ENERGY STAR®
Residential Clothes Dryers

Draft 2 Version 1.0 Specification

Stakeholder Webinar
September 5, 2013
# Agenda

<table>
<thead>
<tr>
<th>Agenda Item</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction – Welcome/Goals, Overview of Specification Development</strong></td>
<td>Amanda Stevens, EPA</td>
</tr>
<tr>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>- Certification Criteria Changes</td>
<td></td>
</tr>
<tr>
<td>- Effective Date</td>
<td></td>
</tr>
<tr>
<td>- “Connected” Functionality</td>
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<tr>
<td></td>
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<tr>
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Webinar Goals

1. Highlight proposed changes in the Draft 2, Version 1.0 specification.
2. Solicit stakeholder feedback on outstanding issues/questions identified.
3. Address stakeholder questions about process and/or changes.
4. Discuss next steps and timeline.
Specifications Development

• EPA develops ENERGY STAR product specifications using a systematic process that relies on rigorous market, engineering and pollution savings analysis, and involvement from industry stakeholders.

• EPA uses a set of six key Guiding Principles
ENERGY STAR Guiding Principles

1. Significant energy savings
2. Product performance maintained or enhanced
3. Purchasers can recover investment in increased efficiency within a reasonable time period
4. Efficiency achieved through one or more technologies; qualifying products offered by more than one manufacturer
5. Energy consumption can be measured and verified with testing
6. Label provides meaningful differentiation
Specification Development Cycle

1. Open Specification for Revisions (as necessary)
2. Stakeholder Notification
3. Energy & Environmental Analysis
4. Test Methodology Development (as necessary)
5. Release Draft Specification
6. Stakeholder Meetings
7. Release Subsequent Drafts with Interim Decision Memos (as necessary)
8. Post Drafts and Stakeholder Comments to Web Site
9. Final Decision Memorandum
10. Finalize Specification
11. Specification Takes Effect
12. Manufacturers Join Program as Partners and Begin Labeling Products
13. Monitor Market Penetration
14. Officially Launch Specification with Industry and Stakeholders
15. International Coordination

International Coordination
Specification Development

• When developing or revising a specification, EPA balances:
  – The need to keep pace with evolution among leading products and continue to effectively differentiate for consumers.
  – Production cycles, other factors important to the industry.

• Key elements of the stakeholder process:
  – Consistency, transparency, inclusiveness, responsiveness, and clarity.
Clothes Dryer Version 1.0 Specification Development

- EPA launched the clothes dryer specification development effort with a Program Launch letter in July 2012, noting:
  - High household penetration (nearly 80% of homes)
  - Clothes dryers are one of the largest end-use loads in U.S. homes for which there are no voluntary or mandatory labeling programs
  - The introduction of new high efficiency dryers to the marketplace
  - Large opportunity for greenhouse gas reductions
- Draft 1 provided for stakeholder review and comment in August 2012
Clothes Dryer Version 1.0 Specification Development

• This past June, EPA awarded the first clothes dryer with the 2013 Emerging Technology Award (ETA) for Advanced Clothes Dryers.
  – ETA recognition for Advanced Clothes Dryers extended through 2014
• In August 2013, DOE published an amended clothes dryer test procedure (which included a new Appendix D2).
• Draft 2 Version 1.0 specification was shared in August 2013; test procedure reference updated to Appendix D2.
  – Offers manufacturers with an additional avenue for demonstrating improved efficiency via automatic termination control that reduces waste energy at the end of the dry cycle
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V1.0 Test Method

- Test procedure reference was updated to the new DOE test method, which includes provisions for more accurately measuring effects of automatic cycle termination
  - Draft 1 stakeholder feedback encouraged ENERGY STAR to cite a test method that captures the effectiveness of automatic termination controls and better reflect real world energy consumption.
  - DOE published a new clothes dryer test procedure on July 31, 2013 (10 CFR 430 Appendix D2).
    - Offers the opportunity to more accurately assess the energy savings associated with automatic termination and therefore, enables ENERGY STAR program to offer more real-world based guidance to consumers.
Appendix D2 advantages for ENERGY STAR labeling include:

- Better reflects the way in which consumers use a clothes dryer
- More accurately measures the energy consumption
- Allows for greater differentiation in clothes dryer efficiency
- Provides manufacturers with incentive to improve technology that senses when the load is "dry" (sensors and control algorithms)

Manufacturers must use a single appendix for all representations, including ENERGY STAR verification and DOE certifications of compliance.

