



Carbon Capture, Utilization, and Storage (CCUS): Status, Issues, Needs

Session 5: Major US Policy Issues and Needs

Michael E. Moore

VP Energy Commodities and Advisory Services
FearnOil Inc. a division of Astrup-Fearnleys Oslo

Executive Director (2008-April 2017)
North American Carbon Capture Storage Association (NACCSA 2008-April 2017)

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Fossil Fuels at Risk and Why CCUS/CCS/CCU Still Matter

Fossil Fuels at Risk and Why CCUS/CCS/CCU Matters

Historic Paris Agreement on Climate Change

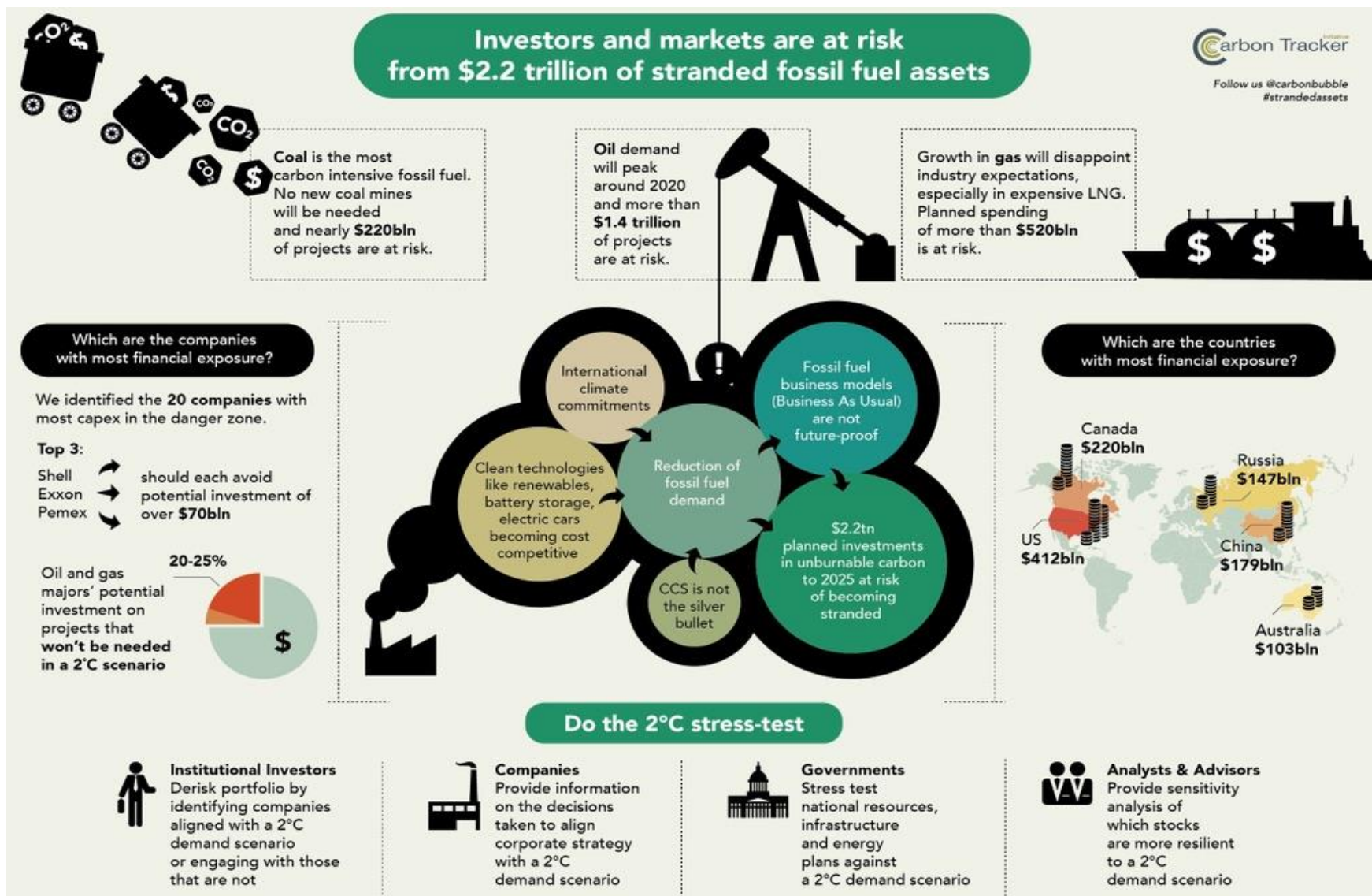
195 Nations Set Path to Keep Temperature Rise Well Below 2 Degrees Celsius



