

# **Appliance Energy Efficiency Regulations Global Policy Framework Part 1 – Regulatory Roadmap Webinar Series**

October 25, 2022

Sponsored by  
Energy Management Committee



# Our power sources industry ecosystem to benefit stakeholders



<https://www.psm.com/membership/joining-information#memb>



# Our power sources industry ecosystem to benefit stakeholders



A place for PSMA to share knowledge and information.



Capacitor



Education



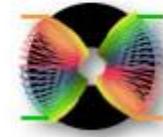
Energy Harvesting



Energy Management



Energy Storage



Magnetics



Packaging & Manufacturing



Power Technology Roadmap



Reliability



Safety & Compliance



Semiconductor



Transportation Power Electronics

Energy Efficiency Database

Safety & Compliance Database

**Manufacturers**  
**Developers**  
**Suppliers**  
**Educators**  
**Integrators**  
**Users**  
**Funders**  
**Regulators**

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# ***Energy Management Committee***



## **Background**

Energy is one of the most critical aspects of global progress and societal development. Concerns about carbon emissions, scarce resources, and economical, efficient use of energy drive the need to increase sustainability. Despite impressive energy savings over the last few decades, we still have a long way to go, and efficient energy management plays a key part.

## **Mission**

The mission of the Energy Management Technical Committee is to serve the needs of manufacturers, government policymakers, and industry standards organizations to provide education, support, and recommendations in matters regarding the energy efficiency of power supplies and system power architectures (no-load, standby, and active-on) with, as a primary goal, the establishment of a consistent global standard for energy efficiency.

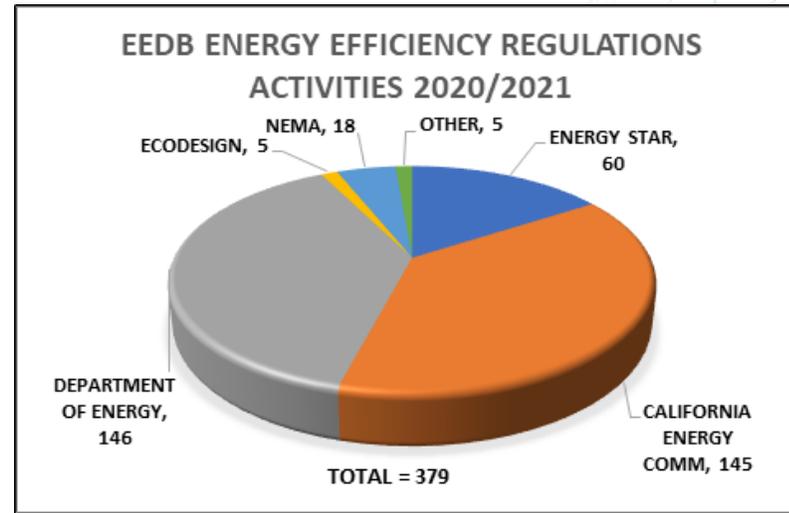
**Join us! Contact us at [power@psma.com](mailto:power@psma.com)**

# Energy Management Committee



## Focus areas

- Maintaining databases with the most recent information on energy efficiency standards for appliances, electronic power supplies, and motor drives, both existing and evolving, from government and regulatory organizations worldwide
- Organizing presentations on power electronics and technologies applicable to Distributed Energy Resources (DER), including wind generators, photovoltaic systems, fuel cells, micro-inverters, energy recovery, and energy storage systems
- Informing stakeholders on the status, trends, and issues related to alternative energy products and system applications as well as emerging technologies and markets for alternative energy sources
- Facilitating cooperation between PSMA and manufacturers, industry standards organizations, and government policymakers on matters regarding energy efficiency and management
- Driving PSMA participation in international and domestic conferences and technical workshops, for example, by sponsoring industry sessions and webinars





Mr. David Chen joined Power Integrations in September 2015 as Director of Applications Engineering. With 28 years of experience in power system design and applications, David has held senior management positions at both publicly traded and privately held companies, including Volterra (acquired by Maxim), Akros Silicon and Jade Sky Technologies, an LED driver start-up which he co-founded. David received both his B.S. degree in Electrical Engineering and M.S. degree in Mechanical Engineering from MIT and is the author of two patents.

David also currently serves as the chair for the PSMA Energy Management Committee.

