Investing in renewable energy in emerging markets – trends and risks

October 2023
For professional investors only.
Who are we?

Gerrit-Jan Brunink
Principal Investment Manager
Energy & Climate

- Founder of the Energy & Climate – Emerging Markets activities at Triodos Investment Management. Focus on origination, due diligence and execution since 2007
- Prior experience: ABN AMRO Global Clients & FMO Dutch Development Bank as a Senior Investment Officer and Manager of the Least Developed Countries Infrastructure Fund

Greig Blackie, CFA
Fund Manager
Triodos emerging market renewable energy fund

- Fund manager of the Triodos emerging market renewable energy fund and Triodos Greenfund since 2020
- Prior experience: Mercer Investment Consulting developing investment solutions for institutional investors
I – Urgency

II – Triodos & Energy transition

III – Investment examples - risks & mitigants

IV – Portfolio solutions
This was last year: reports couldn’t be clearer

Guterres: “I’ve seen many scientific reports in my time, but nothing like this”
And this is 2023: “we’re real...
The fossil fuel sector propped up by subsidies

The fossil sector will receive between 39.7 and 46.4 billion euros in subsidies, even more than expected

The Netherlands gives many more tax breaks to companies for the use of oil, gas and coal than expected. These so-called fossil subsidies amount to an annual amount of between 39.7 and 46.4 billion euros, according to leaked Budget Day documents from climate minister Rob Jetten.

The ministry previously assumed an amount of 4.5 billion euros, while environmental organizations' own calculations came to 37.5 billion euros.
There are 3 kinds of people

1. People who make things happen
2. People who watch things happen
3. People who wonder what happened
Quite a while ago...
Society’s biggest challenge presents a huge investment opportunity

800 million people have no access to electricity
predominantly in Africa and Asia

+1.1 billion people
population growth in China, India and especially Africa by 2040

90% of global electricity demand growth
up to 2040 comes from emerging markets

The share of renewables in EM is still low
in total power production mix despite ample natural sources
I – Urgency

II – Triodos & Energy transition

III – Investment examples - risks & mitigants

IV – Portfolio solutions
Triodos
Worldwide pioneer in renewable energy

#1 lead arranger by number of deals in eight consecutive years
35+ years of experience in renewable energy
40+ dedicated renewable energy professionals
140+ renewables transactions per year
2.5+ billion dollars invested in renewable energy
10+ years investing in renewable energy projects in EM
150+ USD deployed in EM RE projects

Top Clean Energy Lead Arrangers by Number of Deals

<table>
<thead>
<tr>
<th>RANK</th>
<th>LEAD ARRANGERS</th>
<th>NUMBER OF DEALS</th>
<th>DEAL VALUE ($ MILLION)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Triodos Bank NV</td>
<td>140</td>
<td>504.57</td>
</tr>
<tr>
<td>2</td>
<td>European Investment Bank (EIB)</td>
<td>37</td>
<td>7,142.17</td>
</tr>
<tr>
<td>3</td>
<td>Banco Santander S.A.</td>
<td>32</td>
<td>2,643.16</td>
</tr>
<tr>
<td>4</td>
<td>Union Bank (a.k.a. MUFG Union Bank)</td>
<td>26</td>
<td>6,566.85</td>
</tr>
<tr>
<td>5</td>
<td>Norddeutsche Landesbank (Nord/LB)</td>
<td>25</td>
<td>3,729.41</td>
</tr>
<tr>
<td>6</td>
<td>ING Groep NV (incl. ING Bank and ING Capital)</td>
<td>22</td>
<td>3,754.18</td>
</tr>
<tr>
<td>7</td>
<td>European Bank for Reconstruction and Development (EBRD)</td>
<td>21</td>
<td>1,920.56</td>
</tr>
</tbody>
</table>

Source: Clean Energy Pipeline.
Renewable energy investments in emerging markets
Combination of direct and indirect investments

Source: Triodos Investment Management, data per Q2 2023
Triodos’ emerging market partners:
Investment origination, local presence and expertise
Centralised solutions

- On- and near-shore wind
- Hydropower
- Solar PV
Decentralised solutions

1bn people globally for whom decentralised solutions are the lowest-cost option
I – Urgency

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IV – Portfolio solutions
Operating 365 Vestas wind turbines with a capacity of around 310 MW, this wind farm added approx. 17% of the total capacity of the national grid in Kenya at the time it was built. The African Development Bank (AfDB) is a key partner and our lender of record.

