

Investing in Clean Energy in Asia

**Asia Clean Energy
Forum 2008**

June 2008



Potential Tectonic Shifts in the Energy Sector

Fossil Fuel Depletion

- 🔺 **The World has a finite resource of fossil fuels**
 - ⇒ Essentially stored “ancient sunlight”
- 🔺 **IEA estimates that the World will run out of oil and gas around 2050 based on the present Reserves-to-Production ratio**
- 🔺 **...But the picture is significantly worse than this:**
 - ⇒ The World is approaching a “Hubbert’s Peak” – a terminal decline in oil production – expected to occur 2015–2020[†]
 - ⇒ Gas is expected to follow soon thereafter (C. 2025)
- 🔺 **This creates the “perfect storm” for sustained increases in global fossil fuel prices**

† Over 60 countries are already in terminal decline of oil production.

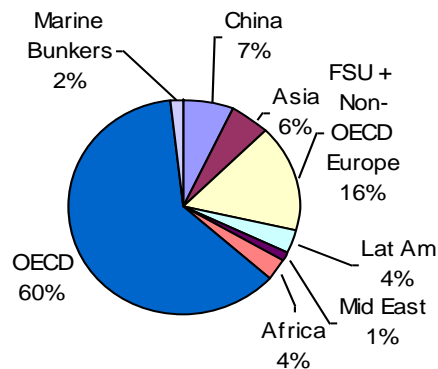
Implications and Solutions

- ⚠ **There is no present viable alternative energy solution to meet global demand (for both generation and, especially, transportation)**
 - ⇒ ...let alone the aspiring energy demand growth of developing countries
- ⚠ **The best we can hope for is to stretch out present fossil fuel resources...**
 - ⇒ To buy time to develop alternative energy systems and technologies for tomorrow's energy needs
 - ⇒ And reduce greenhouse gas emissions to stave off the impact of climate change
- ⚠ **There is no “silver bullet”:**
 - ⇒ The World needs an urgent, aggressive acceleration of investment in Clean Energy systems and technologies
 - ⇒ This is especially true in Asia where growth in energy demand and the carbon intensity of energy use is highest

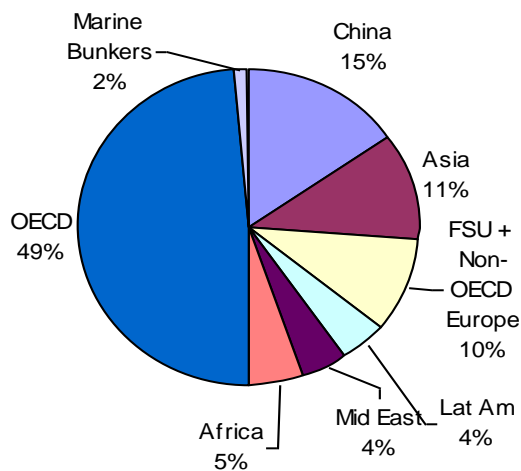
Asia: An Increasing Share of Energy Use

Asia responsible for significant share of growth in energy demand... and carbon emissions

