Energy and Resources Innovation in California

Rob James
Pillsbury Winthrop Shaw Pittman LLP
San Francisco, California
September 22, 2016

Welcome

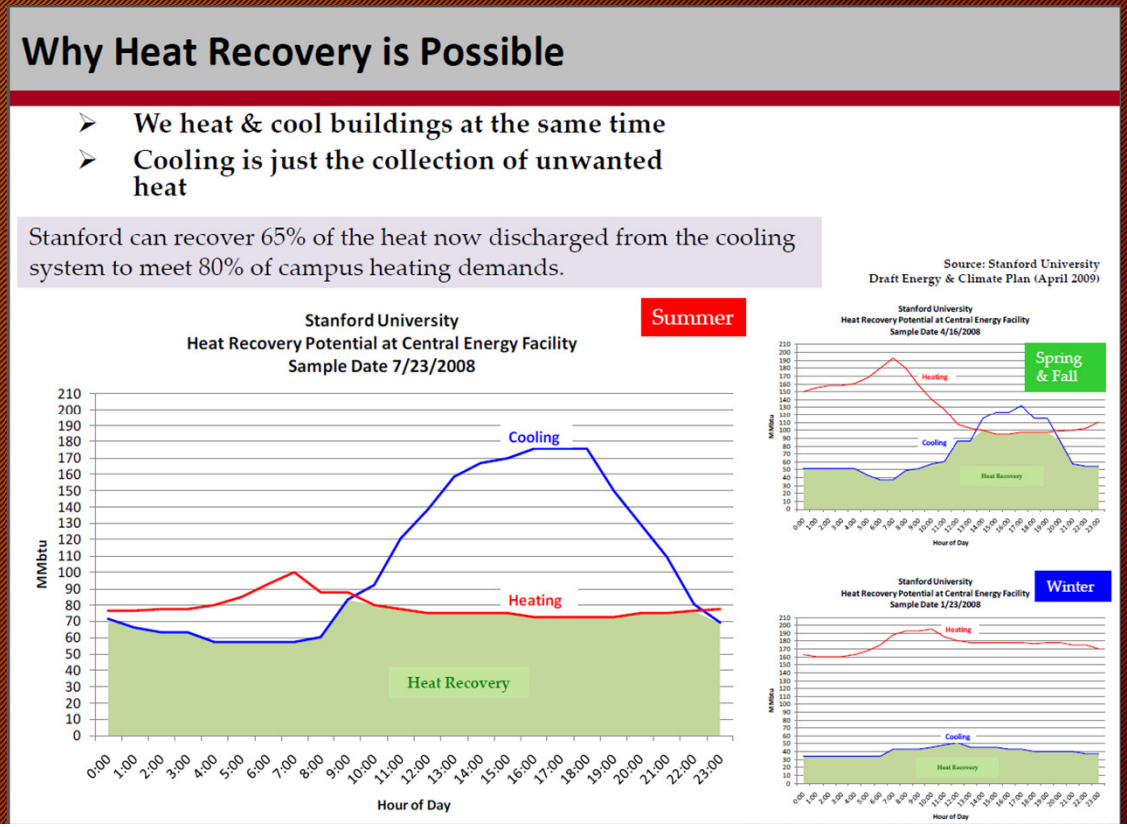
- To **California**, a locus of innovation
  - ✓ Renewable electricity mandates for utilities
  - ✓ Energy efficiency and smart grid requirements
  - ✓ Energy storage and biofuel incentives
  - ✓ World-class universities with energy basic and applied R&D
  - ✓ Trade associations and advocacy groups
  - ✓ VCs and PE firms with deep interest and expertise in the space
- And to **Pillsbury**
  - ✓ Law firm grounded in technology, energy/natural resources, capital markets and infrastructure
  - ✓ We know VC and PE, but we also know HH

Cleantech, California style

Heat exchangers for university district energy system (Stanford Energy System Innovations, SESI)

Separate heating and power, not combined heating and power

Proprietary control software now being licensed to others (ROOT3)



