the engineering analysis
  - Calculate average life-cycle cost (LCC) using representative values for water cost, electricity cost, discount rate, and equipment life
  - Consider increase of condenser water use at a given efficiency level if it is more cost effective (based on average LCC) than the remaining alternative design options
  - Consistent with the LCC approach, the analysis will assume all water-cooled ice makers are installed in open loop (or single-pass) configuration.
- This approach avoids development of multiple cost-efficiency curves for multiple condenser water flows, and selection of the most cost-effective condenser water flow in the downstream analysis

Item 9: Balance of Condenser Water Use and Energy Use in the Analyses

DOE requests comment on its suggested approach to include consideration of condenser water use increase as a design option in the analysis (see chapter 2 of the preliminary TSD). This approach uses estimates of LCC in the engineering analysis to evaluate the cost effectiveness of design options that affect both energy and water use. DOE also requests comment on its intent to use such an approach to develop condenser water use standards for continuous ice machines.

Manufacturer Markup

- Manufacturer selling price is the output of the engineering analysis
  – A manufacturer markup of 1.25 was applied to arrive at manufacturer selling price.

Manufacturer Production Cost (MPC) × **Manufacturer Markup** = **Manufacturer Selling Price (MSP)**

Manufacturer Production Cost (MPC):

- **Direct material**
- **Direct labor**
- **Factory overhead**
- **Depreciation**

Manufacturer Markup:

- **Sales & marketing**
- **Research & development**
- **Shipping paid by manufacturer**
- **Interest**
- **Profit**

Item 7: Manufacturer Markups

DOE requests comment on whether the proposed markup factor of 1.25 to mark up between MPC and MSP is appropriate, too high, or too low.

Cost-Efficiency Curve Results: Incremental MPC Results for Batch Ice Makers

Equipment Class	Max Available	Representative Harvest Capacity *lb/24 hours*	EL2**	EL3	EL4	EL5	EL6	Max Tech	
								Level	**Cost**
IMH-W-*-B**			**10%**	**15%**	**20%**				
Small	25%	300	$32					14%	$38
Medium	22%	850	$25					10%	$25
Large	23%	1,500	$12					11%	$18
	8%	2,600						3%	$12
IMH-A-*-B**			**10%**	**15%**	**20%**				
Small	24%	300	$10	$24	$55			20%	$55
Large	21%	800	$10	$29	$126			20%	$126
		1,500	$12	$90				15%	$90
RCU-*-***-B**			**9%**	**15%**	**20%**	**25%**			
Small	20%	700	$12	$50				16.5%	$68
Large	40%	1,500	$16	$81				16.5%	$103
	27%	2,400	$147					14%	$204
SCU-W-*-B**			**7%**	**15%**	**20%**	**25%**	**30%**		
Small	25%	110	$10	$27	$41			24%	$55
Large	28%	300	$10	$20	$27	$34	$43	39%	$67
SCU-A-*-B**			**7%**	**15%**	**20%**	**25%**	**30%**		
Small	32%	110	$10	$31	$45	$56		28%	$62
Large	31%	200	$17	$35	$46	$60		25%	$60

** EL = efficiency level; EL1 is the baseline efficiency level while EL2 through EL6 represent increased efficiency levels.

Cost-Efficiency Curve Results: Incremental MPC Results for Continuous Ice Makers

Equipment Class	Max Available	Representative Harvest Capacity *lb/24 hours*	EL2**	EL3	EL4	EL5	EL6	Max Tech	
								Level	Cost
IMH-W-*-C**			**10%**	**15%**	**20%**	**25%**	**30%**		
Small	35%	800	$5	$12	$20	$27	$78	33%	$78
Large	20%	1,000	$16	$24	$38			24%	$75
		1,800	$18	$28	$50			24%	$125
IMH-A-*-C**			**10%**	**15%**	**20%**	**25%**	**30%**		
Small	37%	310	$21	$35	$49	$63	$162	30%	$162
		820	$10	$20	$28	$36	$44	42%	$138
Medium	32%	1,000	$18	$25	$33	$41	$94	35%	$136
		1,800	$25	$34	$43	$52	$126	35%	$216
RCU-*-***-C**			**Batch Std. (7%)**	**EL2 -10% (17%)**	**EL2 -15% (22%)**	**EL2 -20% (26%)**	**EL2 -25% (30%)**		
Small	26%	700	$9	$68				16.5%	$68
Large	42%	1,500	$10	$103				16.5%	$103
SCU-W-*-C**			**Batch Std. -20% (3%)**	**Batch Std. -25% (10%)**	**Batch Std. -30% (16%)**				
Small	NA*								
Large	15%	300	$4	$12	$20			18%	$22
SCU-A-*-C**			**7%**	**15%**	**20%**	**25%**	**30%**		
Small	11%	110	$24	$46				18%	$51
Large	39%	300	$-	$17	$30	$46	$62	36%	$162
		670	$-	$37	$65	$98	$135	36%	$335

*No products of this equipment class were identified in product databases. ** EL = efficiency level; EL1 is the baseline efficiency level while EL2 through EL6 represent increased efficiency levels.

