

Thank you for joining. A few notes about logistics for today:

- All participants will be muted on entry.
- Official PICG members will be unmuted when the meeting begins.
- Due to bandwidth restraints, non-PICG members should turn off their video unless it is during the public comment section.
- You may ask clarifying questions at any time using the chat feature and we will try our best to answer them as we go.
- All other substantive public comments should wait for the public comment section of the agenda (3:00 pm).
- If you are having difficulty, please e-mail Amanda Fornelli and amanda@the2rgroup.com.

EPIC PROGRAM

**POLICY + INNOVATION
COORDINATION GROUP**

Agenda

- | | | |
|----|---|----------------|
| 01 | Welcome and Introductions | 1:30 – 1:35 PM |
| 02 | PICG Process to date | 1:35 – 1:40 PM |
| 03 | Partnership Area Identification Process | 1:40 – 1:50 PM |
| 04 | Review of Partnership Areas Pt. 1 | 1:50 – 2:10 PM |
| 05 | Review of Partnership Areas Pt. 2 | 2:10 – 2:25 PM |
| 06 | Review of Partnership Areas Pt. 3 | 2:25 – 2:45 PM |
| 07 | Review of Partnership Areas Pt. 4 | 2:45 – 2:55 PM |
| 08 | Other Partnership Areas Considered | 2:55 – 3:00 PM |
| 09 | Opportunity for Public Comment | 3:00 – 3:20 PM |
| 10 | Next Steps | 3:20 – 3:30 PM |

What is the PICG?

- Response to Evergreen Evaluation of the EPIC Program (2017)
- Established via CPUC decisions D.18-01-008 and D.18-10-052
- High level goal of improving information sharing and coordination both between the EPIC administrators and between the EPIC administrators and CPUC

PICG MISSION

- To identify timely opportunities for substantive feedback and coordination among EPIC investments and California's energy innovation needs and goals
- To provide the support functions that will allow this feedback and coordination to occur effectively

(Note: The PICG is an advisory body and does not itself dictate policy for any of the EPIC administrators nor the CPUC)

Quick Review

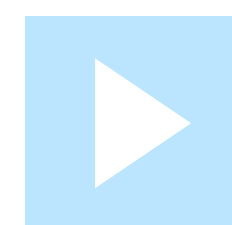
1. Introductory Meeting January 9, 2020
2. Workplan Development January 24, 2020
3. Partnership Area Identification Process Review February 7, 2020
4. PICG Member Interviews and Background Research Feb. 12-(ongoing)
5. Partnership Area Identification Kick-Off March 23, 2020
- 6. Preliminary Partnership Area Presentation April 15, 2020**
7. CPUC narrows Partnership Areas to top 3-5 June 2020
8. Partnership Area workstreams and meetings Sept. 2020 – March 2021
9. 2020 PICG Forum November 2020

Partnership Area Identification

Policy + Innovation Partnership Areas are “issue areas of common interest and substantive opportunity, around which the PICG will engage in targeted coordination.”



WHERE ARE TIMELY OPPORTUNITIES TO CONNECT RD&D TO POLICY?



WHERE CAN ENHANCED COORDINATION ACCELERATE OUTCOMES?



WHAT ARE THE MOST CRITICAL CHALLENGES?

What will the PICG do with Partnership Areas?

3-5

Finalize 3-5 Partnership Areas

JUNE 2020



Announce Partnership Areas and Recruit Participants

JUNE 2020



Outreach to Disadvantaged Communities

JUNE 2020



Conduct Partnership Area Stakeholder Meetings

SEPT. 2020 – MARCH 2021



Conduct an annual Policy + Innovation Forum

NOV. 2020 / OCT 2021



EPIC Project Transparency and Data

2020 – 2021 (& BEYOND)

How will the CPUC identify Partnership Areas?

The Project Coordinator has conducted the process for identifying Possible Partnership Areas as described in the below Partnership Area Identification Process.

