

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

Climate change: IPCC report warns of 'irreversible' impacts of global warming

By Matt McGrath
Environment correspondent

28 February | Comments



GETTY IMAGES

Many of the impacts of global warming are now simply "irreversible" according to the UN's latest assessment.

Phaseout Pathways for Fossil Fuel Production within Paris-compliant carbon budgets

Research Report

Abstract:

To comply with the carbon budget for a 50:50 chance of not exceeding 1.5C of warming requires **immediate and deep cuts** in the production of fossil fuels.

There are **no exceptions**; all nations need to begin a **rapid phaseout** of existing production.

The report makes **absolutely clear** that there is **no capacity** in the carbon budget for **opening up new production facilities** of any kind, whether coal mines, oil wells or gas terminals.

Guterres:
"I've seen many scientific reports in my time, but nothing like this"



"I've seen many scientific reports in my time, but nothing like this." - UN Secretary General Antonio Guterres

And this is 2023: "we're real"

Canada wildfires

Leyland Cecco in Toronto

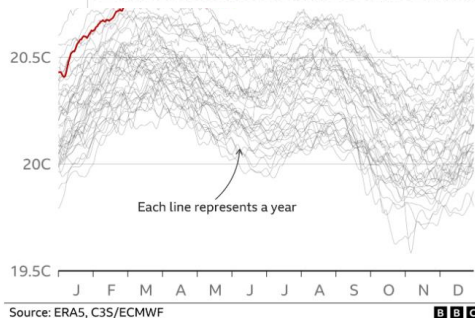
Fri 22 Sep 2023 14:15 CEST



Wildfires turn Canada's vast f from carbon sink into super-c



Flames reach upwards along the edge of a wildfire near Mistissini, Queb



Extremwetterkongress

Meteorologen halten Pariser Klimaschutzabkommen für faktisch gescheitert

Angesichts der zunehmenden Extremwetter-Ereignisse gibt es unter Experten unterschiedliche Meinungen über das sogenannte 1,5-Grad-Ziel. Der Direktor am Max-Planck-Institut für Meteorologie, Marotzke, vertrat die Ansicht, das Pariser Rahmenabkommen für mehr Klimaschutz sei faktisch gescheitert. Man müsse sich damit abfinden, dass die 1,5-Grad-Grenze überschritten werde.

28.09.2023



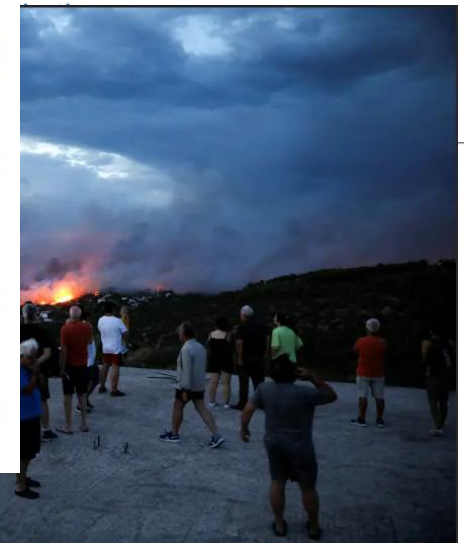
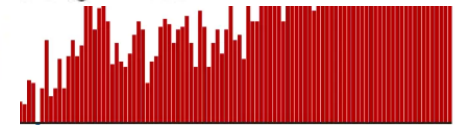
Vom Hoochwasser teilweise mitgerissen: eine Ortschaft im Ahrtal in der Eifel (2021) (imago / Future Image)

Note: Temperature data for 25 July 2023 is preliminary

Source: ERA5, C3S/ECMWF



badly hit?



The fossil fuel sector propped up by subsidies

NOS

News ▾

Sport ▾

Live

Programs



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

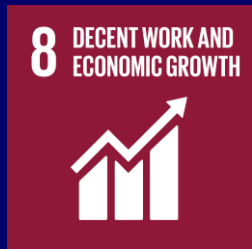


3. People who wonder what happened

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

+1.1billion 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



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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 2023

Top Clean Energy Lead Arrangers by Number of Deals

RANK	LEAD ARRANGERS	NUMBER OF DEALS	DEAL VALUE (\$ MILLION)
1	Triodos Bank NV	140	504.57
2	European Investment Bank (EIB)	37	7,142.17
3	Banco Santander SA	32	2,643.16
4	Union Bank (a.k.a. MUFG Union Bank)	26	6,566.88
5	Norddeutsche Landesbank (Nord/LB)	25	3,729.41
6	ING Group NV (incl. ING Bank and ING Capital)	22	3,754.18
7	European Bank for Reconstruction and Development (EBRD)	21	1,920.54

Source: Clean Energy Pipeline.