Lake Turkana
Kenya

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Senior debt (B-loan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner</td>
<td>African Development Bank</td>
</tr>
<tr>
<td>Triodos amount</td>
<td>EUR 5.5m</td>
</tr>
<tr>
<td>Tenor</td>
<td>10 years</td>
</tr>
<tr>
<td>Project phase</td>
<td>Operational</td>
</tr>
<tr>
<td>Capacity</td>
<td>310 MW</td>
</tr>
</tbody>
</table>
Lake Turkana Wind Power, Northern Kenya
Centralised solution
Lake Turkana Wind Power, Northern Kenya
Centralised solution
Lake Turkana: Risks & mitigants

Zooming in on one the key risks

- Construction risk

Status & mitigants

- Project is operational since 2019
- Complex, remote, multi contract. Still: built in time & within budget which was a major achievement
- Strong contractual arrangements around completion
- Processes & monitoring: interface risks well mapped and monitored sharply by Owners Engineer & Lenders Technical Advisor
- People - strong & determined sponsor group that appointed a highly professional project management team; reputed external advisor experienced in large & complex infra projects on the African continent
4 PEL
India

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Senior debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner</td>
<td>Symbiotics &amp; Triodos Groenfonds</td>
</tr>
<tr>
<td>Triodos amount</td>
<td>INR 400m (c. USD 5m)</td>
</tr>
<tr>
<td>Tenor</td>
<td>4 years</td>
</tr>
<tr>
<td>Project phase</td>
<td>Operational</td>
</tr>
<tr>
<td>Capacity</td>
<td>175 MW</td>
</tr>
</tbody>
</table>

Created in 2010, Fourth Partner Energy (4PEL) provides affordable, clean and sustainable energy solutions to commercial and industrial (C&I) clients through the construction of small and medium scale solar systems. The company manages approximately 400 MW across its distributed and open-access portfolios for over 150 clients.

Find out more about 4PEL’s strategy [here](#) or [watch](#) their testimonial.
4 PEL, India
Decentralised solution – Captive power plants
4 PEL, India
Decentralised solution – Captive power plants
4 PEL: Risks & mitigants

Zooming in on one key risk

- Offtaker risk

Status & mitigants

- Diversified group of offtakers, combination of private (corporates, both international & tier 1 local companies) and public (Indian railways, airports etc)

- Electricity prices attractive (20% below alternative), sound incentive to take the power (apart even from the contractual obligations)

- Sophisticated approach to check creditworthiness of prospects / thorough screening and monitoring once on board
Financing of 20+ small-scale power generators (PMGDs) around the metropolitan regions and rural areas of Chile. These smaller solar stations (1 – 2 MWs):

- are faster to construct,
- can avoid (outdated) national transmission grid problems, and
- help supply the local shortage of reliable & affordable electricity.

### Distributed Generation – oEnergy

**Chile**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Senior Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partners</td>
<td>oEnergy and Cifi</td>
</tr>
<tr>
<td>Triodos amount</td>
<td>USD 5m</td>
</tr>
<tr>
<td>Tenor</td>
<td>17 years</td>
</tr>
<tr>
<td>Project phase</td>
<td>Construction &amp; Operational</td>
</tr>
</tbody>
</table>

Financing of 20+ small-scale power generators (PMGDs) around the metropolitan regions and rural areas of Chile.
Distributed Generation - oEnergy
Decentralised solution
Distributed Generation - oEnergy
Decentralised solution
Zooming in on one key risk

- Energy price / market risk

Status & mitigants

- Chilean system for Distributed Generation benefits from a “Stabilized energy pricing scheme” incorporated in the law

- System includes caps & floors that significantly diminishes volatility

- Proper energy market advice obtained and conservative sizing of debt to reflect hybrid merchant risk
With an installed capacity of 144 MW, the Lotus Wind Power Project is the largest of its kind in Vietnam, comprising three separate 48 MW farms, each with 12 Vestas wind turbines.

Construction of the parks started in 2020 and is operational since November 2021. The project increased Vietnam’s wind energy capacity at the time by 30%.

For more details read the article.

Lotus Wind Power
Vietnam

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<thead>
<tr>
<th>Instrument</th>
<th>Senior Debt (B-loan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner</td>
<td>Asian Development</td>
</tr>
<tr>
<td>Triodos amount</td>
<td>USD 17m</td>
</tr>
<tr>
<td>Tenor</td>
<td>15 years</td>
</tr>
<tr>
<td>Project phase</td>
<td>Construction &amp; Operational</td>
</tr>
<tr>
<td>Capacity</td>
<td>144 MW</td>
</tr>
</tbody>
</table>
Lotus Wind Power, Vietnam
Centralised solution
Lotus Wind Power, Vietnam
Centralised solution

- Construction of clean water wells
- Installation of village libraries
- Refurbishment of schools
- Sustainable farming support
- Gender action plan
Lotus: Risks & mitigants

Zooming in one key risk

- Environmental & Social (E&S)

Status & mitigants

- Elaborate E&S Impact Assessment (ESIA) and E&S action plan, mapping the elements met as well as the follow up actions & specific timelines to be in sync with requirements

- Active engagement with local stakeholders.

