A leading renewable energy developer in Asia

Improving Policy and Institutional Frameworks

1st Dec 2016
A leading renewable energy developer in Asia

- Founded in 2005, Headquartered in Singapore
- To date: raised >USD 400m in equity for clean energy projects
- >120 employees in 8 countries;

ENERGY SOURCES
- WASTE TO ENERGY (WTE)
- BAGASSE COGENERATION
- SOLAR
- WIND

CURRENT ASSETS & PIPELINE
- 1,000+ MW
- 435 MW
  17 owned projects operating or under construction/advanced development
- 714 MW
  27 Projects in Pipeline
- Founded in 2005, Headquartered in Singapore
- To date: raised >USD 400m in equity for clean energy projects
- >120 employees in 8 countries;
Key energy issues facing Governments

- Access to quality energy services
- Security of supply
- Impact on the economy
- Infrastructure – transport and distribution
- Impact on the environment locally
- Impact on the environment globally
- Cost to end users
- Location of power plants
- Sustainability in the long term
Risk and Reward

Development - Finance - Technology

Project Risks

- Negative feasibility or environmental impact assessment
- Delayed/denied permits
- Land rights
- Regulatory uncertainty

Value at risk

Construction delays
- Cost overruns
- Construction errors
- Supplier delays
- Uncertainty of financing
- Delay in grid connection
- Tariff changes

Operation
- O&M cost increase
- Equipment deterioration
- Governance problems
- Force majeure
- Payment risk
- Change in electricity prices
- Change in financing costs

RISK FACTORS

EXPECTED RETURNS

18-25% held to end of asset life

12-15% if held to end of asset life

8-12%
Reward - returns

- May be governed policy and regulatory regime
  - e.g. electricity tariffs, tax breaks and other incentives
- Costs
  - Cost of technology, EPC and land
  - Incentives or disincentives, e.g. import duties, tax breaks
  - O&M
- Capital structure
- Project Returns
  - Revenue – tariff related for example feed-in tariffs
  - Social Impact
## Risks – Identification, allocation and mitigation

<table>
<thead>
<tr>
<th>Risk</th>
<th>Risk to be controlled</th>
<th>Mitigation option</th>
<th>Allocation (risk-taker)</th>
</tr>
</thead>
</table>
| **Project Sponsor** | - Ability to develop project, negotiate third party contracts, obtain licenses etc  
- Actions detrimental to business | - Add additional expertise  
- Structure financing against milestones  
- Sponsor equity, performance fees  
- Oversight (board members), protocols reporting/auditing, covenants | Investor to Sponsor |
| **Supply**     | - Availability of resources  
- Resource cost  
- Financial strength of supplier | - Long term fuel supply agreements  
- Diversification  
- Guarantees | Investor to Supplier |
| **Construction** | - Cost overrun  
- Equipment delivery delays  
- Completion delays | - Fixed timescale agreements  
- Performance incentives  
- Completion guarantees | Investor to Equipment Supplier/Contractor |
| **Operation**  | - Plant performance  
- Maintenance risk  
- Operating cost risk | -Long term O&M (incl. incentives)  
- experienced operator  
- business interruption insurance | Investor to O&M Supplier/Operator/Insurer |
| **Off-take**   | - Payment delays or defaults  
- demand for product/service | - Long term off take (PPA)/regulatory guarantee if possible | Investor to Offtaker |
| **Financing**  | -Interest rate, currency, inflation | - Hedging | Investor |
| **Environmental** | Emissions, pollutants, contaminants, disaster | - Environmental audit  
- Community relations & insurance | Investor to Sponsor/Insurer |
Can’t mitigate policy and regulatory risk but Governments can

- For many utility scale fully commercial renewables, a developer wants:
  - A level playing field on which to compete against other generation options;
  - Proactive institutions that support the goals of the Government Policy;
  - Long term and consistence policy which is very rare in Asia.

- For newer less commercial type projects/technologies which have high climate mitigation or where the above does not apply there needs to be sufficient returns or risk mitigation
  - Assist in project facilitation particularly in the development stage;
  - Increasing revenues or lowering costs through incentives, new mechanisms under Paris Agreement, etc.;
  - Financial risk mitigation instruments e.g. guarantees;
## Policy and Implementation Challenges

<table>
<thead>
<tr>
<th>Category</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Administrative Barriers</strong></td>
<td>- Inconsistent policy framework at state and national level</td>
</tr>
<tr>
<td></td>
<td>- Delays in implementation of policy</td>
</tr>
<tr>
<td></td>
<td>- Lack of transparency and cumbersome bureaucratic procedures</td>
</tr>
<tr>
<td><strong>Renewable Energy Support</strong></td>
<td>- Feed-in-tariffs (FiT) in countries often politically uncertain and inconsistent</td>
</tr>
<tr>
<td></td>
<td>- Conflicting national and local policies</td>
</tr>
<tr>
<td></td>
<td>- Various financial and non-financial incentives, but administration impedes</td>
</tr>
<tr>
<td><strong>Policies Biased to Existing Systems</strong></td>
<td>- Other sector policies or lack of regulation can hamper RE development</td>
</tr>
<tr>
<td></td>
<td>- Incumbent systems give advantage to the bigger power players, which might have more expertise and financial muscle to execute their projects</td>
</tr>
<tr>
<td><strong>Technical/Financial Barriers</strong></td>
<td>- FiT design means projects are likely to be funded entirely with equity</td>
</tr>
<tr>
<td></td>
<td>- Insufficient transmission capacities, poor infrastructure for variable supply</td>
</tr>
<tr>
<td></td>
<td>- State electricity companies often in poor financial health – pay late</td>
</tr>
</tbody>
</table>
Example 1: Solar FiT in the Philippines - The Good...........

