Washington State Energy Strategy Technical Consulting

Agenda-June 11, 2020 Advisory Committee Meeting

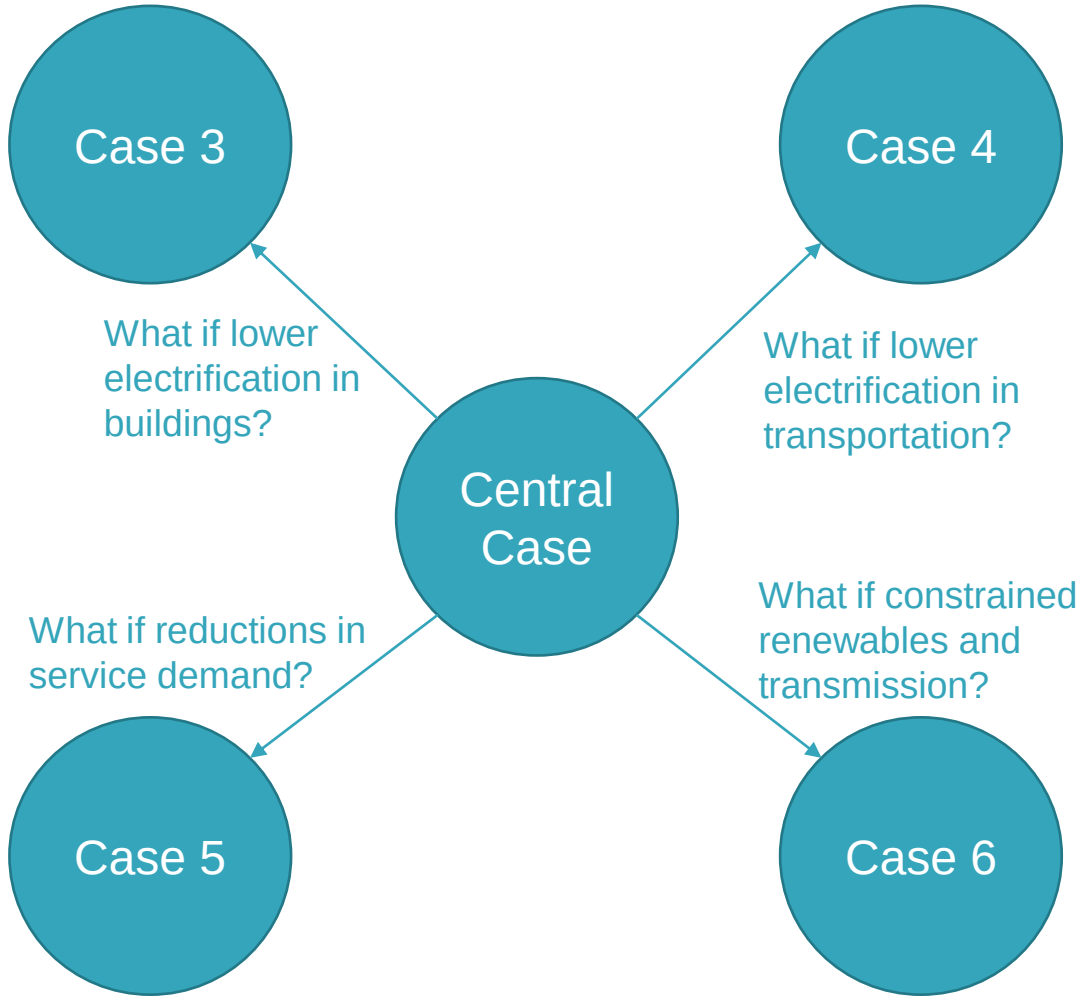
- Economic Impacts Modeling
  - Scott Nystrom, FTI Consulting
- Decarbonization Pathways Scenarios
  - Jeremy Hargreaves, Evolved Energy Research
- Technical Advisory Process
  - Marc Daudon, Clean Energy Transition Institute
- Framing Questions
  - Michael Lazarus, Stockholm Environment Institute
- Break-Out Sessions

Economic Impacts Modeling
Scott Nystrom

Decarbonization Scenarios
Jeremy Hargreaves

Central Case: Meets Decarbonization Target/Is Baseline for Other Cases

- Case against which all other cases are compared
- Relatively unconstrained technology availability in-state and out of state
- Aggressive electrification and efficiency
- No measures taken to reduce service demands
  - ✓ Conservative, can we decarbonize even without behavior changes?
- Four scenarios examine “what if” questions



