

Finance for Resilience

Proposed FiRe interventions 2014/2015

April 2014



INTRODUCTION

Thank you for your interest in the Finance for Resilience (FiRe) initiative!

- This presentation contains information on 24 proposed FiRe interventions.
- In March an independent pre-selection committee picked the top 12 interventions that get to be pitched by their champions at the BNEF Summit (7-9 April).
- At the Summit, the audience will vote for the six FiRe Priorities that will be implemented in a collaborative effort after the Summit.
- In the electronic version of this document, you can use the hyperlinks to jump between workstreams and interventions.

If you have any questions or if you want to support any of these interventions, please contact Janis Hoberg, jhoberg@bloomberg.net.

1. INSTRUCTIONS (I)

This characterisation pack includes 24 FiRe interventions in six work streams:

Work stream	Title	Description	Number of interventions
1	Distributed solutions	Interventions that address small-scale clean energy projects and other distributed solutions	5
2	Energy efficiency	Interventions that deal with various problems of scaling up energy efficiency investment	4
3	Project risk mitigation	Interventions that develop mechanism to reduce risk perception and transaction costs of clean energy projects	5
4	International finance	Interventions that are international in scale or constitute the development of multilateral clean energy funds	7
5	Capital markets	Interventions that involve the creation and promotion of new financial instruments and investment tools	3
6	Disclosure	Interventions that promote disclosure practices to accelerate divestment from carbon-intensive companies	1

1. INSTRUCTIONS (II)

Each FiRe intervention is characterised in five slides:

Slide	Title	Boxes	Explanation
1	Cover page	General description	FiRe Team and other general information
2	Description	Description	Background, proposed intervention, objective, feasibility
		Literature	Relevant literature
		Scale & scope	Potential scale & scope of the intervention (qualitative)
		History	What is the historical background to the intervention?
3	Quantitative analysis	Metrics	Estimates of different scale metrics (quantitative)
		Justification	Sources and explanation of the metrics figures
		Alternative approaches	Alternatives to the proposed interventions
4	Qualitative analysis	SWOT analysis	Qualitative analysis of the intervention
		Barriers	What barriers need to be overcome?
5	Action plan	Action plan	Step-by-step approach for implementation
		Key individuals & organisations	Existing, potential and required partners
		Input from FiRe	What requires the intervention from FiRe?

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1. Instructions

2. Distributed solutions (p.6-31)

3. Energy efficiency (p.32-52)

4. Project risk mitigation (p.53-78)

5. International finance (p.79-109)

6. Capital markets (p.110-125)

7. Disclosure (p.126-131)

2. DISTRIBUTED SOLUTIONS

INTERVENTIONS

1. [Creating a debt fund to scale prepaid energy access \(p.7-11\)](#)
2. [Building the \\$1bn decentralised energy project pipeline \(p.12-16\)](#)
3. [Towards a world free of flares \(p.17-21\)](#)
4. [Liquid air: a global clean power and cooling solution \(p.22-26\)](#)
5. [Business renewables resource centre \(p.27-31\)](#)

CHARACTERISATION TEMPLATE

INTERVENTION 1: *Creating a debt fund to scale prepaid energy access*

SUMMARY: *Bringing entry-level renewable home power to 5m isolated homes in five years*

Date	27 February 2014
Template version	7.0
Workstream	Distributed solutions
Sector(s)	Off-grid energy
Region or country	Sub Saharan Africa, India
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Coach 2 + contact	Eric Martinot, martinot@isep.or.jp
Coach 3 + contact	Christine Eibs Singer, ceibssinger@gmail.com
Working group member 1	
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net , +44 77 6655 0351 (preliminary)

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DESCRIPTION

Description

Unlocking entry-level renewable energy access at scale: Rapid payback times of 1-2 years are achievable for domestic distributed renewable power, providing basic energy in emerging markets for items such as lighting and TV. But adoption is constrained by customers' inability to afford the initial cost of equipment. Prepaid business models remove this affordability constraint and enable small systems (either micro-grid or standalone) to be offered at a cost that is lower than the kerosene and mobile charging services they replace. The sector is growing rapidly with well in excess of 100,000 households connected in the last 18 months and needs a rapid expansion of debt working capital to scale.

Asset finance intervention: The intervention is to create a new financial product, providing debt finance to prepaid energy service providers, securitised against the assets and forward revenue streams from customers. Initial indications suggest the debt can be structured as 2-5-year-term loans with the opportunity to revolve, drawn in US dollars with an effective interest rate of 12-15%.

Growing a viable commercial facility: The initiative follows a step-wise approach, beginning with a \$50m fund and using the resulting implementation data to underpin progressive growth to \$1bn in five years. The initial funding consortium will include development finance bodies to offer loan guarantees in order to offset the early risk and this will phase out as the fund grows.

This intervention can act as a feeder to a number of other, longer-term, FiRe initiatives and can provide a near-term win / proof point to help these grow.

Relevant literature

Global country data for off grid energy <http://luminanet.org/page/country-data-reports#.UwNobl4yCbI>

Lighting Africa market trend report 2012: overview of the off-grid lighting market in Africa, June 2013

Scale & scope

The intervention is to create a debt fund of \$1bn in five years, growing from an initial pilot fund of \$50m, to support commercial providers in accelerating the rollout of prepaid distributed energy. Systems will be deployed to initially 250,000 households by providers with a track record of success and existing distribution channels with a focus on Sub-Saharan Africa and SE Asia. This will grow to 5m homes over the period using organic growth in the existing channels and introduction of new entrants to the market supported by existing scale-up and technical assistance initiatives to build distribution capacity.

History

Prepaid stand-alone energy systems address the affordability challenge of access to power and have been in use since 2010. The sector is growing rapidly and now needs capital to scale. This has worked before in the early days of the mobile phone industry, where growth was accelerated through debt finance based on forward customer revenues. This initiative is specific to the funding needs of prepaid energy and complements or could collaborate with the proposed Shell Foundation/ResponsAbility and Deutsche Bank Essential Capital initiatives that are targeted at a wider audience.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Africa, Asia / kerosene, phone charger
2) Market size of industry:	\$30bn (kerosene) + \$5bn (phone c.)
3) Annual investment in industry:	<\$59m in prepaid distributed systems
Market growth opportunity:	
1) Future potential market size:	\$10bn+
2) Future potential annual investment in industry:	\$1bn+
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	Initially \$50m, growing to \$1bn in five years
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	<u>Idea pilot</u> / Existing / Other (describe): product delivery by existing providers
Other key metrics:	
Intervention does not change the ultimate market size – it accelerates adoption. Without FiRe or similar, organic growth will be limited (estimated at 50% per year). With FiRe, growth can be hugely accelerated. 200% per year over the next 3-4 years is readily achievable. It has also the potential to impact 25m lives and livelihoods (five people per household) and reduce emissions, indoor air pollution and fire risk.	

Alternative approaches
A similar effect can be achieved with a combination of product providers and microfinance. However, this puts the customer into debt and, while it has worked well in some countries such as Bangladesh, it has achieved much less traction in other areas, particularly in Africa.
Justification for scale metrics
Market size Of 1.3bn people off-grid, at least 50% could benefit from distributed prepaid power. Taking a modest figure of \$200 per five-person household for small-scale systems, the immediately addressable market size is in excess of \$26bn. The prepaid distributed power market is still in its growth phase with an estimate of current investment below \$50m.
Market growth opportunity There is no reason why the kerosene for lighting and phone-charging markets cannot be replaced in their entirety. To be conservative, assume 25% of the market is replaced. Even after \$1bn of investment, this market will be at less than 10% saturation and therefore this figure seems reasonable for a run rate.
FiRe metrics Building on existing programmes, rapid growth seems feasible given the current market growth rate of well over 100% per year, but this growth will slow if finance is not available.
Other metrics IEA and other government metrics

QUALITATIVE ANALYSIS

Strengths (intervention)

- Fund aggregates demand to catalyse a new financial product that will accelerate distributed prepaid energy access.
- No requirement for centralised infrastructure; initial product deployment in months (existing stand-alone product to waiting customers).
- Robust to commercial rates of interest (10-15%) with short payback times of 2-4 years (can revolve).
- Scale dynamics to grow fast (like mobile phones).
- Quality standards being put in place for lighting products (reduces risk of non-performance).

Weaknesses (intervention)

- As of today, few companies delivering distributed power whether standalone or micro grid have credit scoring in the conventional sense. Therefore metrics are required to assess consumer risk.
- Small standalone systems may be uneconomic to recover once deployed. Therefore the risk is a consumer risk (like credit card or phones).
- Success also relies on reliable distribution in target markets. Suppliers will need to demonstrate this capability.
- May require loan guarantees in the early days to establish the risk profile of income streams.

Barriers to implementation

- Definition of a credit scoring mechanism to qualify suppliers (this needs to be developed).
- Assessment of reliability of payment systems to prevent spoofing or circumvention (the crypto used is conventional, so no basic risk here).
- Assessment of payment performance, default, theft, circumvention etc.
- Distribution networks are nascent and will need to grow rapidly (selection of appropriate channel partners is important to sustain growth).
- Customer payments are intermittent, driven by crop cycles. Extended payment cycles can lengthen capital repayment time (but this is predictable).
- Investor attitudes to funding projects in emerging countries without formal collateral.
- Government policies / interventions (either positive or negative and however well-intentioned) may delay implementation.
- Existing practitioners can absorb the \$50m fund, but as it grows there will be a need to expand other parts of the value chain, particularly distribution. (Alignment with other programmes such as REEEP will be required here for technical assistance and capacity building.)

Opportunities (market)

- Prepaid distributed power can do for energy what prepaid phones did for mobile – ie, reach consumers that would otherwise not have access and create a mass market from low-income consumers.
- Widespread access to even modest power has a transformative impact on households, improving health, education, earning capacity and safety, and underpinning broad-based economic development.

Threats (market)

- In theory redundant, if grid electricity becomes widely available in rural areas (but with short payback times, even five years of use is value-add).
- If distribution is not in place, growth may be limited by customer access rather than finance. (However this distribution capability is growing fast.)
- Government policies with subsidy and import tariffs can affect the competitiveness of the technology (for example fuel subsidies or solar give-away programmes).