- Manufacturers may elect to use the amended Appendix D2 early, but must show compliance with the January 1, 2015 energy conservation standards using this Appendix.

EPA and DOE welcome stakeholder feedback on the updated test procedure reference.
Revisions to Definitions

• Definitions for Automatic Termination Control, Temperature Sensing Control, and Moisture Sensing Control were removed.
  – No longer applicable to ENERGY STAR certification.

• Combined Energy Factor (CEF) definition was updated to be identical to one in DOE’s new test procedure (Appendix D2).

• For clarity, footnotes have been added to provide the Code of Federal Regulation (CFR) citation for a DOE definition.
Expanded Product Classes

- EPA expanded several product class descriptions to include ventless electric standard and compact 120V configurations.
  - Stakeholder feedback to the Draft 1 specification indicated high efficiency ventless dryers, already available in other markets, may be introduced in the U.S.
  - Inclusion avoids impeding potential market advancements for high efficiency ventless clothes dryer designs.
- The same efficiency criteria used for similarly configured vented dryers have been applied.
- EPA welcomes feedback on extending the criteria to these additional types of ventless dryers and the appropriateness of the levels proposed.
Revised Efficiency Criteria

• Revised energy efficiency (CEF) levels were developed using:
  – Units tested by DOE during the recent test procedure rulemaking
  – Test data in the CLASP 2013 report
  – Additional test data provided by several utilities in comments to EPA
  – Technical data in the DOE TSD and supplemental information shared by stakeholders in the spec development process

• Revised CEF criteria reflect estimated energy savings of:
  – 20% for standard size electric dryers
  – 21% for gas dryers, compact clothes dryers

• The baselines used (i.e., estimated energy use of conventional dryers in 2015) were developed by using an adjusted 2015 Federal standard, that takes into account the differences in calculated CEF values under the 2 test methods.
# Data used to Develop Baseline

<table>
<thead>
<tr>
<th>Product class</th>
<th>Test unit</th>
<th>DOE test procedure (Appendix D1)</th>
<th>Automatic cycle termination—DOE test load</th>
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<tbody>
<tr>
<td></td>
<td>CEF (lbs/kWh)</td>
<td></td>
<td>CEF (lbs/kWh)</td>
</tr>
<tr>
<td>Vented Electric Standard</td>
<td>1</td>
<td>3.58</td>
<td>3.16</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3.93</td>
<td>2.73</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3.83</td>
<td>3.49</td>
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<tr>
<td></td>
<td>4</td>
<td>3.71</td>
<td>3.48</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>3.90</td>
<td>3.51</td>
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<tr>
<td></td>
<td>6</td>
<td>3.80</td>
<td>2.71</td>
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<td></td>
<td>7</td>
<td>3.84</td>
<td>3.06</td>
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<td></td>
<td>8</td>
<td>3.71</td>
<td>3.11</td>
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<tr>
<td>Vented Electric Compact (240V)</td>
<td>9</td>
<td>3.53</td>
<td>3.52</td>
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<tr>
<td></td>
<td>10</td>
<td>3.56</td>
<td>2.27</td>
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<tr>
<td>Vented Electric Compact (120V)</td>
<td>11</td>
<td>3.75</td>
<td>2.18</td>
</tr>
<tr>
<td></td>
<td>Avg</td>
<td>3.79</td>
<td>3.16</td>
</tr>
<tr>
<td>Vented Gas</td>
<td>12</td>
<td>3.43</td>
<td>2.70</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>3.31</td>
<td>2.87</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>3.49</td>
<td>3.07</td>
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<td>Vented Electric Compact (240V)</td>
<td>15</td>
<td>3.39</td>
<td>2.69</td>
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<td></td>
<td>16</td>
<td>3.37</td>
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<td></td>
<td>17</td>
<td>3.37</td>
<td>2.94</td>
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<tr>
<td>Vented Electric Compact (240V)</td>
<td>Avg</td>
<td>3.39</td>
<td>2.92</td>
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<tr>
<td>Ventless Electric Combination Washer/Dryer</td>
<td>18</td>
<td>2.98</td>
<td>2.73</td>
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<tr>
<td>Ventless Electric Compact (240V)</td>
<td>19</td>
<td>2.81</td>
<td>2.70</td>
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<tr>
<td></td>
<td>20</td>
<td>2.28</td>
<td>2.19</td>
</tr>
<tr>
<td></td>
<td>Avg</td>
<td>2.54</td>
<td>2.45</td>
</tr>
</tbody>
</table>
Summary Plot of Electric Standard Clothes Dryer Data