- Country environment (2008 onwards)
  - Already had some power sector deregulation opening up the retail sector and having a Wholesale Electricity Spot Market where price of energy is market determined;
  - High electricity prices in many areas and insecure supply in some case;
  - Half the country’s electricity generated from fuels imported (coal, oil, etc)
  - Growing demand for power across the country
  - Good renewable resources in solar, wind, geothermal, waste/biomass etc.,

- Solar Policy highlights
  - Renewable Energy Act of 2008;
  - Increase renewables to 15,304MW by 2030;
  - Renewable Energy Feed in Tariffs
  - Lead to overreaching targets for solar in 2016

DOE Philippines, 2011
Example 1: Solar FiT in Philippines - The Bad

- Solar FiT policy and implementation
  - FiT for solar and others renewables issued in 2010
  - ERC established FiT rates for each renewable type in 2012 with a target of 50MW for solar and P9.68/kWh
  - Solar project allocation revised to 500MW in 2014
  - Lower FiT rate of P8.69/kWh but only to 15 March 2016

- Constraints
  - Conversion of land from designated agricultural to industrial for solar takes a long time;
  - Permitting process slow and untransparent;
  - Grid constraints not clear
  - Commissioning for grid connection some times difficult;
  - FiT only confirmed after construction
Example 1: Solar FiT in Philippines – The Ugly

- The 500MW target was met by 15\textsuperscript{th} Mar 2016:
  - Target overreached
  - A new industry took off in Philippines with local and international players
  - Capacity built including EPC and technical expertise
  - Financing secured around USD 1.3 billion for projects
  - Costs for development of projects has fallen with experience as well as continuing decrease in technology costs

- **BUT**
  - Oversubscribed with possibly 800-900MW being built all expecting the FiT
  - Confusion about which projects were included and which weren’t
  - Many projects equity or balance sheet financed due to FiT risk
  - Non-fit rate makes many of these projects uneconomical;
  - What’s next........a lot of uncertainty
Example 1: Waste to Energy in Thailand - The Good..........

- **Country environment (2008 onwards)**
  - Most waste either to sanitary landfills or to dumps;
  - Poor track record of technology transfer for waste to energy;
  - Increasing waste levels with incomes and population;
  - Offtakers (EGAT and PEA) with a good track record
  - Power Development Plan (PDP), Alternative Energy Development Plan (AEDP) incorporate important role for renewables
  - VSPP (Very Small Power Producer) regulations put in place for 1-10MW projects

- **Waste to Energy Policy highlights**
  - 2007 Adder rate of THB 0.083 for landfill gas, digestors and thermal for 7 yrs
  - Additional THB 0.033 for projects in the South of Thailand
  - 2008 Adder rate increased for thermal projects to THB 0.117;
Example 2: Waste to Energy, Thailand - The Bad........

- **Adder policy and implementation**
  - A number of projects started development including CDM
  - Only 48MW of waste to energy by 2014 (16MW from Sindicatum)
  - Many projects failed or did not get financed

- **Constraints**
  - Adder cost effective for LFG with CDM (electricity plus carbon revenues)
  - Adder not really cost effective for thermal solutions
  - Ability to raise debt financing difficult due to inexperience and bad track record
  - Low technical capacity in Thailand
  - Technologies proposed were not always appropriate
  - Waste supply not secure
Example 2: Waste to Energy in Thailand – The Ugly

• BUT

  • Waste and waste to energy policy still in flux with new Government
  • All new projects stopped delayed 2014-2016
  • New FiT Rate agreed for Waste to Energy (THB 3.76 for 20 yrs)
  • PPP process developed and waste to energy prioritised

Samrat Prakan (Bangkok Post, 2014)
What we learnt?

• A lot of learning by doing from both Governments and Developers resulted in modest results.

• During the period 2008-2016, there was enough capital to build many more projects but not enough financeable projects, and local capacity takes time but needs real projects.

• Government Policy often takes so long to formulate, implement and get right that it discourages many international operators – for scale up it needs to be right.

• Policies have been stop/start and never consistent, the Paris Agreement is 10 yrs and offers a unique opportunity to do this.

• Carbon markets stimulated a lot of interest but soon died away once Kyoto was not extended and market collapsed. New mechanisms need to learn lessons in their design.

• Public finance has an important role in encouraging the private sector but levels cannot be sustained for scale up.

• Need to draw on the capital markets and larger institutional investors.

• Public finance has and still does finance more fossil-fuel related activities than climate mitigation – particularly from subsidies hidden or otherwise.
Fossil fuel subsidies are still out of control

$544\,bn$ vs $137\,bn$

Public finance for fossil vs Public climate finance

Source: numbers adapted from IEA (2014)
Thank you

Jay Mariyappan
Managing Director, Delivery

Sindicatum Sustainable Resources Group
80 Anson Rd, #28-02, Fuji Xerox Towers
Singapore 079907
Email: jay.mariyappan@sindicatum.com
Tel: +65 6578 9285 or +65 97110002

www.sindicatum.com