Public Meeting Agenda

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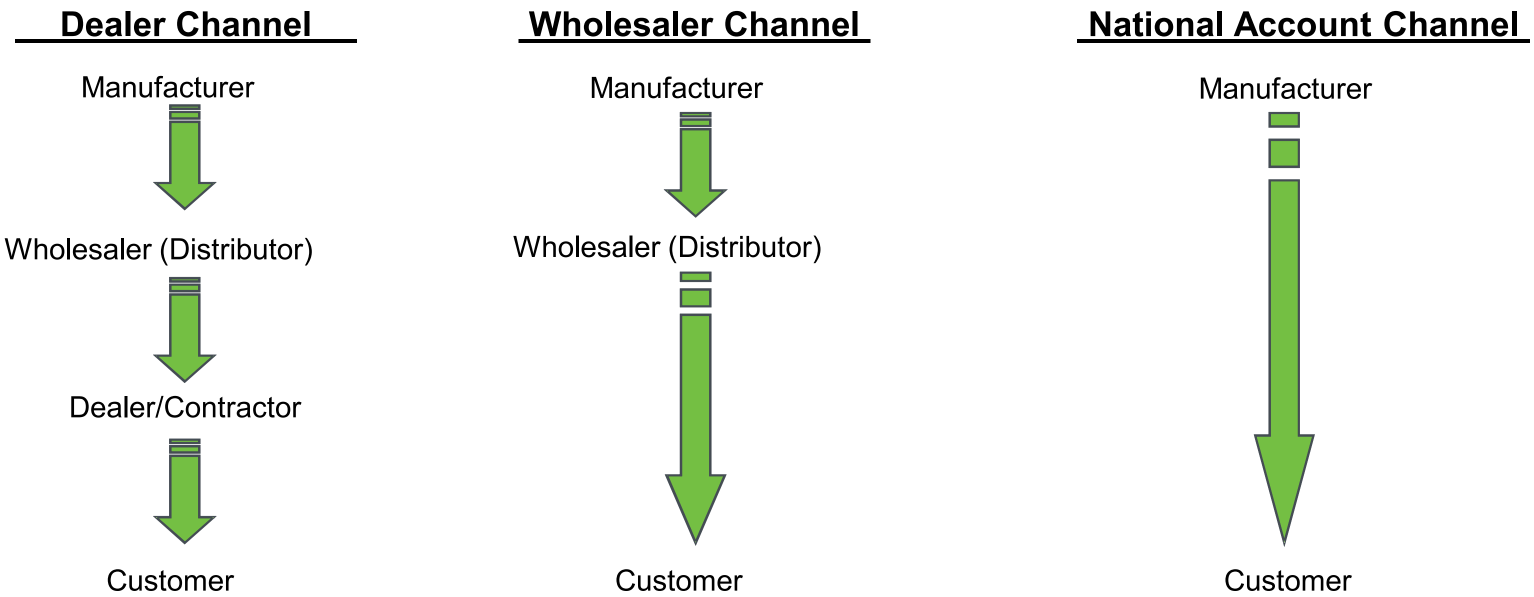
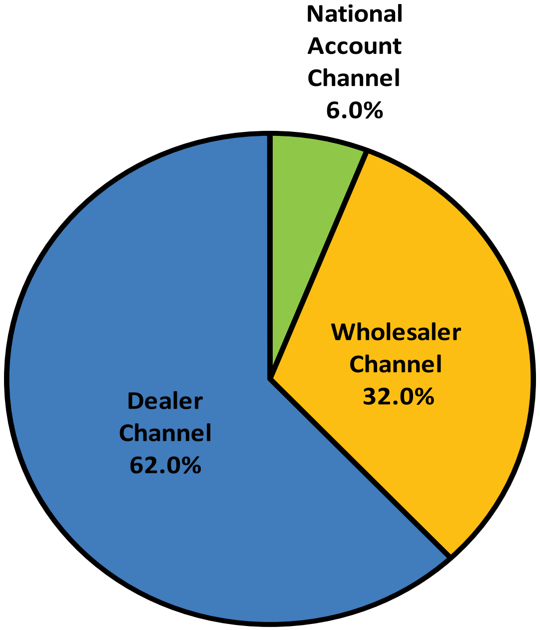
1	Overview & Test Procedure Final Rule
2	Market/Technology, Screening & Engineering Analysis
3	**Markups, Energy Use, Life-Cycle & Payback Analysis**
4	Shipments Analysis & National Impact Analysis
5	Manufacturer Impact Analysis
6	Notice Of Proposed Rulemaking Analyses
7	Closing Remarks

Markups Analysis

- Purpose
  - Determine the baseline and incremental price markups for translating manufacturers sales price into customer prices
  - Determine the market share weighting factor of each distribution channel

Distribution Channels





Distribution Channel Weighting Factors

Source: U.S. Census Bureau, 2007 Economic Survey

Item 11(a): Markup Assumptions

DOE requests interested parties' comments on the share values for the three major distribution channels through which commercial ice-making equipment is purchased by the end user.

Markups Inputs

- Industry balance sheets from Heating, Air-conditioning & Refrigeration Distributors International (HARDI) for wholesalers profit data
- U.S. Census Bureau data for mechanical contractor profit data

Markups Methodology

- Contractor and wholesaler expenses and markups:
  - Cost of goods sold
  - Labor expenses (salaries and benefits)
  - Occupancy expenses (rent, maintenance, utilities)
  - Other operating expenses (depreciation, advertising, insurance)
  - Profit
- Express expenses and profit in terms of per dollar cost of goods sold and sum up the resulting numbers to obtain a baseline markup
- Assumption for incremental markups: labor and operating expenses are fixed, and other operating expenses and profit scale with manufacturer selling price (cost of goods sold)
- National account markup is assumed to be half of the wholesaler markup

Preliminary Weighted-Average Markups (Baseline / Incremental)				
	Wholesaler	Dealer (Includes Wholesaler)	National Account	Overall Weighted Average Markup, All ACIM Equipment
Distribution Channel Markup	1.36/1.09	2.01/1.30	1.18/1.05	1.75/1.21
Markup (Incl. Sales Tax)	1.46/1.17	2.15/1.39	1.27/1.12	1.88/1.30

Sales Tax Multiplier	1.07

Item 11(b): Markup Data Sources

DOE also requests additional data or data sources to use to characterize the costs of the local contractor or dealer segment of the dealer/contractor channel.

Energy Use Analysis

- Purpose
  - To determine the energy use of automatic commercial ice makers in real-world conditions
- Automatic commercial ice makers also use water, so the energy use analysis was expanded to include water analysis
- DOE analysis based on test procedure in combination with energy consumption model presented in the engineering discussion
- Engineering analysis estimates energy and water usage per 100 lb/24 hours; subsequent DOE analyses require kilowatt-hour usage and gallons of water used per year
- DOE assumed the equipment runs at 50 percent of capacity (or half of the time)
- DOE assumed condenser water is used in single-pass (open loop) installations

Item 13: Utilization Factors

DOE seeks information on utilization factors or potential data sources that can be used to improve upon the current assumption of 50-percent utilization factors.