Heat Pump Dryer Test Data Points

Combined Energy Factor (CEF)

Test Unit Number

- **DOE Test Data - Auto Term**
- **CLASP Test - Auto Term**
- **CA IOU Auto Term**
- **Draft 2 ENERGY STAR Proposal (CEF = 3.93)**
- **ENERGYSTAR V1.0 Estimated Baseline (CEF = 3.11)**
- **DOE Test Data - Appendix D1**
- **2015 Federal Standard (CEF = 3.73)**

Represent one test unit, tested under varying design conditions.
Revised Efficiency Criteria

- 5% connected functionality allowance is retained in Draft 2
  - Products must be certified using final (TBD) ENERGY STAR test method to use allowance

<table>
<thead>
<tr>
<th>Product Category</th>
<th>CEF&lt;sub&gt;BASE&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vented Gas</td>
<td>3.48</td>
</tr>
<tr>
<td>Vented and Ventless Electric, Standard (4.4 cu-ft or greater capacity)</td>
<td>3.93</td>
</tr>
<tr>
<td>Vented and Ventless Electric, Compact (120V) (less than 4.4 cu-ft capacity)</td>
<td>3.80</td>
</tr>
<tr>
<td>Vented Electric, Compact (240V) (less than 4.4 cu-ft capacity)</td>
<td>3.45</td>
</tr>
<tr>
<td>Ventless Electric, Compact (240V) (less than 4.4 cu-ft capacity)</td>
<td>2.68</td>
</tr>
</tbody>
</table>

**Equation 1. Calculation of Minimum CEF**

\[
CEF_{\text{MIN}} = CEF_{\text{BASE}} - CEF_{\text{Adder\_Connected}}
\]

<table>
<thead>
<tr>
<th>Product Type</th>
<th>CEF&lt;sub&gt;Adder_Connected&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Electric Clothes Dryers</td>
<td>0.05 x CEF&lt;sub&gt;BASE&lt;/sub&gt;</td>
</tr>
</tbody>
</table>
Efficient Design Options

• Improved automatic cycle termination
  (sensors/controls)
  – Recent DOE NOPR testing illustrated a wide 30% spread in reported CEF performance between the best and worst performing units.
  – In addition to the differentiation that already exists, testing the effectiveness of sensors provides the incentive for pursuing additional opportunities for improvement; initial assessment indicates energy savings of at least 11%.

• Modulation
  – Manufacturers have indicated 5-10% savings realistic for electric dryers; last DOE TSD noted 5% energy savings through heater replacement.
  – TIAX modulating gas dryer 10-25% energy savings, with savings varying by load size.

• Heat recovery
  – Draft 1 stakeholders submitted test data showing energy savings of 17% through modified heat exchanger
  – Inlet air preheating, exhaust recirculation
Efficient Design Options (cont’d)

• Heat pump/hybrid heat pump
  – European heat pump dryers tested by CLASP demonstrated a 50% energy savings relative to an standard electric baseline dryer, 3.11 CEF

• Insulation, motor efficiency, air circulation
  – Improved sealing and insulation could achieve savings of 2-6%. Recent CA IOU testing suggested 2%.
  – Manufacturers cited split motor design or more efficient motors could account for 1-5% energy savings. Some manufacturers have said 1-2% gains could be achieved from air circulation.
## Consumer Savings & Payback

<table>
<thead>
<tr>
<th>Product Category</th>
<th>kWh</th>
<th>MBtu</th>
<th>Annual Energy Savings</th>
<th>Per-Unit Electricity Savings ($)</th>
<th>Per-Unit Gas Savings ($)</th>
<th>Per Unit Total Savings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vented Gas</td>
<td>30</td>
<td>0.54</td>
<td>3</td>
<td>41</td>
<td>5.75</td>
<td>9</td>
</tr>
<tr>
<td>Vented &amp; Ventless Electric, Standard</td>
<td>160</td>
<td>-</td>
<td>18</td>
<td>217</td>
<td>-</td>
<td>18</td>
</tr>
</tbody>
</table>

Assumptions: Prices of $0.113 per kWh and $10.64 per MBtu were used to estimate per-unit cost savings, annually and over an average 12-year average clothes dryer lifetime (Appliance Magazine. U.S Appliance Industry: Market Value, Life Expectancy & Replacement Picture 2011).