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Create fund management consortium of experts	Champion + team + FiRe + new participants	April 2014
Define specific collaborations with other FiRe activities, such as Rwanda 100% Access	Champion + team + FiRe	Q2 2014
Formation of a working group which collectively with lead lenders becomes the "Funding Consortium"	Champion + team, FiRe team, experts, BNEF	June 2014
Definition of top-level characteristics for supported projects and acceptance criteria for borrowers	Champion + team, Funding consortium	Q3 2014
Definition of fund structure and outline term sheets for investors and borrowers	Champion + team, Funding consortium	Q3 2014
Definition of detailed due diligence process with target of less than three months DD start to award	Champion + team, Funding consortium	November 2014
Acquisition of final funding consortium and launch of fund	Funding consortium	December 2014
First distribution	Funding consortium	Q1 2015

Key individuals & organisations

Key organisations:

- Banks willing to lend US-dollar-denominated debt for deployment in emerging markets
- DFIs and other organisations prepared to offer initial loan guarantees to de-risk early stages of the programme
- Credit scoring agencies to set standards for the debt
- World Bank / IFC / distributed lighting programme (Lighting Global)
- GSMA and other directly related industry bodies

Input from FiRe

- Support creating the working group and the fund. Specifically, looking for expertise in:
 - Structuring debt finance / asset finance
 - Risk assessment in emerging countries
 - Loan guarantees and mixed philanthropic/commercial structures
 - Experience of historical comparables such as mobile phones and MFI financing
- Advice on credit scoring of opportunities in a way the industry will understand
- Objective is to secure providers for the initial \$50m fund delivered by no more than 2-3 commercial lenders with loan guarantee support from no more than two DFIs

CHARACTERISATION TEMPLATE

INTERVENTION 2: *Building the \$1bn decentralised energy project pipeline*

SUMMARY: *The intervention will create a vehicle for aggregating small-scale projects to support access to finance and capacity and ultimately lead to scale.*

Date	5 March 2014
Template version	5.0
Workstream	Distributed solutions
Sector(s)	Small-scale renewable energy, finance
Region or country	TBD
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DESCRIPTION

Description

Context: Despite broad consensus that decentralised (off-grid) energy production is critical to achieving access to energy for all, the market remains small-scale and fragmented. The relative immaturity of the market means that projects are not easily bankable, have high due-diligence costs, offer low rewards, and experience capacity issues, meaning they are not immediately attractive to the market.

A potential solution to scaling the market is the concept of aggregation. In particular, the question that needs to be considered is how to pool and structure resources (financial, procurement & distribution channels, capacity building, knowledge management etc.), to accelerate financial due-diligence processes and support market scale-up.

Proposed Intervention: This intervention proposes to develop a platform which aggregates information on small-scale off-grid energy companies. In particular, the platform will standardise pre-due-diligence information, using the “lean” start-up template. The platform will use the UNF’s Energy Access Practitioner Network as an initial source of demand and, with an initial focus on Africa, will be piloted in Q3 2014. Following this, the platform will be opened up to additional companies and regions, with the goal of creating a \$1bn pipeline by the end of 2016. Pilot results dependent, the platform will further support the broader ecosystem needs, eg, providing entrepreneurs with the necessary assistance to prepare for investment.

Key Benefits: This intervention will accelerate the market by providing investors with a go-to platform for bankable deals and entrepreneurs with the capital required to grow.

Relevant literature

- UNF, Energy Access Practitioner Network: Energy Access: Investing for Energy Access - 2013 Directory of Investment and Funding Opportunities
- Lighting Africa Market Trends 2012

Scale & scope

Research conducted by the UNF found that 141 Practitioner Network members surveyed required an aggregate sum of over \$250m for a period of 12-18 months (40% equity, 27% debt and the remainder grant funding). These members will provide the initial source of pipeline demand for the platform. Once the platform has been piloted, it will be opened up to additional companies. With more than 1,600 enterprises in the Practitioner Network and a need of \$259m over a 12-18-month period for 141 enterprises gives a factor of 1.8, meaning the potential addressable market amounts to approximately \$2.9bn over the next 12-18 months alone.

History

Several parallel efforts have been in play in recent months to increase the capital flows to small-scale off-grid energy companies, these include:

- The UNF’s Energy Access Practitioner Network has conducted a detailed survey to better understand the financing needs of its members.
- The Ground Up Project has been set up to provide easy, global access to standardised, trustworthy information on small environmental impact projects.

By leveraging these efforts, this intervention aggregates and standardises demand, creating a go to platform for bankable deals.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Africa / small-scale off-grid energy
2) Market size of industry:	\$38bn (kerosene, lighting)
3) Annual investment in industry:	\$1bn
Market growth opportunity:	
1) Future potential market size:	>\$2.9bn
2) Future potential annual investment in industry:	TBD
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$1bn
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	<u>idea</u> / Pilot / Existing / Other (describe):
Other key metrics:	
<ul style="list-style-type: none"> • Number of enterprises funded: approximately 141 in year 1 alone • Incremental job creation • Incremental number of people with access to energy • GHG abatement potential 	
NOTE: Estimates will be validated during the scoping phase ahead of the BNEF Summit.	

Alternative approaches
<p>The concept of aggregation aims to create scale. This intervention aims to do this through the aggregation of pre-due-diligence information on small-scale off-grid energy providers, thereby providing investors with easy access to a bankable deal flow. Alternative (and complementary) approaches could focus on strengthening the demand side through aggregation of procurement sources or distribution channels or the supply side through a facility that could prepare and aggregate a risk-adjusted portfolio for investors.</p>
Justification for scale metrics
<p>Market size</p> <p>Assuming over \$250m investment is needed for 141 enterprises for a period of 12-18 months (as per the UNF survey) and a total of 1,600 easily accessible entrepreneurs, the total market size / year could amount to \$2.9bn.</p>
<p>Market growth opportunity</p> <p>There are thousands more entrepreneurs implementing small-scale off-grid energy solutions outside of the Energy Access Practitioners Network – meaning the market could be more than double the estimated size for FiRe.</p>
<p>FiRe metrics</p> <p>The platform will be built and piloted in Q3 / Q4 2014. Pilot results will then be assessed ahead of full-scale roll-out, with the \$1bn threshold expected to be reached at the end of 2016.</p>
<p>Other metrics</p> <p>Estimates assume 141 enterprises in scope in year 1 (number of Energy Access Practitioner members who responded to the survey).</p>

QUALITATIVE ANALYSIS

Strengths (intervention)

- Builds on existing efforts, including the Energy Access Practitioner Network and the Ground Up Project, to overcome barriers to investment in the small-scale off-grid energy market
- Provides investors with easy access to a bankable deal flow, thereby attracting private finance into the energy access space, supporting market scale
- Supports capacity building at the local enterprise level by educating enterprises on the need for standardised, transparent information ahead of due diligence and investment

Weaknesses (intervention)

- Unproven model in the energy space, with little data about the market globally
- Enterprises may need significant support in providing relevant information in a consistent, and standard way
- Different investors may require different types / levels of information – further complicating the ask of entrepreneurs
- Engages multi-stakeholder collaboration which may be prone to slow process design

Barriers to implementation

- Capacity issues at small-scale project level
- Inadequate data about a large enough pipeline of small-scale projects
- Time for public de-risking or cornerstone funding to come through is too long
- Lack of dedicated human resources to help design and test the aggregation model
- Inadequate seed funding during the pilot phase
- Lack of data / research capacity on environmental performance of small-scale projects

Opportunities (market)

- Catalysing large-scale investments from public and private sources
- Building on existing or planned public finance and DFIs' risk mitigation tools and their aim to catalyse private financing for clean energy
- Developing a platform for emerging energy enterprises to join to attract capital and scale more rapidly

Threats (market)

- Other information platforms emerge that are more attractive to investors

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Finalise scope and detailed action plan	The Ground_Up, UNF, ADP, SE4All	April 2014
Finalise information template	The Ground_Up, ADP	May 2014
Test information template with investors and refine accordingly	The Ground_Up, UNF, ADP, SE4All	June 2014
Plan engagement with entrepreneurs and investors	UNF, ADP	June 2014
Pilot engagement and information template completion with sub-set of Energy Practitioner Network	The Ground_Up, UNF, ADP, SE4All	July 2014
Monitor and support information template completion	UNF, ADP	August 2014
Gather and upload completed information templates onto central platform	The Ground_Up	September 2014
Open the platform and invite investors to assess enterprises and conduct required due diligence, where appropriate	The Ground_Up, UNF, ADP, SE4All	September – October 2014
Gather feedback and results from pilot and refine platform / template accordingly	ADP	November – December 2014
Coordinate full-scale roll-out	ADP	January 2015

Key individuals & organisations

Individuals:

- Richenda Van Leeuwen, Energy Access Practitioner Network, United Nations Foundation
- Brindusa Fidanza, The Ground_Up Project
- Christine Eibs Singer, Sustainable Energy for All

Organisations:

- Accenture Development Partnerships (Caroline Narich and Ian Lobo)
- The Ground_Up Project
- UN Foundation

Input from FiRe

- Platform for visibility – to ensure greatest access to potential stakeholders and branding as “go to” platform for information on small-scale off-grid energy enterprises
- Access to members and capital – including investor community to fund development of platform, and investors to engage in template design and roll-out
- Access to financing vehicles (private or public) looking for a pipeline of bankable decentralised energy projects
- Research capability to assess the environmental performance of small-scale projects
- Share BNEF analysis and data where relevant

CHARACTERISATION TEMPLATE

INTERVENTION 3: *Towards a world free of flares*

SUMMARY: *Develop new business models to incentivise the capture and monetisation of flared gas*

Date	20 February 2014
Template version	1.0
Workstream	Distributed solutions
Sector(s)	Fossil fuels
Region or country	Global
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Coach 4 + contact	Peter Gutman, ptgutman@gmail.com ,
Working group member 1	Bjørn Hamso, bhmaso@worldbank.org , +1 202 458 1065
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net , +44 77 6655 0351 (preliminary)

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DESCRIPTION

Description

The challenge: 140bcm of gas is flared globally annually (annual gas use of China), corresponding to 360Mt of carbon dioxide released into the atmosphere (equating to the emissions of 77m cars), with a potential for further increase due to ongoing developments in the Middle East and North America. Gas is flared due to (i) the prioritisation granted to oil by producers and governments due to pricing and logistical advantages, (ii) lack of infrastructure as well as (iii) volume uncertainty/volatility.

The potential: The opportunity space is significant and wide-ranging, spanning the economic attractiveness of monetising wasted resources, the environmental benefit of reducing greenhouse-gas emissions as well as the social value of electrifying/bringing energy to remote areas.

Feasibility: The successful regulatory environment in place in certain jurisdictions, the state of current technologies, provide a sound foundation to build upon.

Proposed FiRe intervention: The goal is to develop a new business model for gas flaring reduction opportunities in a given high-flaring area.

Approach: The intervention will combine an analysis of (i) the existing barriers to investment, (ii) the successful gas flaring projects worldwide to date and (iii) and the risk/return profile of the various flaring regions, before developing a tailored and multi-stakeholder pilot. The pilot will be used as a catalyst towards other areas.

Relevant literature

Monitoring & Reporting Guideline for Flare Reduction CDM Projects, World bank GGFR Report, September 2010.

Oil & Gas CDM/JI Glossary of Terms, World bank GGFR Report, September 2010.

Guidelines on Flare and Vent Measurements, World bank GGFR ,September 2008.

Scale & scope

The intervention should lead to a concrete multi-stakeholder initiative aimed at spurring infrastructure investments with a focus on establishing new business models conducive to investments in the gas flaring reduction segment, complementing the Global Gas Flaring Reduction (GGFR) initiative's operational and regulatory focus.

