Looking Forward:

Challenges and Opportunities for HEI

Bob O’Keefe
Vice President
HEI Annual Conference
April 30, 2023
HEI: Drawing on the Best of the Science Community
A Deep Well of Science and Technology Experts

The Many Faces of HEI

HEI Board, Technical Staff

Standing Committees: Research, Review, Energy, GHOC, ISOC, EJ
Special Panels: Traffic, SCET
Oversight Panels; Reanalysis, ACES, Diesel EPI, GAM,
Ad-hoc Review Panels
Stakeholder Advisory Panels, EJ, Global, Reanalysis, ACES

Regular input from Sponsors, NGOs, more
HEI Today: HEI’s Strategic Plan

✓ Targeting HEI’s research and review activities.
✓ Responding to the needs of HEI industry and government sponsors and other interested parties.
✓ Anticipating future policy and technology events.
✓ Evolving over time to adapt to changing knowledge and events.
HEI Today: Four Key Initiatives

Accountability: Testing The Links Between AQ Actions and Health

Transport and Urban Health

Complex Questions for the Air Pollution Mixture

Global Health

Cross Cutting: Sensitive Populations, Transparency, Data Access, Systematic Synthesis, Statistical Methods, More...
And a Fifth Initiative Underway: **HEI-Energy**

*Targeted Exposure and Health Science to Inform Transformation of the Nation’s Energy Systems*
The Challenges Today: Accountability: Testing The Links Between AQ Actions and Health

- Can we better test and quantify the consequences of policy actions on air quality and health?
- How can examinations of air quality interventions help us analyze cause and effect?
- Can these studies improve cost-benefit analyses of future actions?
The Challenges Today: Complex Questions for the Air Pollution Mixture

Testing associations between air pollution exposure and health effects below standards.

- Are current standards sufficiently protective?

New, low-cost sensors and satellite remote sensing promise to improve exposure assessment

- But many challenges to overcome.

Studies, including NPACT, report no clear-cut links between PM characteristics and health.

- Questions about differential toxicity persist.
A host of new technologies – EVs, AVs, shared ride and goods delivery services are changing the future of transport

- But many challenges will persist in United States, Europe, LMICs:
  - Long-lived internal combustion engines
  - Questions about NOx, UFP, non-tailpipe, in-use emissions.
  - New steps to tighten both tailpipe and GHG standards.
- And a growing focus on noise, socioeconomic status, access to green space, others

- **NEW RFA:** *Assessing the Health Effects of TRAP in a Changing Urban Transportation Landscape*
The Challenges Today: HEI-Global
Growing Markets, High Local and Transported Air Pollution, Public Health Impacts

• Globally air pollution is 4th leading risk factor for mortality.
• Nearly everyone lives in areas above the updated WHO Guideline for PM$_{2.5}$.
• Major standard setting and source control getting underway.
  • Limited science, not widely accepted.
  • A lack of data on which sources pose greatest risk,
  • A need to understand all sources — coal use, industry, household fuel combustion, waste, transport — in context.
HEI Global Platform
Supported by: Clean Air Fund, Children’s Investment

**State of Global Air**
Flagship annual report presents global and country-specific air pollution exposures, health impacts, and trends. (IHME-GBD)

**Global Burden of Disease from Major Air Pollution Sources**

**Targeted Analysis, Reports, Active Communication**
Regional *Spotlight* Reports, Special Reports, Policy Briefs, and more.

**Capacity Building**
Support for targeted research and strengthening local investigator capacity in selected geographies (e.g., India).
The Challenges Today:
HEI-Energy
Supported by EPA, industry, and philanthropy

-Science to identify potential exposures from current oil and natural gas operations

-Targeting the highest priority topic: what are the exposures and where are they coming from?