- Currently little correlation in the market between efficiency performance (EF) and price.
- Using an estimated incremental cost of $50, consumer payback would be in about 3 years for standard electric dryer.
  - Modestly longer (7 years estimated) for gas; but EPA believes it is important for the spec to cover gas dryers given their overall lower operating cost and carbon footprint during use.
## National Savings

<table>
<thead>
<tr>
<th></th>
<th>Electricity (GWh/yr)</th>
<th>Gas (MBTU/yr)</th>
<th>Carbon Equivalent (Million lbs CO2E/yr)</th>
<th>Cost Savings (Millions$/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Clothes Dryers</td>
<td>267</td>
<td>211,264</td>
<td>435</td>
<td>32</td>
</tr>
</tbody>
</table>

Additional Changes in Draft 2

- **Removal of Automatic Termination Criteria**
  - Draft 1 proposed specific design/operational requirements
  - Incorporation of Appendix D2 test method in Draft 2 makes such requirements unnecessary, since the effectiveness of automatic cycle termination will be tested.

- **Removal of Warranty Requirements**
  - Draft 1 proposed minimum warranty requirements; there is precedence in the program for including in order to ensure performance is maintained with greater efficiency.
  - In light of stakeholder feedback and absent more specific data quality or longevity of more efficient dryers and their sub-components, warranty requirements have been omitted from the Draft 2 specification.

- EPA welcomes stakeholder feedback on these changes in Draft 2.
Clothes Dryer Cycle Time

- Draft 2 includes a new reporting requirement for drying time.
  - Stakeholders had raised a variety of concerns with maximum drying time requirement that had been proposed in Draft 1.
  - Alternatively, in Draft 2, EPA is proposing that drying time be reported.
    - Initial step to gather consistent data on drying time and product type.
    - EPA is considering making this data available to consumers on the website, that enables them to consider both efficiency and duration of the drying cycle in a standardized way.
  - EPA welcomes feedback on this reporting requirement and on making this information available for consumers on the ENERGY STAR website.
Proposed Guidance for Reporting

- Length of drying cycle is determined by measuring the test cycle:
  - sections 3.3.2, Appendix D2, for automatic termination control dryers. Drying cycle time equals test cycle time.
  - sections 3.3.1, Appendix D2, for timer dryers. The following correction is applied to determine drying cycle time.
    - Correction is intended to account for the range of acceptable RMC values at the completion of the test cycle.

\[ t_{\text{dry}} = \left[ \frac{55.5}{W_w - W_d} \right] \times t \]

Where:
- \( W_w \) = the moisture content of the wet test load as recorded in section 3.4.2 of 10 CFR 430, subpart B, appendix D2.
- \( W_d \) = the moisture content of the dry test load as recorded in section 3.4.3 of 10 CFR 430, subpart B, appendix D2.
- \( t \) = the measured test cycle time.
Version 1.0 Effective Date

- EPA anticipates finishing the Version 1.0 spec in early 2014, possibly sooner depending on the stakeholder comments received in September.
  - The Agency plans to identify a date by which there will be a selection of ENERGY STAR products on the market for consumers to choose from.
  - Next step will be to engage manufacturers to gather information on their timelines for testing products to the amended DOE test method and having products that meet the ENERGY STAR requirements on the market.
- EPA welcomes any feedback or discussion on the effective date for Version 1.0.
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Overview of Draft 2 Version 1.0 Connected Functionality

• EPA is seeking to help advance products with intelligent features in ways that deliver immediate consumer benefit and support a low-carbon electricity grid over the long term.