Renewable energy investments in emerging markets

Combination of direct and indirect investments

- Solar Green credit line
- Wind
- Hydro
- e-Mobility
- Geothermal
- Waste to Energy

- Armenia
- Georgia
- Kyrgyzstan
- Ukraine
-

- Egypt
- Ghana
- Morocco
- Nigeria
- Sierra Leone
-

- India
- Indonesia
- Nepal
- Pakistan
- Vietnam

- Honduras
- Nicaragua
- Costa Rica
- Dominican Republic
- Ecuador

Djibouti	Mozambique	Tanzania
Kenya	Rwanda	Uganda
Madagascar	Somalia	Zambia
Malawi	South Africa	Zimbabwe

Triodos@Investment Management

Source: Triodos Investment Management, data per Q2 2023

Triodos' emerging market partners: Investment origination, local presence and expertise

Triodos Network Europe

Triodos @ Groenfonds
 Triodos Investment Management
 Triodos @ Bank

Development Financial Institutions

FMO Entrepreneurial Development Bank
 BIO Investing in a Sustainable Future
 finnfund
 Norfund
 INVESTMENT FUND FOR DEVELOPING COUNTRIES
 KFW FinDev Canada
 75 British International Investment
 PROPARCO GROUPE AFD

Multilateral Development Banks

ADB ASIAN DEVELOPMENT BANK
 BANQUE AFRICAINE DE DEVELOPPEMENT
 AFRICAN DEVELOPMENT BANK
 European Bank for Reconstruction and Development
 European Investment Bank
 IDB Inter-American Development Bank
 IFC International Finance Corporation
 WORLD BANK GROUP
 Creating Markets, Creating Opportunities

Like minded Impact Investors

OIKO CREDIT
 symbiotics
 BlueOrchard Impact Investment Managers
 SUNFUNDER

Investee project developer funds

FRONTIER ENERGY
 CLIMATE FUND MANAGERS
 Cifi

Centralised solutions

On- and near- shore wind



Hydropower



Solar PV



Decentralised solutions

Commercial & Industrial



Distributed generation



Mini-grid



1 bn

people globally
for whom
decentralised
solutions are
the lowest-cost
option



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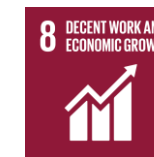


Lake Turkana Kenya



Instrument	Senior debt (B-loan)
Partner	African Development Bank
Triodos amount	EUR 5.5m
Tenor	10 years
Project phase	Operational
Capacity	310 MW

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 Wind Power, Northern Kenya

Centralised solution

Triodos @ Investment Management



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



Triodos @ Investment Management

4 PEL

India



Instrument	Senior debt
Partner	Symbiotics & Triodos Groenfonds
Triodos amount	INR 400m (c. USD 5m)
Tenor	4 years
Project phase	Operational
Capacity	175 MW

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



Distributed Generation – oEnergy



Chile

Instrument	Senior Debt
Partners	oEnergy and Cifi
Triodos amount	USD 5m
Tenor	17 years
Project phase	Construction & Operational

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

Decentralised solution

Triodos@Investment Management



Distributed Generation - oEnergy

Decentralised solution



oEnergy Distributed Generation: Risks & mitigants



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

Lotus Wind Power

Vietnam



Instrument	Senior Debt (B-loan)
Partner	Asian Development
Triodos amount	USD 17m
Tenor	15 years
Project phase	Construction & Operational
Capacity	144 MW

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

Centralised solution

Triodos @Investment Management



TRUYỀN TẢI ĐIỆN QUẢNG TRỊ



EVN NPT
PTC2

TRẠM BIẾN ÁP 220KV LAO BẢO
220KV LAO BAO SUBSTATION

Đ. ACH - XÃ TÂN HỢP - HUYỆN HƯƠNG HOÀ - TỈNH QUẢNG TRỊ - ĐIỆN THOẠI: 0812 289695

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)