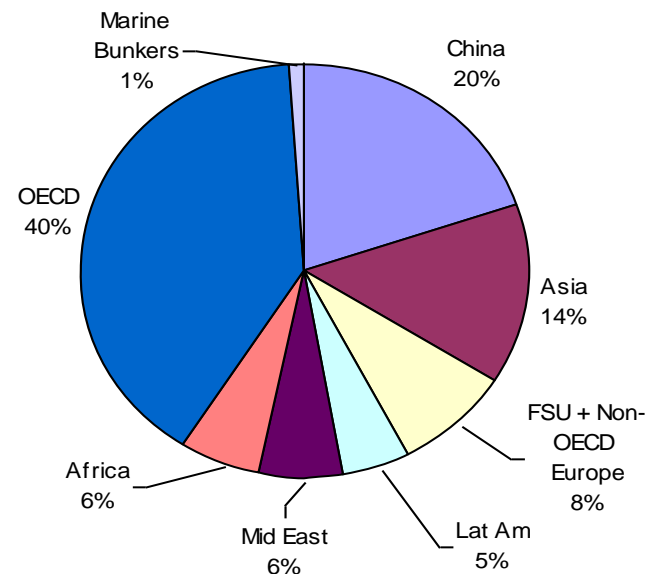
1973
6,128 Mtoe



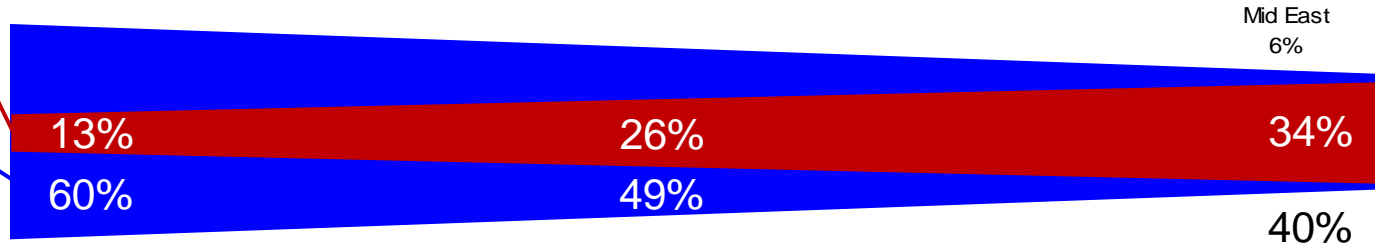
2005
11,435 Mtoe



2030
17,100 Mtoe (RS)