What does “de-carbonization of energy (fossil fuels) by 2050.....” mean?

<http://newsroom.unfccc.int/paris/>

US\$2.2 Trillion Fossil Fuel Assets at Risk



+280 Global investors (managing more than \$17 Trillion in assets) urge G7 to stand by Paris Agreement and drive its swift Implementation



Ceres



Investor Group on
Climate Change



Principles for
Responsible
Investment

Continue to support and implement the Paris Agreement, including the need to: ■ Ratify the Paris Agreement, and where already ratified, continue to support the Paris Agreement ■ Submit nationally-determined contributions (NDCs) in 2017 ■ Implement and strengthen future NDCs ■ Develop 2050 climate plans in 2017 ■ Communicate annual progress out to 2050.

Drive investment into the low carbon transition, through making commitments to: ■ Support a doubling of global investment in low carbon assets in developed and developing countries by 2020 ■ Include carbon pricing in climate-energy action plans ■ **Agree on a timetable to phase out fossil fuel subsidies** ■ Prioritise and implement climate-energy action plans and align policies in 2017 ■ Implement the recommendations of the G20 Green Finance Synthesis Report.

Implement climate-related financial reporting frameworks. To this end, investors urge global leaders to: ■ Clarify the mandate of national financial regulators to evaluate and require disclosure of material climate-related financial information ■ Request that the international financial standard setting bodies respond to the Financial Stability Board Task Force on Climate-related Financial Disclosures recommendations ■ Prioritise knowledge sharing on scenario analysis and transition planning.

<http://investorsonclimatechange.org/wp-content/uploads/2017/05/Briefing-Paper-for-G7-G20.pdf>

US Fossil Fuels at Risk

Resources

- US coal resources
- US natgas resources
- US oil
- US NGL resources (LPG, ethane, etc.)
- US petcoke
- Imports/exports

Consumers

- Power plants: coal, natgas, oil, diesel, jet, residual fuel oil, ethane
- Transportation fuels: gasoline, diesel, jet fuel, ship bunkers, LNG, CNG, LPG
- Feed-stocks: natural gas, natural gas liquids, petrochemicals
- Imports

Considerations

- Keeping value in face of decarbonization
- Developing carbon values for low carbon results
- Future international issues around LCA on resource supply and added value resources
- Shareholder value preservation
- Adding “low carbon” oil reserves
- Making “low carbon” fossil fuels for the market
- Augmenting rate base capacity for reliability and resilience
- Monetization of existing fossil fuels resources, infrastructure and processes – wealth of a Nation
- Funding for future fossil fuels resources, infrastructure and processes-wealth of a Nation
- Policy parity for all clean energy (not just renewables)