# Global Policy Framework

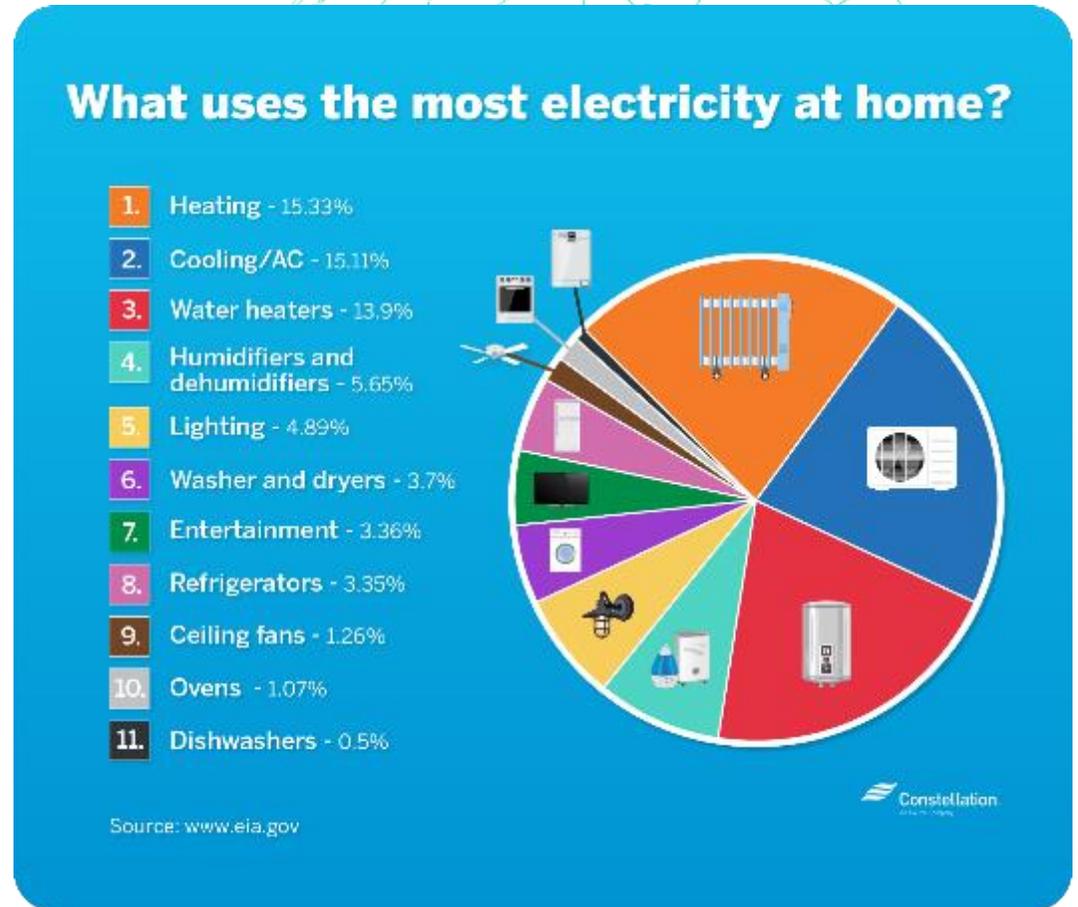
David Chen, Arnold Alderman



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# Why Appliances and Equipment

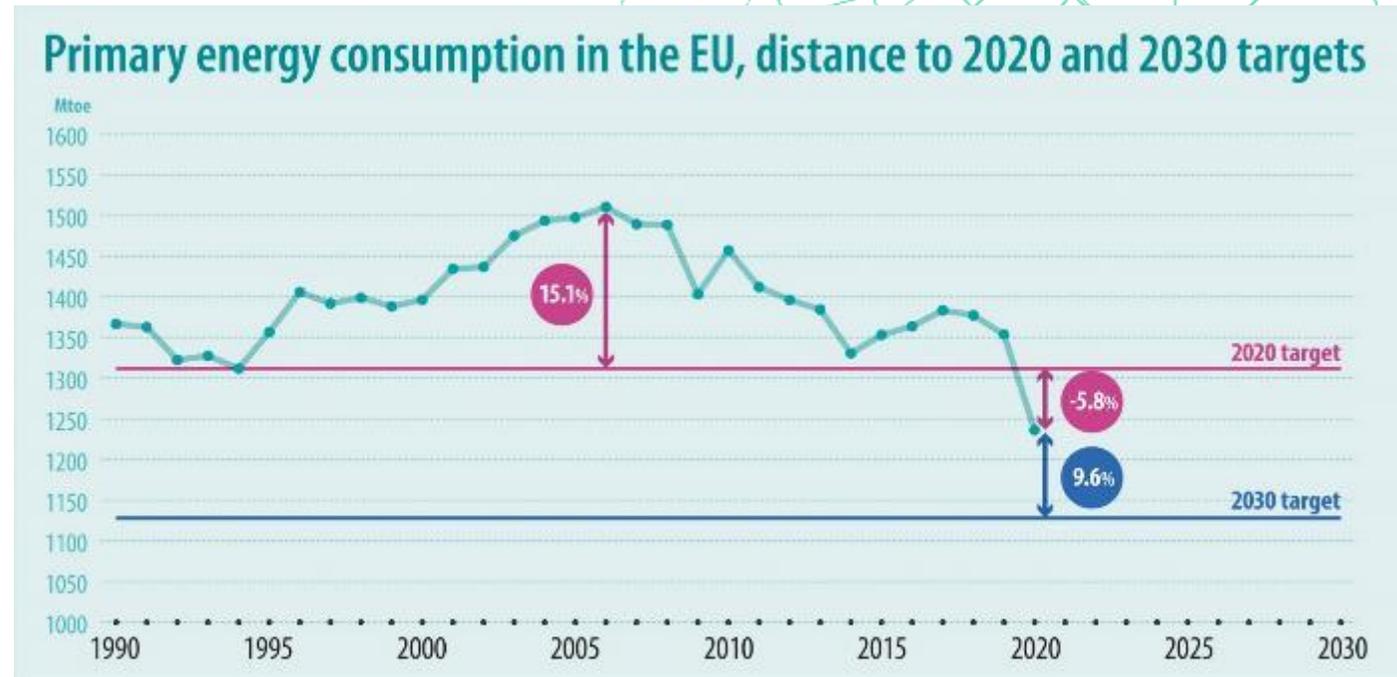
- Most power supplies are located in appliances, powering more than 15 appliances in any house
- Efforts to improve appliance efficiency started in 1974 with focus on the refrigerator
  - Today's refrigerators use 44% less energy than those in 1990 despite greater than 15% more storage capacity at nearly half the retail cost\*
- In 2002, attention widened to whole range of appliances and equipment, with the external power supply powering everything from toothbrushes to cell phones