Item 14: Single-Pass Configuration

DOE requests comment on the modeling of condenser water usage assuming all ice makers are installed in a single-pass configuration.

LCC and PBP Analysis Purpose

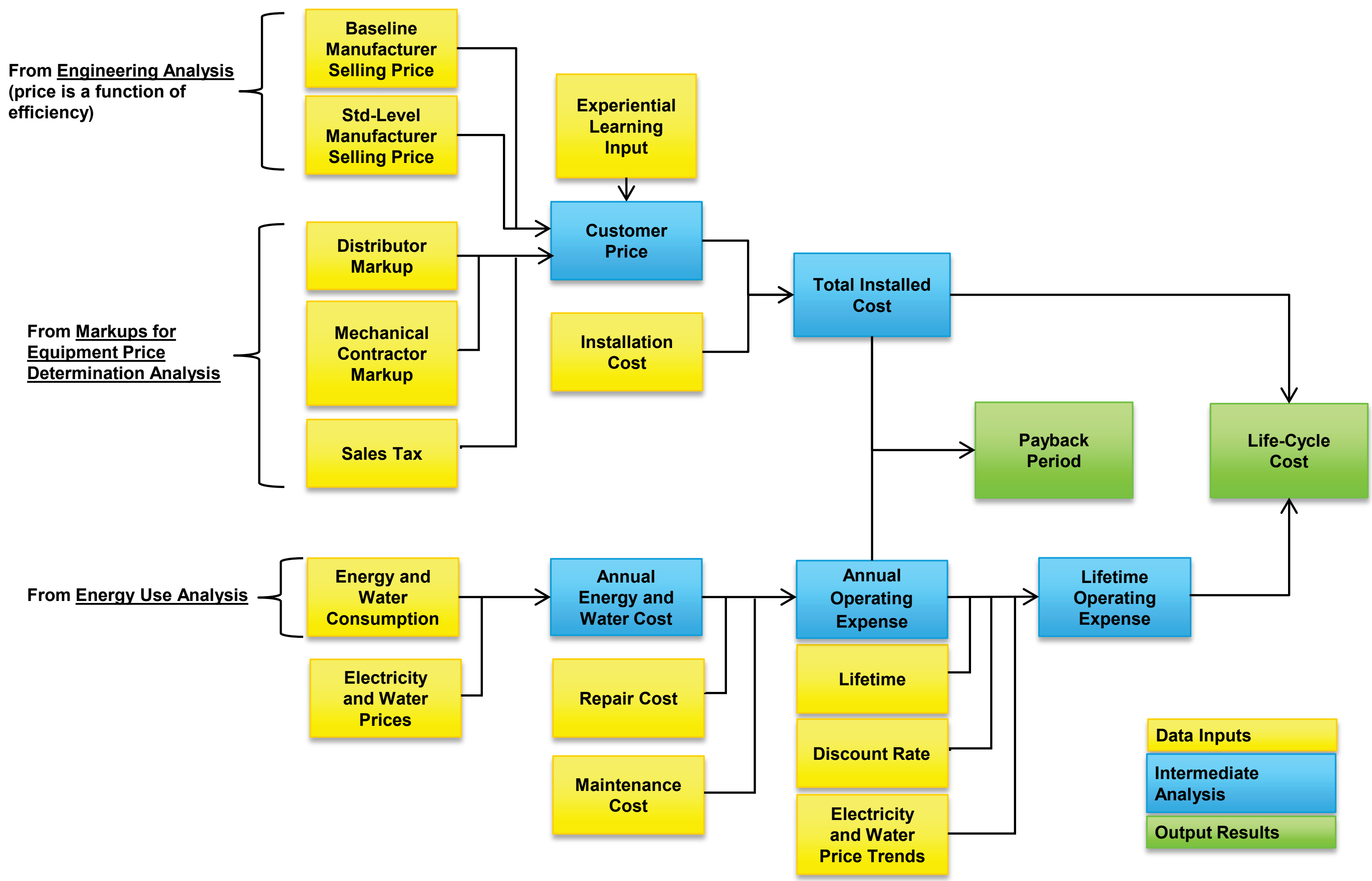
- Estimate financial impacts on individual (commercial) customers by calculating
  - Life-cycle cost savings
  - Payback period

LCC and PBP Analysis Methodology

- Life-cycle cost: Equipment-installed price + operating costs over the equipment lifetime
  - LCC savings: Base-case LCC minus standards-case LCC
- Payback period: Equipment-incremental installed price / first-year operating cost savings
- LCC is discounted; PBP is not discounted ("simple" PBP)

Markups, Energy Use, Life-Cycle & Payback Analysis

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy



Experiential (Price) Learning

- Experiential learning was introduced to capture historically observed decreases in MSP
- Theory is that as manufacturers produce ever increasing numbers of units, production costs decline as manufacturers find better production methods
- For the LCC and PBP analysis, MSP was adjusted from the current year to the year when the standards take effect (approximately 1.7 percent decline)
- See Appendix 8C and DOE Notice of Data Availability published on February 22, 2011 (76 FR 9696)

Item 12: Experiential (Price) Learning
DOE seeks comment about the use of experiential learning to adjust MSP for expected future price changes.

Efficiency Levels – Effect of Current Standards

- Standards set by EPACT 2005 went into effect on January 1, 2010
- For most batch equipment between 50 and 2,500 lb/24 hours, EPACT 2005 standards define the baseline efficiency levels
- For continuous machines and for batch machines not covered by EPACT 2005 standards, estimated current market baseline efficiency levels were obtained from the engineering analysis.

Item C: Baseline Efficiency Levels
DOE seeks comments on the methodology used to determine baseline efficiency levels for the preliminary analysis.

