

How to Achieve the World's Best MEPS

Asia Clean Energy Forum

June 14, 2023



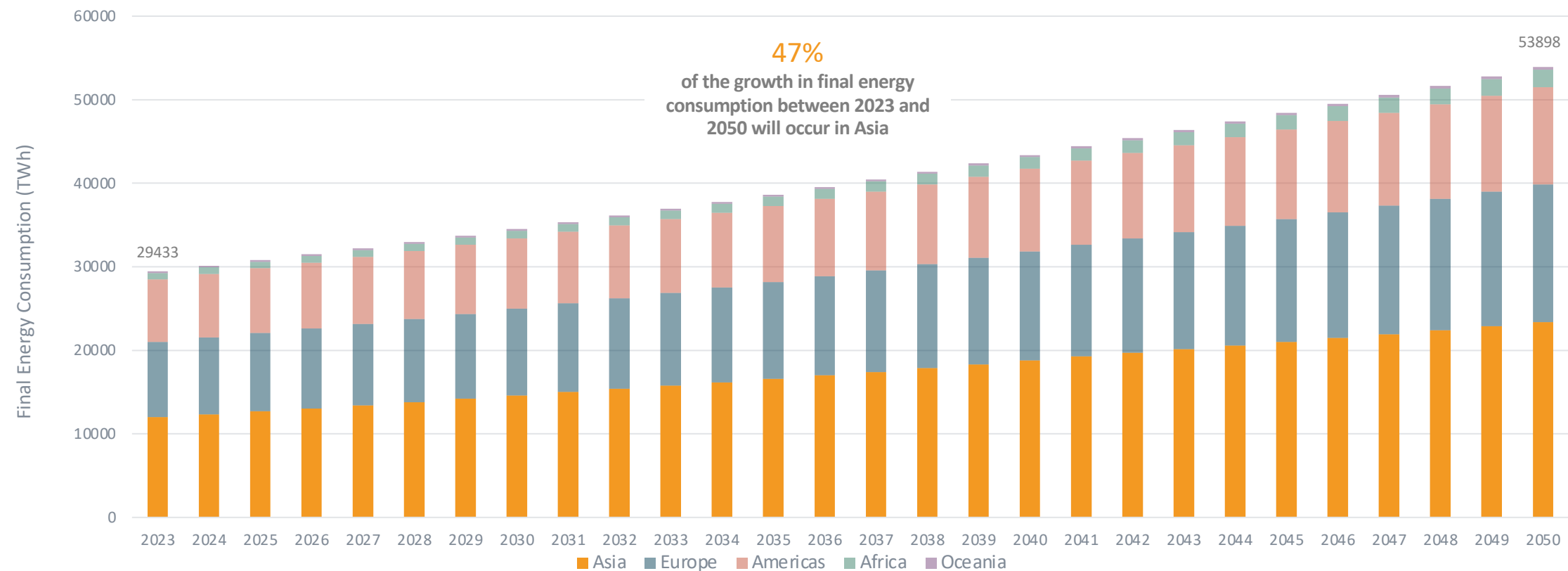


CLASP improves the energy and environmental performance of the appliances & equipment we use every day, accelerating our transition to a more sustainable world.

Energy Demand from Appliances and Equipment is Growing



Figure 1: Total Appliance and Equipment Final Energy Consumption (TWh) Under Business as Usual¹