History

Statoil does not accept continuous gas flaring for gas disposal purposes in its operations driven by the carbon tax introduced on the Norwegian continental shelf in 1991. Statoil was one of the founding partners when the World Bank established the GGFR initiative in 2002. Statoil is bringing its experience to international projects through technology and business development to find value for associated gas. The gas flaring reduction on Tres Hermanos with PEMEX is the first CDM project registered and built in Mexico for instance.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Global, with focus on Russia & Africa
2) Market size of industry:	N/A
3) Annual investment in industry:	N/A
Market growth opportunity:	
1) Future potential market size:	\$50m-\$1bn/yr
2) Future potential annual investment in industry:	N/A
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	~\$1bn/yr
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / <u>Pilot</u> / Existing / Other (describe):
Other key metrics:	
CO2 emission abatement	
Socio-economic development related to the productive use of energy in remote areas	

Alternative approaches
Set-up appropriate institutions (national gas company, regulator, transporter), develop regulations (gas pricing, commercial rules, transportation, standards, safety), new policies (strategy, priorities, objectives, plans), innovative monetisation small scale technologies (CNG, mini-GTL, gas to chemical...), private-public partnerships, technology transfer funds, loan guarantees
Justification for scale metrics
Market size
Gas flaring being forbidden in many jurisdictions, the monetisation of the gas is an integral part of the development plans and therefore not quantifiable on a stand-alone basis
Market growth opportunity
Global gas flare volumes of 140bcm of gas per annum (GGFR)
Gas price range \$/MMBtu [1-20]
FiRe metrics
Other metrics

QUALITATIVE ANALYSIS

Strengths (intervention)

- Significant potential value of flared gas
- Often produced in areas lacking energy
- Technology available and continuously improving

Weaknesses (intervention)

- Production profile based upon oil production with consequent reservoir related uncertainty
- Remote areas
- Small quantities, often not economic to produce
- Low prices (subsidised markets, export restrictions)

Barriers to implementation

- High above-the-ground country risks (regulatory and fiscal instability, lack of transparency, security)
- Producers contradictory incentives (oil production)
- Lack of new business models and service providers
- Access to information
- Relationship to local banks or brokers
- Lack of operator coordination
- Role of regulator / regional authorities for coordination
- Lack of holistic approaches

Opportunities (market)

- Combining substantial CO2 emission reduction with the electrification of communities
- Develop new business models
- Increased interest for gas, the cleanest fossil fuel
- New small-scale gas utilisation technologies being developed
- Inexpensive associated gas, compared to oil, with consequent market penetration potential
- Increased awareness of gas flaring issue

Threats (market)

- Energy subsidies

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Analyse existing data and experiences globally to (i) highlight and prioritise the main barriers to implementation and (ii) learn from existing solutions / past failures	Statoil	June 2014
Ranking of the geographical areas in terms of gas flaring reduction potential (at the asset, area or country level)	Statoil	June 2014
Identify one or a limited number of focus areas based on actions 1 and 2	Statoil	September 2014
Identify all potentially relevant stakeholders	Statoil - FiRe	October 2014
Define business and economic models	Statoil - FiRe	December 2014
Identify factors of success, incentives, barriers to remove	Statoil - FiRe	February 2015
Negotiate with producer and authorities	Statoil - FiRe	April 2015

Key individuals & organisations

Individuals:

Hege Marie Norheim, SVP Corporate Sustainability, Statoil

Bjørn Hamso, GGFR Program Manager, The World Bank

Organisations:

Statoil

World Bank

Input from FiRe

- Assist in developing innovative business models when regions and fields are identified
- Identify the relevant stakeholders
- Assess the need for third-party/broker
- Develop incentivising contract for the broker

CHARACTERISATION TEMPLATE

INTERVENTION 4: *Liquid air: a global clean power and cooling solution*

SUMMARY: *Secure field trials for the Dearman liquid air engine to generate government support and market demand in order to commercialise the technology, thereby delivering cleaner and cheaper transport and refrigeration.*

Date	21 February 2014
Template version	2.0
Workstream	Distributed solutions
Sector(s)	Clean energy; cold chain
Region or country	Global (pilots in UK, India and Tanzania)
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DESCRIPTION

Description

Cold is the Achilles heel of the world's developing economies.

A lack of refrigerated transport in emerging economies means that as much as 40% of perishable food goes to waste post-harvest. In the megacities of the fast developing nations, such as Delhi and Beijing, cold chains are booming but powered by highly polluting diesel. In a refrigerated vehicle, around 20% of the diesel serves to keep the food cold. One diesel-powered refrigeration unit emits broadly the same particulate-matter emissions as 10 modern diesel lorries and four times the NOx.

What's needed is a sustainable and affordable alternative to the 'business as usual' cold chain.

Our intervention will deliver liquid air as a breakthrough, safe and simple solution for food availability, safe food, and affordable clean mobility. It will enable a "velvet revolution", using existing combustion technology and distribution infrastructure to create a huge leap in sustainability.

The Dearman engine is a novel piston engine powered by the expansion of liquid air delivering cold **and** power; the only exhaust is clean, cold air. It can save up to \$30,000 on operating costs per vehicle per year versus diesel. It can reduce CO₂ by 50 tonnes per vehicle per year.

In demonstration in the UK this year it will be in full field trials from beginning of 2015. Liquid air/nitrogen can be powered from renewable generation, meaning the transport fuel can be zero carbon. But equally since there is surplus liquid nitrogen production capacity in many countries, a skeleton fuel supply infrastructure often already exists.

Our intervention

A transformational solution at many levels; intervention is needed over the next 12 months to put cold on the economic and environmental agenda; garner support of governments; establish in-country route and commercial / donor funding to field trials, and develop in-country capacity and customers for commercial deployment.

Relevant literature

Dr Henry Clark, Queen Mary University of London, (2011), 'A novel cryogenic energy system for zero emission vehicles'

Centre for Low Carbon Futures and University of Birmingham reports:

- *Liquid air in the energy and transport systems:*
- *Liquid air technologies: A guide to the potential October 2013*

Scale & scope

Refrigerated transport is a multi-billion dollar market growing at +10/yr CAGR (+20% in fast developing nations). The technology has three other applications:

1. Air conditioning: accounts for 25% of diesel usage of buses, with a global market of 800,000+ units a year.
2. A high-yield low-grade heat energy recovery system can increase overall fuel efficiency of heavy-duty diesel engines by more than 25%. Total global medium/heavy truck market is ~12m+ units.
3. An inexpensive, zero-emission engine: this is highly relevant for multi-billion-dollar global on- and off-highway vehicle markets, including industrial (eg, fork-lift trucks), mining, and urban vehicles in emerging markets (eg, tuk-tuks).

History

Peter Dearman had the novel idea of injecting liquid air and a heat exchange fluid (water /glycol) into the chamber, increasing the pressure generated, and therefore the work output – an 'internal steam engine'. The engine concept was validated by the University of Leeds and Ricardo. The UK government and private shareholders have now committed more than \$65m to developing the Dearman engine and other liquid air technologies, which also includes a state of the art cryogenic research centre at the University of Birmingham.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Global / transport, heavy duty diesel engines
2) Market size of industry:	\$12.7bn
3) Annual investment in industry:	\$3bn/yr (in India alone)
Market growth opportunity:	
1) Future potential market size:	Double over next five years
2) Future potential annual investment in industry:	Multi \$ bn
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$1bn
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / <u>Pilot</u> / Existing / Other (describe):
Other key metrics:	
Food wastage (40% post-harvest)	
Reduction in diesel and emissions ~20% per engine deployed	

Alternative approaches
Diesel is the incumbent; liquid nitrogen evaporation system – same economic as diesel; hydrogen fuel cells are being researched but cost and infrastructure challenges
Justification for scale metrics
Market size- Global: Markets and Markets Report: Global Cold Chain Market (for Food Industry), (Markets and Markets 2013); China: AT Kearney Report and Global Cold Chain Alliance; India: Cross Tree Report by Pawanexh Kohli (Chief Advisor to National Centre for Cold Chain Development); Pharmaceutical: Global Healthcare Cold Chain Logistics Market Report and Forecast (2013, Research and Markets) and IMARC Group for growth of Pharmaceutical Cold Chain.
Market growth opportunity:
Ricardo Strategic Consulting: Market assessment of opportunities in waste heat recovery and refrigeration (2013) ImechE – Global Food, Waste Not, Want Not Feeding the 9bn: The tragedy of waste (2013) Tanzanian Horticultural Association; Post Harvest Foundation
FiRe metrics E4tech and Ricardo sales projections engines + liquid air/nitrogen fuel at 7.5cents a litre and Turquoise International Limited economic modelling
Other metrics
IMEchE Report: Global food: Want not, Waste not (2013); Centre for Low Carbon Futures and University of Birmingham Report: <i>Liquid air in the energy and transport systems (2013)</i> ; Liquid Air Energy Network Report – <i>Liquid Air on the Highway (to be published June 2014)</i> ; ImechE - <i>Affordable, clean refrigeration for the developing world (to be published July 2014)</i>

QUALITATIVE ANALYSIS

Strengths (intervention)

- Harnessing renewables to deliver zero-emission motive power and cold. Significantly cheaper than the incumbent (diesel).
- Additional applications including waste heat recovery; these can be combined on one vehicle.
- Made from simple materials in well-established processes - cheaper and quicker to market than other novel technologies.
- Mature, well understood technology.
- Abundant and free feedstock – air. Non-polluting and non-combustible– exhausts clean air.

Weaknesses (intervention)

- Comparatively young technology compared with incumbents.
- Not yet part of the mainstream energy alternative conversation (batteries/hydrogen).
- As with all alternative technologies, lower energy efficiency than fossil fuels.
- Will require capital investment in additional liquid nitrogen/liquids air plants. (in due course)

Barriers to implementation

Liquid air in the energy mix

- Lack of industry awareness and understanding of liquid air as an energy vector outside the UK.
- Governments may back “known” incumbent (battery and hydrogen) and resist new forms of energy storage.

International engagement

- Developing networks and generating cross-country exposure to connect both with potential end users, policy-makers and the OEM supply chain.

Financial

- If we are to have transformational impact, there will be a pressing need to raise finance for the critical transition from prototype to field trial and on to commercial deployment, especially given emerging markets.

Opportunities (market)

- Growth of cold demand across industrialised, rapidly industrialising and developing markets.
- The market is looking for low-emission alternatives to diesel.
- Limited solutions for zero-emission refrigeration.
- Synergies with existing / technologies eg, diesel hybrid.
- DE takes advantage of existing liquid nitrogen supply network- could increase market demand for investment flows into increasing air liquefaction capacity.