1. Developing the Partnership Area Framework
2. Map EPIC Projects onto obstacles and challenges in Partnership Area Framework
3. Identify Critical Areas
4. Identify Timely Opportunities
5. **Compile Possible Partnership Areas**
6. Narrow Partnership Areas into top 3-5 for 2020

PROPOSED PARTNERSHIP AREAS

- 1 HOW CAN WE ENSURE THE TRANSITION TO CLEAN ENERGY IS ALIGNED WITH AND ADDRESSES **DAC/LOW-INCOME CUSTOMER NEEDS**
- 2 HOW DO WE DEPLOY **MICROGRIDS** QUICKLY
- 3 HOW CAN CALIFORNIA ACCELERATE **LONG-DURATION ENERGY STORAGE** TO MEET THE MARKET NEED IN TIME
- 4 HOW DO WE DEVELOP NEW TOOLS TO PRIORITIZE AND WEIGH **WILDFIRE MITIGATION** INVESTMENTS
- 5 HOW DO WE PRIORITIZE INVESTMENTS TODAY TO MINIMIZE SOCIAL AND ECONOMIC DISRUPTION OF **PSPS** FOR THE MOST CRITICAL PUBLIC SERVICES AND MOST VULNERABLE
- 6 HOW CAN WE ENSURE THE EMERGING **ELECTRIFICATION OF VEHICLES** SUPPORTS, AND DOESN'T HARM AND OVERWHELM, THE ELECTRIC GRID
- 7 CAN WE **DECARBONIZE OUR BUILDING STOCK** WITHOUT STARTING FROM SCRATCH
- 8 HOW CAN WE BRING TOGETHER ENERGY EFFICIENCY INVESTMENTS AND R&D EFFORTS TO MOVE THE NEEDLE ON **LOW-INCOME MULTIFAMILY RETROFITS**
- 9 WHAT IS THE NEW ROLE OF **DISTRIBUTED ENERGY RESOURCES** AS WE RESHAPE THE GRID
- 10 HOW CAN WE DEPLOY CONSISTENT, TECHNOLOGY-NEUTRAL **PRICE SIGNALS** TO UNLOCK AND OPTIMIZE THE CUSTOMER ROLE IN GRID SERVICES
- 11 CAN WE DEPENDE ON **GREEN ELECTROLYTIC HYDROGEN** TO SERVE OUR LAST 20% OF DECARBONIZATION NEEDS
- 12 HOW CAN WE ENSURE THE INVESTMENTS WE ARE MAKING IN THE GRID TODAY PREPARE US FOR THE **CLIMATE REALITY OF TOMORROW**

1

HOW CAN WE ENSURE THE TRANSITION TO CLEAN ENERGY IS ALIGNED WITH AND ADDRESSES DAC/LOW-INCOME CUSTOMER NEEDS?



REFERENCE: PAGES 12-14

- This partnership area seeks to bring stakeholders together to discuss and identify critical gaps for DACs/low-income communities within EPIC project design and develop a plan of action to increase transparency, community involvement and knowledge transfer.
- This initiative will also focus on bringing together all EPIC project participants who have worked with DACs/low-income communities to discuss areas for collaboration and present opportunities for inclusive program design to other program participants.
- This partnership area will aim to drastically improve the dialogue and leverage existing market research for understanding critical differences and similarities in our California communities and how to access them, and how to ensure community benefit.

CORE QUESTIONS

What are effective ways for researchers or program implementers to understand the specific needs and strengths of communities?

- What resources and technical assistance do community organizations need to engage?
- What technical assistance and support would be helpful?
- What should community outreach look like in this ever-changing energy landscape and environment?
- What aspects of an R&D project do community members and community-based organizations want to be involved in?

What technical and financial challenges are more significant in DACs or Low-Income communities?

- What are residential and business challenges?
- What are the intersections with public health and safety?
- What challenges are posed by renting and multi-family properties?
- How can we develop impactful financing programs for DACs/LI to access clean energy?