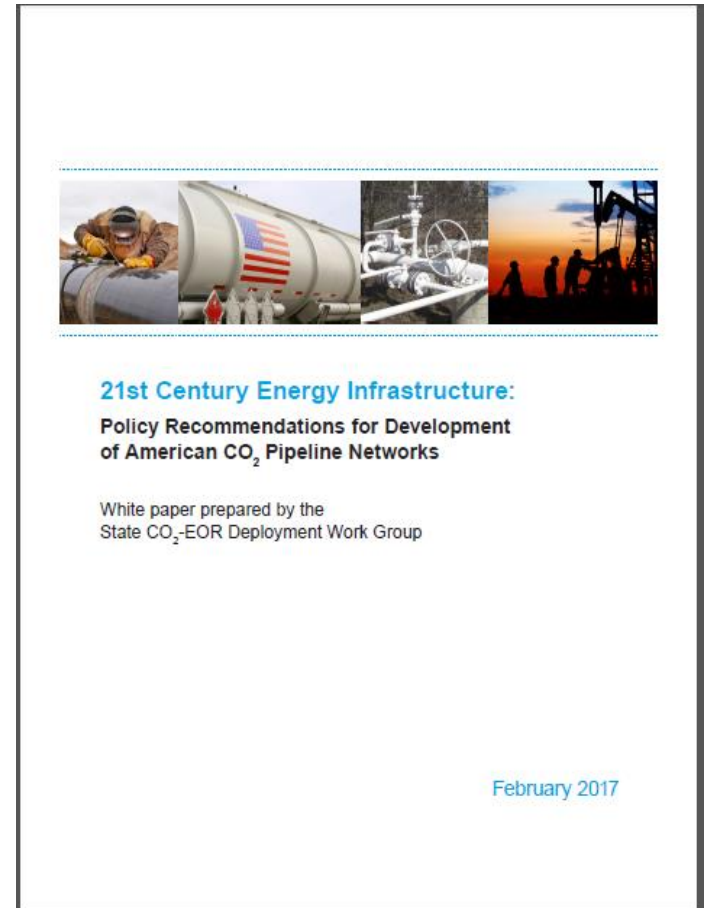
CCUS/CCS/CCU Project Value

- Different project opportunity areas:
 - Carbon capture utilization storage (CCUS)
 - Carbon capture storage (CCS)
 - Carbon capture utilization (CCU)
 - All decarbonize fossil fuels
- CO₂-emissions and commodity CO₂
 - Natural CO₂-from formations like natural gas
 - Anthropogenic CO₂-captured from processes
 - Biogenic CO₂-from ethanol production
 - Growing global carbon market

CO₂ Shipping and CO₂ Pipelines



http://www.ieaghg.org/exco_docs/2017-TR1.pdf



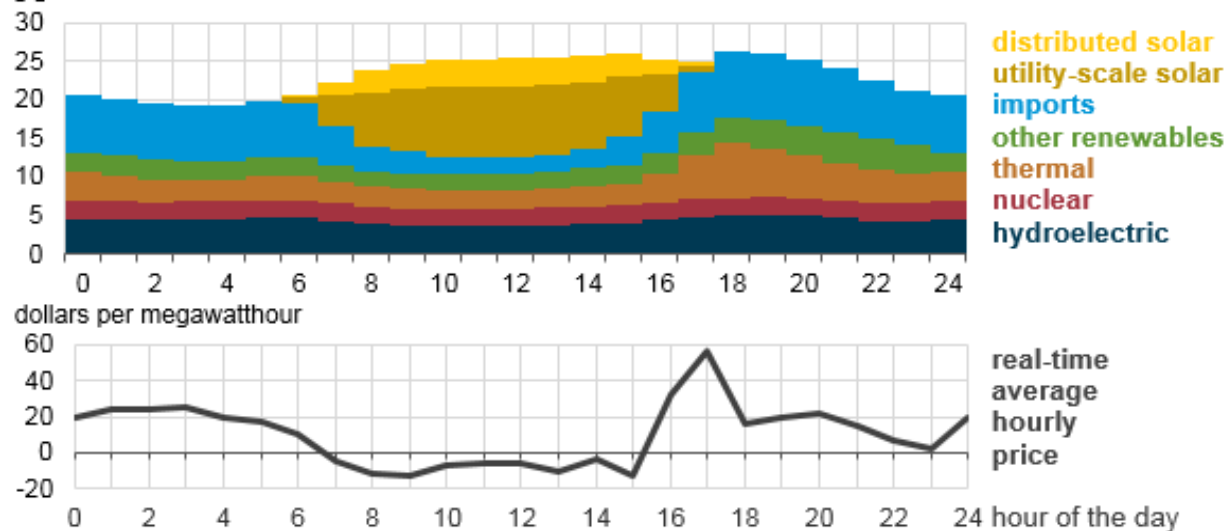
http://www.betterenergy.org/sites/default/files/White_Paper_21st_Century_Infrastructure_CO2_Pipelines_0.pdf