\*Reference: <https://www.regulations.gov/document/EERE-2013-BT-NOC-0005-0106>

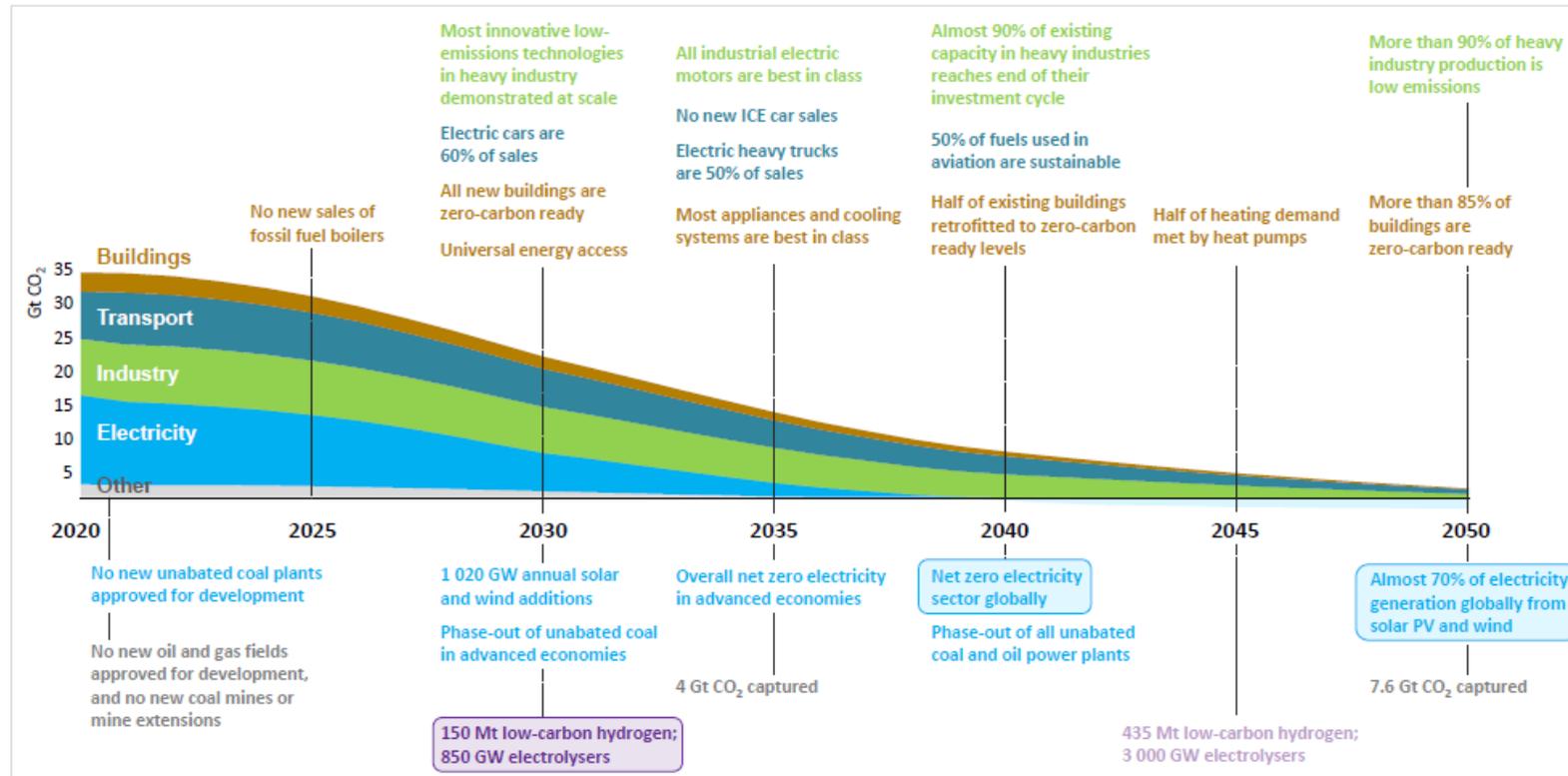
# Starting to Bend Energy Consumption Curve

- Enough progress was made by 2016 that government agencies decided to set the energy consumption baseline for all appliances
- By 2020, Europe already achieved over 50% of the energy reduction needed at 2030
- Progress due to...
  - New policies
  - Better technologies
  - COVID-19



# The World Cannot Rest on our Laurels

Set near-term milestones to get on track for long-term targets



IEA 2021. All rights reserved.