I – Urgency

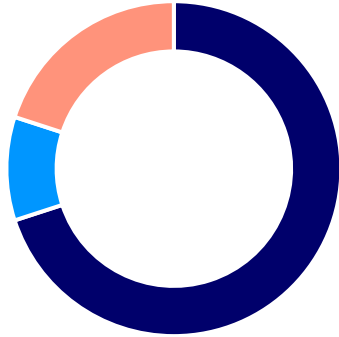
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Example of pooling of assets into portfolio solutions

Asset class



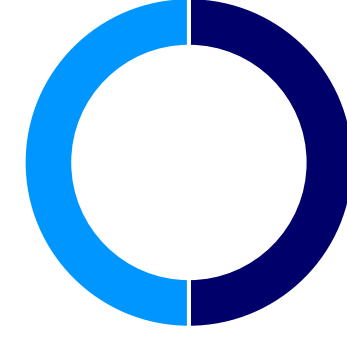
Senior debt	70%
Mezzanine debt	10%
Equity	20%

Regions



Africa	25%
Eastern Europe & Central Asia	25%
South East Asia	25%
Latin America	25%

Segments



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

Technologies:



Solar



Wind



Hydro

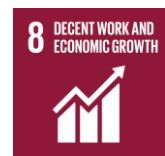


Storage



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

Contact



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Investing in renewable energy in emerging markets – trends and risks

Webinar by Triodos Investment Management & Bech-Bruun law firm

October 2023

Foto: Colourbox

Introduction to your speaker

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



Introduction to Project Development

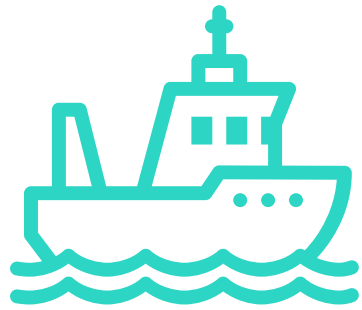
An emerging markets is a country transitioning from a low-income economy, to a modern industrial economy

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

- Inadequate infrastructure
- Immature regulation and legal uncertainty
- Political risk
- Strong local stakeholders
- Etc.



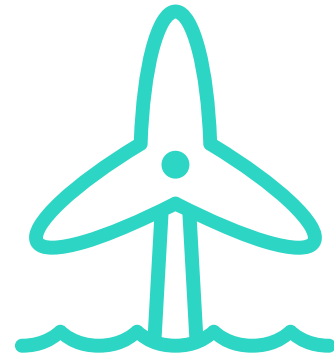
DEVEX, CAPEX, OPEX



DEVEX



CAPEX



OPEX



Foto: Colourbox

Key aspects of project development

- Contracting
- Bankability and project financing



Foto: Colourbox

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



Foto: Colourbox

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)			What can decrease the financing appetite (i.e. increase interest)		
<p>Increasing obligations by supplier i.e., Including additional reporting requirements for supplier</p>	<p>Pre-NtP flexibility i.e., low termination cap, WTG decrease etc.</p>	<p>Broad IPR rights i.e., access to contractor IPR perpetually</p>	<p>Payment i.e., Payment period shall be less than 60 days</p>	<p>Restrictions on right to limit scope i.e., limiting the right to change number of WTGs</p>	<p>Accepting more responsibility for delay i.e., Delay to Taking-Over due to Employer's delay</p>
<p>Uncapped liability</p>	<p>Interface risks i.e. pushing third party responsibility towards supplier</p>	<p>Insurance requirements</p>	<p>Including liability caps i.e., Longer period for reaching liquidated damages cap (higher cap or lower LD's amount per day)</p>	<p>Restriction on descoping Descoping by means of Variation Order shall not be for the purpose of allocating works to a third party</p>	<p>Serial defect provision more favourable to Supplier i.e., higher threshold, sharing of costs etc.</p>
<p>Payment provisions generally</p>	<p>Value of securities</p>	<p>Non-restricted damages i.e., not including exclusions of general damages</p>	<p>Payment Plan i.e., Frontloaded Payment</p>	<p>Limiting risk relating to Site Data and Grid Compliance i.e., Risks related to Site Data and Grid Compliance and consequences of failure comply</p>	<p>Supplier friendly LD mechanisms Type Certificate Delay LDs and claw back mechanism</p>



Foto: Colourbox