Report from Financing CCS Task Force

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CSLF Financing Roundtable
6 April 2010, Washington, DC

FINANCING ROUNDTABLE CONCLUSIONS

Business Case Risk Framework:

Technical, market and regulatory risks, costs and uncertainties need to be addressed:

- Capital subsidies and loan guarantees for the additional equipment costs;
- Operating subsidies (as feed-in tariffs or tax benefits or long-term off-take agreements) for capture and storage;
- Early co-funding of engineering (FEED);
- Insurance (trust funds, bonding);
- Performance standards for old and new units;
- Clear regulatory guidance for land use, injection, storage, groundwater protection, and stewardship and liability.

CSLF Financing Task Force: Next Steps, 2011

- **2010 Roundtables on Finance achieved a fruitful dialog between public and private sectors to resolve key risks.**
- **The dialog must be taken to a deeper level to resolve issues for financing projects with CCS at commercial scale – an order of magnitude in funding over demonstrations or pilot efforts.**
- **IEA believes that energy financing challenge to 2030 is in €£$ Trillions… not a government budget call, but debt financing needed.**
- **Explication of elements in several "Funding Models" is needed:**
  - Differences between power sector, other energy-intensive sectors
  - Differences of low-growth OECD vs. high growth Developing Nations
  - Differences among market factors and regional features, industrial capacity
- **Two Roundtables are proposed for 2011, one in Asia, one in Washington**
  - Funding will be sought from sponsors and institutions
  - Other organizations to be engaged: G8/G20, IEA, Development Banks, Industry
- **Deliverables: Details of Funding Models, Tools for Government Agencies**

Landscape for Investment in Projects with CCS

Difficult Challenges

- Tight credit globally, with stiff competition for investment
- Cheap fossil fuels (natural gas), with subsidies still intact
- High uncertainty about GHG policy
- Severe fiscal deficits (local, federal)
- Unclear regulatory permitting
- Lack of system performance guarantees
- Cheap, old coal plants still running (competition for new units)

Major Opportunities

- Historically low interest rates
- Reduced volatility in market prices by shifting to coal sources
- Tech pathway to fix large GHG sources by adopting CCS
- Modernization of industrial base
- Entails large-scale international cooperation (public and private)
- Local economic development
- Alternative fuel diversification with domestic utilization (gasification may enable fuel fabrication)

Societe Generale: Financing Challenges

Conclusions: Key Financing Challenges to be Addressed

Projects are fundamentally uneconomic	■ **EOR provides the only positive cashflow to the Projects – no alternative market for product** ■ Where is the value if no EOR? ■ How to recover significant investment on the CCS infrastructure – particularly for "multi-user" schemes ■ **Economic subsidy and/or guarantee will be required for the Project to be bankable**
Risk Allocation & Interdependent Infrastructure	■ Integration of this Project with several independent operating businesses give challenges to risk allocation ■ Failure in any part of the chain may have knock on effect to the whole Project ■ **Emission level of the flue gas / processing gas is outside the control of the Project** ■ Termination Regime to be considered carefully due to single ender user for the Project
Technology	■ CCS technology has not been tested for large scale commercial use – Particularly Post Combustion ■ Construction and operation experience is limited ■ **Difficult to find a traditional EPC Wrap with warranty and damages provisions at economic cost** ■ **Lenders likely to require higher performance guarantees on early projects due to uncertainties**
Environmental Compliance	■ **CCS technology to be used for enhanced oil recovery could become NGOs' target** ■ Questioning of benefits of new coal fired generation even with CCS ■ **Credible monitoring and certification of sequestration crucial**
Un-tested in the Finance Market	■ Large financing needs call for diverse funding sources to secure largest possible financing component ■ Lenders have not been tested on the above risks ■ **"First of its Kind" risk** ■ **Until there is confidence in Government policy and technology there will be no project finance**
Key Message	■ **Currently no comprehensive legal and regulatory framework exists for CCS** ■ **Legal issues (CO_2 network and storage liabilities & monitoring are not clear** ■ **Policy and regulatory framework remains unclear** ■ **NO LONG TERM CLARITY = NO PROJECT FINANCE**

