Stanford Climate Change Workshop – November 19, 2015

Approximately 25 climate change experts gathered at Stanford on November 19, 2015 to brainstorm on the potential opportunities that our next President might prioritize to reduce GHG emissions under his/her Administration. The discussion was conducted under Chatham House rules. This outline captures some of the points raised during the course of the workshop.

Emissions Sources

- Central focus on emissions from the **power sector** is necessary: that’s where 42% of GHGs are generated.
  - Validates Administration’s prioritization on the Clean Power Plan (CPP) & the need to decarbonize the electricity sector.
    - CPP may usher in some form of trading, potentially offering market-based flexibility into compliance strategies.
    - Strong support for considering carbon tax as an efficient mechanism to reduce GHG emissions
      - Note: some recommend avoiding characterizing a carbon tax as “putting a price on carbon.”
  - **HFCs + methane** (e.g. from natural gas systems, landfills, coal mines) + **black carbon emissions** must be a top priority given outsized impact of these GHGs vis-à-vis CO2. (Also see discussion below under Land Use, below.)

- **Real estate/building sector** needs to be a top priority, based on its GHG footprint (approximately 1/3 of total energy use).
  - **Energy efficiency** gains within buildings – how/where can the feds play?
    - Federal role in building sector is limited to tax policy; market making and infrastructure; limited subsidies. Consider adjusting Fannie/Freddie policies to support energy savings investments or certification.
• PACE program should be expanded; need Fannie Mae’s help.
• Consider broadening the mission of Fannie/Freddie to consider locational efficiency and requiring EE audits for Fannie/Freddie mortgage qualification.
• Acute need for better data on building efficiency (draw lessons from California’s implementation of Prop 39; AB 802). Can feds help, working with state/local programs?
  o Federal buildings – leadership and “proof of concept” opportunities.
    • Review current scoring rules for federal real estate investments.
    • Support deep retrofit of owned assets.
    • Accelerate consolidation and colocation.
    • Government should focus on sending energy efficiency demand signal to the marketplace with coordinated purchasing power from its large building stock.
  o DOE equipment standards program has been successful; how “gear it up”? Consider fee bate model? (May require statutory change.)
  o Leverage existing HUD, DOT, and EPA Sustainability Communities effort; add in GSA’s new efforts on “Economic Impact.”
  o Extend access to federal procurement schedules to state and locals.
    • Give access to USG’s sustainable procurement.
    • Extend ESPC contracts to state and local facilities.
  o How influence real estate industry, which is atomized, non-tech, and largely non-federal? Real estate incentives tend to be perverse (e.g., triple net leases).
  o Focus on real estate/transportation nexus; facilitate civic infrastructure development.
    • Acknowledge and capitalize on development/transit nexus to maximize lower-GHG-impact growth.
    • Expand Build America Bonds with location and energy efficiency focus.
    • Establish Infrastructure Bank to support financing for urban and institutional district heat and power facilities, micro-grid investments, and transportation assets that support location efficiency.
    • Develop Retail Investment Funds that support investment around mass transit.
  o Building codes look backwards. How leapfrog forward with new energy efficient building approaches that are not held back by immediately obsolete building codes?
  o How scale up “District Energy” innovations – such as exhibited in the Stanford Energy System Innovations (SESI) project -- for similar, aging energy infrastructure projects around the U.S.?
• **Transportation sector** needs to be a top priority, based on its GHG footprint (approximately 1/3 of total energy use).
  o US leadership needed to address aviation emissions.
    ▪ Focus on biofuel-based jet fuels (with the help of DOD via DARPA – potential 50% biofuels usage goal by DOD aircraft).
    ▪ Need active U.S. engagement in ICAO (Int’l Civil Aviation Organ.)
    ▪ Increase NASA aeronautics R&D.
    ▪ Accelerate elimination of lead from general aviation.
  o US leadership needed to address maritime transportation emissions; the maritime industry consumes large volumes of the world’s dirtiest fuels (e.g., bunker fuel).
    ▪ Aggressive engagement in international forum (the IMO).
    ▪ Consider restructuring federal Title XI loan guarantees for shipbuilding to require LNG/CNG.
    ▪ Consider reserving loan guarantee capacity for repowering of existing Great Lakes and inland waterways fleets.
    ▪ Recommit to US Navy’s “Great Green Fleet.”
    ▪ Establish tax incentives and begin EPA regulatory process for shore power of vessels at dock.
  o **Surface transportation** opportunities in the US.
    ▪ Need to **electrify cars/trucks**. There will be a huge investment in fleet turnover in the coming years-- $15T dollars. How take advantage of that level of investment to address climate concerns?
      • Consider developing a new iteration of CAFE standards (e.g., an incentive-based approach)?
      • Get inefficient cars/trucks off the road (being attentive to serious equity issues).
      • Establish by regulation a joint EPA/DOT methodology for measuring cradle-to-grave carbon footprint of individual motor vehicles (help consumers make informed choices).
      • X-prize for the best wearable app that measures the carbon footprint in real time of transportation choices.
    ▪ Self-driving cars and shared transport models:
      • How maximize lower GHG opportunities that they potentially present (and avoid the longer commutes that they potentially could promote)?
      • Federal insurance in support of transportation asset-sharing ventures (Uber, Zip, Split, etc.)?
    ▪ Level the federal funding playing field for more efficient, safer movement of people. (e.g., formula funding dominates federal funding for airports, interstates and highways; less than 50% competitive grant money is
available for transit; 0% federal formula or competitive funding is available for inter-city passenger rail.)
- Feds should influence “loss of service” criteria used by state/local transportation projects that tilt the funding scale in favor of greenfield projects.
- Need a “modally agnostic” surface transportation program that incentivizes and encourages city pairs 50-400 miles apart to be served by intercity passenger rail.
  - Inefficiencies in transportation networks are major contributor to GHG emissions. Adopt a National Freight Policy that incentivizes goods movement on water as long as possible, then on rail as long as possible, then truck the last mile -- a goods movement hierarchy.
  - Recruit transit organizations to support revenue potential associated with carbon tax or cap and trade program.
  - Seek to incentivize LNG for trucks, railroads.
  - Need mapping of transit systems.
  - Maximize government fleet leadership opportunities.