Market Considerations

Rising solar generation in California coincides with negative wholesale electricity prices

California Independent System Operator net generation, March 11, 2017

gigawatt-hours



Source: U.S. Energy Information Administration, based on [Monthly Electric Utility Sales and Revenue Report with State Distributions](#) and [California Independent System Operator \(CAISO\) data](#)

Note: Distributed solar generation is estimated based on December 2016 installed net-metered capacity as reported in [form EIA-826](#), [Monthly Electric Utility Sales and Revenue Report with State Distributions](#).

On March 11, utility-scale solar generation in the territory of the California Independent System Operator (CAISO) accounted for almost 40% of net grid power produced during the hours of 11:00 a.m. to 2:00 p.m. This is the first time CAISO has achieved these levels, reflecting an almost 50% growth in utility-scale solar photovoltaic installed capacity in 2016. The large and growing amount of solar generation has occasionally driven power prices on the CAISO power exchange during late winter and early spring daylight hours to very low, and sometimes negative, prices. However, consumers in California continue to pay average retail electricity prices that are [among the highest in the nation](#).

Path Forward for Low Carbon Fossil Fuels:

**Policy Parity, for example the recommendations of the
National Coal Council's Report**

“Leveling the Playing Field for Low Carbon Coal”

- National Coal Council--A Federal Advisory Committee to the U.S. Secretary of Energy. The NCC provides advice and guidance on a continuing basis as requested by the Secretary of Energy on the general policy matters relating to coal
- Report issued the Fall of 2015
- Policy Parity
<http://www.nationalcoalcouncil.org/studies/2015/Leveling-the-Playing-Field-for-Low-Carbon-Coal-Fall-2015.pdf>

The New Administration

- \$1 Trillion Infrastructure Initiative-competition heating up as to what are the priority sectors
- Executive Order on Identifying and Reducing Tax Regulatory Burdens -Tax Reform-what stays, what goes, what gets modified...what gets done.
- Energy Secr. Perry Memo to the DOE for study on the US electric grid-outcomes and recommendations
- Executive Order 13771 —entitled "Reducing Regulation and Controlling Regulatory Costs"

Questions & Thank You!

Michael E. Moore

- **VP Energy Commodities and Advisory Services**
- **FearnOil Inc. (a division of Astrup-Fearnleys AS)**
- **www.fearnleys.com**
- **Executive Director 2008-April 2017**
- **North American Carbon Capture Storage Association (2008-April 2017)**
- **mmoore@fearnoil.com Tel: 281-759-0245**

QER Jan 6th page 41

- **Work with states to promote best practices for regulating and siting CO2 pipelines.** Building on successful state models for CO2 pipeline siting, DOE, in cooperation with Federal public land agencies, should take a convening role to promote communication, coordination, and sharing of lessons learned and best practices among states that are already involved in siting and regulating CO2 pipelines or that may have CO2 pipeline projects proposed within their borders in the future.
- **Enact financial incentives for the construction of CO2 pipeline networks.** Congress should enact the Administration's proposed Carbon Dioxide Investment and Sequestration Tax Credit, which would authorize \$2 billion in refundable investment tax credits for carbon capture technology and associated infrastructure (including pipelines) installed at new or retrofitted electric generating units that capture and permanently sequester CO2.

Carbon Advance Centre

- **A dedicated national group to address the growing impact to fossil assets and offering pathways for the clean efficient future use:**
 - Advocating policies based on recognition of continued need for fossil fuels in the overall energy mix and the timeline for commercializing CCUS
 - Educating policymakers on the indispensability of CCUS to meeting climate targets
 - Educating policymakers on the economic potential of CCUS
 - Countering fossil divestment and “keep it in the ground” efforts and emphasize the benefits fossil assets with CCS/CCUS/CCU
 - Connecting CCUS supporters from across fossil and non-fossil industries, financial entities, supportive NGOs, and concerned governmental entities

Fossil Fuels are Critical in all Sectors