Electricity and Water Prices

- Current electricity prices based on Energy Information Agency (EIA) Form 861 data - specific to state and sector
- Growth rates based on EIA's Annual Energy Outlook (AEO 2011) - specific to sector and region of the country
- Both will be updated for the NOPR analysis
- Energy prices extended to building type using Commercial Building Energy Consumption Survey (CBECS) data
  - Time-of-use pricing or marginal pricing were not used
- Current water and wastewater prices based on American Water Works Association rate survey
  - Specific to state and sector
- Water and wastewater price growth based on consumer price index (CPI) for water utility costs

Markups, Energy Use, Life-Cycle & Payback Analysis

- Installation costs
  - Estimated as a fixed percentage of the base (level 1) MSP
  - Average: $859 for remote condensing, $404 for SCU and $649 for IMH
  - Varied by state based on a state-level index developed using RS Means data
- Annual Repair costs
  - Estimated as a fixed percentage of the base (level 1) customer equipment cost
  - Average: $258 per year for remote condensing, $121 per year for SCU and $195 per year for IMH
  - Varied by equipment class; did not increase with efficiency levels
- Annual Maintenance costs
  - Preventative maintenance: estimated as a percentage of the base (level 1) customer equipment cost
  - Average: $258 per year for remote condensing, $121 per year for SCU and $195 per year for IMH
  - Varied by equipment class; did not increase with efficiency levels

Item 16: Installation, Maintenance and Repair Costs

Installation Cost: DOE assumes that higher efficiency equipment would not incur any additional installation costs when compared to the baseline equipment. DOE requests interested parties' comments about this assumption and specific information, if appropriate, for DOE to consider in this approach.

Maintenance Cost: DOE assumes that manufacturers prescribe routine annual or bi-annual preventative maintenance procedures for commercial ice-making equipment. DOE requests input from interested parties on maintenance costs, and the relationship between maintenance costs and the type and size of equipment.

Repair Cost: DOE is currently modeling the repair cost for equipment as a simple percentage of the baseline selling price of the equipment. DOE requests comment on this approach and specific information, if appropriate, for DOE to reconsider this approach.

General: The technology options under consideration for the rulemaking are presented in chapter 5 of the preliminary TSD. DOE requests input from interested parties concerning the effect that these technology options have on the installation, maintenance, and repair costs.

Discount Rates

- Based on weighted average cost of capital
- Different rates by establishment type: Lodging, Health Care, Food Sales, Food Service, Retail, Education, and Office

Equipment Lifetime

- Lifetime - average lifetime of 8.5 years was used for all equipment
  - Modeled as a distribution, from 4 to 12 years, averaging 8.5 years through the probability of selection

Uncertainties in Input Values

- Used Monte Carlo analyses to vary key inputs
  - State, which changes
    - Installation costs
    - Markups
    - Electricity costs
  - Building type, which changes
    - Discount rate
    - Electricity cost
  - Equipment lifetimes (Weibull survival functions)
  - Base-case efficiency level distribution

Item 15: LCC/Payback Assumptions and Uncertainty Analysis
DOE welcomes input from interested parties on these assumptions.

Summary of LCC and PBP analysis results for all the efficiency levels for the IMH, Air-cooled, Small, Batch Equipment Class

Efficiency Level Number	Efficiency Level *kWh/yr*	Life-Cycle Cost, All Customers			Life-Cycle Cost Savings				Payback Period, Median *years*
		Installed Cost *2010$*	Total Discounted Operating Cost *2010$*	LCC, All Customers *2010$*	Affected Customers' Average Savings *2010$*	% of Customers that Experience			
						Net Cost *%*	No Impact *%*	Net Benefit *%*	
1	5,639	4,222	6,216	10,438	0	NA	NA	NA	NA
2	5,078	4,238	5,829	10,067	372	0	41	59	0.33
3	4,797	4,261	5,636	9,896	462	0	24	76	0.52
4	4,516	4,310	5,442	9,752	524	0	8	92	0.90

Markups, Energy Use, Life-Cycle & Payback Analysis

Item D: LCC and Payback Period Analysis, General Comments

DOE seeks comments about the analyses, assumptions, and data sources. DOE welcomes suggestions for additional data sources for input assumptions.

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Shipments Analysis Purpose

- Estimate future stock and shipments of ACIM equipment by equipment class
- Estimate efficiency mix of stock over time

