**Visegrad+ Grant No. 21920002**

**ECOLABELLING**

***Innovations in circular economy***

***– environmental labels and declarations***

# Instruction for classes (exercises)
# Energy Star

Guidelines for exercises

## Basic information – discussion

- Energy Star – discussion of questions:
  - ✓ Try to describe what you think the Energy Star brand looks like?
  - ✓ Who owns the Energy Star brand?
  - ✓ What do you think the Energy Star brand represents?
  - ✓ Which products can be labeled Energy star?

## Instruction for exercise

- Work in groups - 1 goupe = one task
- Each group chooses one task:
  - ✓ Task 1 - lighting
  - ✓ Task 2 - smart house
  - ✓ Task 3 - imaging technology
  - ✓ Task 4 - white techniques



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## Instruction for task 1

- Task 1 – Lighting
- Students will determine if products are eligible for the Energy Star label when they have:
  - ✓ Information on individual products

| Bulb type | Parameters |
|---|---|
| **Philips Hue White and Color ambiance 9,5W E27 PMO 2 pack starter pack** | LED smart bulb, 9.5 W, E27, luminous flux 806 lm, supply voltage 230 V, dimmable, minimum chromaticity 2700K, maximum chromaticity 6500K, energy label A +, Service life 25,000 h |
| **Philips Hue White Filament 7W E27 A60** | LED smart bulb, 7 W, E27, luminous flux 550 lm, supply voltage 230 V, dimmable, minimum chromaticity 2100K, maximum chromaticity 2100K, energy label A +, Service life 15,000 h |
| **Narva E27 / 60W / 230V industrial bulb** | Manufacturer Narva, 60W, E27, luminous flux 630 lm, voltage 230V, chromaticity 2700K dimmable, energy class E |



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✓ Criteria

<table>
<tr><th>Performance characteristics</th><th>Current criteria</th></tr>
<tr><td>Efficiency</td><td>
<table>
<tr><th></th><th>Color rendering index</th><th>Minimum lamp efficacy (initial lm/W)</th></tr>
<tr><td rowspan="2">Omnidifectional</td><td><90</td><td>80</td></tr>
<tr><td>≥ 90</td><td>70</td></tr>
<tr><td rowspan="2">Directional</td><td><90</td><td>70</td></tr>
<tr><td>≥ 90</td><td>61</td></tr>
<tr><td>Decorative</td><td colspan="2">65</td></tr>
</table>
</td></tr>
<tr><td>Light output</td><td>Light output requirements differ for different categories, based on the incumbent incandescent bulbs. Most requirements are measured in lumens, but PAR, MR and MRX bulbs have requirements in center beam candlepower based on equivalency claim and beam angle.</td></tr>
<tr><td>Corelated color temperature</td><td>Nominal CCT: 2200K*, 2500K*, 2700K, 3000K, 3500K, 4000/4100K, 5000K, 6500K<br>*Filament-style lamps only</td></tr>
<tr><td>Color quality</td><td>CRI ≥ 80 and R9 > 0 for LED bulbs.</td></tr>
<tr><td>Lumen maintenance</td><td>LED: Bulb shall maintain minimum percentage of 0-hour light output after completion of the 6000-hr test duration, ranging from 86.7% - 95.8% depending on the claimed lifetime of the bulb.</td></tr>
<tr><td>Bulb life</td><td>Minimum life rating of 10,000 hours for CFLs, 15,000 for omnidirectional and decorative LED, and 25,000 for directional LED bulbs.</td></tr>
<tr><td>Dimming</td><td>Maximum and minimum light output on the dimmer, as well as flicker and noise and must dim to 20% or less.</td></tr>
<tr><td>Warranty</td><td>Minimum warranty period of 2 years for bulbs with a life rating of < 15,000 hours, and minimum 3 year warranty for bulbs with a life rating ≥ 15,000.</td></tr>
<tr><td>Allowable base types</td><td>The range is limited to bulbs with the following standard ANSI basic types: E26, E26d, E17, E11, E12, G4, G9, GU10, GU24, GU5.3, and GX5.3.</td></tr>
<tr><td>Start time</td><td>The bulb must light up and remain lit continuously for 750 milliseconds after the application of electricity.</td></tr>
<tr><td>Run-up time</td><td>Bulb must reach 80% of the stabilized light output in ≤ 45 seconds.</td></tr>
<tr><td>Power factor</td><td>≥ 0.5 for CFL.<br>≥ 0.6 for Omnidirectional LED bulbs with input power ≤ 10 watts.<br>≥ 0.7 for all other LED bulbs.</td></tr>
<tr><td>Rapid cycle stress test</td><td>15000 on/off power cycles</td></tr>
<tr><td>Dimensional requirements</td><td>The bulb must conform to the shape standards of the American National Standards Institute</td></tr>
<tr><td>Elevated temperature testing</td><td>Endurance test at elevated temperature inside a recessed can or test rig maintained at 45 ° C or 55 ° C.</td></tr>
</table>