Asia's Share
OECD's Share

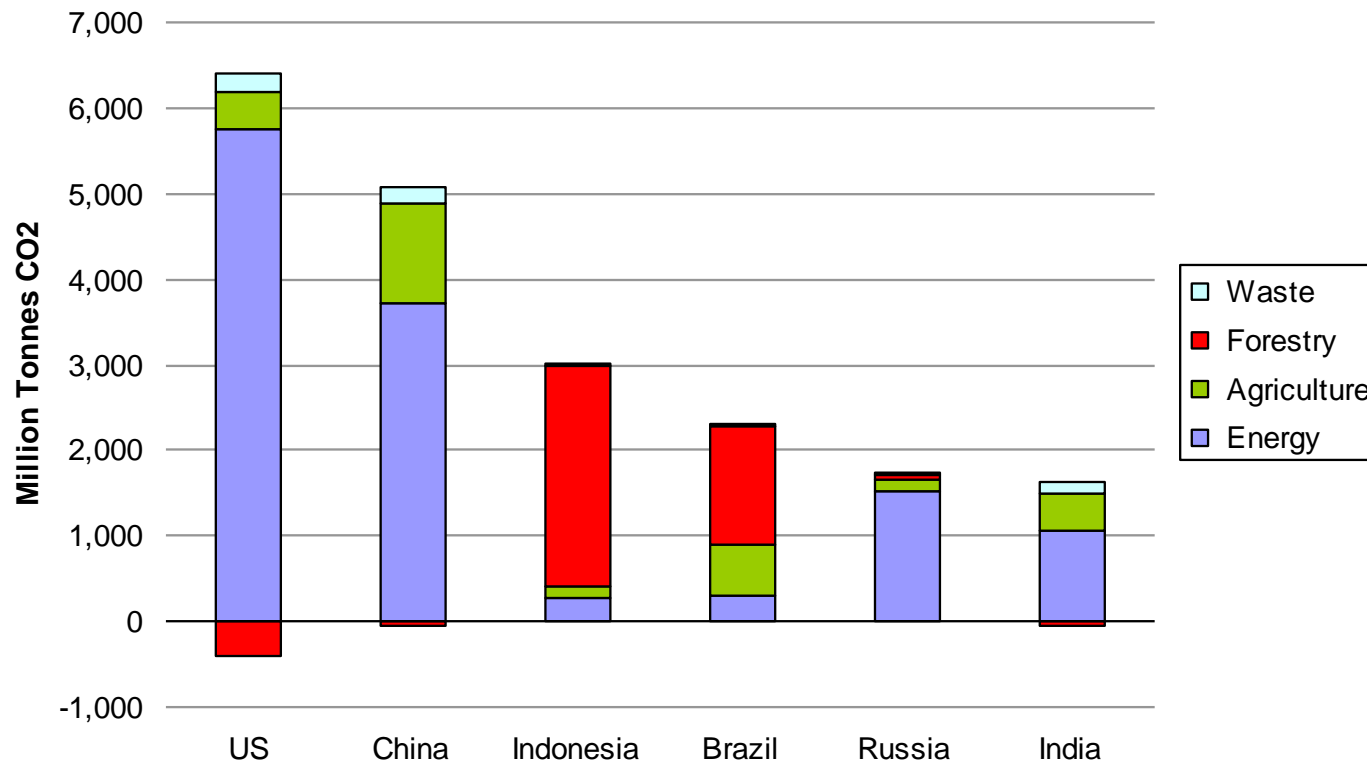


Source: IEA Key Energy Statistics 2007. Reference Scenario refers to the business as usual scenario.

Climate Change Impacts

Developing nations have ascended to the ranks of the world's top greenhouse gas emitters

Source of Carbon Emissions from World's Largest Emitters



Source: World Bank, DFID, March 2007, "Indonesia and Climate Change".

Note, the European Union would comprise the third largest polluter behind US and China.

Risks and Opportunities

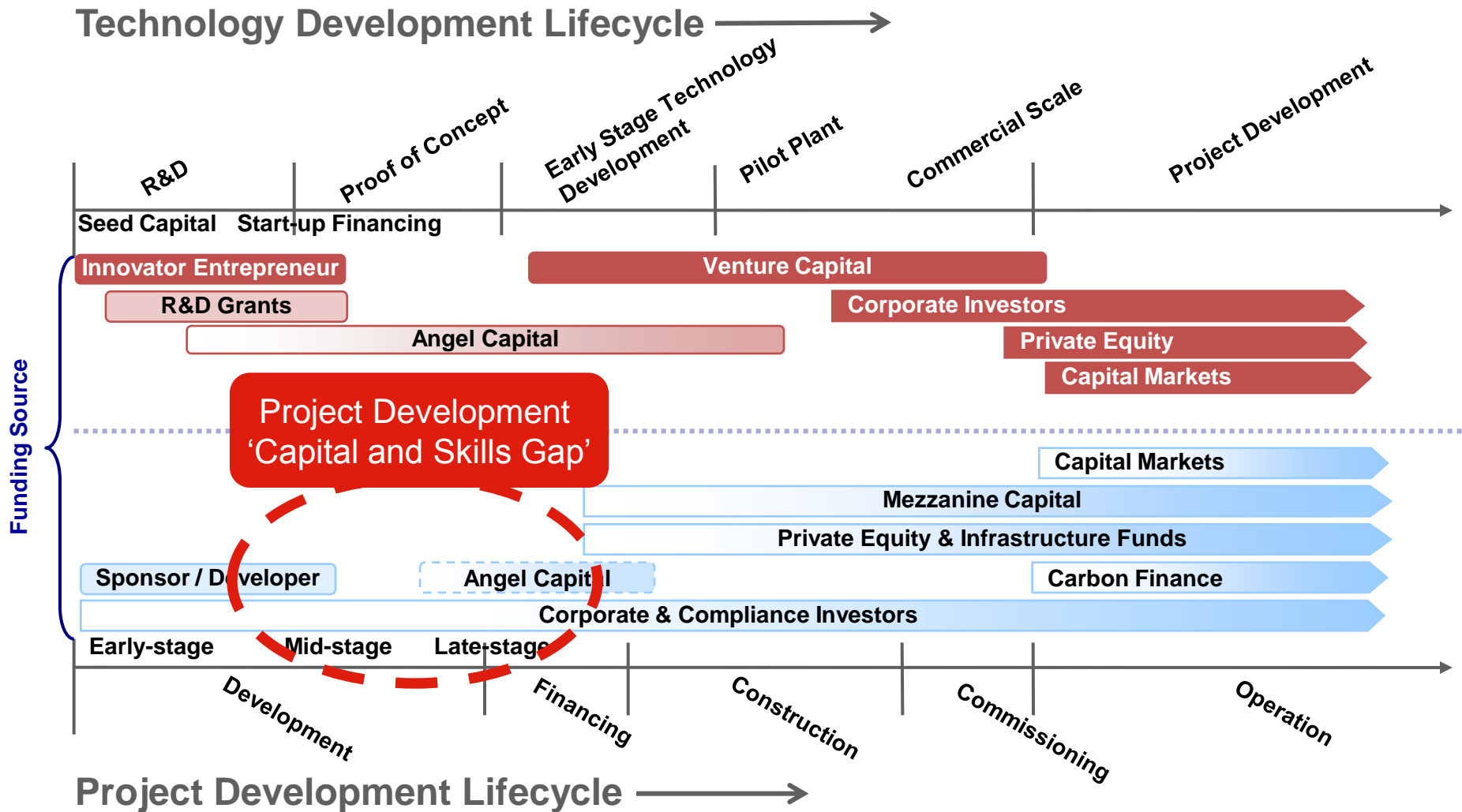
- ⚠ **Tectonic shifts in the energy sector will require redesign of energy systems and will have broad implications for every economic sector**
 - ⇒ **Deployment of Clean Energy infrastructure and technology becomes an imperative, not just a “nice to have” mitigation against Climate Change**
 - ⇒ **Energy efficiency – doing more with less – similarly becomes of paramount importance**
 - ⇒ **Redesign of urban structures and infrastructure will be required – urban centres will be more dense, with a greater role for public transport**
 - ⇒ **Develop sustainable land use and improve yields to meet food and biofuel production**
 - ⇒ **Countries most reliant on energy (e.g. for transport) will be the most vulnerable – e.g. US, Australia and Canada**
- ⚠ **Massive investment will be required across every sector – a potential redesign of human activity and our relationship with the environment**
- ⚠ **Potential risk of global economic downturn if economic systems are not prepared**