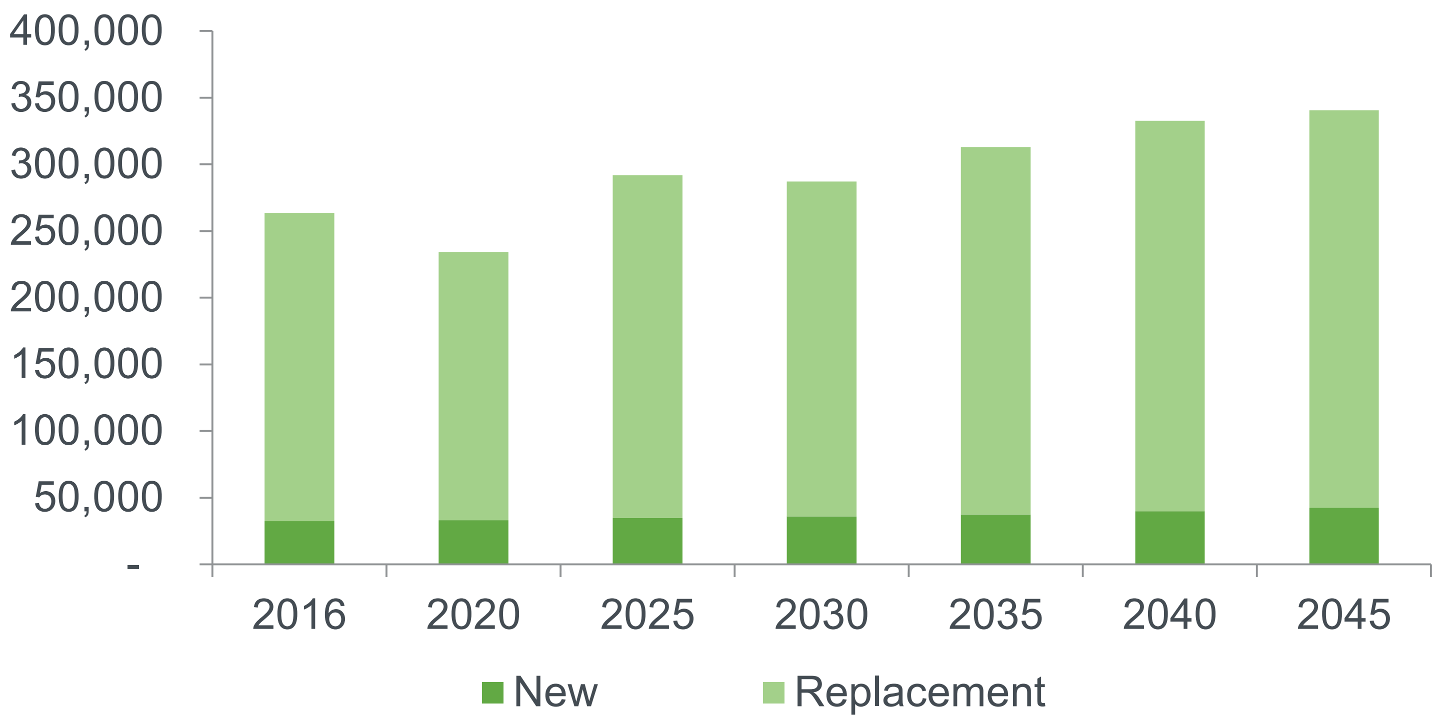
Shipments Analysis Methodology

- Future shipments are based on historical shipments and growth rates are based on commercial floor space construction forecast from Energy Information Agency's Annual Energy Outlook (AEO 2011)
- DOE estimated historical shipments data for the year 2010 using:
  - Shipments for 2010 submitted by AHRI for this rulemaking
  - U.S. Census Bureau Current Industrial Reports (CIR)
  - North American Association of Food Equipment Manufacturers' (NAFEM) 2010 report
- Equipment stock was estimated based on the 2010 shipments data

Percentage of shipments, by equipment classes, based on ratios developed from 2010 AHRI shipments data

Equipment Class	Percentage of Shipments	Equipment Class	Percentage of Shipments
IMH-W-Small-B	4.5%	IMH-W-Small-C	0.8%
IMH-W- Med -B	2.9%	IMH-W-Large-C	0.1%
IMH-W-Large-B	0.5%	IMH-A-Small-C	4.4%
IMH-A-Small-B	27.1%	IMH-A-Large-C	0.2%
IMH-A-Large-B	16.1%	RCU-Small-C	1.2%
RCU-Small-B	5.4%	RCU-Large-C	0.5%
RCU-Large-B	6.1%	SCU-W-Small-C	0.0%
SCU-W-Small-B	0.7%	SCU-W-Large-C	0.1%
SCU-W-Large-B	0.2%	SCU-A-Small-C	4.6%
SCU-A-Small-B	13.9%	SCU-A-Large-C	4.1%
SCU-A-Large-B	6.6%		

Annual Shipments for Selected Years



- Total cumulative shipments of 8,818,414 throughout the analysis period
- Total stock in 2016 was estimated as 1.75 million units

National Impact Analysis Purpose

- To assess the impacts at the national level at each efficiency level as measured by
  - National Energy Savings (NES)
  - Net Present Value (NPV) of total customer economic impacts

National Impact Analysis Method

- For each year, for both the base case and standards cases, DOE calculates:
  - National energy consumption (energy use per unit multiplied by total stock)
  - Total customer expenditures on automatic commercial ice makers:
    - National equipment expenditures
    - National operation and maintenance costs
- Difference between base case and standards cases in each year gives NES and NPV of customer economic impacts.
- Dollar values are discounted

National Impact Analysis: Key Inputs from Upstream Analyses

- Stock and shipments (Shipments Analysis)
  - NIA distributes shipments across efficiency levels based on analyses of model availability
  - For standards cases, efficiency distributions for standards cases based on roll-up scenarios
- Additional cost/energy use inputs (LCC and PBP Analysis)
  - Annual electricity costs per ACIM unit
  - Installed cost per unit
  - Annual operating and maintenance costs other than energy costs per unit, including water and wastewater costs
- Experiential learning factors were applied to equipment costs in each year of the analysis

National Impact Analysis: Other Inputs

- Discount Factor
  - Used 7 percent and 3 percent real discount rates from the Office of Management and Budget's Regulatory Analysis Guideline A-4
  - Future expenses are discounted to present year (2011)
- Electricity Site-to-Source Conversion Factors
  - Used to convert on-site energy consumption to primary (or source) energy generation
  - The preliminary analysis used a factor developed for the 2009 Commercial Refrigeration Equipment Rulemaking using the EIA's National Energy Modeling System (NEMS)
  - For NOPR, a new analysis will be performed using NEMS

Equipment Class	National Energy Savings by Standard Level quadrillion British thermal units (quads)					
	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
IMH-W-Small-B	0.006	0.010				
IMH-W- Med -B	0.011					
IMH-W-Large-B	0.003	0.003				
IMH-A-Small-B	0.057	0.094	0.139			
IMH-A-Large-B	0.066	0.109	0.155			
RCU-Small-B	0.020	0.040	0.045			
RCU-Large-B	0.027	0.052	0.059			
SCU-W-Small-B	0.000	0.001	0.001	0.002		
SCU-W-Large-B	0.000	0.000	0.000	0.001	0.001	
SCU-A-Small-B	0.007	0.028	0.040	0.053	0.062	
SCU-A-Large-B	0.003	0.013	0.019	0.025		
IMH-W-Small-C	0.000	0.000	0.000	0.001	0.004	
IMH-W-Large-C	0.000	0.000	0.000	0.000		
IMH-A-Small-C	0.001	0.001	0.002	0.003	0.005	
IMH-A-Large-C	0.000	0.000	0.000	0.000	0.000	0.000
RCU-Small-C	0.000	0.001				
RCU-Large-C	0.000	0.001				
SCU-W-Small-C						
SCU-W-Large-C	0.000	0.000	0.000	0.000		
SCU-A-Small-C	0.000	0.000	0.000			
SCU-A-Large-C	0.000	0.000	0.000	0.000	0.001	0.004