Threats (market)

- Generating sufficient finance.
- Inertia/resistance to change.
- Future taxes on liquid nitrogen/air as a fuel.
- A collapse of energy prices undermining the economics of liquid air

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Engine and refrigeration system installed onto mule vehicle	Champions, Air Products, MIRA	April 2014
Engagement and feasibility studies with agreed overseas markets to affirm application impact within specific markets <u>and define field-trial programmes</u> – locations, partners and costs.	Champions and working group and in-country partners	Q2-3 2014
Institution of Mechanical Engineers two-day international summit.	Champion + IMechE	30 June /1 July 2014
Design for manufacture commences	Champion, E4Tech, MTC	Sep. 2014
Secure funding for agreed first international field trials	Champion + McLarty Associates, in-country partners	Q4 2014/ Q1 2014
First fleet field trials in UK in collaboration with government and key industry partners; report back on progress to FiRe team –	Champion, Mira and Air Products, rail partner	Jan. 2015
Commence implementation of field trials for markets outside of UK, build up in-country capacity	Champion + working group + MIRA, and in-country partners	From: Feb. 2015

Key individuals & organisations

Individuals:

- Dr. Andrew Atkins
- Professor Colin Garner
- Professor Richard Williams
- Dr Tim Fox, Prabal Sarma,
- Jon Price
- Nick Owen
- Nelson Cunningham, Kellie Meiman, Eric Trachtenberg,
- Chris Reeves, MIRA
- Jon Tremble
- Clive Hickman
- Lisa Kitinoja
- John Kell, UKTI
- January Makamba, Deputy Minister
- Jackie Mkindi, CEO

Institution:

- Ricardo Strategic Consulting
- Loughborough University
- University of Birmingham
- Institution of Mechanical Engineers
- Centre for Low Carbon Futures; E4tech
- McLarty Associates
- MIRA
- Air Products
- Manufacturing Technology Centre
- World Food Logistics Organisation; Post Harvest Foundation
- John Kell, UKTI
- Government of Tanzania
- Tanzania Horticultural Association

Input from FiRe

We have a strong UK network. We need to create a global “ecosystem” to tactically help:

- Promote to policy-makers impact of refrigerated transport unit emissions
- Engage with primary donors (USAID and Dept of Agriculture) and others to explain the opportunities and impacts of liquid air as a sustainable energy store
- Connect with defined in-country audiences (government, donors, agriculture, food distribution and retail) to facilitate field trials
- Engage with in-country technical colleges to build capacity
- Secure initial \$150m of project finance (eg., IFC, OPIC, PCGA, private) to move from prototype to rapid commercial scaling-up in five markets

CHARACTERISATION TEMPLATE

INTERVENTION 5: *Business Renewables Resource Center (BR²C)*

SUMMARY: *Create a non-profit resource centre to enhance large, non-energy company renewable energy procurement and investment through education for corporate transactional staff.*

Date	3 March 2014
Template version	1.0
Workstream	Distributed solutions
Sector(s)	Renewable Energy
Region or country	US initially, maturing to international over time
Champion 1 + contact	Jules Kortenhorst, jules@rmi.org
Champion 2 + contact	Dan Seif dseif@rmi.org , +1-970-927-7357
Champion 3 + contact	Hutch Hutchinson hutch@rmi.org , +1-303-990-2838
Coach 1 + contact	
Working group member 1	
Working group member 2	
Working group member 3	
BNEF mentor + contact	Kieron Stopforth, kstopforth@bloomberg.net , + 44-20-7673-2619

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Opportunity: The majority of large US companies have set greenhouse-gas reduction or sustainability goals, necessitating substantial renewable energy attainment. As of mid-2013, 25 large companies by themselves have installed nearly 1,000 solar PV installations in the US. While the intent and activity of large companies in renewable energy are clearly now real, the scale of action, compared to the energy profiles of most US large companies, remains small.

Challenge: Transactional information within the finance, budgeting, legal, and accounting disciplines must be pertinent to real-world deal-making and relevant to the daily concerns of these transactional staff and their senior decision-makers. Today, such information is expensive, insufficiently available, and/or not catered to staff of large, non-energy-related corporations. As such, many renewable energy deals with non-energy companies often die mid-stream.

Intervention: RMI will launch the Business Renewables Resource Center (BR²C) and provide the following three tiers of services:

- Tier 1 - transactive staff education: transactional case studies, key contacts database, “starter kits” for assessing the deal set for their assets, and contract dissections
- Tier 2 - executive education: CFO/Sr. VP bootcamps
- Tier 3 - market enablement: demand aggregation and auction platforms.

How and Why It Will Work: The Center’s key objectives are to overcome the informational and educational barriers that impede investment in renewable energy projects. The Center will disseminate pertinent information, often as a direct conduit for top-tier experts, in an affordable, broad, and meaningful way to corporate transactional staff. Within 1-2 years, the Center will be spun off from RMI as a standalone, membership-driven, non-profit entity.

Relevant literature

RMI & WWF (2013) *Corporate Renewable Energy Buyer’s Day – Meeting Report* (Not public; provided to BNEF in October 2013 and sent to BNEF FiRE review committee as auxiliary info with Center FAQs document)
 WWF, Calvert Investments, and Ceres (2011) *Power Forward: Why the World’s Largest Companies are Investing in Renewable Energy*
 WRI (2013), *Aligning Profit and Environmental Sustainability*
 BNEF & Vestas (2012) *Global Corporate Renewable Energy Index*

Scale & scope

Commercial and industrial (C&I) energy use was ~40% (38 quads) of energy use in the US in 2012 when evaluated at the “fence-line” and in transportation fleet use, totalling ~\$300bn in annual investment and procurement. Large company (~Fortune 500) US energy use is estimated at about half of this energy total, and their actions serve as potent leadership examples to smaller companies. Less than 10% of total C&I energy is renewable (just ~3.6 quads; ~\$29bn/yr). The BR²C targets an increase of C&I RE monetary flows by 50% by 2019 (net increase of \$21bn/yr. into renewables – a \$15bn/yr. increase against BAU/non-FiRe), led by a doubling by the Fortune 500. Therefore, the target US C&I RE investment and procurement total is \$50bn/yr in 2019.

History

In RMI’s one-on-one confidential collaborations with large corporations over many years, internal company transactional education was consistently identified as a critical need. Also, it was the top internal-to-companies solution identified at the WWF-RMI Buyer’s Day held in September 2013, an invitation-only event with 14 Fortune 500 companies representing >\$1.0 trillion in annual revenue. RMI has launched several, broad membership, industry change vehicles before, including Esource, truSolar, eLab, and NACFE.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	US market; all commercial and industrial activities
2) Market size of industry:	~38 all-energy quads at C&I "fence-line" and in C&I transportation fleets; of which ~3.6 quads are renewable
3) Annual investment in industry:	~\$310bn/yr in capex and opex for all C&I US energy; ~\$29bn/yr. for C&I U.S. renewable energy (incl. large hydro-derived electrical)
Market growth opportunity:	
1) Future potential market size:	~3.8 quads C&I renewables (in 5 yrs. – 2019)
2) Future potential annual investment industry:	\$35bn/yr. C&I renewables (in 5 yrs. - 2019) – note: adjusted for 0.2 quad increase and inflation
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	Net increase of \$15bn-&-1.8-quads/yr by year-end 2019 (\$50bn/-&-5.3-quads/yr total)
2) Expected implementation time:	<u><1 year</u> / 1-3 years / > 3y years Note: Launch is <1 yr.; ~5 years (2019) to reach FiRe metric/goal
3) Current stage of development:	Idea / <u>Pilot</u> / Existing / Other Note: RMI began launch process at end of 2013 and will run kick-off event mid-2014.
Other key metrics: ~200 Center-participating companies by 2016	

Alternative approaches
There exists a scattered set of offerings, that when collectively assessed, are similar to BR ² C. Albeit they are generally at higher cost, regularly non-neutral, and less focused on corporate transaction staff. Providers include specialist for-profit consultancies, transactional specialists (legal, accounting, etc.), government, and non-profit entities. The BR ² C would be a "funnel" for these offerings, while currently none exists.
Justification for scale metrics
Market size US industrial energy expenditures >= \$200bn http://www1.eere.energy.gov/seeaction/pdfs/industrial_factsheet.pdf US Comm. sector energy expenditures >= \$50bn – from quad ratio against industrial: http://www.eia.gov/totalenergy/data/annual/pecss_diagram.cfm C&I fleet energy expenditures >= \$50bn – from quad ratio against industrial: http://www.eia.gov/totalenergy/data/annual/pecss_diagram.cfm ~5 quads (med. and heavy C&I transport.) - http://www.eia.gov/forecasts/aeo/supplement/suptab_68.xlsx ~1 quad (light C&I transport) – compilation of multiple sources
Market growth opportunity (non-Fire) A modest growth of 0.2 quads of C&I renewables use in 2019 seems "business as usual," approximated from 20x 2013 installed PV capacity generation (reduced by C&I's grid share and C&I on-site) in total (not annually) over 2014-19 (10x from PV; 10x other RE).
FiRe metrics 2013 US C&I renewables use can increase 50% (increase of 1.8 quads/yr.; driven by 1 quad increase from the Fortune 500) against BAU/non-FiRe by 2019 based on RMI's <i>Reinventing Fire</i> "Transform Case" rate of increase for time frame.

QUALITATIVE ANALYSIS

Strengths (intervention)

- Drives services to right transactional people within companies – not a sustainability officer effort.
- Funnel a scattered set of existing services in an comprehensive, useful, and affordable manner.
- Puts corporate action front and centre – it is fundamentally a Center for corporations by corporations, facilitated by a non-profit. Empowers the “we want to act” and pulls on and helps transform the “we just like to look green.”
- Puts the best expertise before a corporate audience. Doesn’t try to outcompete existing providers, but rather work with them for maximum market growth.

Weaknesses (intervention)

- Not the only solution needed - PUC regulation, utility business model, economic, corporate decision-making, and technical limitations also persist. But all of these have their own, potent avenues of address.
- Renewable power solutions are regionally specific. To cover large deal-flow potential, geographical specifics will need to be addressed, which is challenging. Also, eventual scalability to international solutions faces similar challenges.
- Not for all large corporations at first. At launch, for the leading quartile in renewables interest, but maybe not those at the tip of the spear (e.g. Google).

Barriers to implementation

- Creation of critical energy – Center needs to “come out of the gates” with major supporting corporations, an outstanding initial service or services, and involvement of engaged and excited expert providers. Otherwise it may look like yet one more of the scattered NGO efforts to support corporate sustainability that do not go beyond meetings and white papers.
- The Center’s value proposition to transactional intermediaries is varied and universal interest is unlikely. Yet, to be effective, the Center needs to funnel top-tier expertise. Intelligent and creative solutions will need to be offered for different sets of expert providers. The Center will need to attract an initially narrow, but highly capable, set of expert providers and drive momentum to pull in more over time.
- The dance of who goes first – corporations will generally look to their peers for action. While it may be relatively easy to go from 20 to 40 participating, and financially supporting, companies, going from a handful to 10 may be the most challenging.

Opportunities (market)

- Medium-term; Have been sent clear signal from 14 WWF-RMI Buyer’s Day companies that this is a near-term solution. As the electricity market evolves (hopefully to more renewable-friendly PUC regulations and utility business models) and the Center successfully equips hundreds of companies with sufficient transactive know-how, the need for core renewables transactional competencies may eventually decrease.
- Renewable energy supply participants in the US feel the time is ripe – developers are increasingly looking to corporate parties to move markets.

Threats (market)

- Utilities and PUCs may move faster than anticipated, making renewable electricity easier for C&I participants (thus reducing need for Center).
- Suppliers may feel that the Center is a competitor, rather than a market broadening enabler, and not participate. Need to appropriately design participation for their benefit, discussions to date are positive.
- Fossil-based fuel, electricity, and heat could become cheaper, reducing corporates ability to scale learning curve for renewables investment/procurement.