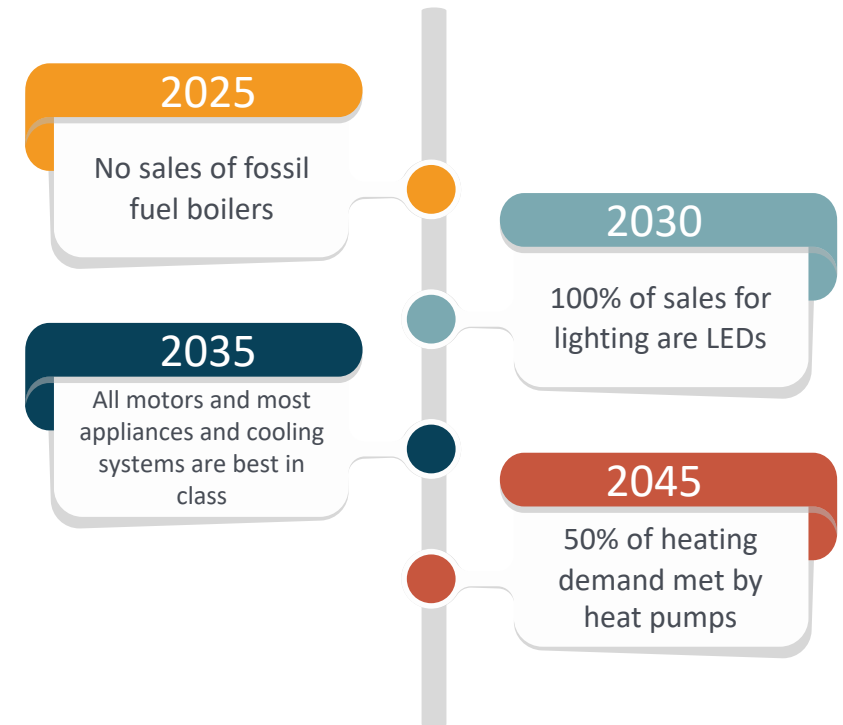
Note Includes air conditioning, ceiling and portable fans, electric motors, lighting, refrigerator-freezers, residential hot water heaters, space heating, and televisions

1. 'Mepsy: The Appliance & Equipment Climate Impact Calculator', CLASP, V1.9.1, April 2023, <https://clasp.shinyapps.io/mepsy>.

Current Policies Are Not Enough to Achieve Net Zero Emissions by 2050

- The solutions needed to achieve net zero emissions in the appliances sector already exists.
- To achieve net zero emissions, most of the appliances sold in 2030 need to match today's best available technology.
- Prioritizing MEPS and decarbonization efforts within the buildings sector will be critical.

Figure 2: Key Milestones in the Pathway to Net Zero²

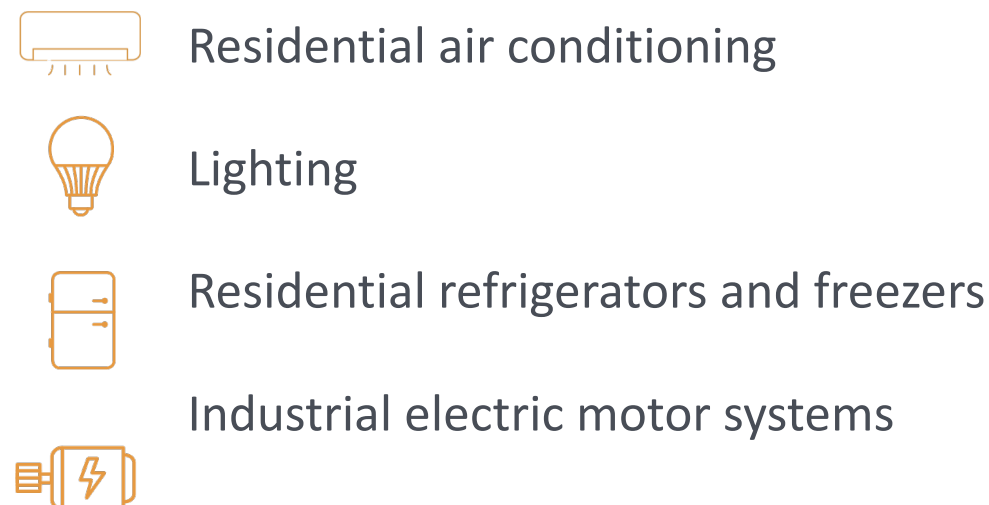


2. IEA. "World Energy Outlook 2022." Paris, France: International Energy Agency, 2022. <https://www.iea.org/reports/world-energy-outlook-2022>.

- To speed transition to Net Zero, **14 countries** signed the [Product Efficiency Call to Action](#) at COP 26³



- Signatories committed to **doubling the efficiency** (or halving the energy use) of four common types of appliances and equipment by 2030



3. Clean Energy Ministerial. “14 Governments Commit to Product Efficiency Call to Action | Clean Energy Ministerial.” <https://www.cleanenergyministerial.org/>, 2021.
<https://www.cleanenergyministerial.org/14-governments-commit-to-product-efficiency-call-to-action/>.