Shipments Analysis & National Impact Analysis

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Equipment Class	Cumulative Net Present Value by Standard Level At 7% Discount Rate (Billions of 2010 Dollars)					
	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
IMH-W-Small-B	0.012	0.020				
IMH-W- Med -B	0.024					
IMH-W-Large-B	0.006	0.007				
IMH-A-Small-B	0.132	0.209	0.285			
IMH-A-Large-B	0.153	0.211	0.301			
RCU-Small-B	0.047	0.089	0.098			
RCU-Large-B	0.062	0.112	0.124			
SCU-W-Small-B	0.001	0.002	0.002	0.003		
SCU-W-Large-B	0.000	0.001	0.001	0.002	0.002	
SCU-A-Small-B	0.016	0.056	0.080	0.106	0.124	
SCU-A-Large-B	0.007	0.026	0.037	0.049		
IMH-W-Small-C	0.000	0.000	0.001	0.002	0.008	
IMH-W-Large-C	0.000	0.000	0.000	0.000		
IMH-A-Small-C	0.001	0.002	0.004	0.007	0.007	
IMH-A-Large-C	0.000	0.000	0.000	0.000	0.001	0.001
RCU-Small-C	0.000	0.002				
RCU-Large-C	0.000	0.001				
SCU-W-Small-C						
SCU-W-Large-C	0.000	0.000	0.000	0.000		
SCU-A-Small-C	0.000	0.000	0.000			
SCU-A-Large-C	0.000	0.000	0.000	0.001	0.002	(0.003)

Shipments Analysis & National Impact Analysis

Item 17: Shipments Data Differences

DOE seeks industry support in determining the differences between the historical shipment data provided by AHRI and data derived from the U.S. Census Bureau's Current Industrial Reports. The Census Bureau data consistently showed higher shipments of automatic commercial ice makers than the AHRI data over a 10-year historical period.

Item 18: Efficiency Distributions

DOE seeks industry support in determining whether the base-case equipment efficiency distribution correctly captures all equipment currently available for purchase by customers of ice-making equipment. DOE also seeks input about the impact of higher equipment purchase prices on shipments in standards cases.

Item E: Shipments/Equipment Stock Data Sources

DOE welcomes comments or suggestions on additional data sources related to equipment stocks and shipments.

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Overview

- The purpose of the Manufacturer Impact Analysis (MIA) is to identify the impacts of amended energy conservation standards on manufacturers.
- The key quantitative outputs of the MIA are the change in industry net present value (INPV) due to amended standards and the direct impact on manufacturing employment.

The MIA is conducted in three phases:

Manufacturer Impact Analysis

Overview: Phase 1

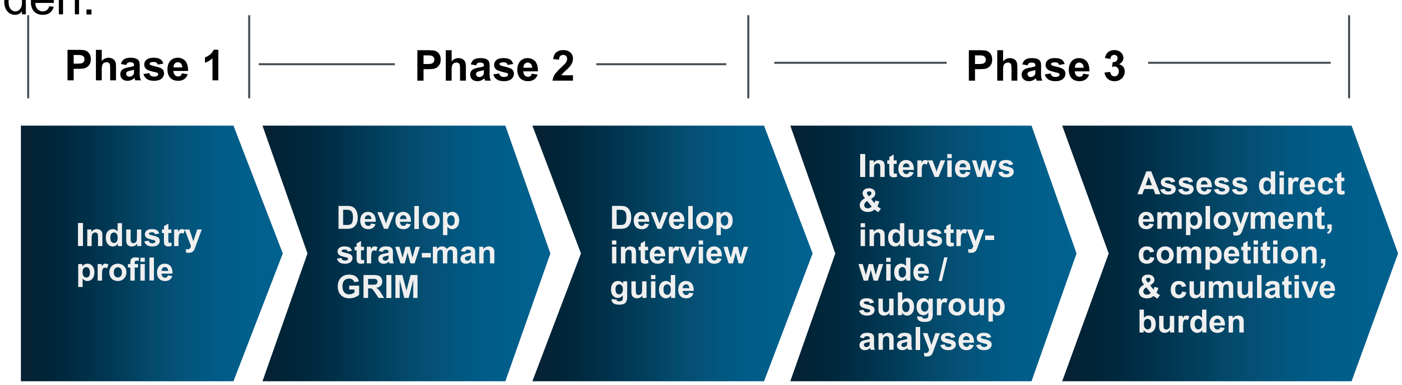
- DOE creates an industry profile to characterize the industry and identify important issues that require consideration.

Overview: Phase 2

- DOE prepares the Government Regulatory Impact Model (GRIM) as a framework for analyzing industry cash-flow and prepares an interview questionnaire to guide subsequent discussions and collect key data.

Overview: Phase 3

- DOE interviews manufacturers and assesses the impacts of amended standards both quantitatively (using the GRIM) and qualitatively, examining impacts on competition, manufacturing capacity, employment, and regulatory burden.