Crosscutting Issues

Fostering Innovation

- Need to increase clean energy investment. Currently, federal energy RD&D is 1/3 of what is needed.
  - Without legislation, energy R&D will remain fragmented. (In one year, 23 federal agencies implemented 700 renewable energy initiatives – GAO 2012.)
- What’s the vision for federal R&D investments? Need to make R&D more effective and efficient:
  - Need to better link up upstream R&D with scale-up financing opportunities; need more communication/coordination between R&D and finance.
    - E.g., find ways to get information developed through ARPA-E and other federal research out to the private sector. (Note: DOE’s recently has established a Clean Energy Information Center.)
  - Increase collaboration between DOE and 17 national labs. Consider developing a shared strategic vision for national labs developed with DOE, while seeking to avoid micromanagement.
  - Identify lessons learned from DOE Innovation Hubs since 2010.
    - Innovation hubs potentially can provide important regional synergies.
    - Focus on lashing together gov’t, academy, and industry via seed money. Need more focus on optimal organizational approach.
- Apply race-to-the-top funding approach.
- Consider “hub” on specific topics (already occurring, on de facto basis). Potential priorities could include CCS, land use (with Interior, USDA). (See Center for American Progress report on hubs.)
  - Need more disciplined R&D exit criteria. (e.g., arguably, DOE’s Sun Shot program has run its course, given private sector investment in solar technology.)
  - How best address soft costs?

- Apply lessons learned from successful ARPA-E program
  - Restructure other DOE programs to ARPA-E model to spur innovation?

- Evaluate how best to coordinate with, and leverage, private sector R&D investment initiatives (PRIME + Gates, et al.). Focus on fostering bold opportunities to promote innovation by opening up new opportunities for competition, taking a page from communications revolution.