What initiatives have been successful in DACs or Low Income Communities?

- What aspects made them successful?
- What are the challenges that are still unresolved?
- What community structures can be leveraged more effectively?

Who may be missing from the discussion and what is the most effective way to bring them in? How do we ensure they feel heard?

HOW DO WE DEPLOY MICROGRIDS QUICKLY ?

REFERENCE: PAGES 15-18

- This Partnership Area will bring together EPIC-funded stakeholders working across the microgrid space to facilitate shared learnings in past microgrid projects, and technology innovations today which can drive replicable design and unlock market potential.
- The goal of collaboration would be to identify simpler Microgrid Toolkits or standard designs that enable the quick deployment of Microgrids in priority areas.
- This Partnership Area will also bring together stakeholders to discuss regulatory and policy solutions, rate structures, and incentives which can facilitate low cost implementation.

What are the essential components to a microgrid design that could be easily replicated?

- What are some lessons or take-aways from previous microgrid projects?
- What are challenges in interconnecting microgrids today?
- How can we make microgrids affordable?
- What technologies are not available today which are needed to achieve replicable and affordable microgrids?
- How have microgrids been funded or financed?

What constitutes a good location for a microgrid?

- How can we leverage areas with existing and new behind-the-meter DERs to develop microgrids?
- How can we make microgrid accessible to DACs and low-income communities?

CORE QUESTIONS

HOW CAN CALIFORNIA ACCELERATE LONG-DURATION ENERGY STORAGE TO MEET THE MARKET NEED IN TIME ?

REFERENCE: PAGES 19-20

- Current energy storage technology has been focused on power-dense lithium-ion, which can be charged and discharged rapidly, but can be cost-prohibitive as an option for long-duration energy needs.
- This potential future Partnership Area would bring together EPIC projects focused on long duration battery storage R&D to gather learnings on this technologies charge and discharge capabilities, potential solution to the intermittency of renewable assets, added grid reliability, and ways to overcome hurdles to interconnection.

CORE QUESTIONS

What technologies are best for long duration storage? Are these technologies readily available?

- How do we reduce the upfront cost of long duration storage technologies?
- How much physical space do these long duration storage options take up?

How do we create a market for long duration storage?

- What permitting challenges may long duration storage face?
- What interconnection challenges may long duration storage face?
- Where should these technologies be located?
- Do these assets serve an individual customer need or a broader grid need?

What are the lifecycle impacts of long duration storage options, such as waste and other environmental impacts?

Partnership Area Input

- A. Comment on this group of Possible Partnership Areas.
- B. Highlight Partnership Areas where you think the issues are most critical, timing is most ripe, and there are areas for coordination among R&D efforts.
- C. What core questions are missing?
- D. What other timely opportunities should we be aware of?

HOW DO WE DEVELOP NEW TOOLS TO PRIORITIZE AND WEIGH WILDFIRE MITIGATION INVESTMENT ?

REFERENCE: PAGES 21-24

- As the Commission evaluates and implements Wildfire Mitigation plans, understanding the types, trends, and tradeoffs of solution sets are essential for prioritizing asset investments and understanding the costs-benefit of alternatives.
- This Partnership Area will leverage the work being done by EPIC projects to gain better access to data and modeling to understand wildfire ignition risk and spread risk, to understanding the impact of climate change on that risk, and to understand the wide range of solutions that may be leveraged to most cost-effectively mitigate wildfires and related Public Safety Power Shutoff events.

How can we create transparency in asset management schedules and asset management planning?

- What methods are used to calculate risk spend efficiency?
- How can point in time decision making around asset hardening and asset management be improved?
- How do we best model future grid topography?

What are emerging fire prevention technologies and what are the intended for?

What models and forecasting tools are not available today?

How are DACs and Low-Income communities incorporated into the wildfire prevention and asset management strategies?

How do we get from R&D to commercialization and incorporate into daily operations?