Key issues identified during the Preliminary MIA

- New energy standards for ice makers may not be cost-effective
- Separate equipment classes should be established for batch and continuous ice makers
- Amended standards should account for the varying hardness of ice produced by different continuous ice makers
- Higher product costs could prompt customers to purchase bagged ice as an alternative to purchasing ice makers
- Conversion costs
- Testing burden
- Potential customer impact
- Potential threat to domestic manufacturing jobs

Item 10: Manufacturer Impact

As part of the NOPR, DOE will seek further comments from manufacturers about their potential loss of market share, changes in the efficiency distribution of covered equipment within each industry, and the total change in equipment shipments at each energy conservation standard level, among other topics. DOE will then estimate the impacts on the industry quantitatively and qualitatively. DOE seeks further comment about the impact of standards on domestic manufacturers.

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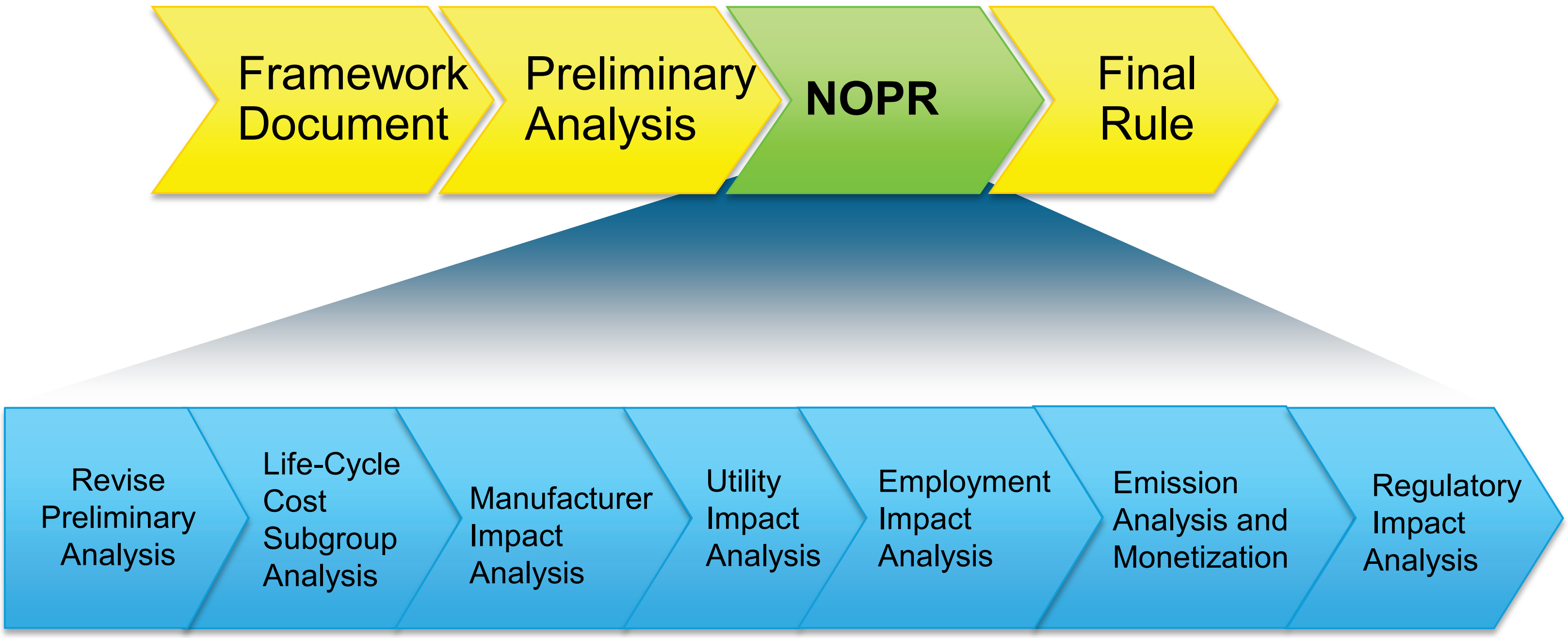
Notice Of Proposed Rulemaking Analyses



Notice Of Proposed Rulemaking Analyses

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

- LCC Subgroup Analysis (TSD chapter 11)
  - Effects on various national consumer subgroups
- Manufacturer Impact Analysis (TSD chapter 12)
  - Continue work begun in the preliminary MIA
- Utility Impact Analysis (TSD chapter 13)
  - Model effects on generation capacity of utilities using NEMS
- Employment Impact Analysis (TSD chapter 14)
  - Indirect effects on national employment
- Emissions Analysis and Monetization (TSD chapters 15 & 16)
  - Effects on airborne pollutant emissions
- Regulatory Impact Analysis (TSD chapter 17)
  - Potential for non-regulatory approaches

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Item 19: General Comments on Analyses or Assumptions

During each stage of the preliminary analysis, DOE made assumptions related to key parameters of the analytical process on the premises that the assumed parameters reflect the actual conditions that automatic commercial ice maker experiences. These assumptions are described in the respective TSD chapters. DOE welcomes comments on these assumptions.

Closing Remarks

DOE welcomes any closing remarks from interested parties.

Contact Information for Feedback

In all correspondence, please refer to the Automatic Commercial Ice Making (ACIM) Equipment Energy Conservation Standards rulemaking by:

- Automatic Commercial Ice Makers Rulemaking,
- Docket Number **EERE-2010-BT-STD-0037**, and
- Regulatory Identification Number (RIN) **1904-AC39**

Email: ACIM-2010-STD-0037@ee.doe.gov

Postal:

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Building Technologies Program, 6th Floor
950 L'Enfant Plaza, SW
Washington, DC 20024
Tel: 202-586-2945

➢**Comment period ends March 9, 2012**

Relevant Webpages

- **DOE Appliance Standards**
  - http://www1.eere.energy.gov/buildings/appliance_standards/
- **Automatic Commercial Ice Makers Rule**
  - http://www1.eere.energy.gov/buildings/appliance_standards/commercial/automatic_ice_making_equipment.html
- **Contact Charles Llenza, Project Manager, from the Appliance Standards Program for additional information:**
  - **Charles.Llenza@ee.doe.gov**
  - **202.586.2192**
- **Contact John Cymbalsky, Supervisor, from the Appliance Standards Program for additional information:**
  - **John.Cymbalsky@ee.doe.gov**
  - **202.287.1692**

Backup Slides

List of Requests for Comment

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Item 1 DOE requests comment on whether ice maker package size increase should be considered in this rulemaking. If so, DOE requests comment on how to select reasonable maximum sizes for ice makers in the analysis.