**Financing Innovation and Clean Energy Deployment**

- Phasing out tax credits and other outright subsidies will likely be necessary (due to limited tax credit market; political challenges, etc.); look for a soft landing.
  - Old dogs, new tricks: develop MLPs (MLP Parity Act); REITs (via IRS ruling); Private Activity Bonds (outside disaster zones!) for clean energy projects.
  - Consider creative uses of existing loan authorities.
- Given the availability of cheap money, how much gov’t financing $$ is needed? What are appropriate criteria for federal financing help? (e.g., outside validation via private $$ commitments?)
  - Need to distinguish among early stage, scale-up and deployment needs.
  - Huge $$ needed for deployment -- post-R&D (RD&D); getting through the scale up phase. $310B spent on clean energy in 2014; need to get to $1T/year, largely via private investment (not VC, more asset/project finance).
    - CCS is good example – need to find profit in carbon product.
- Should encourage the use of more patient private capital.
  - “Aligned Intermediary” initiative.
  - Divestment movement provides opportunity.
  - Push for requirements to consider climate risk in investment world.

- How deal with “crony capitalism” charge?
- Financing and soft costs are too high. How reduce?

**Utilities**
• Key is opening the door to competition in the utility sector, a la the communications revolution. Need disruptive thinking, a la Google X. Trend is inevitable; how best to speed it up?
  o Challenge “restraint in interstate trade in electrons” as stifling energy consumer choices; lawsuit led by large energy consumers? DOJ Antitrust division, a la AT&T breakup?
  o Open up “behind the meter” innovations; limit monopoly to the wires; incentivize wires companies to provide “smart” grid services; invest R&D $$ in the academy for behind-the-meter and smart grid innovations.
  o Offer stranded asset incentives for utilities?
  o States still are “laboratories of democracy” but liberate captured state regulators to facilitate competition.
  o Promote competition “at the grid edge.” PUCs should be required to consider competitive impacts of their actions (e.g., injury to solar industry); compel consideration of antitrust concerns in rate cases involving rate structure charges.
  o Data generated/analyzed by smart grid should be recoverable cost, available broadly. Consider amendments to PURPA re grid data?
• Huge investments will be made to modernize the grid ($2T in next 10 years): how make the most of these large capital infusions?
  o Consider lifting cap on utilities’ capital spending constraints. E.g., consider allowing utilities to increase capital spending at more than the inflation rate.
  o Storage will be key. California experience shows big market response to limited policy push.
  o Accelerate investments by providing generous opportunities for utilities to write off “stranded assets”?
• Need clarity regarding appropriate federal role. Gov’t can assist with early innovation; fill gaps that the market won’t/can’t; play role of the objective validator. In addition:
  o DOJ brings commerce clause challenges to discriminatory state utility statutes.
  o TVA; BPA – push on them to support competition.
  o Implement Clean Power Plan to favor competition.
  o Other potential tools to promote wholesale competition:
    ▪ Order 1000 implementation.
    ▪ Utility mergers.
    ▪ CAISO regionalization.

Building Clean Energy Generation/Infrastructure
• Need to make big moves to substantially increase renewable generation from 7%. Huge capital flows will be required.
  o Effort to replace oil consumption in transportation sector with clean electricity increases the stakes.
• State Renewable Portfolio Standards will continue to be important drivers.
• Role for federal government?
  o Evaluate strategies for improving the process by which federal agencies and private parties can make bulk renewable energy purchases.
  o Legislative push for clean energy standard?
  o Facilitate permitting of renewable energy and transmission projects on public lands. (See land use, below.)
• Nuclear: need to develop clear policy direction. Concern about pending losses of nuclear capacity in the U.S.