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Targets start with CO<sub>2</sub> and translate into energy consumption reduction needed

Source: IEA NZE (Net Zero Emissions) 2050\_launch\_slides

# Targets for 2030, 2050, and 2060

- EU achieved its 20-20-20 climate and energy targets (vs. 1990 levels)\*
  - Greenhouse gas emissions 31% lower
  - Share of renewables at 21.3%
  - Reduction in energy consumption by 23% (helped by 2020 COVID lockdowns)
- Governments have set new targets for 2030 and 2050
  - In 2018, EC set new binding energy efficiency target of 32.5% for 2030
  - EU recently adopted a 55% net emissions reduction target by 2030
  - Goal for climate neutrality and net zero net energy by 2050
- China has “dual carbon goals”
  - Peak CO2 emissions by 2030
  - Carbon neutrality by 2060

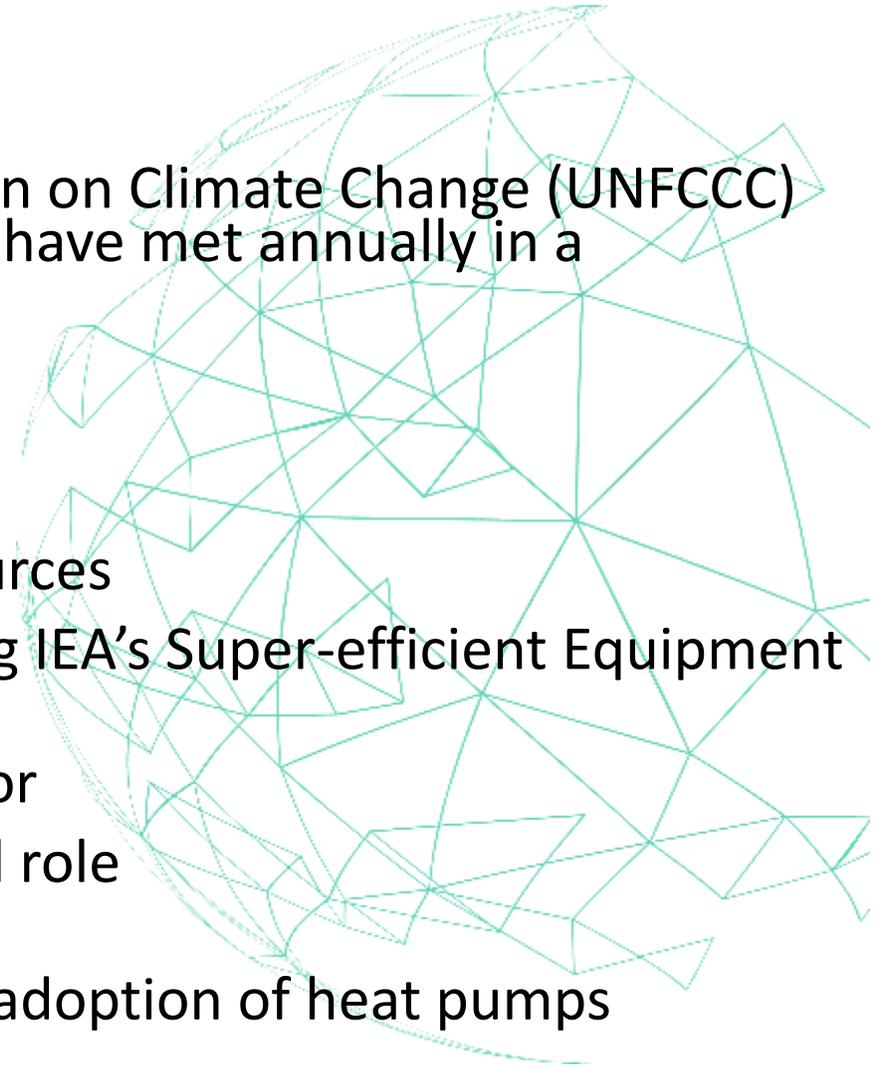
\*Source: European Environment Agency (EEA) report ‘Trends and Projections in Europe 2021’

# Climate Neutrality by 2050 Hinges on Global Push to Increase Energy Efficiency

- Reaching EU's 2030 energy efficiency target requires much faster decline in energy consumption vs. gains achieved from 2005-2020
- After 2030, without new measures, savings level off
- Annual efficiency improvement needs to double (2% → 4%) to match ambition of IEA Net Zero Emissions by 2050
- Three key policies drive reductions in electricity consumption
  - Regulations (Minimum Energy Performance Standards)
  - Information (Labels)
  - Incentives