Identifying Top Energy Efficiency Standards for Priority Appliances



- Reviews MEPS across key countries for six high energy-consuming appliances & equipment (e.g., air conditioning, electric motors, lighting, refrigerators, space heating, and water heating).
- Compares MEPS to global goals and benchmarks
 - United for Efficiency (U4E Model Regulations)
 - COP 26 Call to Action (doubling appliance efficiency)
 - Electrification
 - Net-zero emissions

<https://www.clasp.ngo/tools/worlds-best-meps/>



Defining the World's Best MEPS

LIGHTING

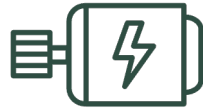


Product: Non-directional general service indoor lighting products

Metric: Luminous efficacy (lm/W)

Target: 90 lm/W

ELECTRIC MOTORS



Product: 3-phase alternating current induction motor (low voltage < 1000 V)

Metric: IE efficiency classifications defined in IEC 60034-30-1

Target: IE3

AIR CONDITIONERS

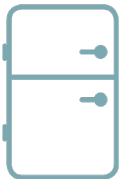


Product: Split system air conditioners with 7 kW (24,000 Btu/h or 2 refrigeration tons) cooling capacity

Metric: Cooling seasonal performance factor (CSPF)

Target: 5.1 Wh/Wh

REFRIGERATORS



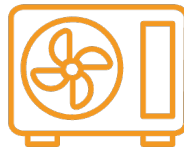
Product: 400 L frost-free refrigerator-freezer

- 300 L fresh-food compartment
- 100 L top-mounted freezer compartment (3 star/-18 °C)

Metric: Annual energy consumption (kWh)

Target: 279 kWh/year

SPACE HEATING



Product: Product types with significant potential for efficiency/CO₂ reduction: gas furnaces & boilers, electric resistance, one-way air conditioners

Metric: Percentage of market subject to ambitious policies (0-100%)

Target: 50% of market

RESIDENTIAL WATER HEATERS



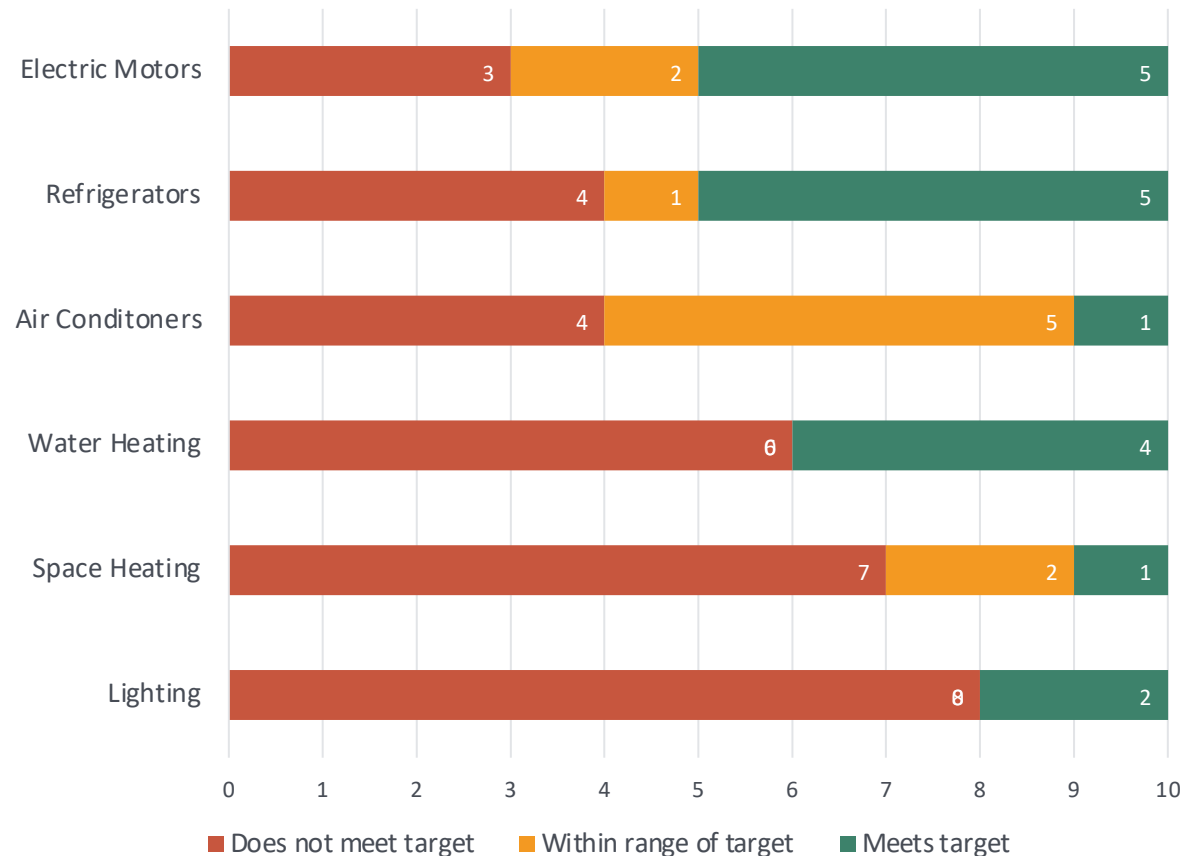
Product: Gas storage & instantaneous, electric storage