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Review year 1 fundraising plan, corporate steering committee build-out, and initial services plan	Champion + team	April 2014
Donor outreach, steering committee build-out, and general public relations campaign (note: already underway – May activities would be an amplification)	Champion + team	May 2014
Refine impact metrics tracking system for dollar and quad impacts	Champion	June 2014
Launch Event – <u>Service 1</u> : Center-revealing event that also has built-in educational offerings for corporate deal teams.	Champion, event sponsors and partners	July-August 2014
Second major wave of donor outreach and steering committee build-out	Champion	August 2014
<u>Service 2</u> : Web-based case study set, contract dissection set, or progressive program (eg, Exec RE MBA) for deal teams	Champion, and service partners	Nov. 2014
<u>Service 3</u> : CFO bootcamp or similar high-level executive-focused service	Champion and service partners	Jan. 2015
Report on achievement of Center and provide outlook	Champion	BNEF Summit 2015

Key individuals & organisations

Individuals:

- Hutch Hutchinson, Managing Director at Rocky Mountain Institute
- Dan Seif, Principal at Rocky Mountain Institute
- Marty Spitzer, Dir. of US Climate Policy, World Wildlife Fund
- Bryn Baker, Mgr. of Climate Change and Renewable Energy, World Wildlife Fund

Organisations:

- Rocky Mountain Institute
- World Wildlife Fund

Input from FiRe

- A broadcast platform – coordination with Bloomberg events and information dispersal systems
- Networking to key transactional experts and service providers – referrals and open and clear support indications
- Guidance on rapid and effective growth
- Networking to funding donors – in particular, connections to corporate foundations (Bloomberg’s foundation peer entities)
- Potential partnership with BNEF on selected Center services
 - Deeper, “size of the prize” analysis – more precise analysis of the monetary flow potential of Fortune 500 companies’ goal attainments
 - Transaction agent contact database
 - Case studies database

3. ENERGY EFFICIENCY

INTERVENTIONS

6. [Accelerating energy efficiency financing \(33-37\)](#)
7. [Global open energy data initiative \(p.38-42\)](#)
8. [Marshall plan for Southern European buildings \(p.43-47\)](#)
9. [PACE: Providing capital for clean energy retrofits \(p.48-52\)](#)

CHARACTERISATION TEMPLATE

INTERVENTION 6: *Accelerating energy efficiency financing*

SUMMARY: *Scale-up energy efficiency financing through energy audits*

Date	31 March
Template version	4.0
Workstream	Energy efficiency
Sector(s)	Industry, SMEs and banking
Region or country	Global
Champion 1 + contact	Josué Tanaka, tanakaj@ebrd.com , +44 20 7338 6364
Champion 2 + contact	
Coach 1 + contact	Jigar Shah, jigar.shah@iipnetwork.org
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BNEF mentor + contact	Thomas Rowlands-Rees, trowlandsree@bloomberg.net , +44 20 3216 4144

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Energy efficiency is the **most effective mitigation instrument to achieve significant energy savings and carbon emission reductions in the short to medium term**. Technologies are known, and the scope for their application span across all sectors and countries. The challenge is to accelerate energy efficiency investment which remains well below its economic potential.

To address this challenge, this intervention will aim to deploy **up to \$5bn** in energy efficiency financing for large energy-intensive industries and SMEs through the active use of **energy audits** and the translation of technical energy savings potential into financial action. This will be achieved by developing the energy efficiency **financing capacity of local banks** and by providing energy audits to large energy-intensive companies and SMEs.

This intervention will produce results immediately in 2014 based on the energy efficiency financing activity of the **EBRD in its region of operations**. Building on this experience, the intervention will next develop specific channels to finance energy efficiency projects in China, India and Brazil, driven by an active energy audit programme. These channels would involve core business, financial and technical actors in each country. Results in these countries should start to be achieved in 2015, and the intervention could then be expanded to a third set of countries.

The speed and scope of implementation would depend on the availability of funding for the energy audits and technical assistance and on the range of partners which could be mobilised by the intervention in each country.

Relevant literature

The practical experience of the EBRD is that energy audits are a key instrument to drive energy efficiency financing and address important barriers. The 2012 World Energy Outlook (sections 9 to 12) provides a clear analytical context for this intervention.

It is relevant to note that the IIP has analysed the EBRD experience in this area and this could be used in the context of this intervention.

Scale and scope

The scope of intervention could be **global** based on the participation of international and local financial institutions, industries and their associations and other market players. EBRD activity since the launch of its Sustainable Energy Initiative (SEI) clearly shows the scale of energy efficiency financing and impact that can be achieved in its region of operations (see below). This intervention would build on this experience, expanding initially to a set of large countries including China, India and Brazil and then to a subsequent set of countries leading to a potential global scale of intervention.

History

EBRD launched its Sustainable Energy Initiative in 2006 to scale up its investments in energy efficiency and renewable energy. From launch to the end of 2013, cumulative EBRD SEI investment reached \$17bn in 756 projects, of which \$14.4bn was in energy efficiency. SEI investment accounted for 28% of total EBRD investment in 2013. Cumulative carbon emission reduction from these energy efficiency projects is estimated at 54Mt per year.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Global / energy efficiency
2) Market size of industry:	\$75bn
3) Annual investment in industry:	Less than \$10bn
Market growth opportunity:	
1) Future potential market size:	\$11.8 trillion (2012-2035)
2) Future potential annual investment in industry:	\$200bn
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$5bn over three years
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / Pilot / <u>Existing</u> / Other (describe):
Other key metrics:	
<ul style="list-style-type: none"> • Number of financial intermediaries : 130 banks by year 3 • Number of industries: 180 over 3 years • Number of energy audits: 1750 over 3 years • Energy savings: \$1.4bn per year by end year 3 • GHG reduction: 11m tonnes year by end year 3 	

Alternative approaches
<p>ESCOs, trade associations and industry groups could be a channel both to expand use of audits and financing energy efficiency. This potential varies considerably from country to country. Low capital efficiency of ESCO model can hinder growth.</p>
Justification for scale metrics
<p>Market size</p> <ul style="list-style-type: none"> • The IEA estimates that total global investment in energy efficiency measures in 2011 was up to \$300bn. • Market size of industry assumed at a quarter of the potential for all sectors. • Annual investment in industry based on McKinsey 2009 estimate for a suite of 675 energy-saving measures across all sectors.
<p>Market growth opportunity</p> <p>\$11.8 trillion for 2012-35 cumulative (IEA), Efficient World Scenario, across all sectors (buildings, industry, transport).</p>
<p>FiRe metrics</p> <p>\$5bn estimate based on EBRD experience (see slide 2) and IFC CHUEEE Program which reached \$1bn in year 3.</p>
<p>Other metrics</p> <p>Assumption of five audits per FI. Based on EBRD experience, average investment through local banks per audit of \$1m, 3 year payback resulting in annual savings potential of \$0.3m per audit, For direct industrial EE, average investment per audit of \$19m.</p>

QUALITATIVE ANALYSIS

Strengths (intervention)

- Technologies available and ready for deployment
- Financial models and approach defined and tested
- Broad range of potential actors across sectors and countries
- Demonstrated results of approach which can be scaled up
- Broad range of potential actors across sectors and countries
- Broad technical capacity to scale up energy audits

Weaknesses (intervention)

- Funding for energy audits and technical assistance to banks

Barriers to implementation

- Funding for energy audits. If implemented at full scale, intervention would require around \$75bn for audits not including training costs for banks.
- Careful integration of technical and financial analysis
- Fit in business strategy of financial institution, buy-in at senior management level and integration in credit assessment process
- Incentives for energy efficiency projects – risk-sharing facilities and appropriate security requirement
- Insufficient cadre of good technical staff, especially sector-specific (iron and steel, cement, chemicals etc.) specialists
- Clear definition of energy efficiency project
- Good monitoring and verification protocols
- Need for companies to adopt energy management systems (EnMS) for successful implementation

Opportunities (market)

- First to deploy at global scale use of energy audits as drivers of energy efficiency financing to industry, commercial and infrastructure companies
- Second, to build up a global network of local banks with energy efficiency financing expertise. EBRD's network in its region already includes some 80 banks

Threats (market)

- Subsidised energy prices
- Limited technical capacity for energy audit delivery in certain contexts
- Financial market trends may constrain ability / willingness of local banks to develop energy efficiency financing activity

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Step 1: Define indirect approach through local financial intermediaries and direct approach to larger industrial companies based on EBRD experience.	EBRD and IIP	Jul 2014
Step 2: Define set of target markets and banks including assessment of experience to date and specific scope for growth. Initial set to include China, India, Brazil and EBRD region. Identify potential funding sources for audits and technical assistance to banks.	EBRD and IIP	Sept 2014
Step 3: Define country-specific approaches connecting with main actors active in those markets such as local banks. Approach to include marketing of approach, country event and workshops. Identify local organisations to drive direct activity with large energy-intensive industries.	EBRD, IIP, CBRC, BEE, BNDES, MDBs	Oct-Nov 2014
Step 4: Funding for EE audits, bank training and incentives for indirect channel.	TBD	2014
Q4 2014. Step 5: Create roster of technical specialist at region/country level.	IIP	Q4 2014
Step 6: Deployment in initial set of countries: China, India, Brazil and EBRD region including workshops for local bank managers and industrial associations.	EBRD, IIP, CBRC, BEE, BNDES, MDBs	2015
Step 7: Based on experience in initial set of countries, define new set of countries with strong EE financing market potential.	EBRD and IIP	Q3 2015

Key individuals & organisations

Individuals:

- Josué Tanaka, MD, EBRD
- Bob Taylor (IIP)
- Patrick D'Addario (LaGuardia Foundation)
- Julia Reinaud (Consultant)

Organisations

- EBRD
- IIP (Implementation Agency)
- FiRe
- CBRC (China)
- BEE (India)
- BNDES (Brazil)
- MDBs based on country coverage and experience
- Local banks and industrial associations at country level

Input from FiRe

- Funding for implementation agency
- Technical knowledge and convening power of BNEF
- Organisational support to events at country and global levels
- Access to senior executives in banks and industry
- Participation in meetings with key officials in FiRe activity countries

CHARACTERISATION TEMPLATE

INTERVENTION 7: *Global open energy data initiative*

SUMMARY: *Enhance investor confidence in energy efficiency by building actuarial data*

Date	4 March 2014
Template version	3.0
Workstream	Energy Efficiency
Sector(s)	Energy efficiency
Region or country	Global – pilots in US, UK, and EU
Champion 1 + contact	Matt Golden, matt@efficiency.org , +1 415 902 4546
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Champion 3 + contact	Jonathan Maxwell, Jonathan.Maxwell@sdcl-ib.com
Champion 4 + contact	Steve Fawkes, stevenfawkes@aol.com
Coach 1 + contact	Cisco DeVries, cisco@renewfund.com
Working group member 2	Jenny Ya He, jenny.ya.he@gmail.com
Working group member 3	Ian Jeffries, ian@eevs.co.uk , +44 207 034 7981
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net , + 44-20-3525-8303 (preliminary)

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Background: Actuarial performance data is critical to engaging both capital and capacity markets to finance energy efficiency as an asset class and as an energy resource. Data exists currently in a patchwork of programmes and formats and has been largely inaccessible, making managing both performance and financial risk an expensive and complex process of underwriting each project individually.

To solve for the lack of actuarial basis to manage financial and performance risk, and to enable a system for energy efficiency that is similar to virtually every other market and asset class, this project will aggregate sources of existing data, coupled with a framework of organisational protocols to enable classification of projects.

The Intervention: The [Open Energy Data](#) project will provide an open source scalable platform to help both public and private users share and access data derived from past and current programmes to enable markets to assess and manage risk. Rather than attempting to determine all use cases and data requirements in advance, this approach is based on the agile principles, where data is made available early and often, and solutions emerge based on iteration and how that data is used in the marketplace.

