

100% Clean: How DOE's Solar Investments Will Help to Achieve Ambitious Decarbonization Goals

- **Jennifer Granholm**, Secretary of Energy
- **Kelly Speakes-Backman**, Acting Assistant Secretary for Energy Efficiency & Renewable Energy
- **Becca-Jones Albertus**, Director of the Solar Energy Technologies Office

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- This event is being recorded
- Please stay muted and keep your camera off
- Slides, recording, and transcript will be available on energy.gov/seto-webinars
- Previously submitted questions will be answered at the end
 - Submit new questions to solar@ee.doe.gov and we will answer them after today's event
- For technical difficulties, chat or email Meisha Baylor (meisha.baylor@ee.doe.gov)



Office of ENERGY EFFICIENCY
& RENEWABLE ENERGY

SOLAR ENERGY TECHNOLOGIES OFFICE

100% Clean: How DOE's Solar Investments Will Help to Achieve Ambitious Decarbonization Goals

March 25, 2021

Kelly Speakes-Backman, Acting Assistant Secretary for
Energy Efficiency and Renewable Energy

Dr. Becca Jones-Albertus, Director, Solar Energy
Technologies Office

energy.gov/solar-office



Solar Energy Technologies Office (SETO) Overview

MISSION

We accelerate the **advancement** and **deployment of solar technology** in support of an **equitable** transition to a **decarbonized energy system by 2050**, starting with a decarbonized power sector by 2035

WHAT WE DO

Advance solar technology and drive soft cost reduction to make solar **affordable** and **accessible** for all Americans

Enable solar to **support grid reliability** and pair with storage to provide new options for **community resilience**

Support **job growth**, **manufacturing**, and the **circular economy** in a wide range of applications

