Renewable Transmission: Rights, Wrongs and Conflicts… Access, Pricing, Jurisdiction or Goals?

Carl Zichella
Director of Western Renewable Programs, Sierra Club
Cambridge, Massachusetts
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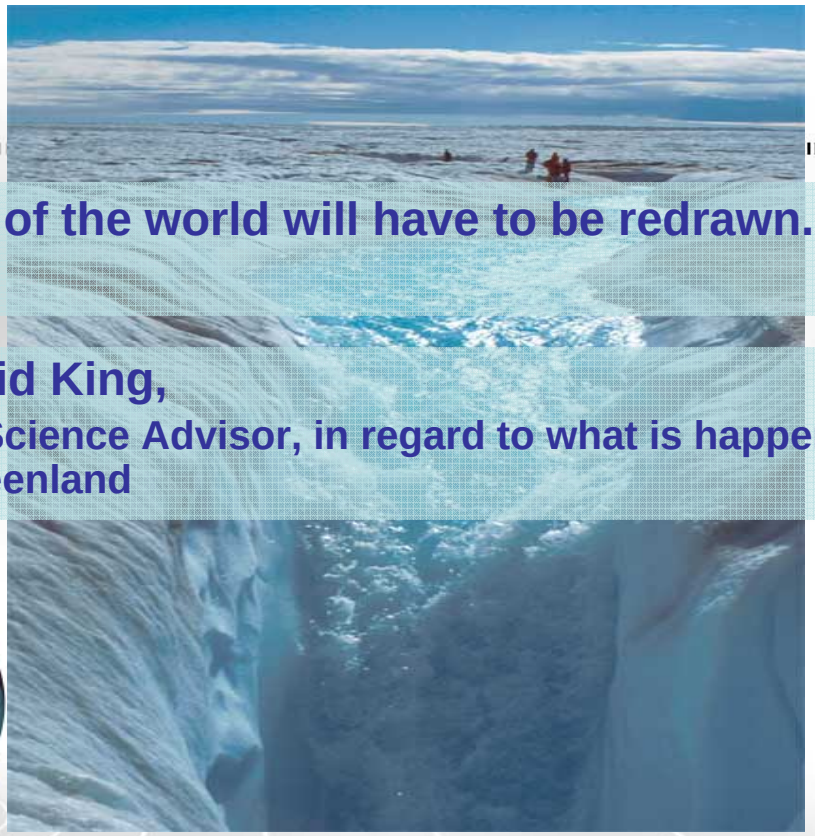
The Driver is Climate Change

- The U.S. must transform the way we power the world's largest economy
- Global temperature increases must be kept to one degree Celsius if possible (450 ppm CO2)
- Four – five degrees worst case scenario (≈ warming since last Ice Age)
- Benefits of early action far outweigh costs (*Stern Review)*

Consequences are Severe

- One in 20 people could be displaced by rising sea levels
- One-third of world's species face extinction (IPCC)
- Poorest nations face the earliest and most disastrous consequences, least ability to adapt
- Climate refugees and resource conflicts