CORE QUESTIONS

HOW DO WE PRIORITIZE INVESTMENTS TODAY TO MINIMIZE SOCIAL AND ECONOMIC DISRUPTION OF PSPS FOR THE MOST CRITICAL PUBLIC SERVICES AND MOST VULNERABLE



REFERENCE: PAGES 25-27

- This Partnership Area seeks to leverage lessons learned from EPIC projects focused on grid hardening, sensors, monitoring, grid controls and distribution automation, and seek to bring together researchers and community stakeholders to identify solutions that can best be utilized to minimize or mitigate shutoffs, and to identify priority areas in communities where resiliency can be best supported.

CORE QUESTIONS

What were the social and economic disruptions of prior PSPS events?

Which strategies have been tested for minimizing disruptions from PSPS events?

What sensors or situational awareness tools could be used to mitigate shutoffs?

What can traditional grid modernization strategies and technologies teach us about what works and what doesn't work?

What role does telecommunications play in resiliency needs?

What are best practices in stakeholder communication and engagement for emergency events?

How can we prioritize grid hardening or sectionalization to serve community resources needed the most?

How can more real-time information on shutoff events be shared with critical public service providers and communities.

Partnership Area Input

- A. Comment on this group of Possible Partnership Areas.
- B. Highlight Partnership Areas where you think the issues are most critical, timing is most ripe, and there are areas for coordination among R&D efforts.
- C. What core questions are missing?
- D. What other timely opportunities should we be aware of?

HOW CAN WE ENSURE THE EMERGING ELECTRIFICATION OF VEHICLES SUPPORTS, AND DOESN'T HARM AND OVERWHELM, THE ELECTRIC GRID?



REFERENCE: PAGES 28-30

- This Partnership Area will bring together RD&D efforts working on transportation electrification and vehicle-grid integration issue, as well as utility planning efforts, to accelerate innovation in the adoption, integration, and optimization of medium- and heavy-duty electric vehicle charging.
- This will focus on vehicle-grid communication and planning implementation, and ways to best mitigate the impact of clusters of medium- and heavy-duty vehicle charging on the distribution, particularly in areas that impact environmental justice communities.

What challenges do fleets face in electrification?

- How do we incentivize large fleets to electrify?
- How do we electrify rideshare?
- How can we develop a consistent charging standard for medium-/heavy-duty vehicles?

How can we leverage and support the work of the interagency Vehicle-Grid Integration (VGI) Working Group?

- Where has VGI successfully been implemented?
- What are the lessons learned?
- How do we incentivize customers to participate in optimized charging?

How can we mitigate grid impacts from clusters of medium-/heavy-duty electric vehicles?

- What communities across the state are most impacted by medium-/heavy-duty emissions?

CORE QUESTIONS

CAN WE DECARBONIZE OUR BUILDING STOCK WITHOUT STARTING FROM SCRATCH ?

REFERENCE: PAGES 31-34

- This Partnership Area would be focused on bringing together pilot projects under the BUILD Program and TECH Initiative and EPIC projects working on building decarbonization, addressing affordability, finance and market obstacles to DAC and Low-Income community participation in decarbonization, and to gain lessons learned on rebuilding after disasters.

CORE QUESTIONS

New buildings and rebuilding:

- How do we ensure DACs and Low-Income customers benefit?
- What challenges may be faced in electrifying buildings?
- How can coordination accelerate market transformation?
- What customer preferences may influence the decision to electrify?
- How do we optimize building electrification strategies?
- What does a community-wide strategy look like?

Building Retrofits

- How do we ensure DACs and Low-Income customers benefit?
- What challenges may be faced in electrifying buildings?
- How can coordination accelerate market transformation?
- What customer preferences may influence the decision to electrify?
- How do we optimize building electrification strategies?
- What does a community-wide strategy look like?
- How can we more comprehensively understand existing capacity for electrification (e.g. panel size, electrical service size)?

What impact does building electrification have on the electricity grid?