Land Use/Emissions Sources and Sinks

• Land Use-Related Emissions Sources:
  o Ag-related emissions.
    ▪ Livestock – methane (1/3 of all ag emissions).
    ▪ Liquid manure management.
    ▪ NOx from fertilizers.
  o Methane emissions from oil/gas production/distribution.
  o Deforestation.
  o Wildfires.
  o Permafrost melt.
• Potential land use-related mitigation opportunities
  o Ag industry
    ▪ Biogas anaerobic digesters – USDA has an initiative; opportunity to expand? Need incentive-based approach.
  o Methane emissions from oil/gas production/distribution.
    ▪ EPA/BLM regulatory actions.
    ▪ Leak detection technologies.
    ▪ Infrastructure inspections, etc.
    ▪ Potential disclosure requirements.
  o Forest management in the U.S.
    ▪ Use thinning, prescribed fires, successional forest harvesting practices to promote forest health and reduce incidence of catastrophic fires.
  o Evaluate federal fossil fuels extraction policies on public lands (coal; oil and gas).
  o Consider key areas of potential biofuels development:
    ▪ Biogas from manure, landfills, etc.
- Wood pellets and wood wastes from forest thinning activities (wood is renewable resource with 50% stored carbon). (Need full life-cycle evaluation of potential climate benefits.)
- Cellulosic ethanol.

- Sequestration opportunities -- natural landscapes (forests, rangelands, wetlands) sequester a significant portion of global carbon (15%). Some concern that sinks could become sources without good stewardship. Potential policy opportunities include:
  - Need to educate policymakers and the general public about the public benefits of natural landscapes. Establish easily accessible database of information regarding carbon uptake from ag and forest lands, wetlands, parks, etc.
  - Enhance carbon uptake in soils.
    - Spreading composted manure and bio char can significantly enhance rangelands’ carbon sequestration opportunities; invest in additional research; develop more pilots. (Note: State of California interest in issue; Marin Carbon Project).
    - Develop “natural capital,” market-based concepts to better value natural carbon-absorbing assets.
    - Consider categorizing carbon-assisting watershed improvements as “infrastructure” for funding/policy purposes.
    - Conserve agricultural and forest lands via conservation land banking; work with states and local entities to develop mitigation strategies if ag and forest lands are taken out of production.

- Assist in siting clean energy and transmission projects.
  - Improve appropriate access and permitting processes for siting new clean energy projects on public lands, where federal gov’t can provide direct policy direction.

- Developing Adaptation/Resilience Strategies to Address Climate Impacts on Resources.
  - The federal government is in a unique position to be an information source and clearinghouse regarding potential climate impacts and resilience and adaptation strategies that are being utilized around the U.S.
  - Feds should develop easily accessible and user-friendly GIS mapping capabilities to understand and project potential climate impacts on resources.
    - Better use of GIS mapping techniques needed – identify data gaps; identify inefficient, duplicative systems/programs across competing federal agencies; consider partnering with leading states and syncing up software and data approaches (e.g., California).

**International Considerations**

The domestic/international interplay will become more and more important, post-Paris.
• Paris success provides new opportunities for key sectors. International approaches may emerge via climate “clubs,” bilateral initiatives, public/private partnerships.
  o Consider formalizing sectoral collaborations (e.g., extractive industries; materials-related industries)(taking a page from Bali).
  o Explore public private partnerships (e.g., tropical forest alliance; alliance for climate smart agriculture).
• As noted above, tackling aviation and maritime emissions will require collaboration with international nations/organizations.
• The Montreal Protocol provides a promising international mechanism to address HFC emissions.
• The Paris agreement’s focus on deforestation provides and opportunity for (1) cost-effective, market-based investments in avoided deforestation in other nations; and (2) more focus on US forest and rangeland stewardship (per land use section, above).
  o Need more attention on measurement, reporting, verification (you can’t manage what you don’t measure).
• Likewise, international black carbon reductions provide potential trading opportunities.
• How can federal gov’t use subnational efforts (e.g., Calif + other subnationals) as leverage for national policies?

Important Miscellaneous Issues:

• Governance questions (addressed in January workshop)
  o Need a “Carbon Cabinet” to coordinate inter-agency initiatives?
  o First wave of Executive Orders from the new President will set the stage for climate-related policy directions – what should they address?
• Consider developing a federal legislative proposal from the Administration to help define/focus the Administration’s priorities.
• How deal with carbon leakage issue? (i.e., shifting of U.S. manufacturing-related emissions overseas).
• Need to address equity issues – e.g., community-based v. rooftop solar.
• Avoid excess buildout of natural gas infrastructure.
• How can feds help on promoting attention to, and investment in, resilience issues?