Finance Roundtable Dialog

Public-Private Funding Models: Key Elements

"Trigger points" for mobilizing capital

Policy & Regulations

Government

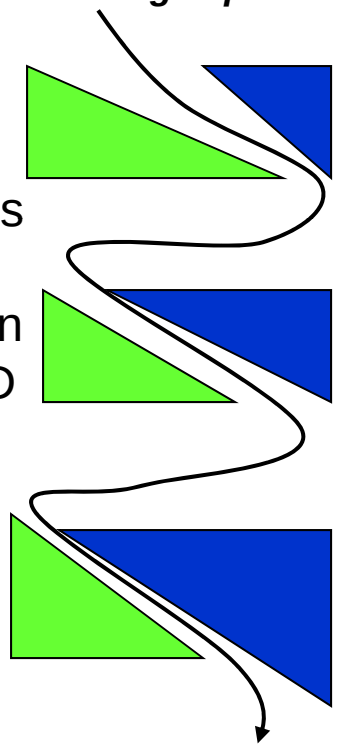
- GHG policy
- Siting regulations
- Performance Standards

Technology Deployment

- R&D / Tech cooperation
- Demonstration & FEED

Market & Finance

- Monetary incentives
  - Tax measures, FITs
  - Allowances
  - Green bonds
- Energy rates



Industry & Investors

- Property investment
- Feedstock & infrastructure
- Monetizing cost / benefit

- Engineering & Innovation
- System integration
- Training, education

- Debt / Equity financing
- Insurance; trust funds
- Market presence

"Reliable energy from secure supply with environmental stewardship"

FUNDING MODELS

- ***Public utility***
- ***Private project***
- ***Hybrids… others***

Funding Models to Consider (GCCSI)

FIGURE 7: IMPLICATIONS OF ALTERNATIVE ENGAGEMENT MODELS

DEFAULT PROPERTIES OF THESE MODELS

	RISK	PUBLIC OWNERSHIP OF IP AND EXPERIENCE[1]		ABILITY TO SHARE RISKS WITH PRIVATE SECTOR[2]	DEMAND ON GOVT CAPABILITY BUILD[3]	SCENARIOS SUITABLE FOR ADOPTION	
1	PUBLIC UTILITY MODEL	All experiences captured by govt, with high potential to share globally	TECH MGT CONTROL	Govt holds all risks (subject to insurance contracts with private co)	**High** – significant technical capability build/ acquisition necessary	FOAK demo projects where govt, rather than private co, has sufficient capability and experience	POSSIBLE
2	OUT-SOURCING MODEL	Technical IP held in private co, govt to gain project mgt learnings	TECH MGT CONTROL	May offload individual execution risks to private sector (design/build/ops)	**Medium-high** – procurement and mgt expertise required	FOAK demo projects, where private sector holds some adjacent experience	
3	OWNER / FINANIER MODEL	Tech IP and mgt exp in private, but govt keeps control as active owners	TECH MGT CONTROL	May offload overall project risks to private, bears the ultimate risk as financier	**Medium** – capability in controlling fund release, monitoring progress and providing oversight	Projects where private sector can bear some overall project risk, but not willing to risk significant $	
4	MIXED FUNDING MODEL	Almost all IP/exp in private, govt plays passive financer/monitor role	TECH MGT CONTROL	Potential to share the ultimate project risk with private sector	**Medium-low** –strategic and monitoring capability to steer and evolve funding model over time	Currently unprofitable projects with high risks	
5	PRIVATE SECTOR MODEL	All IP and exp rests with private co	TECH MGT CONTROL	Potential to have private sector bearing and managing all risks	**Low** – regulatory capacity to design, enforce legal rights, and securing operational safety	Projects with demonstrated (profitable) economics and manageable risks (not available in demonstration phase)	X

The Global CCS Institute Funding Models offer a path forward to negotiations between public and private sectors on risks and cost-sharing given a variety of modes and regional differences. At the highest level, parties need to decide what roles they are prepared to (or must) play to move a CCS project forward.

The 'engagement model' is the division of roles between public and private sector participants across key functions such as designing, building, project managing, ownership and financing.