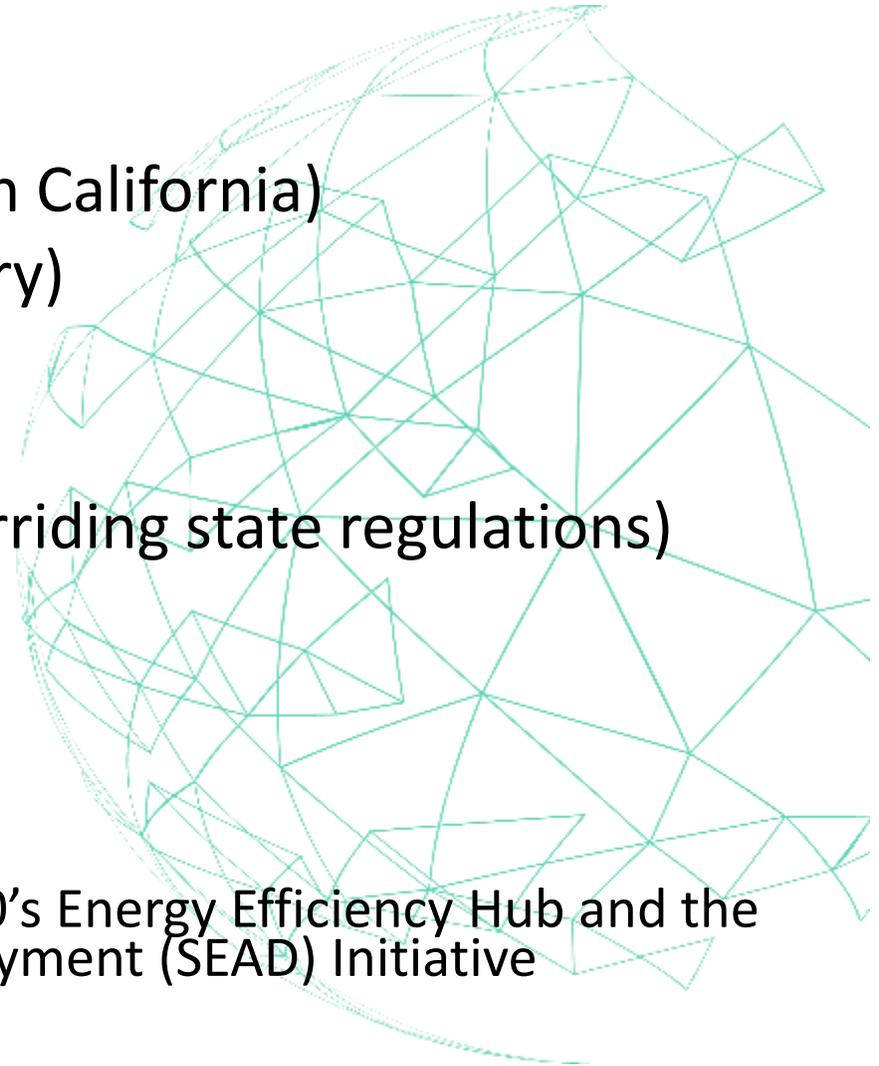
# COP26

- Since the United Nations Framework Convention on Climate Change (UNFCCC) came into force in 1994, parties to the UNFCCC have met annually in a Conference of Parties (COP)
- Agreements to tackle climate change
  - Coal pact
  - Methane deal
- Increase in investment in renewable energy sources
- Initiative to increase energy efficiency by joining IEA's Super-efficient Equipment and Appliance Deployment (SEAD)
- Regulations needed to shape consumer behavior
- Condition monitoring will need to play a central role
  - Example: aerospace sector for safety
- Installation and aesthetics are main barriers to adoption of heat pumps