Cleantech, California style

- Heat exchangers for university district energy system (Stanford University SESI)
- Resilience: accident-tolerant uranium fuel for nuclear reactors (General Atomics)
- Pongamia germplasm biofuel (TerViva Bioenergy)
- Biodiesel and lignite fuels (Catchlight, Renewable Energy Group, LS9, Tinuum)
- Energy storage technologies (ReVolt (Switzerland), PG&E, SMUD)
- Wave energy generation—Irish technology tested in Atlantic basin (WaveHub off Cornwall) for use in Pacific basin (California and Australasia)
- *In situ* geothermal heat exchange (GreenFire)
- Electric vehicles (Efficient DriveTrains)
- Carbon capture development, supported by government R&D:
  oxyfuel combustion and sequestration (Clean Energy Solutions, Kimberlina)

Frontier energy and resources development

- Energy and resources development a challenge even in well-established settings
- **Frontier development** where:
  - ✓ Multiple existing and potential technologies evolving or being used
  - ✓ Legal regime and relevant agencies not settled
  - ✓ Benefits to be gained (or adverse impacts to be avoided) are unclear or uncertain
  - ✓ Counterparties and economic terms (including prices, subsidies and taxes) are not identified at time that commitments must be made

The case of carbon capture and sequestration

- Family of technologies and techniques for capturing carbon as CO_2 before, during or after production or combustion of carbon fuels, and removing the carbon from the atmospheric life cycle
- Pre-combustion (gasification), post-combustion (amine scrubbers), oxyfuel combustion (complete burn in O_2)
- Biological, industrial and geologic sequestration and their challenges
- Technology achievements (Norway, Canada) and setbacks (Kemper, Mississippi)
- Limited subsidies, legal uncertainties, unreliable carbon price or derivatives

Changing the game

- Two powerful but distinct means of coping with frontier conditions
- **The Game-Changer**
  - ✓ Work collectively to modify the *status quo*—choose a "winning" technology, lock in an economic benefit or penalty, clarify a legal rule, settle an inter-agency squabble
  - ✓ Effect by government decision, spurred by common advocacy, often working through trade associations or standards organizations
  - ✓ Requires cooperation among actors, leading to "odd policy bedfellows"
  - ✓ Cooperation costs time and money and requires compromise
  - ✓ But the results are more reliable and apply to a range of projects, some of which might not be viable without the changed game

Finessing the challenge

- **The Finesse**
  - ✓ Work individually to identify the project that does not solve the challenge or change the status quo, but instead happens to be minimally affected by them
  - ✓ Find the unusual project or technique that suffers least from the conditions
  - ✓ An entrepreneur **finesses** by spotting and pursuing an opportunity that radically simplifies a given problem that is presently bedeviling his competitors
  - ✓ Not deception, not sharp dealing
  - ✓ Are individual finesses and game-changing collective actions mutually exclusive? Or can actors go down both paths?

Finesses and game-changers in carbon capture

- **Whose property rights for injection and storage: the mineral or water rights holder, or the surface rights holder?** Game-changing legislation in favor of surface owner, or finesse with small number of rights holders (e.g., federal government land)
- **Which capture technology?** Game-changing selection of "winner" by government or industry, or finesse by being open to different technologies (carbon-to-liquids)
- **Do CO_2 pipelines enjoy eminent domain?** Game-changing legislation, or finesse with a project entailing no transportation at all (Kimberlina)
- **Whose liability for release of CO_2 post well closure? Which agency regulates?** Game-changing legislation a la Price-Anderson, or finesse in a state that offers releases
- **What price for sequestered CO_2?** Game-changing markets and option contracts, or finesse with an offtake contract

Finesses and game-changers for innovations

- Frontier technologies can run in circles and circularities—
  with clearer standards and price signals, we would have more projects;
  but we need more projects to establish standards and prices
- Finesses and game-changers are distinct attempts to break circularities
  and make individual or collective progress
- Does your enterprise champion a finesse of the *status quo*?
- Or does it lead to, or require, a game change?

References

- Lewis Hyde, *Trickster Makes This World: How Disruptive Imagination Creates Culture* (1998)

- Robert A. James, *Finesses and Game-Changers in Frontier Project Development: The Case of Carbon Capture and Storage* (Stanford Program on Energy and Sustainable Development (PESD), Working Paper #87, 2009)

- Robert A. James

  rob.james@pillsburylaw.com

  +1.415.983.7215