Focused on major technology shifts: condensing (≥86%) and heat pumps (>100%)

Metric: Percentage of market subject to ambitious policies (0-100%)

Target: 5% of market

Figure 3: MEPS Analysis in 10 Key Economies⁴



- Appliance efficiency policies are at different stages across Asia, some have longstanding programs, while others are just beginning their journey.
- Several Asian economies have MEPS that meet the target or are within range of the target:
 - **China:** Electric motors, air conditioning
 - **India:** Lighting (LEDs), refrigerators
 - **Indonesia:** Lighting (LEDs)
 - **Japan:** Electric motors, air conditioning, refrigerators, space heating
- Aligning policies to existing model regulations would result in more ambitious MEPS and larger savings.

4. CLASP. "World's Best MEPS: Identifying Top Energy Efficiency Standards for Priority Appliances." CLASP, 2022. <https://www.clasp.ngo/research/all/worlds-best-meps/>.

Efficiency Not Moving Fast Enough

- Limited historic and current product efficiency data make tracking progress against doubling goal challenging
- For countries with data, we only observe sufficient progress on refrigerators
- No progress on air conditioners or motors
- Insufficient data to determine lighting progress, but likely forthcoming due to new MEPS and Minamata









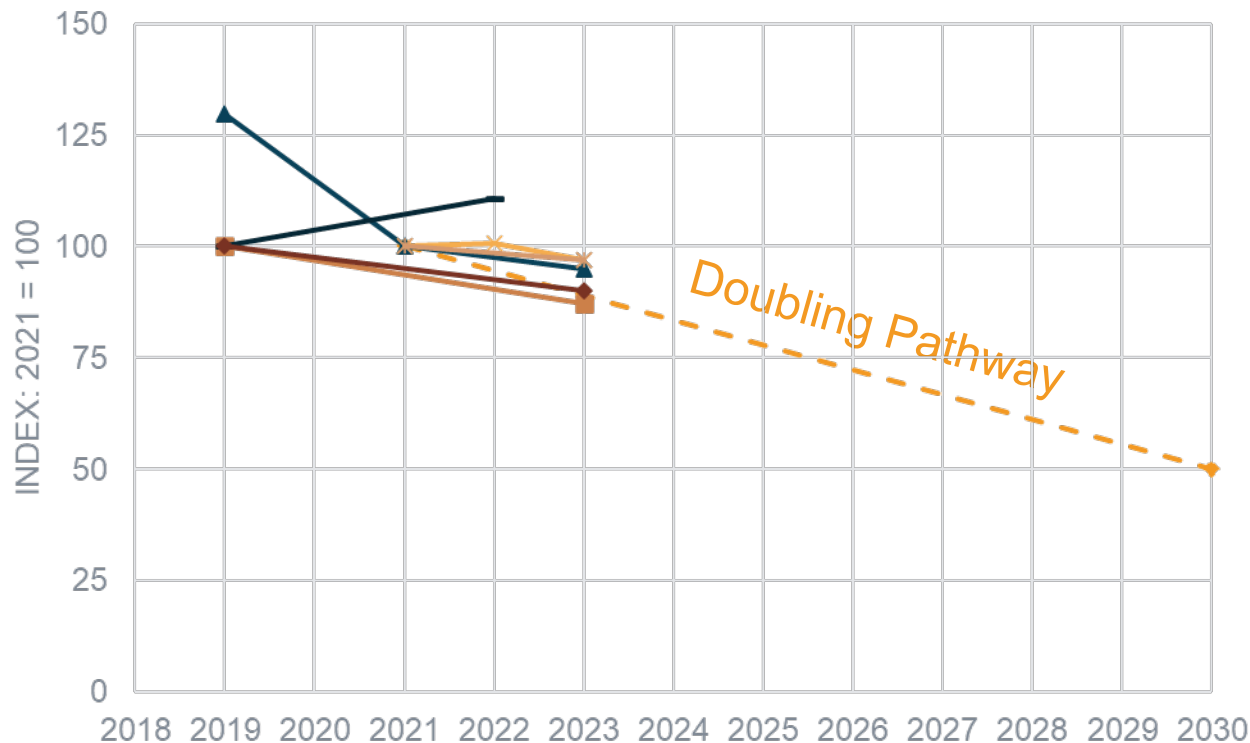
	
	
	
	

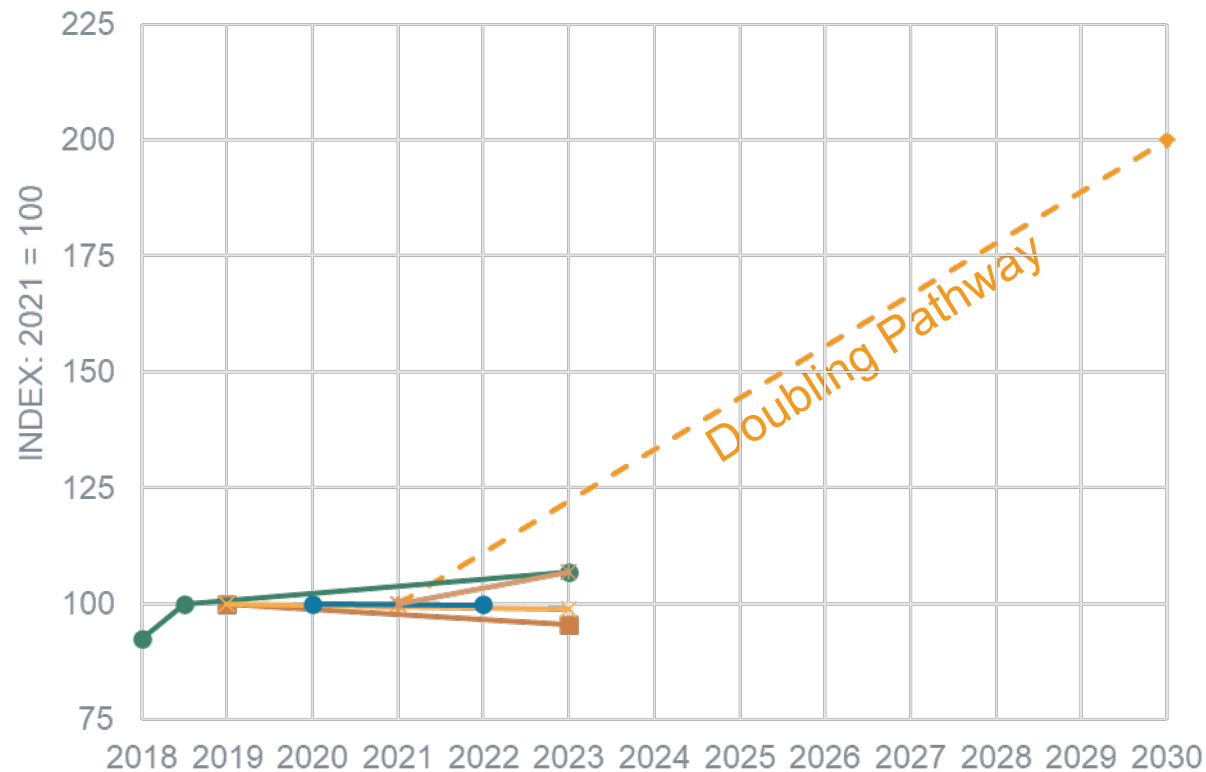
Figure 4: Efficiency Improvements in Residential Refrigerators⁵