Item 2 DOE requests input on what levels of potable water use can be considered reasonable minimums for consideration in the analysis, whether the minimums depend on equipment class, and, if so, what this relationship is.

Item 3 DOE seeks comment regarding the suggested equipment classes as outlined in the executive summary and chapter 3 of the preliminary TSD.

Item 4 DOE requests comment on the suggested efficiency levels to be used in the analysis for all of the equipment classes. DOE requests comment on the baseline efficiency levels for continuous ice machines. DOE also requests comment on using the EPACT 2005 standards for cube type equipment as the baseline for all batch equipment. In addition, DOE requests comment on the interim efficiency levels and maximum technology levels for all analyzed equipment classes.

List of Requests for Comment (Cont.)

Item 5 DOE's initial, brief analysis of the energy use impact of the remote compressor suggests that the 0.2 kWh/100 pounds of ice differential for large-capacity remote compressor ice makers is appropriate (see chapter 5 of the preliminary TSD). DOE requests comment on this analysis and on DOE's intent to maintain separate equipment classes for large-capacity RCU equipment (either batch or continuous) using this same differential. DOE requests data and information showing that this, or an alternative energy use differential, is appropriate.

Item 6 DOE requests comment on its approaches for development of energy standards for large-capacity batch ice makers in the harvest capacity range from 2,500 to 4,000 lb/24 hours

Item 7 DOE requests comment on whether the proposed markup factor of 1.25 to mark up between MPC and MSP is appropriate, too high, or too low.

Item 8 DOE requests information regarding the proprietary status of low-thermal-mass evaporator designs, such as the designs found in Hoshizaki batch ice makers. Specifically, DOE seeks input on which relevant patents are still active, and what other forms of intellectual property ownership might be associated with such designs. DOE also seeks input on whether proprietary status is the key reason that other manufacturers would not be able to adopt such designs.

List of Requests for Comment (Cont.)

Item 9 DOE requests comment on its suggested approach to include consideration of condenser water use increase as a design option in the analysis (see chapter 2 of the preliminary TSD). This approach uses estimates of LCC in the engineering analysis to evaluate the cost effectiveness of design options that affect both energy and water use. DOE also requests comment on its intent to use such an approach to develop condenser water use standards for continuous ice machines.

Item 10 DOE seeks further comment about the impact of standards on domestic manufacturers. See chapter 12 of the preliminary TSD for more details.

Item 11 DOE requests interested parties' comments on the share values for the three major distribution channels through which commercial ice-making equipment is purchased by the end user. DOE also requests additional data or data sources to use to characterize the costs of the local contractor or dealer segment of the contractor channel.

Item 12 DOE seeks comment about the use of experiential learning to adjust MSP for expected future price changes.

List of Requests for Comment (Cont.)

Item 13 DOE seeks information on utilization factors or potential data sources that can be used to improve upon the current assumption of 50-percent utilization factors.

Item 14 DOE requests comment on the modeling of condenser water usage assuming all ice makers are installed in a single-pass configuration.

Item 15 Based on the data from available sources, DOE proposes to use an equipment lifetime value of 8.5 years for all equipment classes in all building types. DOE used Weibull survival functions to represent the equipment lifetime values in the LCC and PBP analysis and shipments analysis. DOE welcomes input from interested parties on these assumptions.

Item 16 DOE assumes that higher efficiency equipment would not incur any additional installation costs when compared to the baseline equipment. DOE requests interested parties' comments about this assumption and specific information, if appropriate, for DOE to consider in this approach.

With respect to maintenance cost, DOE assumes that manufacturers prescribe routine annual or bi-annual preventative maintenance procedures for commercial ice-making equipment. DOE requests input from interested parties on maintenance costs, and the relationship between maintenance costs and the type and size of equipment.

DOE is currently modeling the repair cost for equipment as a simple percentage of the baseline selling price of the equipment. DOE requests comment on this approach and specific information, if appropriate, for DOE to reconsider this approach.

The technology options under consideration for the rulemaking are presented in chapter 5 of the preliminary TSD. DOE requests input from interested parties concerning the effect that these technology options have on the installation, maintenance, and repair costs.

List of Requests for Comment (Cont.)

Item 17 DOE seeks industry support in determining the differences between the historical shipment data provided by AHRI and data derived from the U.S. Census Bureau's Current Industrial Reports. The Census Bureau data consistently showed higher shipments of automatic commercial ice makers than the AHRI data over a 10-year historical period.

Item 18 DOE seeks industry support in determining whether the base-case equipment efficiency distribution correctly captures all equipment currently available for purchase by customers of ice-making equipment. DOE also seeks input about the impact of higher equipment purchase prices on shipments in standards cases.

Item 19 During each stage of the preliminary analysis, DOE made assumptions related to key parameters of the analytical process on the premises that the assumed parameters reflect the actual conditions that automatic commercial ice maker experiences. These assumptions are described in the respective TSD chapters. DOE welcomes comments on these assumptions.

List of Requests for Comment (Cont.)

Item A: Equipment Classes

DOE would like to know if there are different types of equipment with significant annual shipments that do not fall under any of the equipment classes considered for the preliminary analysis.

Item B: Technologies

DOE asks interested parties to comment on other technologies that DOE should consider.

Item C: Baseline Efficiency Levels

DOE seeks comments on the methodology used to determine baseline efficiency levels for the preliminary analysis.

Item D: LCC and Payback Period Analysis, General Comments

DOE seeks comments about the analyses, assumptions, and data sources. DOE welcomes suggestions for additional data sources for input assumptions.

Item E: Shipments/Equipment Stock Data Sources

DOE welcomes comments or suggestions on additional data sources related to equipment stocks and shipments.