Focus of the roundtable discussions

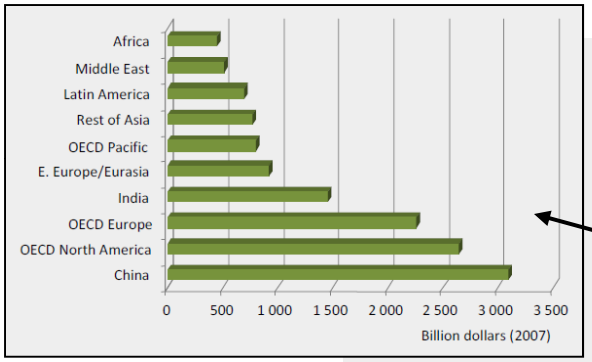
Summary (Bernard Frois, CCS Summit; 20 May 2010, Berlin)

1) **Today, CO_2 price is too low. 100$ possible? When is uncertain.**
2) **Costs are considerable. Subsidies are not sufficient.**
3) **Financing *Commercial-scale* projects with CCS focuses key risks.**
4) **High risks (technical, market, policy): <u>All</u> risks must be addressed. Public-private negotiation on risk coverage is paramount.**
5) **Rewards not clear. How to recover capital *and* make profit?**
6) **Long-term liability is a major issue; Development is opportunity.**
7) **Market uncertainties, emissions regulations and subsurface rules must be addressed as well, to mobilize private debt and equity.**

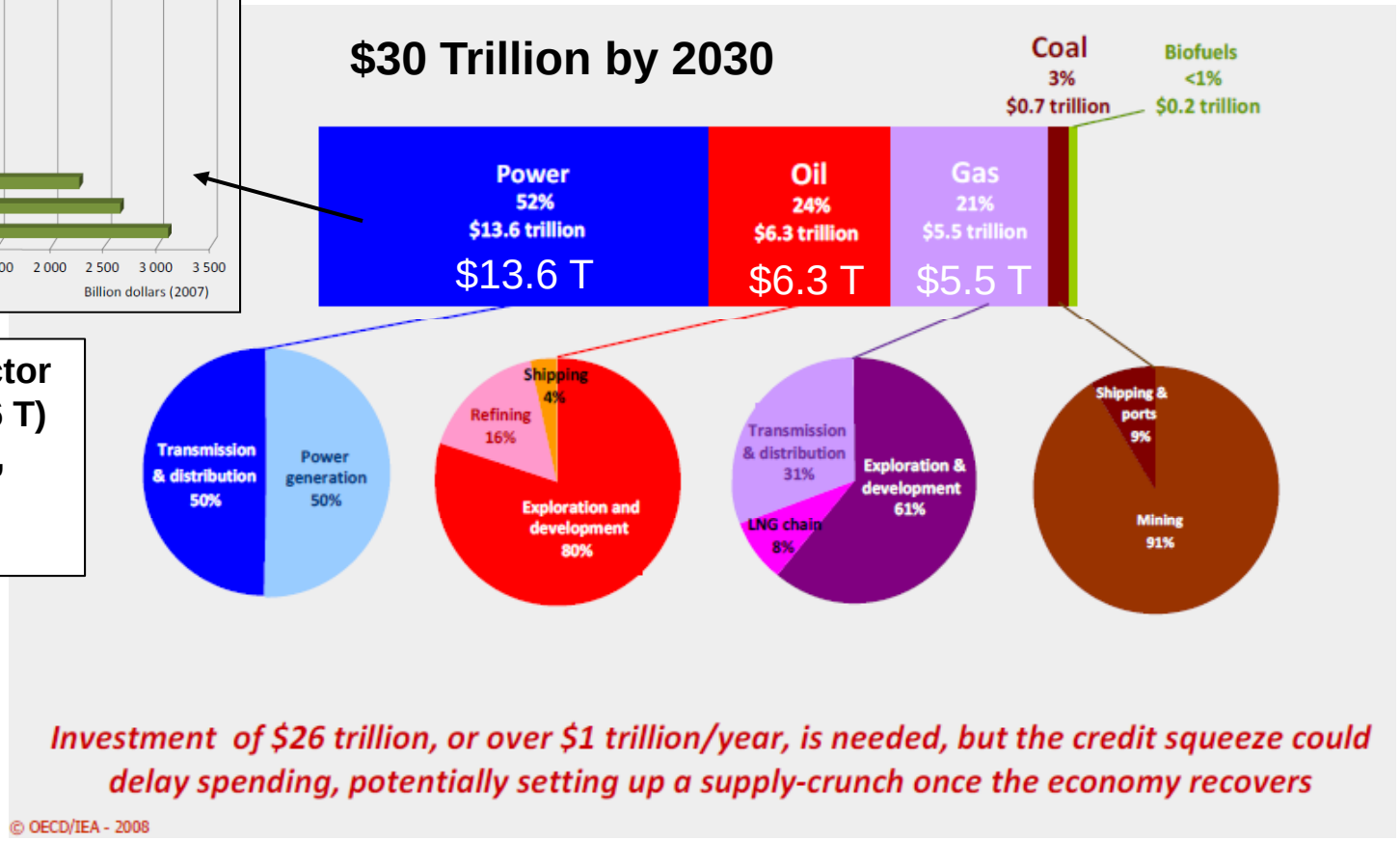
Public -Private Partnerships can flow through the **bond** market