-Strong commitment to community engagement and understanding health, disproportionate impacts

-Laying a foundation to inform the health benefits and unintended consequences of the energy transition
HEI Energy
Community Exposure Research: AQ, Noise, and Water

Air Quality and Noise
Tracking Community Exposures and Releases (TRACER) Collaboration

- Quarterly meetings to coordinate

Study Duration: 2022-2024

Water Quality

- In-kind support provided by sponsors and state officials

Study Locations

In-kind support provided by sponsors and state officials
HEI Energy: Extensive Community Engagement

Defining priorities for exposure and health research

- Government: Federal, State, and Local Departments
- Non-Governmental Organizations
- Foundations
- Consulting Companies
- Community groups and members
- Academic
- Oil and Natural Gas Industry
- Non-Governmental Organizations
- Government: Federal, State, and Local Departments
- Non-Governmental Organizations
- Foundations
- Consulting Companies
- Community groups and members
- Academic
- Oil and Natural Gas Industry
Future Challenges ... AND Opportunities

• Assessing Air Pollution Solutions for Marginalized (EJ) Communities

• Air Pollution and Health in a Changing Transportation Landscape

• Health Implications of the Energy Transition
HEI Future: Assessing Air Pollution Solutions for Marginalized (EJ) Communities

- In response to increased awareness of disparate exposures and effects
- HEI workshop: nearly 60 community, academic, government, and sponsor participants (Atlanta, October 2022)
- Need for new funding models to support:
  - Partnership building and continuity of engagement
  - Flexible research designs
  - Research translation that engages multiple sectors

- HEI has empaneled new EJ Advisory Council and Oversight Panel and will soon launch new RFAs with significant community engagement
HEI Future:
Air Pollution and Health in a Changing Transportation Landscape

• Rapidly Changing Transportation Landscape (see tomorrow’s session!)
  • New technologies, new fuels
  • Different Approaches for Different Market Sectors (Heavy, medium, and light duty)

• Rapid Motorization in Low- and Middle-Income Countries

• HEI consulting with existing sponsors and new fuels and technology experts to identify key future priorities:
  • Assessing the health impacts of legacy internal combustion engines
  • Examining Benefits and Effects of New Technologies and Fuels (EVs, Fuel Cells, Hydrogen, Low Carbon Fuels)
HEI Future:  
Health Implications of the Energy Transition

• Vast Changes in the Production and Transport of Energy
  • New fuels (e.g., hydrogen); new decarbonization technologies (e.g., CCUS); and much more

• HEI Energy Already Beginning to Engage:
  • Completing research on community exposures to oil and gas operations with extensive community engagement (see the posters today!)

• Key Future Priorities:
  • Assessing the health benefits and unintended consequences of major national energy choices (coal, nuclear, renewables and others), and
  • Assessing similar health-based questions around a specific set of operations, the new regional hydrogen hubs and CCUS.
Looking Ahead:
*Initial thoughts from some HEI sponsors*....

Potential Public Health Benefits and Impacts of:

- Major expansions and interconnectivity of the electrical grid
- Increased battery production, recycling and disposal
- Increased production and processing of rare earth metals
- The development of widespread hydrogen infrastructure
- Reduced fleet turnover rates and health consequences for EJ communities

Where can HEI fit into the paradigm shift that will play out in the coming decades?
Future Opportunity: Integrated Science for Informed Decisions
Leveraging the Deep Well of HEI Science

Assessing Air Pollution Solutions for Marginalized (EJ) Communities
• Accountability Studies
• Community-engaged Studies

Air Pollution and Health in a Changing Transportation Landscape
• Health impacts of Legacy ICE
• Assessing Effects, Benefits of New Technologies and Fuels (EVs, Fuel Cells, Hydrogen, Low Carbon Fuels)

Health Implications of the Energy Transition
• Community Engaged assessment of Oil and Gas Exposures, Health
• Benefits and Effects of Hydrogen, CCUS, Renewables and other Energy Choices
Looking Ahead: Building the 2025-2030 Strategic Plan!

Work with input from sponsors, science, community stakeholders to create an exciting new Strategic Plan

Key Process Milestones

- **Fall/ Winter 23-24**  
  - Visits to individual sponsors, stakeholders, science community

- **March - 2024**  
  - Sponsor meeting with Research Committee to hear recommendations

- **April 2024**  
  - First Draft Presented in special session at 2024 HEI annual meeting,  
    - Public comments invited

- **June – Sept 2024**  
  - Revised Plan, Review by Sponsors

- **Dec-Jan 2024-2025**  
  - Plan adopted by HEI Board

*Final HEI Strategic Plan effective April 1, 2025*
THANK YOU!

Robert OKeefe
Health Effects Institute
rokeefe@healtheffects.org