- Specific community development programs, process guided by local social experts (AFRY)
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Example of pooling of assets into portfolio solutions

### Asset class
- Senior debt: 70%
- Mezzanine debt: 10%
- Equity: 20%

### Regions
- Africa: 25%
- Eastern Europe & Central Asia: 25%
- South East Asia: 25%
- Latin America: 25%

### Segments
- Grid connected: 50%
- Off-grid: 50%
  - Utility scale
  - Distributed generation grids
  - Commercial & industrial captive power
  - Small & Medium Enterprises
  - Mini grids

### Technologies:
- Solar
- Wind
- Hydro
- Storage
- Other proven tech

Hybrids: Energy + Storage
Delivering attractive characteristics for investors

- Predictable cashflows
- Competitive risk-adjusted returns
- Low correlation to traditional asset classes
- Natural interest rate hedge via floating rate loans
- Partial inflation protection
- Stable performance in down markets
- Inelastic demand for energy
- Positive environmental & socio-economic impact
- Access to highly skilled developers and development finance capital

Lotus Wind, Vietnam
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Webinar by Triodos Investment Management & Bech-Bruun law firm

October 2023
Mathias Rose Svendsen
Head of Offshore Wind at Bech-Bruun law firm

8 years of experience with project development of renewable energy

Experienced within development of renewable energy infrastructure
An emerging market is a country transitioning from a low-income economy to a modern industrial economy.

Project development in emerging markets may be more difficult due to:

- Inadequate infrastructure
- Immature regulation and legal uncertainty
- Political risk
- Strong local stakeholders
- Etc.
DEVEX, CAPEX, OPEX
Key aspects of project development

- Contracting
- Bankability and project financing
Contracting

Developers should consider preferred contracting strategy:

- Multiparty Contracting
  - Interface-risk is with developer
  - Preferred in developed markets and developed technology
  - Offers (generally) flexibility and competitive pricing
  - Requires organizational size and personnel

- EPC Contracting
  - Interface-risk is with contractor
  - Preferred with novel technologies
  - Suitable for slim organisations
  - Offers (generally) less flexibility and uncompetitive pricing
Interface risk

An interface is a circumstance between two or more scope of works packages that are interrelated and affect each-other’s performance

How to mitigate:
• Entering into interface agreements
• Bonus scheme for early completion may be provided
• Establishing an interface committee
• Decision making mechanisms
• Early warning notices
• Cooperation responsibilities
Bankability

Why?
• Ensuring financing of a project
• Limiting risks
• Making the project financially desirable and profitable to lenders

How?
• Market insight, market standards
• Understanding risks and risk interfaces
• Limitation of risks through risk identification, risk allocation and risk mitigation
• Negotiation and alignment
• A well-tested procedure
Bankability

Focus on bankability of contracts in both DEVEX and CAPEX-stage of project development

Negotiate lenders’ favourite clauses into key contracts:
- Sufficient guarantees
- Step-in rights for lenders
- Cooperation clauses
- ESG standards
- Insurance requirements
- Assignment clauses
## Value Drivers

### Key provision that increase the financing appetite (i.e. decrease interest)

- Increasing obligations by supplier 
  i.e., Including additional reporting requirements for supplier
- Pre-NP flexibility 
  i.e., low termination cap, WTG decrease etc.
- Broad IPR rights 
  i.e., access to contractor IPR perpetually
- Uncapped liability 
  i.e. pushing third party responsibility towards supplier
- Payment provisions generally
- Value of securities
- Non-restricted damages 
  i.e., not including exclusions of general damages

### What can decrease the financing appetite (i.e. increase interest)

- Payment 
  i.e., Payment period shall be less than 60 days
- Restrictions on right to limit scope
  i.e., limiting the right to change number of WTGs
- Accepting more responsibility for delay 
  i.e., Delay to Taking-Over due to Employer’s delay
- Serial defect provision more favourable to Supplier 
  i.e., higher threshold, sharing of costs etc.
- Limiting risk relating to Site Data and Grid Compliance 
  i.e., Risks related to Site Data and Grid Compliance and consequences of failure comply
- Supplier friendly LD mechanisms
  Type Certificate 
  Delay LDs and claw back mechanism
- Including liability caps 
  i.e., Longer period for reaching liquidated damages cap (higher cap or lower LD’s amount per day)