Social Science and the Alternative Energy Future

REGULATION AS A DRIVER OF TECHNOLOGY DEPLOYMENT

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FEDERAL REGULATORY INTERVENTIONS TO ACCELERATE DEPLOYMENT OF NEW ENERGY TECHNOLOGY

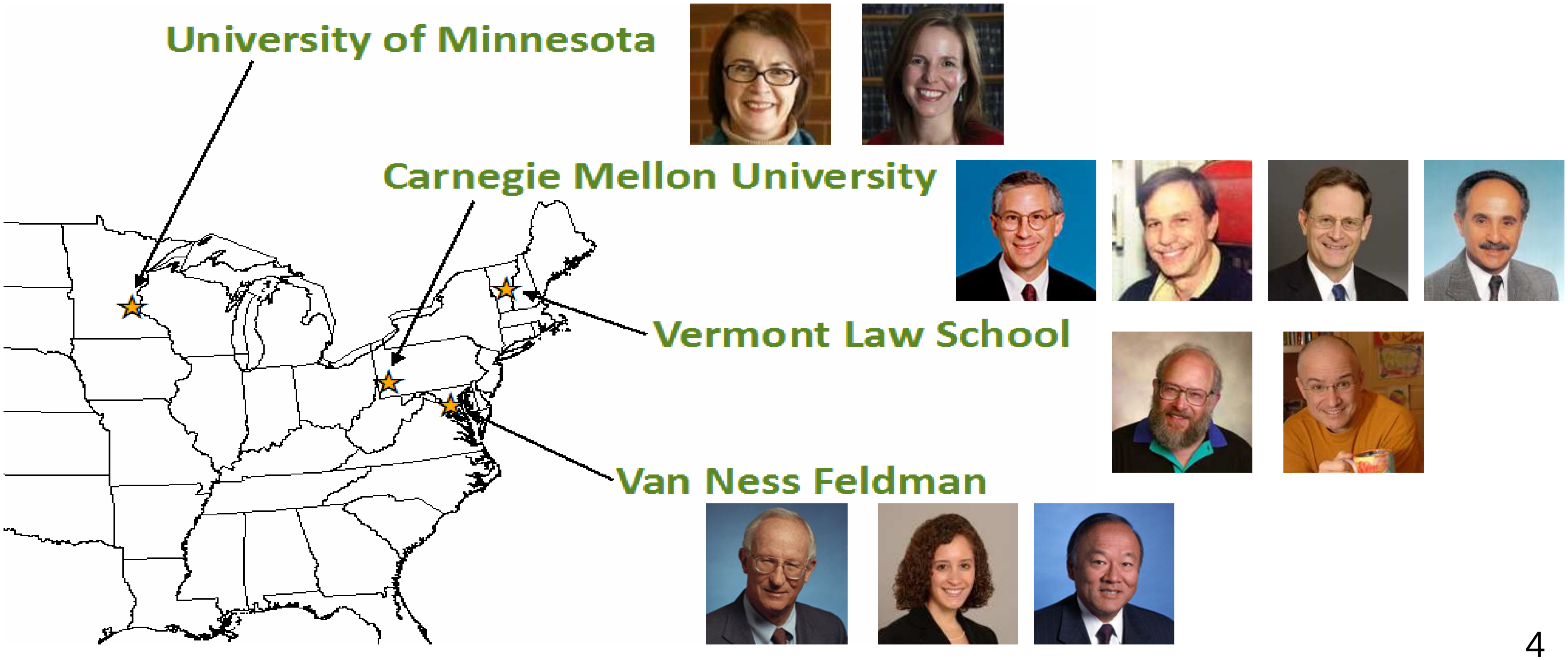
- Federal Water Power Act (1920) – Hydroelectric licensing – comprehensive facility siting authority for non-Federal hydroelectric development.
- Natural Gas Act (1937) – Natural gas pipeline regulation – comprehensive regulation of siting and construction of interstate natural gas pipelines and rates, terms and conditions of service.
- Atomic Energy Act (1954) – Licensing and safety regulation of commercial nuclear reactors, including limitation of liability for nuclear accidents under 1957 Price-Anderson Act and Framework for permanent disposal of spent nuclear fuel under Nuclear Waste Policy Act (1982/87).
- Clean Air Act (1970) – Statutory standards for light duty motor vehicle emissions drives deployment and use of catalytic converters.
- PURPA (1978) – Opened up market for non-utility renewable generators and cogeneration .