- Initial data includes 4 Call to Action signatories and 2 other countries
- Up to 3-13% reduction in average energy consumption compared to historical data
- Metric is annual energy consumption or proportional index (lower is better)

5. CLASP, forthcoming paper on tracking progress towards existing efficiency commitments.

Figure 5: Efficiency Improvements in Residential ACs⁶



- Initial data includes 5 Call to Action signatories and 1 other country
- While some countries show improvement, no progress on average
- Metric is seasonal (SEER, CSPF, APF) or full-load (EER) efficiency (higher is better)

6. CLASP, forthcoming paper on tracking progress towards existing efficiency commitments.

- When developing appliance efficiency policies there are many unique factors to consider, e.g., institutional maturity, technical capacity, priorities, etc., that policymakers should consider.
- Ensuring a strong supporting institutional environment is also critical to successful implementation. Examples include:
 - Test laboratories and strong testing capacity
 - Existence of regional frameworks
 - Compliance programs
 - Presence of consumer advocacy groups

World's Best MEPS

Comparison of world-leading
appliance efficiency
standards



<https://www.clasp.ngo/tools/worlds-best-meps/>

Mepsy

Model the impacts of energy
and carbon reduction policies



<https://clasp.shinyapps.io/mepsy/>

CPRC

Searchable database of
1500+ quality, water, and
efficiency policies



<https://cprc-clasp.ngo/>

VeraSol

Solar-powered and off-
grid appliance database



<https://data.verasol.org/>

Compliance Toolkit

Resources to help design
effective compliance
strategies



<https://www.clasp.ngo/tools/clasp-compliance-toolkit/>

Computer Testing Tool

Measure the power and
performance of a personal
computer



<https://www.clasp.ngo/tools/>

Thank you!
Any questions?



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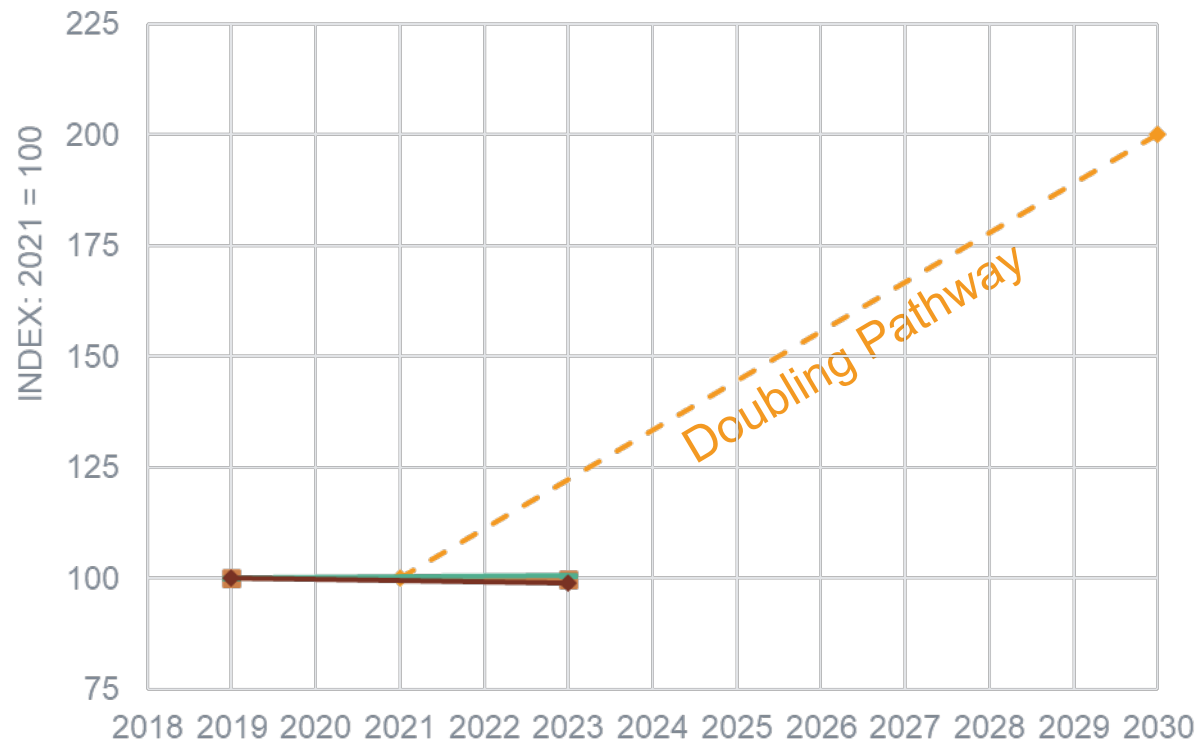