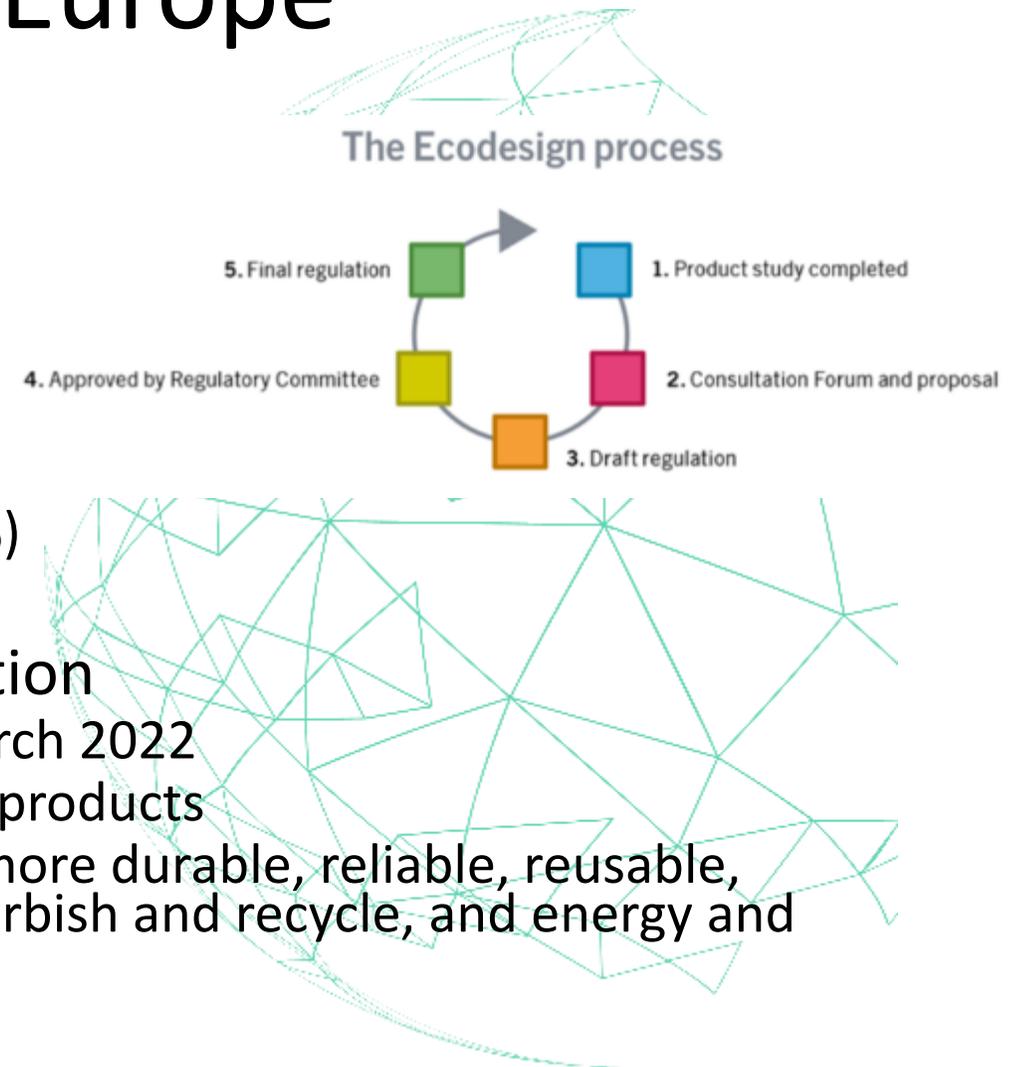
# Leading agencies

- California Energy Commission (mandatory in California)
- European Commission Ecodesign (mandatory)
- EU Code of Conduct (voluntary)
- ENERGY STAR® (voluntary)
- U.S. Department of Energy (mandatory overriding state regulations)
- UK Brexit implications (mandatory)
- Standardization Administration of China
  - China's representative body for ISO and IEC
- International Energy Agency
  - Coordination through programs such as the G20's Energy Efficiency Hub and the Super-Efficient Equipment and Appliance Deployment (SEAD) Initiative



# Broadening Frameworks - Europe

- EU policy framework for energy efficiency
  - 50 implemented measures in place
  - 31 product groups + horizontal standby
- Impact (2020 vs. BAU)\*
  - 10% cut in EU primary energy use
  - Electricity savings ~1000 kWh/household (27%)
  - €60B annual consumer savings
- Ecodesign for Sustainable Products Regulation
  - Presented by European Commission on 30 March 2022
  - Extends existing scope beyond energy-related products
  - Enables new requirements to make products more durable, reliable, reusable, upgradable, repairable, easier to maintain, refurbish and recycle, and energy and resource efficient



# Ecodesign Working Plan 2022-2024 and Product Priorities



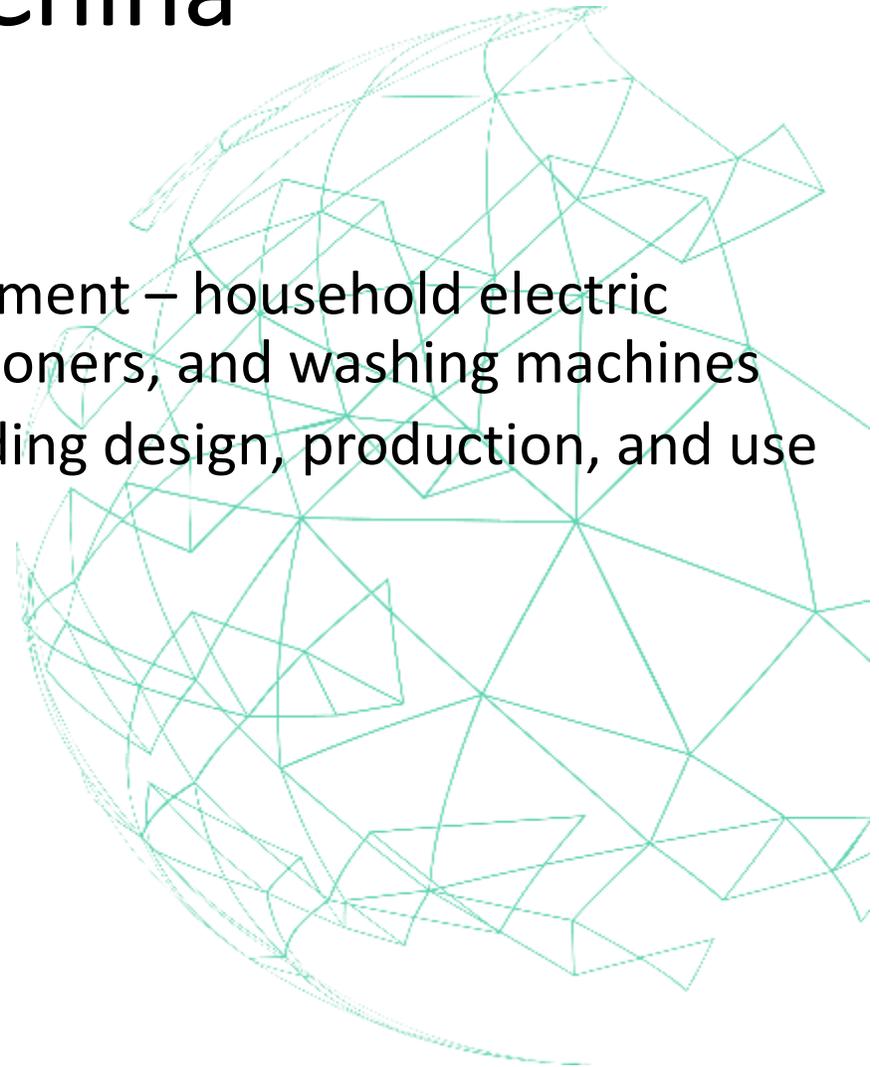
- 46 reviews due by end of 2025
  - Heating and cooling
  - Rescaling tumble dryers and cooking appliances
  - Other reviews – water pumps, fans, external power supplies
- New regulations in consideration
  - Smart phones and tablets
  - PV panels/systems
  - Small network equipment for home and office (for internet connection and local network)
  - Enterprise network equipment (switchers, routers)
  - Imaging equipment – from voluntary agreement to regulation
  - Industrial smart sensors
  - Tires (retreading, abrasion/mileage)
  - Low-temperature emitters (radiators optimized for <math><45^{\circ}\text{C}</math>)
  - Professional laundry appliances, dishwashers, and cooking appliances
  - Universal external power supplies – linking to common charger initiative
  - Electric vehicle chargers
- Horizontal priorities
  - Standardization, circular economy, market surveillance and compliance, EPREL database