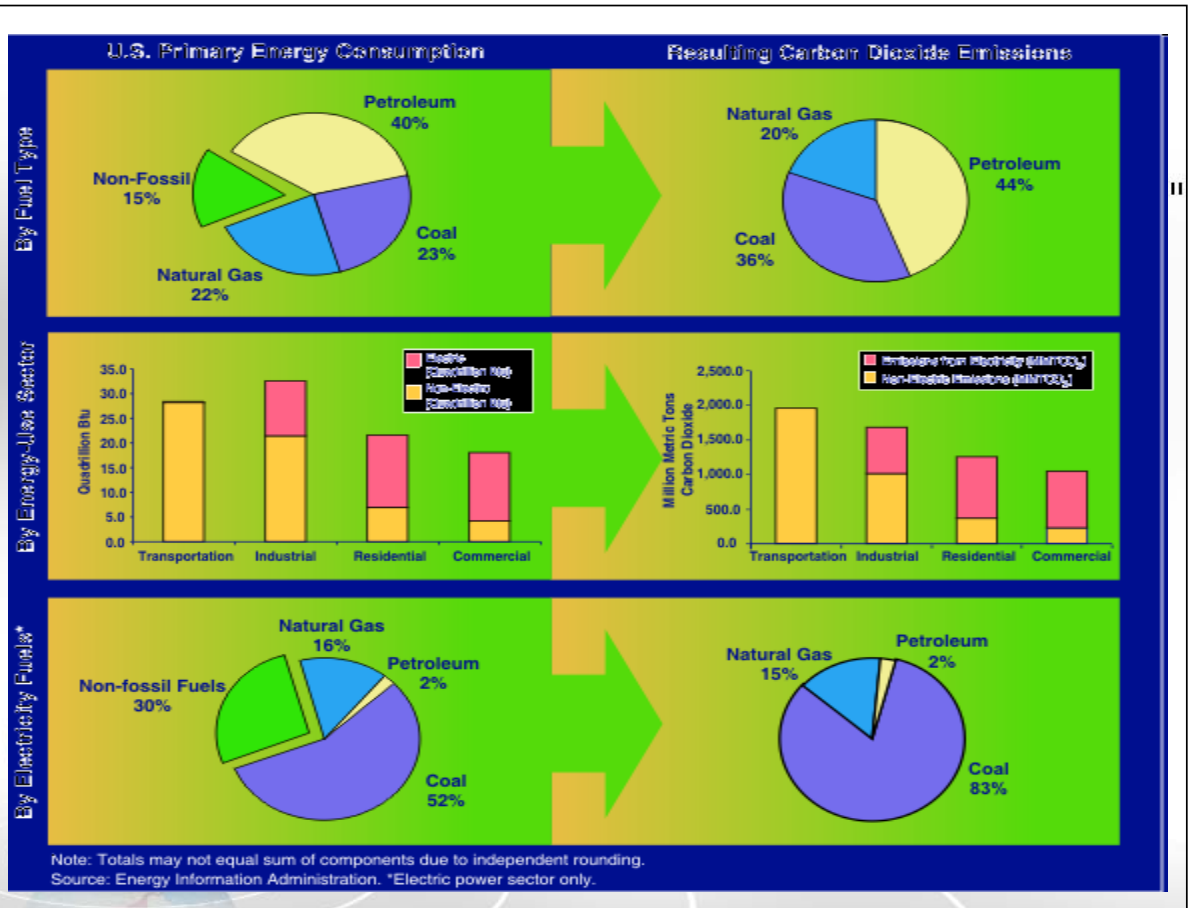


"The maps of the world will have to be redrawn."

- **Sir David King,**
  - **U.K. Science Advisor, in regard to what is happening in Greenland**

Developed Nations Must Lead

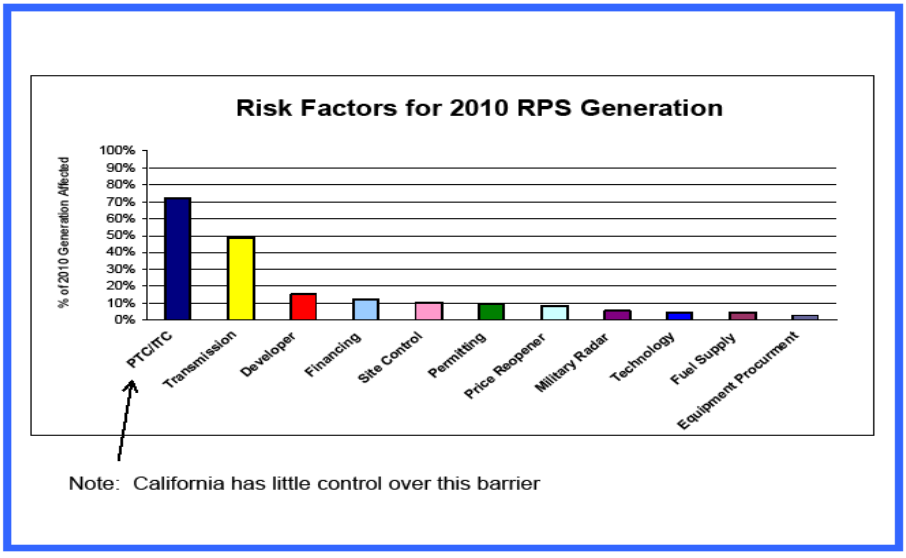
- Largest contributors
- Access to technology and innovation
- Challenges convert to opportunities
- Experience with large-scale economic transitions
- Dislocations globally disrupt all economies
- Models for alternative development



