Social Science Issues Associated with the Siting of Infrastructure for Industrial Decarbonization Hubs

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- Research questions, methodologies, & data to address:
  - Social dynamics & partnerships
  - Community support & opposition
  - Community impacts
  - Workforce
- Case study

Brief Overview of Paper

Industrial decarbonization hubs

- Complex and multifaceted
    - Integrate clean technologies into industrial processes, apply clean technologies as energy sources, and co-locate facilities
    - Involve many different public and private stakeholders
        - Government entities, multiple industries, workforce, and impacted residents & community members
- Involve the transition of existing facilities or the development of new ones

Hub siting

- Multifaceted and multi-phased approach for selecting industrial centers
- Requires coordination among the many stakeholders
- Environmental, economic, & social impacts—interdisciplinary approach

Brief Overview of Paper

Establishing a research agenda

We drew from:

- Existing industrial decarbonization roadmaps
    - World Economic Forum's Transitioning Industrial Clusters Initiative
    - Department of Energy's Industrial Decarbonization Roadmap
    - National Academies' Accelerating Decarbonization of the U.S. Energy System report
- Social science literature
    - Siting acceptance (for smaller-scale facilities, renewable energy)
    - Collective Learning Framework
    - Environmental governance
   - Additional related learning perspectives

Research Agenda

Applying Energy Justice in siting processes

Why?

- Hubs have lasting impacts on communities
  - Potential for the long-term accrual of benefits
- Collaborative decision-making processes yield better outcomes
- Just siting processes are more likely to be supported by community members

Methodologies

- Interdisciplinary, mixed-methods, community-based research
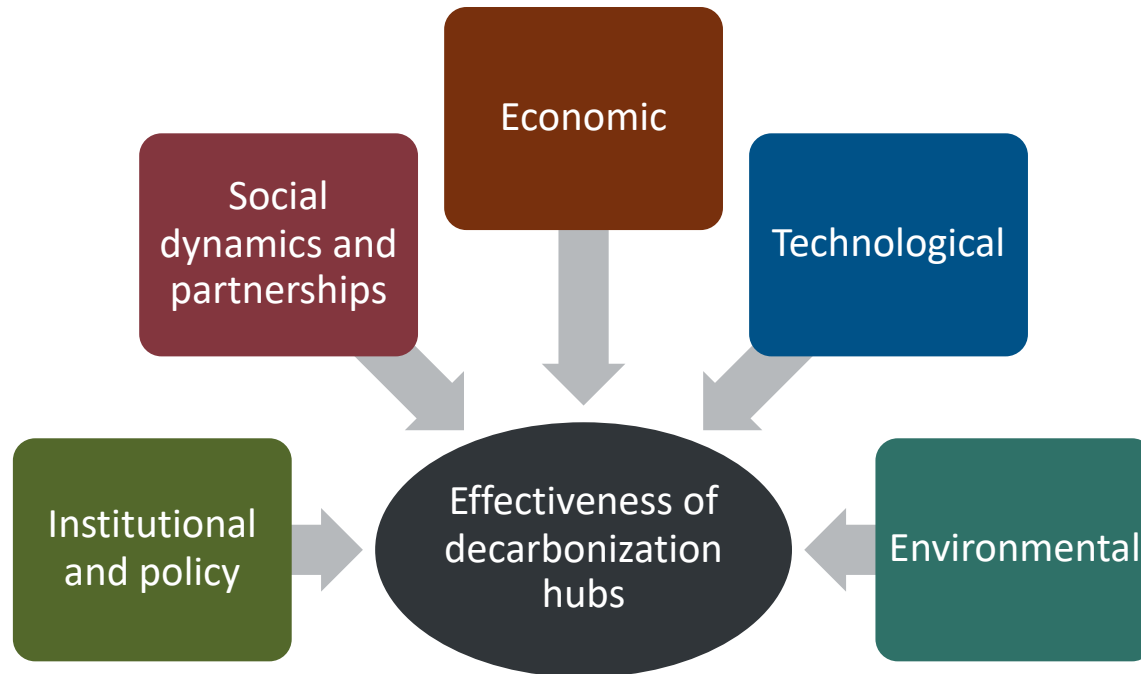
Research Questions

Partnerships
- How can just processes be executed in complex siting environments with many stakeholders?
- What mechanisms and metrics can be used to identify and track risks during hub planning, siting, and operation?

Community Opposition & Support
- How do community perceptions and attitudes differ when decarbonizing existing industrial hubs vs developing new hubs?
- How do communities perceive industrial decarbonization technologies, many of which are at precommercial and demonstration phases?

Community Impacts
- When distributed industrial facilities are moved into concentrated hubs, what are the impacts to the communities losing and receiving the facilities?

Workforce
- What skills related to industrial decarbonization exist in potential hub locations?
- How can existing skills be leveraged in hub development and operation?

Data Needs: **Community Impacts**

Partnerships

Community Opposition & Support

Community Impacts

Workforce

Pre- and post-siting

Local data collection

- **Surveys & focus groups** to assess:
  - Community perceptions and concerns about industrial hubs and how they change over time → which metrics should be tracked?

Data Needs: **Community Impacts**

Partnerships

Community Opposition & Support

Community Impacts

Workforce

Pre- and post-siting

Existing data

- **Economic & environmental data** to track the impact of relocating industrial facilities, e.g.:
  - Unemployment rates, income, environmental hazard exposures
- **Workforce data** to assess alignment of current and needed skills, e.g.:
  - Educational attainment, top job sectors, skill mapping

Data Needs: **Community Impacts**

Partnerships

Community Opposition & Support

Community Impacts

Workforce

Pre- and post-siting

Existing data

- **Datasets**:
    - Climate and Economic Justice Screening Tool (CEJST)
    - DOE's Low-Income Energy Affordability Data (LEAD) Tool
    - NREL's State and Local Planning for Energy (SLOPE) Platform
    - EPA's Environmental Justice Screening and Mapping Tool (EJScreen)
    - Census data
- **Data sources**:
    - Existing community generated documents, e.g.:
        - Community benefits plans
        - NEPA reviews

Case Study

Partnerships

Community Opposition & Support

Community Impacts

Workforce

Example: **H$_2$Houson Hub**

1. How are partners **identifying, tracking, and reducing risk exposure**?

2. How do **perceptions of justice** in the H$_2$Houson Hub process vary across stakeholder groups? What engagement structures lead to the greatest agreement across perceptions of fairness?

3. How are **communities and workers** being included in the H$_2$Houston Hub process? How are community and workforce **concerns** being addressed? Are these strategies **successful**?

4. **How are communities impacted** by the H$_2$Houson Hub?

Thank you!

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