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## Instruction for task 2

- Task 2 –smart house
- Students will suggest according to the picture which products can be installed if the house wants to obtain the Energy Star mark when they have the basic conditions for the award of the label
- Every specific criteria students can find in the document:

  https://www.energystar.gov/sites/default/files/National%20Program%20Requirements%20Version%203_Rev%2011.pdf

## Instruction for task 3

- Task 3 –imaging technology
- Students will determine if products are eligible for the Energy Star label when they have:
  - ✓ Criteria

Energy-Efficiency Criteria for Ac-Ac and Ac-Dc External Power Supplies in Active Mode- standard models

| Nameplate Output Power ($P_{no}$) | Minimum Average Efficiency in Active Mode (expressed as a decimal) |
|---|---|
| 0 to ≤ 1 watt | ≥ 0.480 * $P_{no}$ + 0.140 |
| > 1 to ≤ 49 watts | ≥ [0.0626 * Ln ($P_{no}$)] + 0.622 |
| > 49 watts | ≥ 0.870 |



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Energy-Efficiency Criteria for Ac-Ac and Ac-Dc External Power Supplies

| Nameplate Output Power ($P_{no}$) | Minimum Average Efficiency in Active Mode (expressed as a decimal) |
|---|---|
| 0 to ≤ 1 watt | ≥ 0.497 * $P_{no}$ + 0.067 |
| > 1 to ≤ 49 watts | ≥ [0.0750 * Ln ($P_{no}$)] + 0.561 |
| > 49 watts | ≥ 0.860 |

✓ Information on individual products

| Product | Parameters |
|---|---|
| **Monitor PC** | • Power consumption Pon 15.1 W,<br>• Total energy consumption (TEC) 48.6 kWh,<br>• Video input signals Analog RGB: 0.7 volts ± 5%, input impedance 75 ohms<br>• Temperature 0 ° C to 40 ° C (32 ° F to 104 ° F)<br>• Humidity 10% to 80% (no condensation) |
| **Televison Sencor** | • Power consumption: AC ~ 100-240V, 50/60 Hz<br>• Energy efficiency: 17 W / <0.5 W in standby mode<br>• Dimensions with stand: 439 x 302 x 146 mm<br>• Dimensions without stand: 439 x 268 x 79 mm<br>• Weight: 1.45 kg<br>• VESA: 100 × 100<br>• Consumption in normal mode 17W<br>• Standby power consumption 0.5W |
| **Own product** | |



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## Instruction for task 4

- Task 4 - white technique
- Students determine whether or not the device is suitable for the Energy Star
  - ✓ Criteria for refrigerators and freezers

| Product Type | Current Criteria Levels |
|---|---|
| Refrigerators and Refrigerator-Freezers (7.75 cubic feet or larger) | 10% less measured energy use than the minimum federal efficiency standards |
| Freezer (7.75 cubic feet or larger) | 10% less measured energy use than the minimum federal efficiency standards |
| Compact Refrigerators, Refrigerator-Freezers, and Freezers (Less than 7.75 cubic feet) | 10% less measured energy use than the minimum federal efficiency standards |