Newest

# Broadening Frameworks - China

- China GB/T 39761.1-2021
  - National standard for Green Product Assessment – household electric appliances – Part 1: refrigerators, air conditioners, and washing machines
  - Focus on the entire product life cycle, including design, production, and use



# DOE Appliance and Equipment Standards



- Mandated review of each federal appliance standard every six years
- Appliance Standards and Rulemaking Federal Advisory Committee published draft of 5-year rulemaking schedule on June 2022
- Flurry of activity related to energy conservation standards covering appliances ranging from televisions, ceiling fans, air conditioners and heat pumps to external power supplies, battery chargers and electric motors
- Standards saved energy and money totaling \$76B in 2019, equivalent to \$464 per year per household\*

\*Source: Energy Efficiency and Renewable Energy (EERE) office -

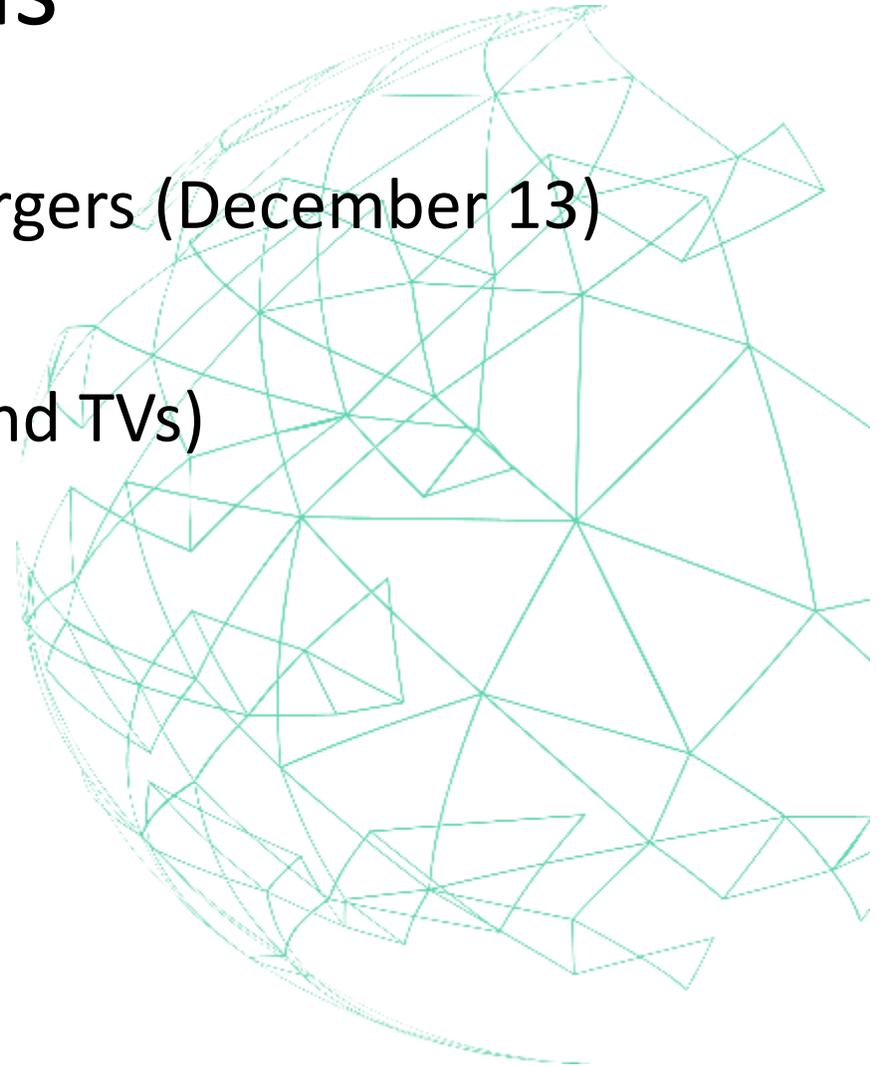
<https://www.regulations.gov/document/EERE-2013-BT-NOC-0005-0106>

# U.S. Energy Security and Climate Change Investments in Inflation Reduction Act of 2022

- Biggest legislative climate investment in U.S. history
  - \$369B toward clean energy manufacturing and tax credits for renewables and EVs
  - Cuts U.S. carbon emissions by 40% by 2030
  - Puts U.S. back in global position to lead climate initiatives with EU
- Provisions in new package build on last year's bipartisan infrastructure bill
  - Last year's bill included funding for EV charging stations and modernizing grid
  - New package adds incentives for consumers and businesses to pivot to clean energy
    - \$60B for domestic clean energy manufacturing (on-shoring)
    - \$30B for production tax credit for wind, solar, and storage
    - \$9B for consumer home energy rebate programs
    - \$2B for National Labs energy research
- Points positive for energy efficiency, renewables, and electrification