Capital Investment Required is Daunting ➔ Debt

Lenders and bondholders will provide the bulk of energy financing to 2030, NOT venture capital, so a credit risk framework will prevail, focused on predictable, steady cash flows.



75% of power sector investment ($13.6 T) targeted in China, OECD Europe, and N.America



Investment of $26 trillion, or over $1 trillion/year, is needed, but the credit squeeze could delay spending, potentially setting up a supply-crunch once the economy recovers

Debt Financing Drives the Framework, not "Venture Capital"

Approach to Business Case Framework

Energy Project Development Timeline → **Risk Analysis of Project Development Stages** → **Rating and Ranking of Risks by Stages** → **Evaluation, Application of Risk Mitigation Mechanisms**

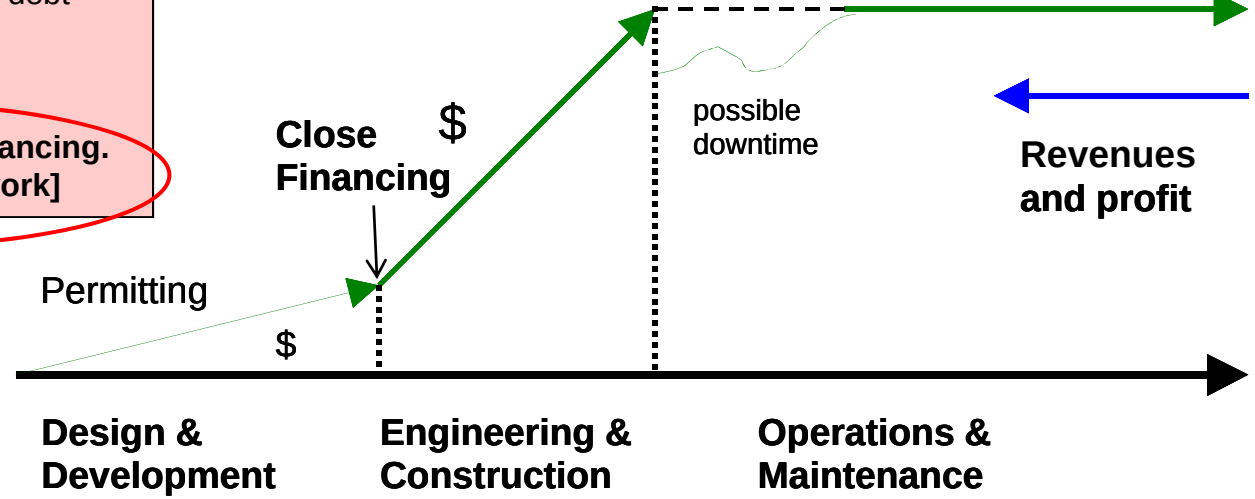
Regulatory and policy risks

Technology and operating risks

Market and Financial risks

Fossil projects with CCS cannot complete financing without a comprehensive commercial risk analysis by creditors with debt financing.