  - ✓ Criteria for a dishwasher

| Equipment | Capacity | Current Criteria |
|---|---|---|
| Standard | ≥ 8 place settings + 6 serving pieces | ≤ 270 kWh/year ≤ 3.5 gallons/cycle |
| Compact | < 8 place settings + 6 serving pieces | ≤ 203 kWh/year ≤ 3.10 gallons/cycle |



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✓ Criteria for Clothes dryer

| **Efficiency Requirements** | |
|---|---|
| **Product type** | **Combined Energy Factor (lbs/kWh)** |
| Vented Gas | 3.48 |
| Ventless or Vented Electric, Standard (4.4 cu-ft or greater capacity) | 3.93 |
| Ventless or Vented Electric, Compact (120V) (less than 4.4 cu-ft capacity) | 3.80 |
| Vented Electric, Compact (240V) (less than 4.4 cu-ft capacity) | 3.45 |
| Ventless Electric, Compact (240V) (less than 4.4 cu-ft capacity) | 2.68 |
| **Cycle Time Requirement** | |
| Maximum Test Cycle Time | 80 minutes |



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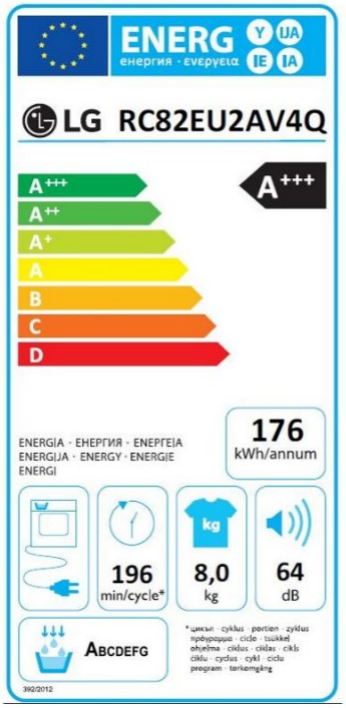
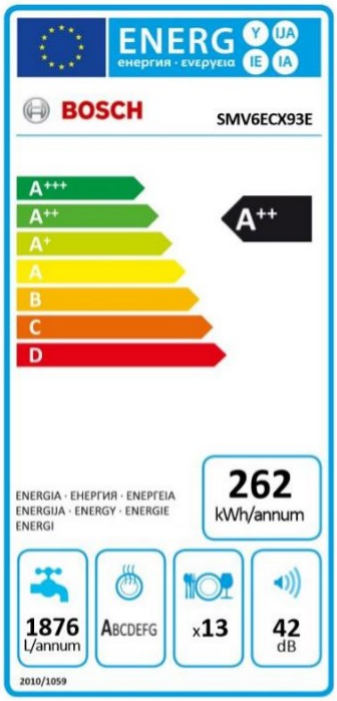
- ✓ Products:

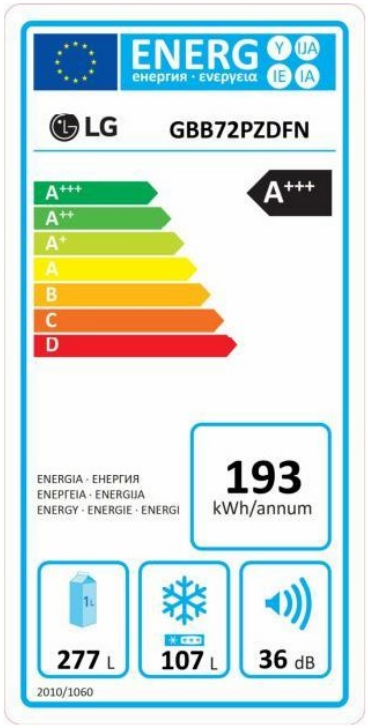
Clothes dryer




Dishwashers




Refrigerator with freezer




**Homework**

- Each student will be given the task of finding out if they have products at home that are environmentally friendly or have the Energy Star label.
- The products are divided into groups:
  - ✓ White technique
  - ✓ Imaging technology
  - ✓ Smart house
  - ✓ Other



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