• Draft 2 introduces optional Connected criteria for residential clothes dryers:
  – Builds on the CF in the final Version 5.0 residential refrigerators and freezers (R/F) specification, recent feedback on clothes washer connected criteria, while looking to leverage opportunities unique to residential dryers.
  – Consumer has full control to override product’s response to a signal from a utility requesting load reduction or deferral.
  – 5% allowance for ENERGY STAR electric dryers certified to these optional connected criteria, including using a future (TBD) ENERGY STAR test method to validate demand response.
  – EPA will flag clothes dryers on the ENERGY STAR website that are certified as meeting optional connected criteria.
Connected Clothes Dryer System

- Consistent with refrigerator/freezers, a diagram and associated text are included that define the connected clothes dryer system:
  - Includes required communications hardware and software.
  - Communications hardware may be built-in or external.
  - Open standards required for connection with external device(s) or application(s).
  - On-premises, open standards connectivity preferred, but alternate means are acceptable.
  - Open standards & open access for 3rd party remote management is not required.
Connected Clothes Dryer System

Connected Clothes Dryer System Boundary

Connected Clothes Dryer w/ External Communications

Internal Protocols (open or proprietary)

Protocol Translation

Open Standard Protocol

Energy Management Device / Application

Connected Clothes Dryer System might exchange data with one or more:
- Smart Meter
- HEMS / Hub / Gateway
- Internet / Cloud Application
- Other Device or Application

Note 1: Communication device(s), link(s) and/or processing that enables open standards-based communication between the Connected Clothes Dryer System and Energy Management Device/Application(s). These elements could be within the base appliance, and/or an external communication module, a hub/gateway, or in the Internet/cloud.
Communications & Open Access

- Aligns with communications criteria proposed for other home appliances:
  - Open standards:
    - In the NIST SGIP Catalog of Standards, or;
    - In the NIST Smart Grid Framework Table 4.1 or 4.2, or;
    - Adopted by ANSI or by a well recognized international SDO.
  - Communications hardware may be:
    - Built-in.
    - Proprietary external paired with module/device.
    - Open standards based port & module.
    - Open standards based port (no module) with one or more of the above.
  - Open Access – API available to interested parties for:
    - Energy Consumption Reporting
    - Operational Status, User Settings & Messages
    - Demand Response (DR)
Consumption Reporting, Remote Management

• The following elements also align with criteria proposed for other home appliances:
  – Energy consumption reporting allows implementation flexibility. API enables 3\textsuperscript{rd} party access and includes reporting accuracy.
  – Remote management
    • Electric dryers, only
    • Is not subject to open standards or open access criteria and may be provided to 3\textsuperscript{rd} parties at the discretion of the manufacturer.
Operational Status, User Settings & Messages

• At least two types of energy-related messages required, for example:
  – Performance issues
  – Energy consumption that is outside the product’s normal range

• In addition to reporting of DR status, Draft 2 proposes adding consumer-authorized reporting of operational status (e.g. off, standby, delay start, cycle in process).
  – Considered important for products that are not continuously operated such that load-balancing entities can understand availability of dispatch-able load.
Operational Status Reporting (Cont’d)

- Stakeholder feedback on similar criteria proposed for clothes washers – one comment requested further clarity may be needed in regards to the level of reporting detail needed by utilities.

- In Draft 2, EPA has listed the following examples of operational states:
  - off, standby, delay start and cycle in process.

- EPA is seeking stakeholder feedback:
  - Would more detail be needed or helpful for utilities as they evaluate appliances’ DR functionality or run appliance DR programs?
    - If so, what detail?
  - Should cycle in progress reporting also include remaining cycle time? Should delay start reporting also include information as to when the cycle will start?
  - How will consumer privacy be managed and protected?
  - Are there other reporting details that would be helpful?
Demand Response

- Proposed DR capabilities for clothes dryers were informed by the recommended definition of smart clothes dryer included in the AHAM / efficiency advocate petition to ENERGY STAR.
  - Delay Appliance Load Capability
  - Temporary Appliance Load Capability
  **Note:** EPA will clarify that DR criteria will be required only for electric clothes dryers.

- DR criteria does not explicitly address price responsiveness.
  - Stakeholders have indicated that price responsiveness may be implemented using ENERGY STAR DR capabilities.
  - Further, discussions have indicated that the importance of price responsiveness is already well recognized by utilities and the appliance industry.
Demand Response (cont’d)

• Clothes Dryer Delay Appliance Load (DAL) Capability
  – Cycle start moved outside of delay period
  – Defaults:
    • 3-hour minimum response.
    • Capable of responding at least 1x per consumer initiated operating cycle
  – Consumer override – before or during delay period
Demand Response (cont’d)

- Clothes Dryer Temporary Appliance Load Reduction (TALR) Capability
  - Restricts average power draw during the load reduction period to no more than 80%-20% of the average power draw
    - **Note:** The Draft 2 specification document contained an error; 80% should instead be 20%.
  - Defaults:
    - 10 minute minimum response period
    - Capable of responding at least 2x per consumer initiated operating cycle
  - Consumer override – before or during delay period
Demand Response (Cont’d)

- EPA is seeking feedback on:
  - Minimum DR durations proposed;
  - whether it is necessary to continue to specify a minimum response and if so, whether the proposal (e.g., x-times per operating cycle) is the preferred way to structure; and
  - Whether there is opportunity for dryers to provide additional DR without impacting consumer expectations
    - Are there other performance considerations that should be considered?
Verification of Connected Functionality

• Compliance with connected functionality will be through examination of the product and/or product documentation.

