HEI Energy Research Program
Introduction to the Energy Research Committee and the Program

George Hornberger, Chair, HEI Energy Research Committee
Vanderbilt University
Director of Vanderbilt Institute for Energy & Environment

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Summary of Presentation

• Overview of the Energy Research Program
• Governance and the Energy Research Committee
• Vision for a Multi-Year Research Program
• Focus on Year 1: Literature Review and Research Planning
• Next Steps
Overview of the Energy Research Program

• **Why a new research program?** Fill knowledge gaps left by past and ongoing research about potential population exposures and health effects from unconventional oil and natural gas development (UOGD) across the United States.

• **Approach:** The same one HEI has used for 35 years to answer questions about air quality and health.

• **Products:** High-quality, impartial literature reviews and original research - all relevant to policy decisions.

• **Beneficiaries:** Government officials, communities, industry, NGOs, and others who can use the research to inform policy development.
Unconventional Oil and Gas Development (UOGD) Defined

Includes:

- **DEVELOPMENT**: exploration, site prep, drilling, well completion and multistage hydraulic fracturing, and management of wastes
- **PRODUCTION**: extraction and processing of hydrocarbons; gathering and compression of gas; management of wastes; and construction and operation of field production facilities
- **POST-PRODUCTION**: well closure and site reclamation

Excludes:

- Distribution networks used to transport oil or gas outside of the production area
- Development from conventional and coalbed methane
- End uses of oil and natural gas
- Potential global climate-change impacts
Schematic of Oil and Gas Operations

Production & Processing
1. Drilling and Well Completion
2. Producing Wells
3. Gathering Lines
4. Gathering and Boosting Stations
5. Gas Processing Plant

Natural Gas Transmission & Storage
6. Transmission Compressor Stations
7. Transmission Pipeline
8. Underground Storage

Distribution
9. Distribution Mains
10. Regulators and Meters for:
   a. City Gate
   b. Large Volume Customers
   c. Residential Customers
   d. Commercial Customer

Source: Adapted from American Gas Association and EPA Natural Gas STAR Program
Governance of the Program

• Modeled directly after the one HEI has used for 35 years to answer questions about air quality and health

• Key elements:
  – Energy Research Committee oversees impartial, policy-relevant literature reviews, research planning, and original research
  – An Energy Advisory Committee provides expert guidance to the Research Committee
  – All work is conceived, implemented, and peer-reviewed independently from sponsors of the research program
  – HEI effectively engages and shares data (all + and – results) with stakeholders
The Energy Research Committee

**George M. Hornberger, Chair**  
Director, Vanderbilt Institute for Energy & Environment, Nashville, Tennessee

**Shari Dunn-Norman**  
Missouri University of Science and Technology, Rolla, Missouri

**Elaine M. Faustman**  
University of Washington—Seattle

**Stefanie Ebelt Sarnat**  
Emory University, Atlanta, Georgia

**Howard Hu**  
University of Toronto, Ontario, Canada

**Judy S. LaKind**  
LaKind Associates, LLC, Catonsville, Maryland, and Adjunct Faculty, University of Maryland—Baltimore

**Armistead (Ted) G. Russell**  
Georgia Institute of Technology, Atlanta
Vision for a Multi-Year Research Program

**Year 1:**
Literature Review & Research Planning
- What it does and does not tell us
- Which knowledge gaps merit research

**Years 2 to 4:**
Population-Level Multimedia (e.g., air and water) Exposure Studies in Multiple Regions of the U.S.

**Year 4 and Beyond:**
- Publication
- Extensive Communication
- Maybe further Exposure or Health Studies

Engage with a broad range of stakeholders at key decision points

Periodically updates its review of the exposure and health literature
Year 1 Tasks and Products

**UOGD-Related Literature Review**
- Epidemiology
- Exposure
- Toxicology
- Risk Assessment

**Publication of Findings**

**Release of Request for Qualifications**
- Population-Level Exposure Research in Multiple U.S. Regions
Ongoing Systematic Review of Human Health Literature

Stakeholder Involvement
- January 2018 Scoping Meeting
- 55 participants; HEI Committee and a wide range of experts and stakeholders

Systematic Approach
- Modeled after the systematic review process developed by the National Toxicology Program (NTP) Office of Health Assessment and Translation (OHAT)
- Includes explicit quality criteria applied uniformly to all studies

For more information: https://www.healtheffects.org/meeting/scoping-meeting-human-health-study-critique
Review of Exposure Literature: What does it tell us about potential UOGD Effects on Air Quality?

“Exposure and health effect studies do not indicate the need for immediate public health action, but do indicate the need for more detailed exposure monitoring and systematic analyses of health effects of residents living near oil and gas operations.”

“This study provides further evidence that populations living nearest to O&G [oil and gas] facilities bear the greatest risk of acute and chronic health risk from exposures to NMHC [nonmethane hydrocarbon] air pollutants emitted from upstream O&G facilities.”
UOG operations did not contribute substantial amounts of methane or benzene to the sampled drinking-water wells. However, ...decades or longer may be needed to fully assess the effects.

The association of these constituents in valley groundwater with distance is observed for the first time using a large industry dataset. The increase may be caused by enhanced mixing of shallow and deep groundwater in valley, possibly triggered by UGD process.
Next Steps with Technical Work

• Completion of the Energy Research Committee’s review of the human health literature, scheduled for release in Summer 2018 after undergoing peer review

• Beginning review of the exposure, toxicology, and risk assessment literature

• Findings and recommendations from the human health literature review will be discussed along with exposure, toxicity, and risk literature at the Committee’s first of two Exposure and Risk Screening Workshops in July 2018

• Workshops provide an opportunity for the Committee to hear from a broad range of knowledgeable stakeholders about the literature and their research priorities
Thank you