CURRENT FEDERAL REGULATORY INTERVENTION PROPOSALS

- Renewables Deployment
  - Transmission expansion (siting and cost allocation)
  - Grid integration of renewables
  - Federal Renewable Electricity Standard, Clean Energy Standard
- Energy Efficiency
  - Energy Efficiency Resource Standard
  - "Decoupling"
- Electric Vehicles Deployment
  - Regulatory treatment under CAFE and CAA
  - Grid integration
  - Rate design
- CCS Deployment
  - Cap-and-Trade bonus allowance proposals
  - Removal of regulatory barriers

CCS DEPLOYMENT

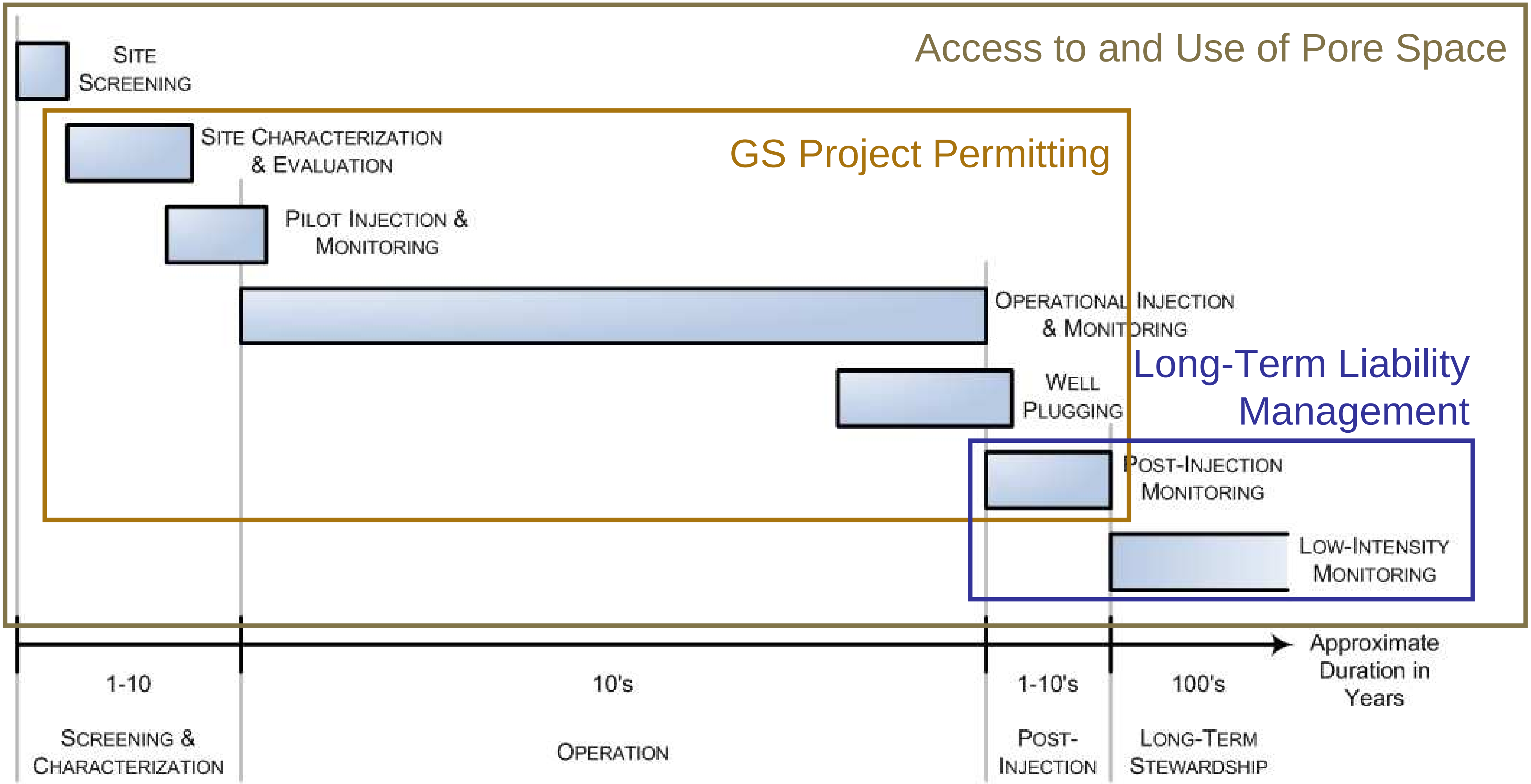
- Current Barriers to CCS Deployment
  - Technology
  - Cost
  - Immature regulatory system
- CCSReg Project is focused on regulatory changes necessary to accommodate widespread deployment of CCS in U.S.