Reference (BAU) and Central Cases

1. Reference (BAU)	Business as usual evolution of the energy system through 2050, assuming current policy is implemented.	▪ No emissions constraints beyond those that exist already in states within the WECC. ▪ Existing policy achieved, such as CETA in Washington.
2. Central	Case to which all others are compared, including relatively unconstrained technology availability in-state and out of state, aggressive electrification, and no reductions in service demands.	▪ Aggressive on efficiency and electrification – what is achievable? ▪ WECC states, non-NW: existing clean energy policy; NW (ID, OR, MT): 80% below 1990 by 2050 target from NWDDP ▪ Service demands remain business as usual through 2050 ▪ All resource options permitted for electricity and fuels production, including nuclear ▪ Fuels trading between states, including pipeline construction ▪ DOE Billion Ton study for biomass availability, with available WA biomass studies ▪ Transmission expansion between states permitted ▪ Load management through dispatch of new flexible load technologies

Two Low Electrification Cases

3. Low electrification and efficiency in buildings and industry	Investigates the challenges of reaching decarbonization targets with slower action in buildings and industry. Determines alternative investments needed in such a scenario, showing the cost impact to get to the 2050 goals with lower efficiency and electrification in buildings and industry.	▪ Central Case but the transition to efficiency and electrification in buildings happens at a slower rate and less efficiency and electrification are achieved by 2050
4. Low electrification in transportation	Investigates the challenges of reaching decarbonization targets with reduced levels of transportation electrification. Will show cost impact of alternative investments needed when primary fuels remain in the economy in larger quantities.	▪ Central Case but transportation retains a higher proportion of gasoline- and diesel-burning vehicles

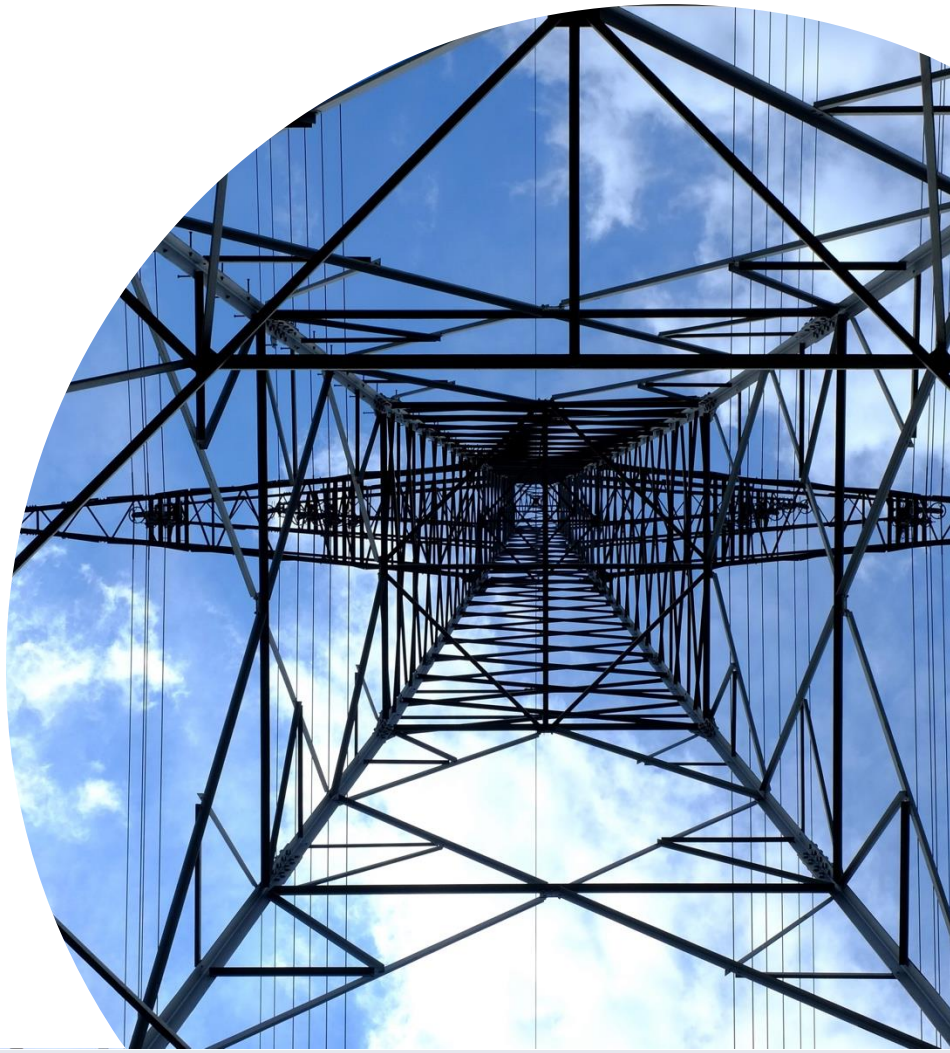
Behavioral Changes and Constrained Renewable/Transmission