• Additionally, DR functionality will be certified using a TBD ENERGY STAR test method
  – DOE is planning to develop a test that will validate the DR capabilities of a residential clothes dryer, to be referenced in the V1.0 specification.
  – DOE is initiating this effort now and will be contacting manufacturers to obtain products for testing or to witness testing in manufacturer labs.
  – Products must be certified using this new ENERGY STAR test method in order to be eligible for the 5% allowance.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter/Institution</th>
</tr>
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<tr>
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</table>
Additional Data from CA IOUs/NEEA

Electric Standard Clothes Dryer

- ENERGY STAR Database
- CA IOU Baseline
- CA IOU Delicate Settings
- Conv Dryer No Heat Time Dry Test
- Conv Dryer Modified Software Test

Draft 2 ENERGY STAR Proposal (CEF = 3.93)
2015 Federal Standard (CEF = 3.73)
ENERGY STAR V1.0 Estimated Baseline (CEF = 3.11)
CA IOU discussion

• Simple software changes and relabeling of modes can allow conventional dryers to be very efficient, but slow drying

• Consumers may not use this mode very frequently, so we believe an ENERGY STAR dryer should save energy in all modes

• One way of achieving this is having a CEF specification line rising with drying time and testing in multiple modes
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## Anticipated Timeline for Version 1.0 Spec Development

<table>
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<th>Date</th>
<th>Event Description</th>
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<tr>
<td>August 5, 2013</td>
<td>Draft 2, Version 1.0 Specification Released</td>
</tr>
<tr>
<td>September 5, 2013</td>
<td>Stakeholder Webinar (Today)</td>
</tr>
<tr>
<td>September 20, 2013</td>
<td>Comment Period Closes on Draft 2 Specification</td>
</tr>
<tr>
<td>October 6 &amp; 7-9, 2013</td>
<td>Clothes Dryer Summit, ENERGY STAR Annual Products Partner Meeting (New Orleans)</td>
</tr>
<tr>
<td>November/December 2013</td>
<td><strong>Final Draft Specification Distributed and Comment Period</strong></td>
</tr>
<tr>
<td>January 2014</td>
<td>Final Version 1.0 Specification Released</td>
</tr>
</tbody>
</table>

- **Depending on the stakeholder feedback received on the Draft 2, a Draft 3 proposal may also be issued which would impact the anticipated schedule.**
- Please submit written comments **by September 20, 2013**, to appliances@energystar.gov
Questions/Discussion
Contacts

Spec Development:
- Amanda Stevens, US EPA
  Stevens.Amanda@epa.gov
- Jessica Lyman, ICF International
  jessica.lyman@icfi.com
- Doug Frazee, ICF International
  dfrazee@icfi.com
- appliances@energystar.gov

Test Method:
- Ashley Armstrong, US DOE
  Ashley.Armstrong@ee.doe.gov
Vented Gas Clothes Dryer Dataset
Electric Compact Clothes Dryer

(120V) Dataset

Combined Energy Factor (CEF)

- DOE Test Data - Automatic Termination
- Draft 2 ENERGY STAR Proposal (CEF = 3.80)
- ENERGY STAR V1.0 Estimated Baseline (CEF = 3.01)
- DOE Test Data - Appendix D1
- 2015 Federal Standard (CEF = 3.61)
Electric Compact Clothes Dryer (240V) Dataset

Vented Electric Compact (240V) Clothes Dryer

- DOE Test Data - Automatic Termination
- Draft 2 ENERGY STAR Proposal (CEF = 3.68 Ventless, 3.45 Vented)
- ENERGYSTAR V1.0 Estimated Baseline (CEF = 2.13 Ventless, 2.73 Vented)
- DOE Test Data - Appendix D1
- 2015 Federal Standard

Ventless Electric Compact (240V) Clothes Dryer