The Open Energy Data initiative will act as a platform for business models that will directly facilitate energy efficiency investment by structuring and analysing data for investors. Analogous to other asset-backed securities or insurance products, these services will enable potential investors to manage risk at a portfolio level.

Parallels: This project closely mirrors very successful efforts in the [healthcare](#) industry to improve access to data that has succeeded in unlocking value in a dataset that is significantly more complex and with greater security concerns than with energy data.

Approach: We recommend leveraging an existing platform that was tested by the US [Investor Confidence Project](#) using residential energy efficiency loan performance data from four of the larger US state-based energy efficiency finance programmes. From this first test case at least one new energy efficiency lending programme emerged based on a regional US bank leveraging the dataset as the basis for a new energy efficiency loan product. By expanding the depth of data and the scope of the project to include both energy and loan performance, we believe that this effort will be a critical element that reduces transaction costs and enables financial markets and project investors to begin treating energy efficiency as an asset class.

Relevant literature

- [Investor Confidence Project – Open Energy Data Project](#)
- [ICP Residential Loan Performance Dashboard](#)
- [White House Open Government Directive](#)
- [Introduction to Open Data – Open Knowledge Foundation](#)
- [Energy Data Initiative](#)
- [A Utility Regulator’s Guide to Data Access for Commercial Building Energy Performance Benchmarking](#)

Scale & scope

An Open Data initiative has global potential. Investment in even the most advanced markets for energy services is held back by a lack of publicly available data, while nascent industries in developing economies will benefit from reduced uncertainty by using data from elsewhere in the world.

The initiative will support a wide range of energy efficiency activities, not limited to mobilising third-party investment. Latent energy efficiency opportunities within organisations will be unlocked as open data provides the necessary confidence.

The direction and focus of the intervention will be determined by the community of users. We believe that the resulting data will be used to develop a range of innovative new approaches and technologies, but the goal is to simply enable markets, entrepreneurs, and programs to innovate based on the most complete and open data set available.

History

Open Data has been an emerging trend in both the US and Europe. In the US this approach is taking root in government and the private sector with particular successes in health data and city open data initiatives. The EDF Investor Confidence Project is a three-year-old US effort that is gaining widespread adoption with investors, project developers and programmes. A European ICP effort is now underway. FiRe provides an opportunity to expand the scale and scope of this initiative by leveraging BNEF’s global network and relationships to increase participation and adoption.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	US, UK, and eventually global. Energy efficiency (built environment)
2) Market size of industry:	\$300bn
3) Annual investment in industry:	As above
Market growth opportunity:	
1) Future potential market size :	Could become a \$1tn industry
2) Future potential annual investment in industry:	As above
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	At least \$1bn
2) Expected time for implementation:	<1 year / 1-3 years / >3 years
3) Current stage of development:	Idea / Pilot / Existing programme / other
<p>Other key metrics: Metrics will include the number of government bodies, funds, procurement frameworks and other entities submitting data to the initiative, as well as the total volume of projects/sites we are able to report on. Similarly, success can be measured by use of the data by investors or other energy efficiency actors, which will be encouraged to submit feedback and details of their usage.</p>	

Alternative approaches
<p>The primary alternative is represented by an array of efforts to pre-determine data use cases and to develop and standardise data into a common taxonomy and eventually a centralised data warehouse. Given the myriad structures used for delivering energy efficiency projects, this approach is costly to develop and difficult to scale.</p>
Justification for scale metrics
<p>Market size</p> <p>Global energy efficiency investment in 2011, Energy Efficiency Market Report 2013, International Energy Agency</p>
<p>Market growth opportunity</p> <p><i>“This market could be worth between US\$ 0.9 trillion and US\$ 1.3 trillion.”</i> (See chapter 3.) Transforming the Market: Energy Efficiency in Buildings, World Business Council for Sustainable Development</p>
<p>FiRe metrics</p> <p>Using the UK to provide context, the energy efficiency industry was estimated at GBP 1.2bn (\$2bn) in 2009 (BSRIA [not available online]). Information and finance related barriers to energy efficiency are widely cited (McKinsey, Policy Connect, Retrofit 2050), so it is reasonable that, over three years and with global reach, open data will unlock at least \$1bn by providing a solid information platform for investment decisions.</p>

QUALITATIVE ANALYSIS

Strengths (intervention)

- Closely mirrors existing successful data efforts
- Mirrors the actuarial basis that has helped other established markets emerge as asset classes for senior capital
- This project does intend to “solve” for what works in the market; instead we believe we can set the stage to enable innovation so that winning business models will emerge
- Implementation is practical to achieve

Weaknesses (intervention)

- Getting energy and loan data can be complex
- May be institutional, legal, and regulatory barriers
- Requested data will be stripped of personally identifiable elements, but we still must overcome a culture where data is viewed as an asset
- Lack of structure in current data may make it hard to aggregate datasets, and significant gaps in the data may exist
- Many other factors affect investors' decision making – provision of data may not in itself unlock the market; rather it provides the building blocks needed for a mature energy efficiency industry

Barriers to implementation

- Industry bodies / suppliers / clients prove unwilling to participate. There is a historical culture of data being viewed as an asset, which may prove difficult to overcome
- International differences may make it impractical to implement a truly global scheme, exacerbating rather than narrowing the differences between developed and undeveloped energy efficiency markets
- In particular, the US experience is that data from publicly funded programmes is willingly released – this may not transfer to other countries / territories
- Organisations holding data have insurmountable concerns over data privacy and are either unwilling to participate or strip down submitted data such that it becomes less useful
- Competition from other schemes, such as those operated by private organisations
- Finding common elements in disparate datasets may prove difficult, preventing meaningful aggregation and classification of data

Opportunities (market)

- Energy and carbon saving targets are major drivers for organisations to undertake energy efficiency
- Legislative drivers in many parts of the world
- Mitigating energy price rises is a common reason for undertaking energy efficiency, making organisations more likely to commission projects
- Enabling technology is now mature – data manipulation and presentation, smart meter data, increased automation
- There is a clear appetite ‘in principle’ to invest in energy efficiency

Threats (market)

- Weakening of political will and commitment to national, regional and international objectives regarding climate change and specific energy efficiency actions
- Fall in energy prices
- Reduced rate of increase in energy prices

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Draw up action plan for enhancement of existing ICP Open Energy Data initiative: internationalise and expand	ICP / EEVS	June 2014
Complete consultation with financiers and project investors to determine specific gaps / data requirements	ICP / LBNL / DECC	July 2014
Create Open Energy Data (OED) steering committee representing key stakeholders and data expert.	Various experts	July 2014
Outreach to EE Finance and Resource programmes world wide to submit datasets	ICP / EEVS	from summer 2014
Develop and socialise the OED platform with users to collaborate on data management and developing use cases	ICP	from summer 2014
Collect data, process and convert into common formats, definitions, through open source code	ICP / User Community	Sept 2014
Implement ad-hoc quarry system and dashboards	ICP	Sept 2014
Based on actual usage and feedback, continue to pursue most valuable datasets and further refine methods	ICP / User Community	from autumn 2014
As use of data will require attribution based on open data licences, track and quantify benefits of the effort	ICP	from autumn 2014
Report on data collected, finance brought to market and case studies	ICP / EEVS	BNEF Summit 2015

Key individuals & organisations

- *EDF Investor Confidence Project (US and EU)*
- *EEVS Insight*
- *BNEF - FiRe*
- *US Department of Energy*
- *UK Department of Energy and Climate Change*
- *University of Chicago – Big Data for Social Good Fellowship*
- *BPIE*

Input from FiRe

- Access to global market data and analysis to determine international strategy and organisations to target for outreach
- Links and introductions to energy efficiency finance and resource programmes worldwide (these will be 'suppliers to' and users of the OED)
- Links and introductions to extensive networks of financiers and investors (users of the OED), including those currently active in energy efficiency investment and those yet to make any such investments
- Technical support, for example a dedicated analyst who will grow and operate the open energy database and its user-accessible front end
- Administrative support, including the organisation of steering committee meetings / events

CHARACTERISATION TEMPLATE

INTERVENTION 8: *Marshall Plan for Southern European buildings*

SUMMARY: *Transform the buildings in Southern Europe through energy efficient retrofit*

Date	28 February 2014
Template version	2.0
Workstream	Energy efficiency
Sector(s)	Buildings / housing
Region or country	Spain, then expanded to all of southern Europe
Champion 1 + contact	Peter Sweatman, info@climatestrategy.com
Coach(es) + contact	Patty Fong
Working group member 1	Maria Teresa de Diego, Ferrovial Agroman Ferrovial
Working group member 2	Mercedes Jack, Madrid Empresa Municipal de Vivienda y Suelo
Working group member 3	Jaime Miró Rábago, Gas Natural Fenosa
Working group member 4	Juan Rubio del Val, Zaragoza Vivienda
BNEF mentor + contact	Thomas Rowlands-Rees

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

The Marshall Plan for Southern European Buildings intends to create a new business model and finance platform for the refurbishment of multi-family dwellings in Spain for subsequent roll-out in similar climatic regions and buildings across Europe. It is presently being developed by six leading institutions: Climate Strategy & Partners, the European Climate Foundation, Ferrovial, Madrid's Empresa Municipal de Vivienda y Suelo (EMVS), Gas Natural Fenosa and Zaragoza Vivienda.

Initially, the plan seeks to address the “low hanging fruit” of the Spanish residential buildings market: The 4m multi-family dwellings which were built before 1960 with no insulation, lift or modern services. These homes are mainly owner-occupied with families broadly from Spain's middle class with some capacity to invest (either under mortgages or through savings) to deliver deep energy savings (over 60%) and the potential for a significant value, comfort and accessibility increases. Over the past 12 months the plan's participants have developed a pilot project which has identified a pipeline of 2,836 dwellings in three target zones in Madrid and Zaragoza, with an estimated total initial investment required of over EUR 113m.

Partners believe that the new business model for the deep, energy-efficient transformation of southern European buildings requires 20+ year debt finance repaid 50% through 20 years of energy savings; 25% through increased property value and 25% from direct subsidy/ tax breaks. The investment made in buildings immediately generates local jobs and government tax receipts for VAT, income tax and a reduction of social security benefits (in economies with high unemployment). Furthermore, the construction sector is mainly SMEs and its multiplier effect on other segments of the Spanish economy is 1.64x.

Once the model is proven through a successful pilot, the investment capacity for similar dwellings in Spain is EUR 150bn; and in Portugal, Italy, France, Greece and others is likely over EUR 50bn. With buildings responsible for 40% of European energy use and emissions, this project is highly strategic for the region.

Relevant literature

GTR (2013). *2014 Report: National Strategy for Buildings Renovation, Keys to Transform Spain's Building Sector*. Spain, Madrid: Cuchí, A., & Sweatman, P. R.

GTR (2012). *GTR's 2012 Report: A National Perspective on Spain's Building Sector, Action Plan for a New Housing Sector*. Spain, Madrid: Cuchí, A., & Sweatman, P. R.

Scale & scope

The Marshall Plan for Southern European Buildings envisages a “cascading engagement process”. Initially, the 2,836 dwellings identified in Madrid and Zaragoza should be renovated to the highest standards through with an initial investment of EUR 113m. The pilot can be completed in 2-3 years.