5. Behavioral changes	While the Central Case conservatively assumes service demands follow a business-as-usual path, service demands may be changed either through decarbonization measures, or for other reasons. VMT reductions are an example that reduce energy demand at the same time as providing other ancillary benefits. This scenario investigates the impact on decarbonization costs of lower service demands.	▪ Central Case but with reductions in vehicle miles traveled to reflect shifts in usage of different forms of transportation, and reductions in service demand in other end uses reflecting customer behavior changes
6. Constrained renewables and transmission	Difficulty permitting new renewable energy sites and new transmission corridors that limit both in-state resource potential and imports into the state. If Washington were to face challenges in expanding both renewable and transmission capacity, how would investments and cost of decarbonization be impacted?	▪ Central Case but with reduced resource potential and tighter caps on installation rates, and limited opportunities for expanding interties.

Technical Analysis Process
Marc Daudon

Technical Advisory Process

- Purpose and Focus
- Approach to:
  - Identifying and assessing policies and actions
  - Engaging Advisory Committee and experts
- Output
- Framing Questions
- Break-Out Sessions



REFRESH: State Energy Strategy Purpose and Focus

- **Achieve legislatively mandated GHG reduction targets** (2030–45%; 2050 – 95%/net zero) and 100% clean electricity target, while
  - Maintaining fair and reasonable energy prices; supporting economic success
  - Promoting a competitive clean energy economy & workforce development
  - Meeting needs of low-income and vulnerable populations; urban and rural communities
- **Roadmap** of sectoral and cross-cutting actions; barriers to overcome; infrastructure investments; innovations
- **Encompass** legislative, agency, and government action; private sector, community, regional, federal; address transition issues, including diverse communities & rural concerns
- **Venue** for creativity, positive focus, working together to craft solutions to achieve goal