There are barriers in at least five areas that could limit large-scale CCS deployment

Access to and use of pore space	A lack of clarity on ownership of pore space in deep geological formation and the means by which this space can be accessed for CO_2 sequestration
Permitting of geologic sequestration projects	Limited authorization for the U.S. Environmental Protection Agency (EPA) to consider impacts beyond those to underground sources of drinking water (USDW) in their Underground Injection Control (UIC) program rule making process A tendency for the EPA to create procedural rules under the UIC program Gaps in knowledge necessary to create detailed regulations for GS today
Management of long-term liability	No system by which the liabilities (tort or otherwise) associated with CO_2 sequestration can be managed in the long-term (i.e., post-closure)
Development of pipeline infrastructure	Lack of an adequate regulatory framework for the construction of CO_2 pipeline infrastructure, particularly for pipeline siting and access to eminent domain
Difficult to manage commercial risks	Uncertainty over the structure of a future CO_2 emissions control program—cap and trade, or otherwise—and the way in which CCS will fit into this program Uncertainty surrounding the economics of capture and geological sequestration, the structure of a future carbon sequestration industry, and the relationships between organizations in this industry.

Barriers impact geologic sequestration projects at different places across the project lifecycle



Three Forms of Long-Term Liability

Type of Liability	Definition	Examples
Tort	Obligation to pay compensatory damages arising from harm or injury during long-term stewardship	• Impacts to USDW • Damage to mineral resources
Climate	Obligation to retire allowances or to take other actions to compensate for leakage under a greenhouse gas emission reduction program.	• Leakage of CO_2 to the atmosphere
Regulatory	Obligation to pay for post-closure activities required by regulation.	• Monitoring, verification, accounting and reporting • Remediation if needed

Objectives of a Long-Term Liability System for Geologic Sequestration

1. Ensuring that those conducting GS operations conduct themselves in a responsible and prudent manner
2. Providing a level of predictability sufficient to encourage the large capital investments that will be required for GS projects
3. Ensuring injured parties can obtain compensation

CCSReg Project Recommendations Would Create a Comprehensive, Efficient Federal Regime

Action	Details
Statutory modification of tort law	Limit liability for GS operators in long-term stewardship, while retaining tort law for the pre-operational, operational, and immediate post-operational phases of a GS project
Creation of the Federal Geologic Sequestration Board (FGSB)	Once the FGSB determines that a GS project is closed—that is, it presents no unreasonable risk to health, safety, or the environment—it would accept tort, climate, and regulatory liability and responsibility for compensation
Establishment of the Carbon Sequestration Trust Fund	Administered by the FGSB and funded by risk-based fees on GS projects; source of funding for the FGSB, and any necessary remediation or compensation payments during the stewardship phase

Project operators and upstream entities wound not be liable for civil claims—except in case of failure to comply with regulations or misrepresentation in order to obtain the certificate of closure

SOCIAL SCIENCE IMPLICATIONS

LEGALLY-EFFECTIVE REGULATORY REGIME DOES NOT ENSURE DEPLOYMENT

- Regulatory policies designed to accelerate deployment of new energy technology can be highly effective legally, but nonetheless founder on political, social or economic objections to the technology or its impacts on affected communities

- Examples:
  - Hydroelectric licensing – 1968 Storm King controversy reined in and eventually stopped major new non-Federal hydroelectric development, and was major driver for enactment of NEPA.
  - Nuclear waste disposal – concerted political opposition from Nevada resulted in 2009 termination of Yucca Mountain project, even though DOE had full statutory authority to proceed
  - CCS – opposition to CCS demonstration projects already surfacing (BP Long Beach project)

SOCIAL SCIENCE IMPLICATIONS (Cont'd.)

DEALING WITH SOCIAL, POLITICAL OR ECONOMIC OPPOSITION

- Prescriptions for dealing with social, political opposition typically include process improvements, such as –
  - Community outreach
  - Transparency
  - Independent technical analysis
  - Credible decision-makers
  - "Consent-based" site selection
- These solutions can have costs in terms of expense, delay, and legal uncertainty, particularly if they are cast as legally-enforceable prerequisites to proceeding with a project or technology

SOCIAL SCIENCE IMPLICATIONS (Cont'd.)

Example 1: ENFORCEABILITY OF PROCESS REQUIREMENTS

- How process improvements are to be implemented is a key consideration in their ultimate workability. Contrast an EIS under NEPA with a Regulatory Impact Analysis (RIA) – required by OMB under Presidential Executive Orders:
  - ➢ NEPA compliance is a legally enforceable prerequisite to proceeding on a project to which NEPA applies – a NEPA violation permits private litigants to stop a project.
  - ➢ An RIA is an internal management guideline and does not confer any right to litigate the action involved.

SOCIAL SCIENCE IMPLICATIONS (Cont'd.)

Example 2: "CONSENT-BASED" SITING

- Concept of "consent-based" facility siting currently-ill defined:
  - Is it advice to program administrators or legally enforceable by states or members of the public?
  - Who has to consent? State, county, municipality, citizens by referendum?
  - Can project proceed without unanimous consent of all entities entitled to a voice?
  - Can consenting entity change its mind?

WHAT CAN WE CONCLUDE?

- Translating recommendations for improving decision-making process into a workable regulatory regime requires careful attention to how additional requirements will work in practice.

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