Scaling Up Clean Energy Investment

Some observations...

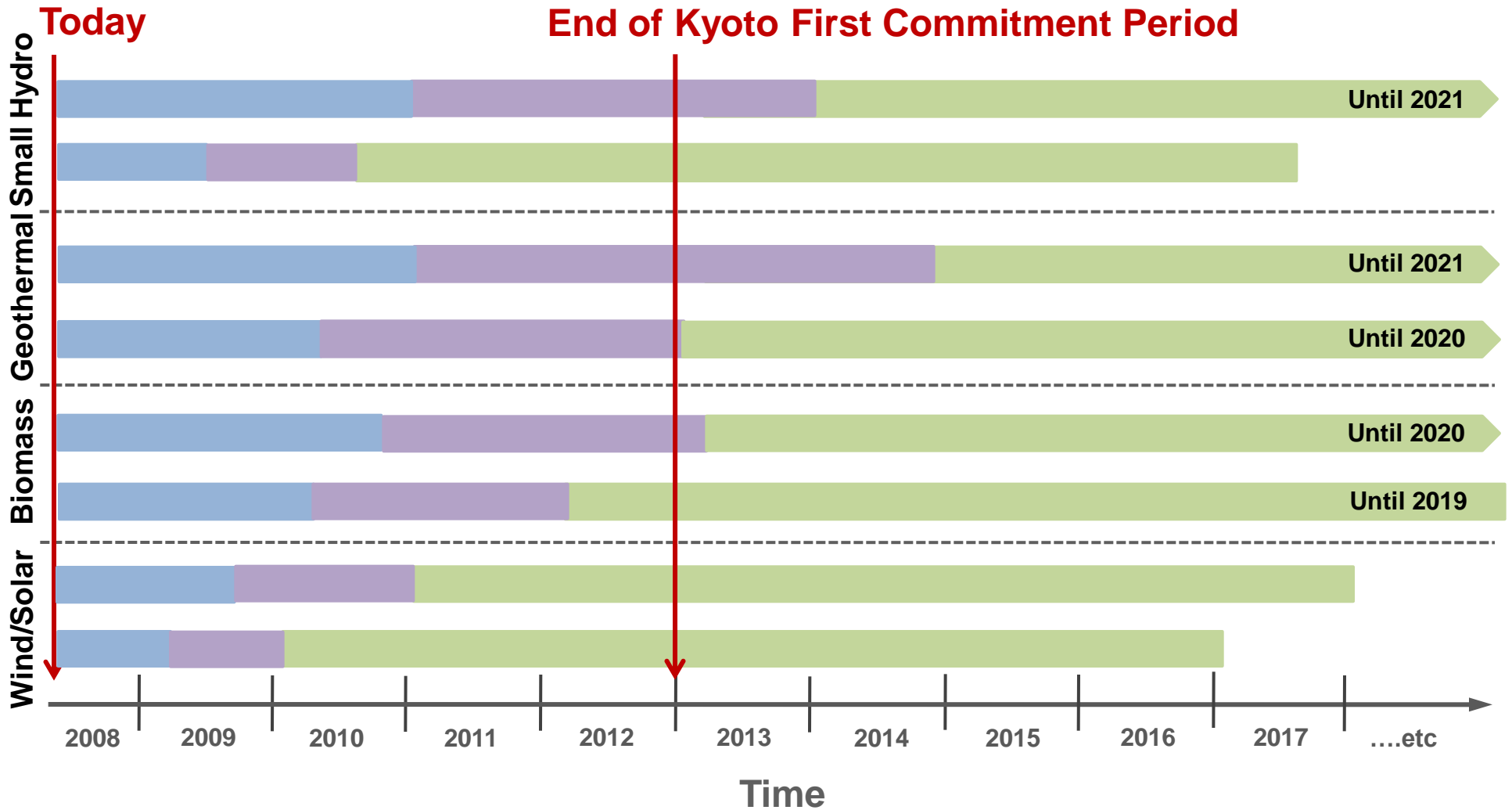
- ❖ Principles of investing in clean energy are fundamentally the same as for energy sector investments generally
- ❖ Five key areas of difference:
 - ⇒ Reliance on policy and regulatory support
 - ⇒ Carbon assets create supplementary revenue streams
 - ⇒ Transaction size is smaller than for conventional energy
 - ⇒ ...attracting non-traditional project developers who lack expertise and capital – particularly in Asia
 - ⇒ Technology (for certain investments – although most projects driven by proven technology)
- ❖ Increasing ‘wall of capital’ focused on sector...
 - ⇒ ...but predominantly focused on more mature transactions
- ❖ A “market gap” at early stage of project development cycle
 - ⇒ Absence of experienced skill sets
 - ⇒ ...and “intelligent” risk capital

Asian Clean Energy 'Capital and Skills Gap'



Source: Josh Carmody and Duncan Ritchie, "Investing in Clean Energy and Low Carbon Alternatives in Asia".
Published by ADB, November 2007.

Project Development Timelines and CDM



Development Period
 Construction Period
 CDM Certification Period (7 years)



Conclusions

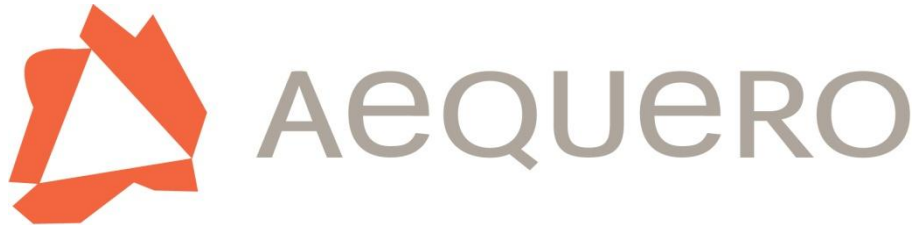
“Private capital will flow to markets (and sectors) where policies and related regulatory frameworks that govern investment are well considered, clearly set out and consistently applied in a manner that gives investors confidence over a time scale appropriate to their investment life cycle.”†

Policy Support + Carbon Price = Investment + Invention

- ⚠ Need to accelerate agreement on Kyoto II
- ⚠ Lack of access to early stage risk capital continues to impair project realization

† Source: Josh Carmody and Duncan Ritchie, Investing in Clean Energy and Low Carbon Alternatives in Asia. ADB 2007.

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