- What do new load profiles look like?
- What are impacts on distribution system?
- How do we ensure there is no cost shifting?

HOW CAN WE BRING TOGETHER ENERGY EFFICIENCY INVESTMENTS AND R&D EFFORTS TO MOVE THE NEEDLE ON LOW-INCOME MULTIFAMILY RETROFITS



REFERENCE: PAGES 35-37

- This Partnership Area will focus on bringing together EPIC projects focused on R&D of new retrofit technologies, businesses in the commercialized retrofit space, low-income communities, and building owners.
- Today, EPIC R&D projects focused on low-income multifamily buildings have trouble getting implemented because R&D investments often must be coupled with existing efficiency and retrofit investments in order to be viable, but there lacks methods to do so. Stakeholders will work together to find ways to integrate and incentivize new R&D technologies and approaches into whole building retrofits.
- This Partnership Area will also explore the potential health and safety benefits of deploying commercialized full building upgrades along with R&D technologies.

What challenges stand in the way to low-income multifamily retrofits?

- In older buildings, what permitting challenges may there be?
- How do you overcome retrofits that require tenants to evacuate the premises for an extended period of time?

Have there been successful projects integrating commercially available technologies with R&D technologies?

- Is it appropriate to deploy pre-commercial technologies in low-income homes? What additional customer protections are required?

Should building upgrades be driven by the tenant needs or the owners' desires?

- What are the retrofits that owners want?
- What are the retrofits that tenants need?

How do you incentivize building owners and low-income tenants?

- Who should pay for up-front costs?
- How do you value health and safety improvements?

CORE QUESTIONS

WHAT IS THE NEW ROLE OF DISTRIBUTED ENERGY RESOURCES AS WE RESHAPE THE GRID ?

REFERENCE: PAGES 38-42

- This Partnership Area will focus on providing the CPUC and policy-makers with a view to the future of the prospects of new DERs and other technology to unlock the ability of DERs to provide coordinated grid services and benefits for the future grid topology.
- It will bring EPIC and other researchers together to discuss new capabilities, as well as new grid needs, that can be supported by DER technology.

CORE QUESTIONS

What is the future of hosting capacity and planning?

- What technology enables greater hosting capacity at least cost?
- What behind-the-meter technology can help support greater hosting capacity?

What have we learned from distribution deferral efforts?

- What are the obstacles to deferring the need for capital expenditures on traditional distribution infrastructure with distributed energy resources?

How should we be thinking about the next technologies that can provide grid services?

- What new technology capabilities of DER can support system reliability or other grid services?
- What technologies can provide grid services actively vs. passively?
- What new data or transactions are needed for DER to provide grid services?

What role does utility communication and control play?

- What role can third-party aggregators play?
- What role can distributed intelligence / transactions play?
- What are alternative approaches to using communicating and controlling existing DER?

Partnership Area Input

- A. Comment on this group of Possible Partnership Areas.
- B. Highlight Partnership Areas where you think the issues are most critical, timing is most ripe, and there are areas for coordination among R&D efforts.
- C. What core questions are missing?
- D. What other timely opportunities should we be aware of?

HOW CAN WE DEPLOY CONSISTENT, TECHNOLOGY- NEUTRAL PRICE SIGNALS TO UNLOCK AND OPTIMIZE THE CUSTOMER ROLE IN GRID SERVICES



REFERENCE: PAGES 43-46

- This Partnership Area will bring together EPIC projects working across various technologies to better understand the impacts and value these technologies create for the grid, and identify consistent technology-neutral price signals that could be evaluated.
- As well, the Partnership Area will gain input from EPIC projects that have focused on customer and consumer behaviors to gain lessons learned on how rate structures and pricing encourage uptake and deployment.

- What price signals/ rate designs have worked and why?
- What specifically made them successful (technology, market, etc)
 - What entices people to make different or new decisions?
 - How do we ensure there is no cost shifting?

- What is the suite of technologies that need better price signals?
- What technologies should be able to access wholesale markets?