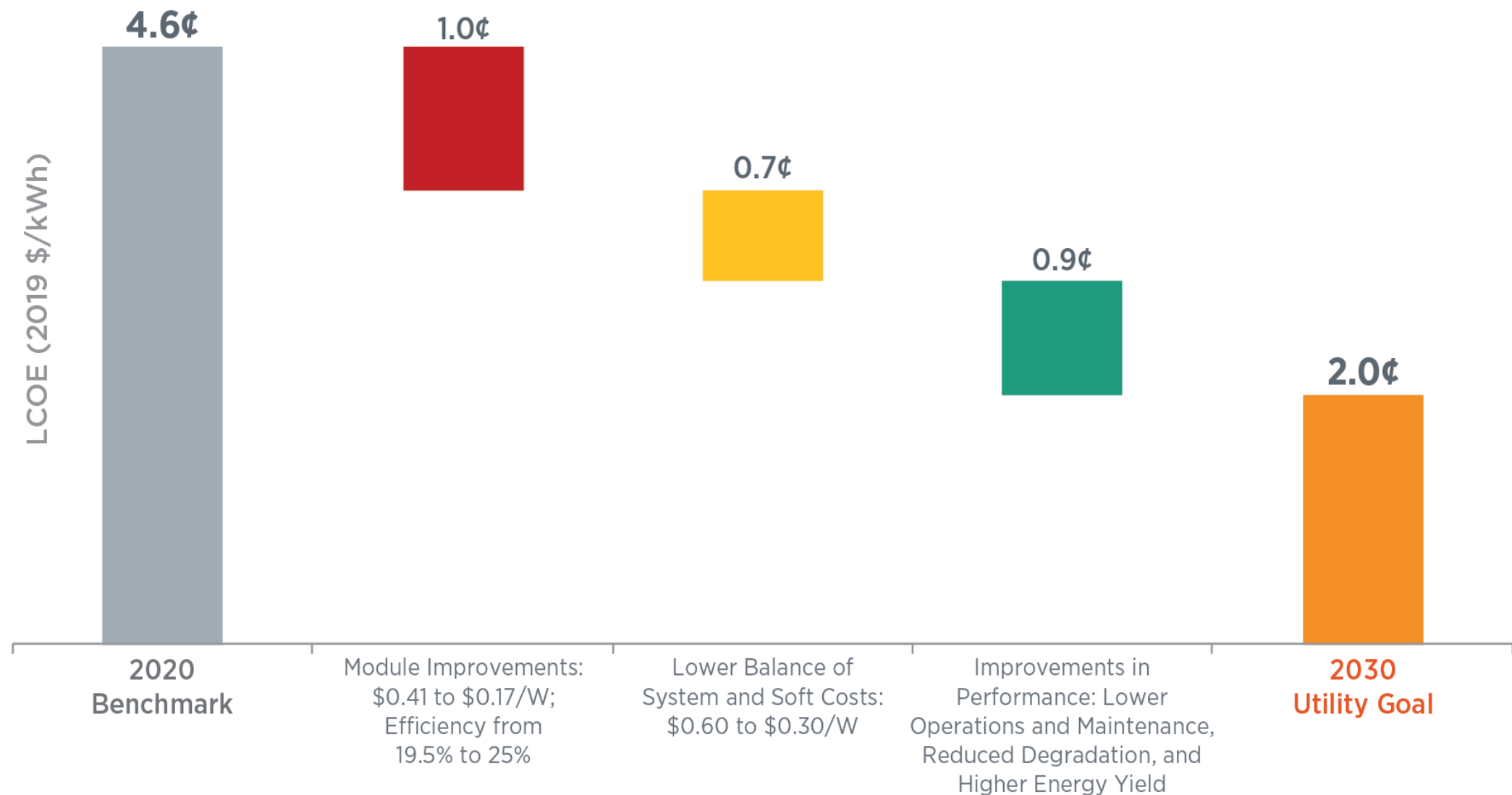


Driving Toward Decarbonization

- ▶ **Accelerate solar deployment and associated job growth** by opening new markets, providing workforce training, growing U.S. manufacturing, reducing environmental impacts, and **putting a focus on energy justice**.
- ▶ Enable inverter-based technologies to provide essential grid services and black start capabilities while demonstrating the **reliable, resilient and secure operation of a 100% clean energy grid**.
- ▶ **Reduce hardware and soft costs** of solar electricity for all Americans to enable an affordable carbon-free power sector by 2035.
- ▶ **Support a decarbonized industrial sector** with advanced concentrating solar-thermal technologies and develop affordable renewable fuels produced by solar energy.

New 2030 Cost Target: \$0.02 per kWh for Utility-Scale PV

A Pathway to \$0.02 per kWh for Utility-Scale PV



SETO FY2021 PV Funding Topics

- **50-Year Service Life PV Systems**
 - Improve lifetime of PV system components and lower the cost of PV energy
- **Small Innovative Projects in Solar (SIPS)**
 - New and emerging PV research that can achieve results in >1 year
- Submit letters of intent by **April 25, 2021**

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April 12, 2021, 2:00 p.m. ET

Photovoltaic (PV) Cells and Modules

Commercial Solar Cell Materials



Monocrystalline Silicon PV



Cadmium Telluride (CdTe) PV

Record module efficiency:

24.4%

19.0%

U.S. market share (2019):

80%

20%

Estimated module lifetime:

25-40 years

25-30 years

Emerging Solar Materials and Modules



Perovskite PV

New efficiency
record of 25.5%



Building-integrated PV

Developing new materials
and system designs

Advanced Module Designs

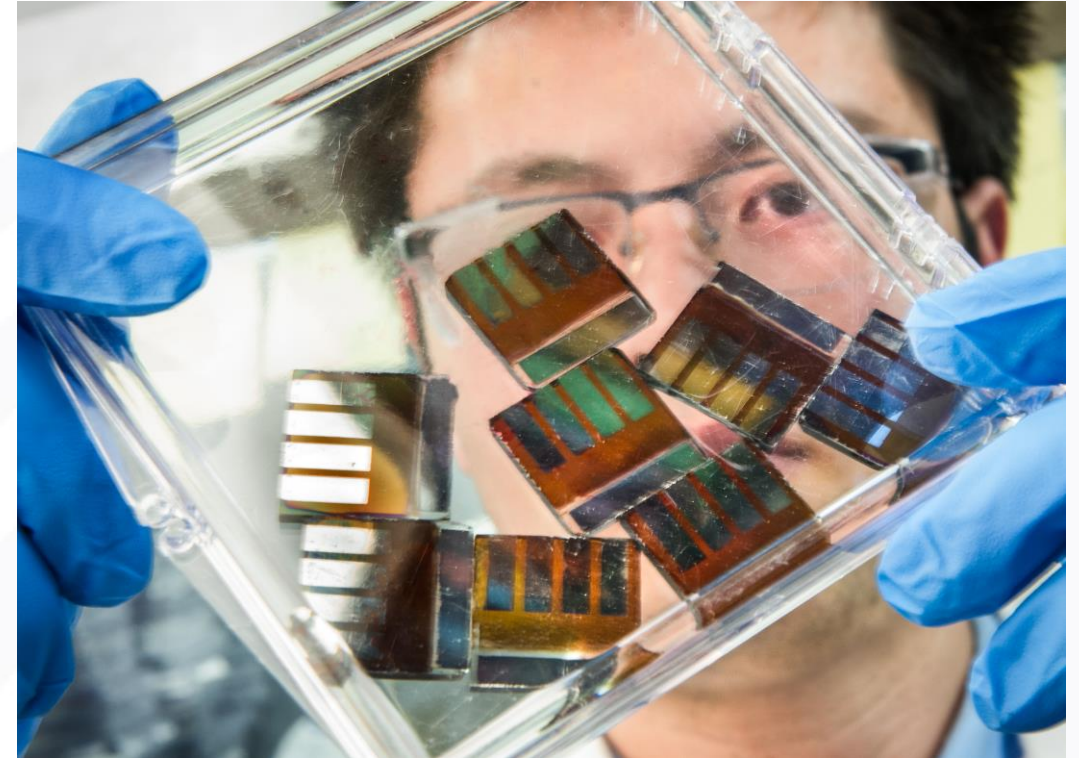


Bifacial PV Modules

Installed commercial
capacity increased 4x
from 2018 to 2019

SETO FY2020 Perovskite FOA Selections

- FOA released August 13, 2020
- \$40 M awarded for 22 projects
- **Research and development in:**
 - Device Efficiency/Stability
 - Manufacturing
- Establishing a **Validation and Bankability Center**
- Enable domestic production of high-efficiency perovskite PV devices and boost confidence in long-duration field performance



American-Made Challenges: Perovskite Startup Prize

PEROVSKITE STARTUP PRIZE

— \$3 MILLION —

A prize designed to accelerate the growth of the U.S. perovskite industry and support the rapid development of solar cells and modules that use perovskite materials.

AmericanMadeChallenges.org/PerovskitePrize

- **Goal:** Accelerate the growth of the U.S. perovskite industry
- Applications accepted on a rolling basis, first period closes in June