Technical Advisory Process – Focused on Developing Policies and Actions

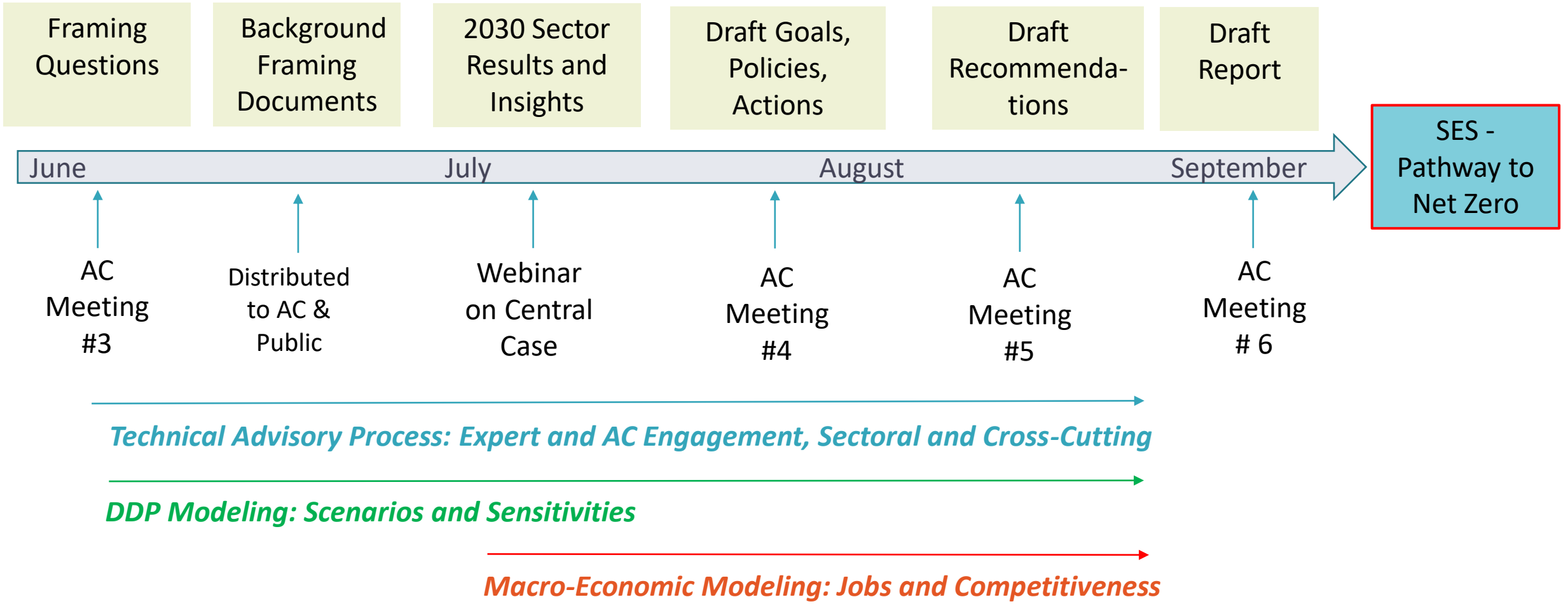
- **Engage experts,** including AC members, for input on policies and actions – options and assessment
- **Focus on four sectors -** electricity, transportation, buildings, and industry; and **cross-cutting** and **cross-sector** issues
- **Define framing questions and key issues;** identify policies and actions to address
- **Assess against criteria**
- **Develop draft strategy recommendations**

Technical Advisory Process Output – Policies & Actions that:

- Put State on path to meet clean electricity and emissions reduction targets
- Improve/sustain Washington's economic competitiveness
- Facilitate equitable transition - address workforce development and historically disadvantaged, disproportionately affected, and rural communities

- Support recovery from COVID-19-caused economic downturn, creating jobs and business opportunities
- Address reliability and security
- Address affordability (fair prices/distribution of benefits)
- Avoid locking in higher emissions pathways
- Position Washington to leverage any federal stimulus
- Technically, practically feasible; can be implemented and lay groundwork for emergent solutions

Advisory Committee Engagement Process



Framing Questions
Michael Lazarus

Electricity Sector

- With efficiency and electrification as top priorities to achieve decarbonization, what policies, investments, and other actions are needed in the coming decade to meet CETA mandates and be on track to meet the state's climate targets?
- Key topics:
  1. Generation resources
  2. Demand management and storage
  3. Reliability and resource adequacy
  4. Grid modernization and resilience:
  5. Regional grid integration, transmission, and siting
  6. New technologies
  7. Equity
- TAP sector lead: Marc Daudon

Transportation Sector

- What are appropriate goals for electrification, clean fuels, reduction in vehicle miles traveled (by mode and/or vehicle duty) and what are the most effective, efficient, and equitable policies and actions to achieve them?
- Key topics:
  1. Vehicle electrification
  2. Clean fuels
  3. Vehicle efficiency
  4. VMT reduction
  5. Freight transportation
  6. Decarbonizing shipping and aviation
  7. Revenue and finance
  8. Equity
- TAP sector lead: Derik Broekhoff

Buildings Sector

- What are the most effective, efficient, and equitable ways to decarbonize the building sector, addressing both rural and urban housing stock, rental and owned residences, and commercial and publicly-owned property?

- Key topics:

  1. Efficiency and electrification
  2. Embodied carbon
  3. Clean fuels
  4. Funding mechanisms
  5. Local governments
  6. Equity and economic opportunity