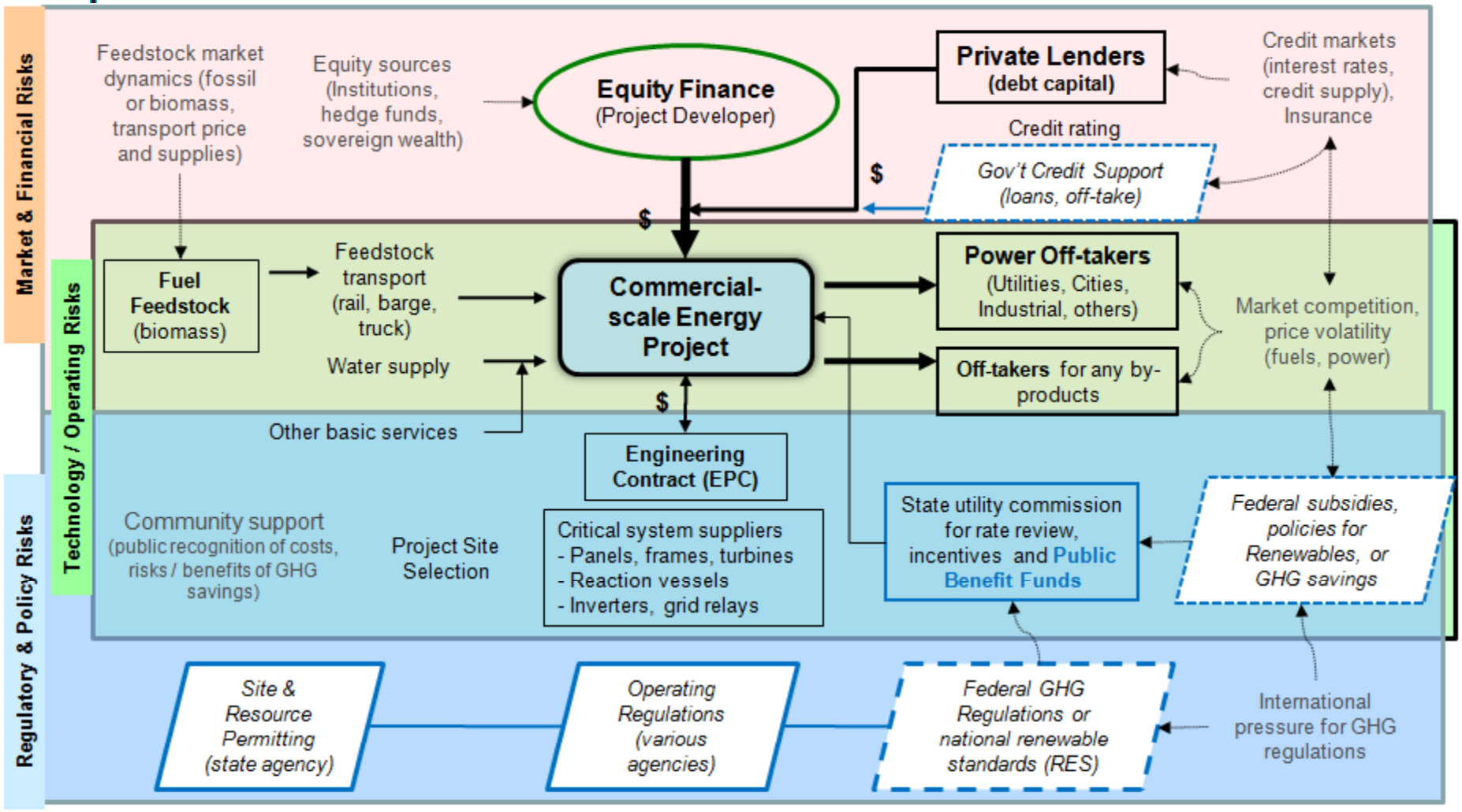
Deployment = debt financing. [credit risk framework]



Source: Scully Capital

Risk Analysis rooted in Project Structure

Commercial Scale Projects with CCS: Key Elements



Source: ADPaterson at IEA WPFF, Nov. 2009