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1:00 p.m. ET



Cadmium Telluride (CdTe) PV Accelerator Consortium

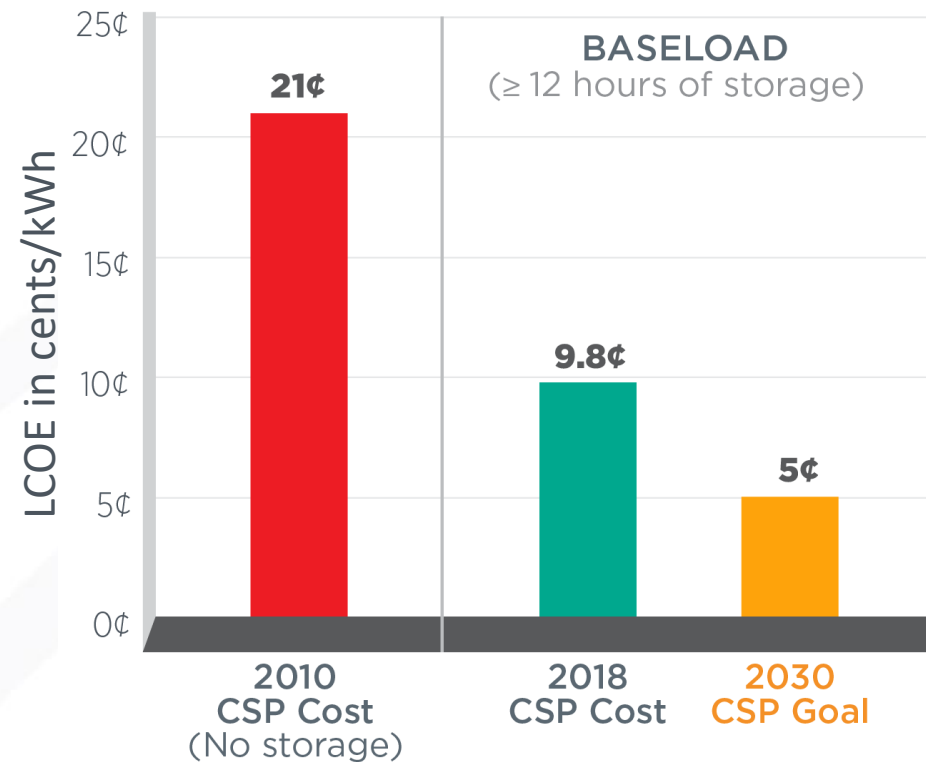
- With \$20 M from SETO, the National Renewable Energy Laboratory (NREL) will coordinate a consortium to enhance U.S. leadership and competitiveness in CdTe PV
- Competitive solicitation to select consortium leadership will be released in May 2021
- 2030 CdTe PV Accelerator Goals:
 - Increase U.S. CdTe PV production
 - Achieve CdTe PV efficiencies of 26%
 - Decrease CdTe module costs to \$0.15/watt

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Research Area: Concentrating Solar-Thermal Power

SETO's 2030 cost targets for concentrating solar-thermal power (CSP) plants with ≥ 12 hours of storage will help make CSP competitive with other dispatchable generators.



Priority R&D Topics:

- Designing high-temperature ($>700^{\circ}\text{C}$) systems
- Enhancing CSP plant performance and reliability
- Lowering installation costs
- Developing systems and components for solar-driven industrial processes

Generation 3 (Gen3) CSP Pathway Downselect

- Sandia National Laboratories **falling-particle receiver** technology chosen as most promising pathway for high-temperature ($>700\text{ }^{\circ}\text{C}$) heat transfer for CSP
- Will receive **\$25M** to build a next-generation, multi-megawatt CSP plant using this technology



SETO FY2021 CSP Funding Topics

- **SOLAR R&R:** Scalable Outputs for Leveraging Advanced Research on Receivers & Reactors
- **PTES:** Pumped Thermal Energy Storage
- **CSP PERFORM:** Process Enhancement and Refinement for Operations, Reliability, and Maintenance
- **CSP REFORM:** Research in Equipment for Optimized and Reliable Machinery
- **SIPS:** Small Innovative Projects in Solar
- Letters of intent due by **April 25, 2021**

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PV/CSP FOA Diversity, Equity, and Inclusion Plan

- Applicants required to submit a plan describing how they will support underrepresented groups, advance equity, and promote inclusion
- Minority-serving institutions, minority-, woman-, or veteran-owned businesses, or entities from disadvantaged communities are encouraged to apply



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Solar Solutions for a Clean Energy Future