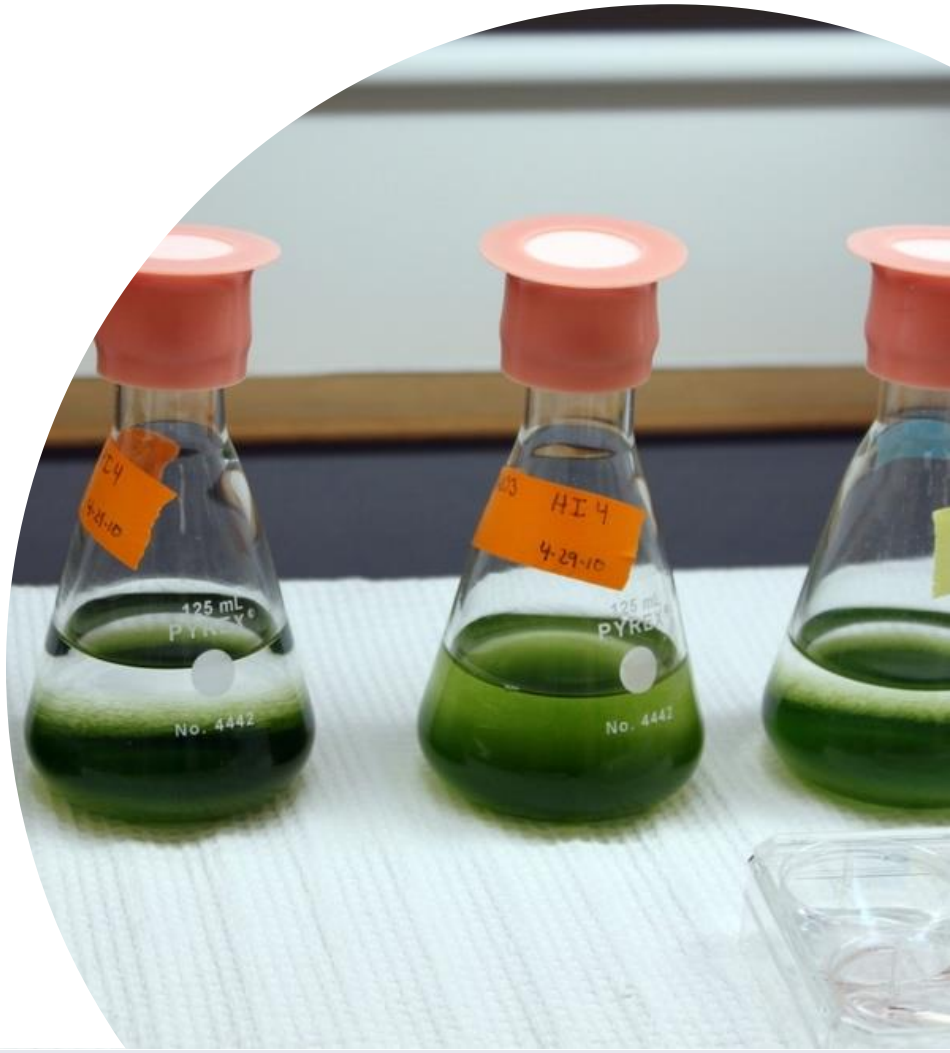
- TAP sector lead: Poppy Storm

Industrial Sector

- How can Washington's industries transition to low-carbon production while promoting jobs and competitiveness?
- Key topics:
  1. Efficiency, electrification, and clean fuels
  2. Emissions-intensive trade-exposed (EITE) industries
  3. Innovation
  4. Funding mechanisms
  5. Utility role
  6. Jobs, equity, and economic development
  7. Regional opportunities
- TAP sector lead: Roel Hammerschlag

Framing Questions Break-Out Sessions

- Do these sets of questions identify the key, broad high-level issues that should be addressed within each of the TAP sectors?
- What modifications or additions would you suggest?
- What resources (studies, experts, etc.) would you suggest the TAP consult in answering these questions?



Thank you!

Technical Advisory Process-Framing

- Framing Questions for Each Sector
  - Feedback at today's meeting
- Framing Documents for Each Sector Process
  - Background information on each sector
  - Relevant existing state policies
  - Key uncertainties
  - Best practices
- Due end of June, incorporates today's feedback

TAP expert and advisory committee engagement

- *CETI team identifies and researches policy and action options for key questions*
- *Engage subject matter experts, including AC members, for review and input (on feasibility, effectiveness, equity, efficiency)*
  - *1x1*
  - *Topic-focused discussions via Zoom*
- *Engage AC for review and input on draft goals, solutions, recommendations (per the slide)*

Technical Advisory Process-Strategy Development

- Identify and assess options, including:
  - Policies and regulations
  - Infrastructure and investments
  - Government programs
  - Innovation and R&D
  - Financial and economic incentives
  - Institutional and market structures
  - Workforce development
  - Community engagement