When pilot results are clear on the energy performance of the pilot buildings, the project has the capacity to scale to 400,000 dwellings a year in Spain and simultaneously develop and open markets in Portugal, France, Italy and Greece. At scale, the Marshall Plan for Southern European Buildings could retrofit 2m dwellings a year requiring annual investment of EUR 50bn.

History

Started in late 2012, the Marshall Plan for Southern European Buildings is made out of a carefully selected team comprising member organisations, and individuals with the deepest pools of building rehabilitation project experience, track record, adequate resources and commitment to the sector in Spain.

During 2013 team members met frequently to:

- Design a new business model for Spain's multi-family residential retrofit market
- Build an assessment framework, economic models and review methodology

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Southern Europe/ Buildings efficiency
2) Market size of industry:	200,000 homes per year
3) Annual investment in industry:	EUR 3-5bn
Market growth opportunity:	
1) Future potential market size:	2m homes per year
2) Future potential annual investment in industry:	EUR 40bn
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	EUR 1-10bn increasing from 2014-20
2) Expected implementation time:	<1 year/ 1-3 years / >3 years
3) Current stage of development:	Idea / Pilot / Existing / Other (describe):
Other key metrics:	
<ul style="list-style-type: none"> • There are hundreds of thousands of commercial buildings which can be renovated cost- effectively saving up to 50% of their energy use • The creation of 150,000+ stable, local jobs in SMEs • The 1.64x multiplier effect on the rest of the economy • The generation of EUR 390bn of cumulative savings with a mainly private sector investment of EUR 260bn from 2014-50 • Energy saving of 1.67MGWh from 2014-20 cumulative • Saving of 26MtC2e emissions cumulative from 2014-50 	
If rolled into France, Italy, Portugal and Greece these figures multiply by 3-4.	

Alternative approaches
Spain and other countries can prioritise energy efficiency investments in other sectors (eg, industry or transport) or in a building transformation which saves less energy (“shallow” interventions), but neither of these approaches will deliver the long-term resilience which the Spanish built environment demands.
Justification for scale metrics
<p>Market size</p> <p>The figures on number of potential dwellings in Spain come from the Spanish home Census 2001 contrasted with the evolution of its buildings codes and energy consumption data. The sources of these figures are National Statistics Institute (INE) and Energy Savings Office (IDAE).</p>
<p>Market growth opportunity</p> <p>2m homes x EUR 20,000 average upgrade investment per 80sqm home. These figures are taken directly from a three-year research project undertaken by the Spanish working group on buildings rehabilitation (cited earlier) which was reviewed by 25 independent experts each year including Michael Liebreich and Dr. Thomas Rowland-Rees of BNEF.</p>
<p>FiRe metrics</p> <p>These figures are drawn directly from a fairly exhaustive set of projections outlined in the 80-page GTR 2012 report and then extended into the other countries using best estimates and complementary research.</p>
<p>Other metrics</p> <p>These estimates are all retrieved from the literature mentioned in section “Relevant Literature” (peer reviewed GTR reports over 3 years).</p>

QUALITATIVE ANALYSIS

Strengths (intervention)

- Highly experienced team with commitments from some of the most significant players in the home renovation market in Spain
- Mature pilot development focus to “prove the business model” for subsequent rapid roll-out
- Timely intervention in support of a weak labour market, especially in construction, where relevant skills are available locally
- Coordinated application of public and private sector skills and resources together to deliver attractive social, environmental and business outcomes

Weaknesses (intervention)

- How much additional debt repayment can homeowners in Spain commit to?
- How to design a long-term finance structure which deals with potential for people to move house and rent?
- How to structure finance facility with public money support and interest rate buy-down alongside private bank distribution and marketing?
- Lack of data on the economic performance of energy efficiency loans in Spain.
- Spanish law does not facilitate securitisation or repayment via energy bills or on tax bills (yet)

Barriers to implementation

- **Scale:** Until now the majority of buildings renovation in Spain has been driven by municipalities or government (mainly for public buildings) providing both aggregation (social housing as landlord) and a substantial proportion of the financing (60-80% of total budgets)
- **Finance:** 60-80% of rehabilitation funds were previously provided by Spanish municipalities and this is unsustainable in the current economic environment and is not necessary
- **Demand:** At present Spanish households are not demanding “energy efficiency” in the way that they do demand “improvements” - such as lifts, structural improvements, new facades, communal lighting, parking and accessibility
- **Aggregation:** The current processes needed to get the required majorities of neighbourhood communities in multi-family dwellings are complex, time consuming and easy for small minorities to over-turn (especially when people have not had the opportunity to see and experience the benefits of energy-efficient refurbishments)

Opportunities (market)

- Deep Renovation of 10m energy inefficient homes to 2050
- Up to 50% savings in its tertiary buildings which can be renovated cost-effectively in parallel
- The creation of 150,000+ stable, local jobs in SMEs with 1.64x multiplier effect
- The delivery of EUR 390bn of cumulative savings to 2050 with a mainly private sector investment of EUR 260bn from 2014-50

And this can be rolled across southern Europe to multiply its impacts by 3-4x.

Threats (market)

- Tight public budgets and diffuse public investment returns (ie, VAT, IRPF and reduced Social Security payments do not accrue to the same ministry which has to provide capital)
- Building owners and tenants not interested in the “long-term”
- Retail banks not offering long-term, low-cost finance fit for this purpose
- Energy companies’ interests misaligned with energy efficient buildings transformation
- Immature market for energy-efficient buildings renovations

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Identify new financial partners/ banks willing to finance the 2,836 pilot project	Champion + Team	April 2014
Design the appropriate financial product that meets clients' needs and allows for public-private finance collaboration	Team + identified finance partners	May-July 2014
Report back to FiRe team as to results of processes initiated at BNEF Summit	Champion + Team, FiRe Team, BNEF liaison	Sep 2014
Launch of commercial and financial product to sign up homeowners in pilot regions	Team	Sep-Nov 2014
Refurbishment of dwellings conducted in 3-5 pilot buildings and with high-quality MRV	Team	Dec 2014 thru Feb 2015
Take model to refinancing partners, national and regional governments to expand pipeline in Spain	Team	Jan-Feb 2015
Initiate roll-out of results and model to other countries France, Italy, Portugal and Greece	Champion + Team, FiRe Team, BNEF liaison	Mar-April 2015
Report on progress of the Marshall Plan for Southern European Buildings	Champion	BNEF Summit 2015
Present Buildings Transformation as short-term "bottom-up" solution for 2015-20 emissions reductions in key sector	Champion + Team, FiRe Team, BNEF liaison	Paris COP 2015

Key individuals & organisations

- Peter Sweatman, CEO of Climate Strategy & Partners
- Patty Fong, Programme Director for Energy Efficiency European Climate Foundation (ECF)
- Maria Teresa de Diego, Head of Urban Rehabilitation at Ferrovial Agroman Ferrovial
- Mercedes Jack, Rehabilitation Director at Madrid's Empresa Municipal de Vivienda y Suelo (EMVS)
- Jaime Miró Rábago, Director of Energy Services at Gas Natural Fenosa
- Juan Rubio del Val, Head of Urban Rehabilitation at Zaragoza Vivienda.

Input from FiRe

- Raise EUR 3-5m to kick-start the Spanish pilot
- Help identify potential new finance partners willing to offer development funds and/or necessary resources for the pilot to get underway in December 2014 and then scale up funding to EUR 1+bn per year
- Develop the high-level policy platform to propagate the Marshall Plan, new business model and build policy maker support from Spain and into France, Italy, Portugal and Greece

CHARACTERISATION TEMPLATE

INTERVENTION 9: *PACE: providing capital for clean energy retrofits*

SUMMARY: *Increase investment in energy efficiency and renewables by attaching repayment to property tax bill*

Date	3 March 2014
Template version	1.1
Workstream	Energy efficiency
Sector(s)	Building energy efficiency
Region or country	USA
Champion 1 + contact	Brad Copithorne, Environmental Defense Fund, bcopithorne@edf.org
Champion 2 + contact	David Gabrielson, PACENow, david.pacenow@gmail.com
Champion 3 + contact	Daniel Kammen, University of California, Berkeley,
Coach(es) + contact	Francisco DeVries, Renewable Funding, cisco@renewfund.com
Working group member 1	Ken Alex, CA Governor's Office
Working group member 2	J.P. McNeill, Renovate America
Working group member 3	John Kinney, Clean Fund
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net , + 44-20-3525-8303 (preliminary)

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

While many energy efficiency or renewable generation projects can pay for themselves over time, property owners frequently lack the capital to invest in these improvements. Homeowners may be underwater on their mortgage or do not want to undergo the hassle of obtaining a home equity loan. For commercial properties, banks and other investors are generally reluctant to provide capital that is subordinated to the first mortgage.

Property Assessed Clean Energy (PACE): A PACE programme allows investors to lend money secured by a property tax assessment collected and enforced by a local government tax assessor. If the current owner sells or is foreclosed on, the PACE assessments remain with the property and continue to be collected as part of the property tax bill. Currently, PACE financing is offered by 26 programmes in nine states across the US. Over 200 commercial buildings have completed \$64m in energy efficiency and renewable energy projects.

Traditionally PACE financings have been executed as loans. Clean Fund, EDF and a few others are working to extend PACE to be compatible with third-party ownership of solar, which is expected to significantly increase commercial solar penetration.

The FHFA (Federal Housing Finance Agency) has made it difficult to execute residential PACE. Renovate America has demonstrated residential demand by originating \$134m of transactions in a jurisdiction of 1.45m people. The state of California is working to remove legal ambiguity for residential PACE.

Relevant literature

1. Johnson Controls. 2013. "Setting the PACE: Financing Commercial Retrofits"
2. NRDC, PACE Now, Renewable Funding, The Vote Solar Initiative. 2010. "Property Asses Clean Energy White Paper: Helping achieve environmental sustainability and energy independence, improving homeowner cash flow and credit profile, protecting mortgage lenders, and creating jobs."

Scale & scope

EDF estimates that nationwide US adoption of PACE would lead to \$87.4bn of incremental investment in energy efficiency over 12 years. Renovate America has executed \$134m of residential PACE investment in a population of 1.45m and continues to expand. Extrapolated over a national footprint, this would imply \$29bn of investment in PACE. Currently, most solar investors are unwilling to finance commercial projects that do not have an investment-grade host. This leaves out approximately 90% of the privately held market. PACE is expected to increase the number of eligible properties to well above 50%.

History

PACE was piloted in Berkeley, California in 2008 (by Cisco Devries, now CEO of Renewable Funding). FHFA opposition to residential PACE led to a large shift in focus to commercial PACE programmes. Efforts to promote residential PACE programmes and resolve roadblocks with the FHFA continue, with strong support from the state of California and a potential for breakthrough in 2014.