Role of Renewables

- Driver is climate change then relative cost v. benefit must take carbon reduction into account
- Coal largest CO2 contributor in sector
- Cannot afford new coal
- Must phase out existing coal
- Time is of the essence
- Renewables the obvious answer

Obstacles to renewable transition



Obstacles to Renewable Transition

- Cost inflated due to lack of carbon pricing
- Remote from load centers
- Intermittency and integration concerns
- Concerns over land use in siting and transmission
- Without protections, backsliding on Carbon likely
- BAU planning and siting frustrates national goals

Environmental Dispatch, Interconnection Stds.

- To prevent carbon backsliding
  - Prevent new high carbon interconnections (Western US)
    - GhG interconnection std – fuel neutral?
  - Prioritize grid enhancements for renewables
  - Dispatch low-carbon resources first
    - Cost distorted by lack of carbon cost
    - General grid upgrades allow for increases in CO2 from existing sources.

Intermittency – how serious a problem?

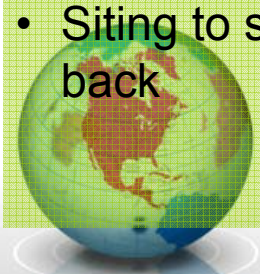
- Firming can be done with other renewables
  - Wind with wind
  - Wind with solar
  - Solar with wind
  - Wind and solar with geothermal and hydro, biomass
  - Storage
- Firming with natural gas

National Benefits, Cost Allocation, Priority

- Business as usual planning and cost recovery geared to territory needs
- Renewable planning and cost recovery should be interconnection focused
- Cost recovery should be interconnection focused
- Need for lines tied to national GhG reduction goals
- Cannot afford to lose ground on carbon
- Time is of the essence.

Interconnection Planning

- Involves key stakeholders up front
- Identify development zones with few conflicts
- Design needed transmission to the zones
  - Do generation and tx planning co-contemporaneously
- Lines identified as needed in the plan prioritized and federally authorized
- Siting to states or with state conditions, FERC fall-back



Key stakeholders

- LSEs and utilities
- Independent transmission sponsors
- Federal agencies
- State regulators
- Local and county governments
- Tribal Governments
- Environmentalists
- Planning entities and sub-regional planners

Siting considerations – key to speed

- Avoid all designated protected areas
- Plan for ecosystem resiliency
- Build what is needed and plan for expansion
- Scalable transmission
- Make full use of designated ROWs and existing infrastructure
- Agencies must collaborate – fed with fed, states with fed.

Interconnection priority

- National priority means accelerated deployment
- Renewables move to front of line
- Renewables displacing coal go first
  - i.e. Mojave generating station, Laughlin, NV.
- Phase out worst polluters first allowing for wheeling of remote renewables and less-polluting conventional resources
- Use system capacity for distributed integration too.
- Accelerate Energy Efficiency to reduce infrastructure needs

For More Information

Carl Zichella
Director of Western Renewable Programs
Sierra Club
carl.zichella@sierraclub.org
(916) 557-1100, ext 104