# Next: Deep Dive Topic Areas

- External power supplies and battery chargers (December 13)
- Major home appliances
- Electronic displays (including monitors and TVs)
- Standby regulations
- Greener heating and cooling
- Migration to BLDC motors
- Digitalization in energy



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## The principal activities of PSMA include:

- Co-Sponsors of the Applied Power Electronics Conference (APEC)
- Provides and maintains a Web Site with relevant industry and member information
- Conducts regular member surveys to identify areas of importance or concern
- Develops standard industry terminology
- Generates and publishes technology and market reports
- Provides regulatory agency interface
- Organizes technical workshops and seminars
- Coordinates with other power related organizations
- Facilitates benchmarking studies with member companies
- Promotes liaison with users, academia and government

[www.psma.com](http://www.psma.com)

## PSMA Benefits:

- **Networking:** Opportunity to meet and interact with your counterparts in other companies on an on-going basis
- **Valuable Information:** Members enjoy access to information in the Members Only area of the Web site
- **Involvement:** Opportunity to be involved with the planning and managing of APEC -- Applied Power Electronics Conference -- sessions that focus on the specific interest of members
- **Participation:** Participate in committees, workgroups and studies to derive a better understanding of market trends, industry trends and better operational procedures to improve performance
- **Discounts:** Receive discounts on registration fees for attending APEC and other PSMA sponsored events
- **PSMA/APEC Passport Program:** All PSMA members exhibiting at APEC can be included in the Passport to increase booth traffic.
- **Finding Trends:** Increase awareness and knowledge of trends and factors that can impact your company
- **Company Profile:** Listing of your company's profile on the PSMA Web Site with a hyperlink directly to your company Web Site
- **Resources:** Opportunity to post job openings and view resumes
- **PSMA Publications:** Regular members receive a copy of all new PSMA publications and reports with discounts for additional copies. Affiliate members may purchase the publications and reports at a discount
- **Power Technology Roadmap Report:** Regular a members receive a copy with discounts for additional copies. Affiliate members may purchase the report at a discount
- **Benchmarking:** Improve the operation of your company by participating in benchmarking studies with other companies in your industry
- **PSMA Newsletter:** Receive "Update" the quarterly newsletter of the PSMA, with information on activities in the industry and upcoming events. You may contribute articles for publication in the "Update"
- **Member Company Spotlight Banner:** Feature your company's products on the PSMA Home Page

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*Thank You and hope you have enjoyed the webinar*

**“Wisdom is not a product of schooling but of the lifelong attempt to acquire it.” – Albert Einstein**

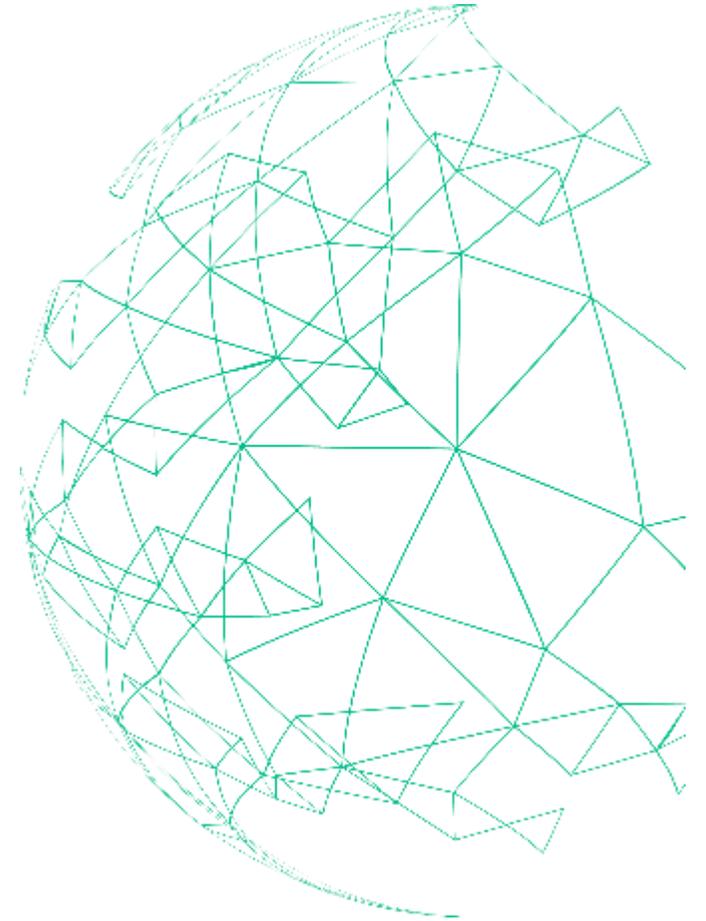
Check to see if your company is a member, there is a lot more available to PSMA member companies

If not a member, membership is very low cost for the benefits to you and your company as a whole.

As a member you become part of a team with over 100 companies  
Be part of the industry voice.

Contact info: [power@psma.com](mailto:power@psma.com)

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**"Individual commitment to a group effort--that is what makes a team work, a company work, a society work, a civilization work." --Vince Lombardi**