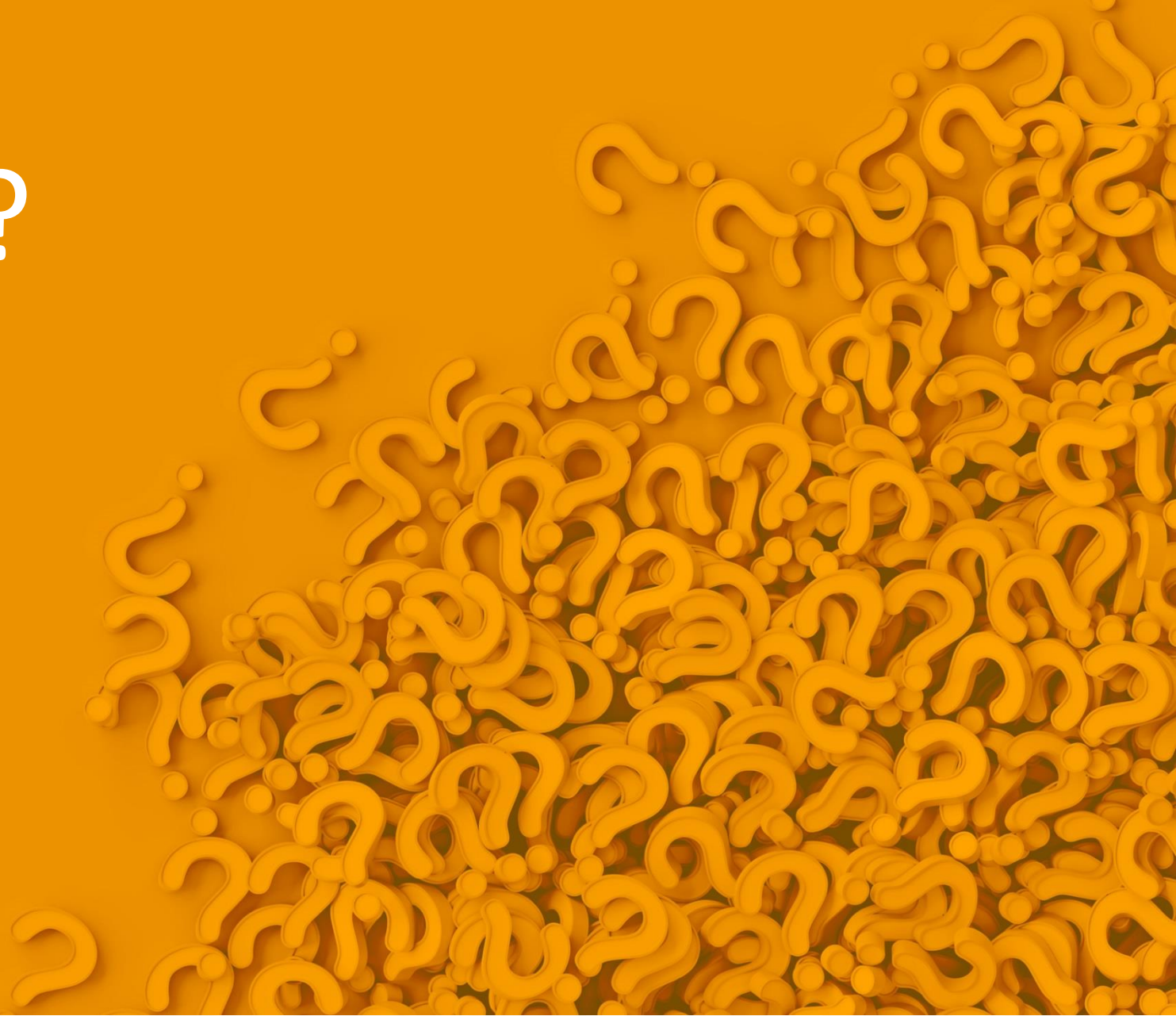
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- [Register](#) for the Perovskite Prize webinar on **April 13** at 1:00 p.m. ET and [apply for the first round](#) by **June**.
- [Sign up for the mailing list](#) for the CdTe PV Accelerator program to get updates on upcoming webinars and deadlines.



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QUESTIONS?



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