- What services can be provided and priced?
- How do you compensate for reliability?
 - How do you incentivize optimized charging?
 - How do you incentivize aggregation of several BTM DERs?

- What do we need in order to enable transactions and pricing for services?
- What tools do we need?
 - Who can participate?
 - How can prices for services be derived?
 - What enabling technology/platform is needed?
 - How do we ensure accuracy and safety of customer data?

CORE QUESTIONS

CAN WE DEPEND ON GREEN ELECTROLYTIC HYDROGEN TO SERVE OUR “LAST 20%” OF DECARBONIZATION NEED ?

REFERENCE: PAGES 47-48

- There are not many active EPIC projects focused on hydrogen or green electrolytic hydrogen.
- This Partnership Area would be focused on how to coordinate future hydrogen-focused R&D projects to test the decentralization of production, use in energy storage, use cases in industrial processes, and feasibility in medium/high duty vehicles.

CORE QUESTIONS

What are the best and most likely use cases for electrolytic hydrogen?

- What industrial process are the least likely to electrify and should renewable hydrogen fuel be focused on?
- Is renewable hydrogen a solution for long duration storage?
- Can you use hydrogen or renewable gas in the existing gas infrastructure?

Can you safely transport and store hydrogen?

How do you decentralize production?

What are the cost impacts of renewable hydrogen, and what is the path to bring costs down?

Are there any unintended impacts to creating renewable hydrogen?

HOW CAN WE ENSURE THE INVESTMENTS WE ARE MAKING IN THE GRID TODAY PREPARE US FOR THE CLIMATE REALITY OF TOMORROW?



REFERENCE: PAGES 49-51

- This Partnership Area will bring together EPIC projects focused on climate impact and adaptation forecasting and modeling.
- The Partnership Area will help to coordinate efforts, create transparency, and facilitate faster development of the models necessary to make important grid decisions and discuss what resources, data, and models may be needed for the future.

What tools do we have today to predict impacts on the grid tomorrow?

- Are these tools and data sources up-to-date and accurate?
- What do the models tell us today about the future of the grid?
- Which climate variables have the largest impact on the grid?
- What are the impacts of a changing climate on electricity generation (e.g. hydro production)?
- Will changing climate conditions impact the efficiency or ability for grid components to operate effectively?

Do we have accurate forecasts for climate change and weather patterns?

What is missing in climate forecasting and modeling which could impact grid decisions?

Which communities are most impacted by climate change?

How do we ensure Disadvantaged Communities and Low-Income Communities are not disproportionately impacted by climate change?

How do we minimize overall utility customer impacts to climate change?

CORE QUESTIONS

Partnership Area Input

- A. Comment on this group of Possible Partnership Areas.
- B. Highlight Partnership Areas where you think the issues are most critical, timing is most ripe, and there are areas for coordination among R&D efforts.
- C. What core questions are missing?
- D. What other timely opportunities should we be aware of?

Other Partnership Areas Considered

- A. Transmission-level Renewable Energy and Storage Integration
- B. Off-shore Wind
- C. Lithium Recovery from Geothermal
- D. Elevating new Energy Efficiency R&D tech into Energy Efficiency Programs
- E. Carbon Capture and Storage
- F. Cybersecurity

Public Comment

1. To make a comment, click on the “Raise Hand” button on the side.
2. If joining by phone, press “*4” to unmute yourself and request to be added to the queue.
3. Please identify your name and organization.
4. We will take public comment as input in the order we can.

Next Steps for PICG Members

- 1. May 12th Written Comments:** The schedule originally had a May 6th due date for comments and a May 12th call to clarify any of those comments. Instead, we are extending the date for comments and eliminating the May 12th call.
- 2. EPIC project matching:** Project Coordinator has done initial matching. Program Administrators are encouraged to review EPIC Project Matching to ensure alignment with Partnership Areas
- 3. Follow-up e-mail** Updated Documents and Materials