Efficient Appliances for People & the Planet

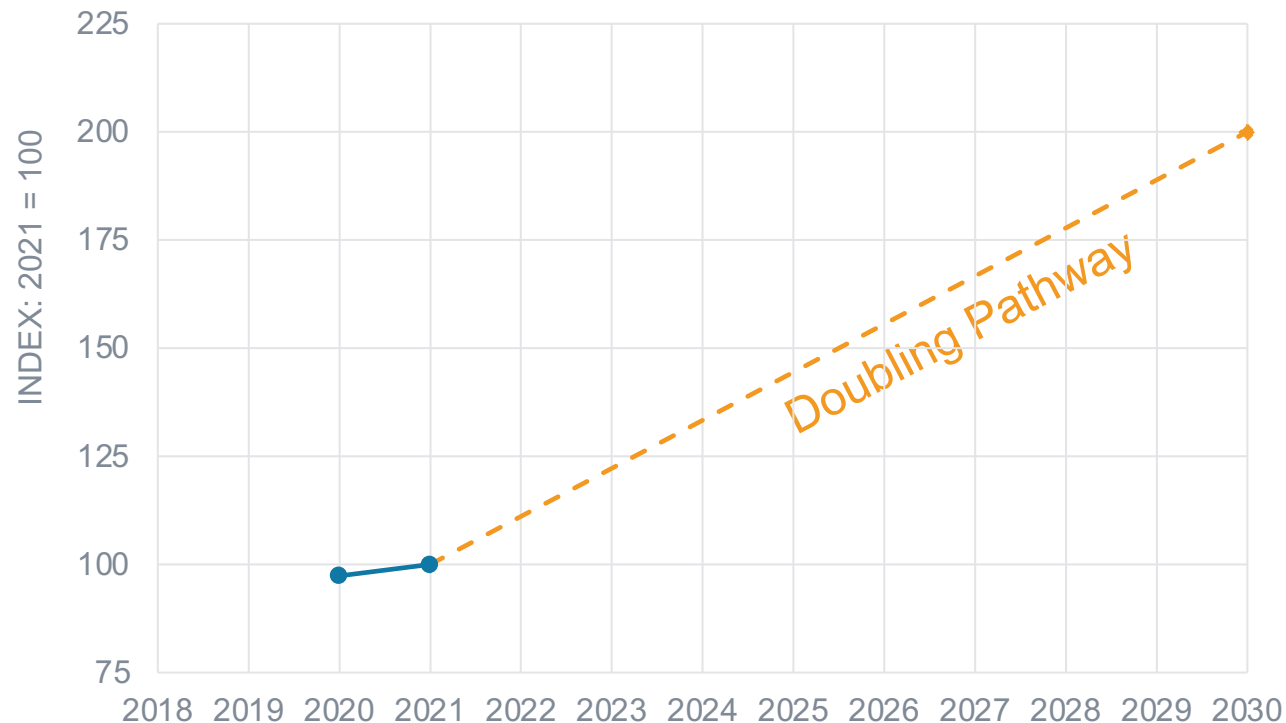
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Additional Slides



- Initial data includes 2 Call to Action signatories and 1 other country
- No progress since 2019 (last data available)
- Metric is full-load efficiency (higher is better)



- Initial data includes 1 Call to Action signatory
- No current data, but CLASP currently collecting
- Standards and product lists are divided by technology, making comprehensive market view impossible
- Metric is luminous efficacy (higher is better)