Analysis	
Current market size:	
1) Relevant geography and industry:	US / energy efficiency, distributed renewables/CHP
2) Market size of industry:	
3) Annual investment in industry:	
Market growth opportunity:	
1) Future potential market size:	
2) Future potential annual investment in industry:	
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$7.3bn (energy efficiency only)
2) Expected time for implementation:	<1 year <u>1-3 years</u> >3 years
3) Current stage of development:	Idea/ Pilot / <u>Existing programme</u> / Other:
Other key metrics:	

Alternative approaches
On-bill repayment – By linking repayment of a financing obligation to the tariff for the utility bill for a property OBR can achieve a similar result to PACE
Credit support – Taxpayers or ratepayers can provide credit support such as loan loss reserves or credit guarantees
Justification for scale metrics
Market size
Market growth opportunity
FiRe metrics
Other metrics

QUALITATIVE ANALYSIS

Strengths (intervention)

- Does not require meaningful taxpayer or ratepayer funding
- Appeals to both ends of political spectrum
 - Texas legislature voted to establish a PACE programme in 2013
- Flexible platforms that accommodate wide variety of property types, clean energy measures, business models and financing vehicles
- Lenders, investors and developers compete for customer business

Weaknesses (intervention)

- FHFA currently opposes residential PACE
- PACE industry is nascent, so relative to the opportunity, there is still limited availability and limited awareness
- Commercial PACE transactions generally require consent from current mortgage holders – PACENow is working with lenders to streamline this process and 80 lenders have signed off on PACE projects

Barriers to implementation

- FHFA will likely need to provide a waiver for the California residential PACE programme before other states are willing to implement similar programmes
- In order to execute PACE programmes for third-party ownership of commercial solar projects, investors will need to become comfortable that the structure preserves the relevant tax benefits

Opportunities (market)

- Nationwide PACE and OBR programmes could generate \$87.4bn in investment in energy efficiency projects over next 12 years
- PACE can be designed to work with a wide variety of financing and business models
- Most commercial properties cannot qualify for 20-year lease or PPA financing for solar projects. Since a PACE obligation survives foreclosure, most commercial properties can qualify for financing

Threats (market)

- PACE programmes require legislation
- Lack of funding for programmatic support, marketing, market segmentation

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Establish investment fund in CA for commercial solar projects through PACE using third-party ownership model	Clean Fund, EDF and Renewable Funding	Summer 2014
Obtain waiver for CA residential PACE insurance pool from FHFA	State of CA, Renewable Funding	Summer 2014
Modify CA residential PACE to accept third-party solar model and create investment fund	Renewable Funding, EDF	2014-15
Modify or establish PACE programmes in other states to obtain waivers from FHFA and to accept third-party ownership models	PACENow, EDF, Renewable Funding, many others	2014-16
Extend PACE to NRDC, IMT City Energy Project cities, including: Houston, Salt Lake City, Chicago, Denver, Atlanta, Kansas City	PACENow	2014-16

Key individuals & organisations

Individuals:

- Charlene Heydinger, Executive Director, Keeping PACE in Texas
- Alfred Griffin, President, NY Green Bank
- Bryan Garcia, President & CEO, CEFIA

Organisations:

- Keeping PACE in Texas
- NY Green Bank
- CEFIA

Input from FiRe

- Philanthropic support for EDF and PACENow
- Three or more tax equity investors for commercial solar PACE investment funds
- Meetings with governor's offices across the political spectrum to discuss how PACE can create private investment and jobs at no cost to taxpayers
- Have three large commercial lenders provide specific market guidance on acknowledgement/consent for commercial PACE
- Legal assistance in developing financing structures
- Analytical assistance in estimating market sizes and impacts

4. PROJECT RISK MITIGATION

INTERVENTIONS:

10. [Monoline guarantees for green bonds \(p.54-58\)](#)
11. [Make clean power plants bankable with insurance \(p.59-63\)](#)
12. [Policy risk insurance mechanism \(p.64-68\)](#)
13. [Geothermal drilling output insurance \(p.69-73\)](#)
14. [International solar investment initiative \(p.74-78\)](#)

CHARACTERISATION TEMPLATE

INTERVENTION 10: *Monoline guarantees for green bonds*

SUMMARY: Raise \$100m in additional equity from impact investors for newly formed monoline insurance company to be used to guarantee \$2bn every five years in local currency green project bonds/bank loans and securitisations in emerging markets.

Date	20 February 2014
Template version	1.0
Workstream	Project risk mitigation
Sector(s)	Infrastructure and securitisations
Region or country	Emerging markets
Champion 1 + contact	Michael Eckhart, michael.eckhart@citi.com , +1-212-816-8488
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Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Monoline financial guarantees are a highly effective means to mobilise institutional financing for green projects and securitisations. A new monoline, AMF Guarantee, will focus on the domestic capital markets of emerging market nations. AMF has a deeply experienced staff and is in the final phase of its capital-raising. Investors who have given preliminary commitments are EIB, DEG, EBRD, CAF, Coca-Cola Company and a major US asset management firm. OPIC has also indicated that it would provide a back-up contingent loan facility of \$100m. Various additional investors are in varying degrees of involvement in assessing participation.

At launch AMF expects to have \$600m in total capital and an A global-scale credit rating, equivalent to a triple-A local currency/national-scale rating in emerging nations.

Equity funding from private and public sector investors interested in green projects to support the transition to a low-carbon, climate-resilient global economy would help the company's launch and shape the future composition of AMF Guarantee's portfolio of investments. The FiRe intervention would be:

- To assist AMF Guarantee in raising \$100m in equity capital that AMF will dedicate to financial guarantees to green projects.
- To identify appropriate green projects and securitisations in emerging markets that would benefit from a full financial guarantee.
- To help AMF establish principles to be used for project selection and impact monitoring to ensure transparency and disclosure of its green portfolio.

If the FiRe intervention is successful, AMF could provide ~\$2bn in financial guarantees for green projects every five years for the life of the company, supplementing the \$570m of green projects already in its pipeline. With this as a demonstration, we expect that other existing and newly formed monolines will also incorporate green transactions into their business plans, enhancing the already significant multiplier effect. It is also likely that AMF will raise a second round of equity within a few years, providing yet more scale.

Relevant literature

[1] Daniel Bond & David Stevens, Background on the Monoline Financial Guaranty Industry, 2014 [2] Frankfurt School-UNEP Centre/BNEF, Global Trends in Renewable Energy Investment 2013, available at <http://www.fs-unep-centre.org> [3] Climate Policy Initiative, The Challenge of Institutional Investment in Renewable Energy, 2013, available at: <http://climatepolicyinitiative.org/wp-content/uploads/2013/03/The-Challenge-of-Institutional-Investment-in-Renewable-Energy.pdf> [4] European PPP Expertise Centre, Capital Markets in PPP Financing, 2010, available at <http://www.eib.org/epec/resources/epec-capital-markets.pdf>

Scale & scope

If \$100m in additional capital is raised for this purpose, AMF will be able to provide approximately \$2bn in financial guarantees for green projects and securitisations every five years for the life of the company – eg., \$10bn over 25 years. AMF could help finance many activities essential to the rapid transition to a low-carbon and climate-resilient economy in emerging market countries, for example solar, wind and hydropower generation and transmission infrastructure; rail, metro and bus transportation infrastructure; and energy-efficient public buildings (new construction and retrofitting).

History

AMF will extend the successful 1996-2007 experience of the international monoline industry in emerging markets. During this time the monolines provided over \$40bn of financial guarantees for emerging market transactions, with ROEs of ~25% and very low losses (0.04% of insured payments). These losses occurred in transactions where the currency denomination of debt service did not match the revenues servicing the debt. AMF will avoid such “unmatched” structures, eliminating the greatest source of emerging market credit losses. It will also enable redeployment to productive use of underinvested emerging market pension and insurance assets.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Emerging markets / green power, transportation, infrastructure
2) Market size of industry:	\$112bn (renewable power)
3) Annual investment in industry:	Small since the 2007/08 crisis
Market growth opportunity:	
1) Future potential market size:	Double of current levels
2) Future potential annual investment in industry:	Double of current levels
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$2bn
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / Pilot / <u>Existing</u> / Other (describe):
Other key metrics:	
These projects will provide jobs and create the infrastructure necessary for sustainable development in these countries. AMF has already raised \$250m of equity capital plus \$100m in additional contingent financial support. These funds will also support sustainable development efforts.	

Alternative approaches
The only approach that might achieve similar results, but with much less scale, would be the use of partial credit guarantees and mezzanine bonds by emerging market governments or by multilateral development finance organisations (EIB, IFC, EBRD, OPIC, etc.). The amount of such support is currently insufficient to meet the needs of emerging market countries. In addition, most of the capital from international development banks will be dollar- or euro-denominated, making the less risky matched local currency financing approach which AMF favours less achievable.
Justification for scale metrics
Market size: BNEF reported that in 2012 \$112bn was invested in renewable power and fuels in the developing countries. This sector is but one of several green sectors targeted by AMF Guarantee. A financial guarantee could allow many more green projects to be financed. .
Market growth opportunity: The IEA has estimated that green energy investments will need to double by 2020 in order to limit global warming to 2°C and avoid the worst effects of climate change. Roughly half of this increase will need to be in emerging market countries.
FiRe metrics: \$100m equity allows AMF to guarantee \$2bn of green project debt. This multiplier arises from the 20x leverage that AMF can use while maintaining its A global/AAA local rating. That rating unlocks some of the \$5 trillion in global emerging market domestic institutional investments (insurance and pension assets) for green projects, since most emerging market regulated fixed income investments go to AAA local currency assets.
Other metrics: All AMF financings will be for activities essential to sustainable development. This is AMF’s core underwriting tenet, one that will minimise losses. Also, AMF transactions will be vetted by OPIC to ensure they comply with generally accepted ESG standards.

QUALITATIVE ANALYSIS

Strengths (intervention)

- Institutional investors (primarily pension funds) in the emerging markets currently have significant assets to invest – an estimated \$5 trillion in pension and life insurance assets alone – much more in bank assets.
- Monoline guarantees have proven to be a readily accepted form of risk mitigation for such investors.
 - Monolines facilitate the involvement of these investors by taking the controlling creditor position in projects and providing surveillance and remediation services.
 - AMF should have a low loss ratio due to its focus on domestic currency debt and essential projects.

Weaknesses (intervention)

- AMF must find sufficient green projects meet its credit standards if it is to build a substantial green portfolio.
- It has already assembled a \$570m pre-launch green pipeline; management believes many more similar deals will be catalysed by news of dedicated green funding at AMF
 - Instability in public policy/ support for green projects could make projects less creditworthy
 - Many market participants are unfamiliar with monolines. It will be necessary to adequately inform them as to their benefits.

Barriers to implementation

- Failure to raise sufficient equity capital to allow AMF Guarantee to get the single-A S&P rating necessary to launch the company: AMF Guarantee is in the final phase of its capital-raising effort. FiRe assistance in raising additional capital from investors interested in green projects could help ensure the company's launch and shape the future composition of AMF Guarantee's portfolio of investments by earmarking a portion of its claims-paying capital to the support of green projects.
- Difficulty in building an adequate pipeline of green projects that will meet AMF Guarantee's credit standards and that would benefit from the use of a monoline financial guarantee. However, AMF already has a \$570m green pipeline. Many participants in the green finance marketplace are not aware of the potential for monoline financial guarantees to facilitate the financing of green projects. FiRe could help inform potential users about the potential role that financial guarantees can play in facilitating institutional investor financing of green projects and securitisations.
- While monoline financial guarantees have been used successfully in a number of emerging markets, it will be necessary to introduce their use in most of the target markets. It may be necessary to educate regulators about the workings of financial guarantees.

Opportunities (market)

- The assets controlled by institutional investors such as pension funds and life insurance companies must be mobilised.
- Monoline financial guarantees have proven to be one of the most effective means of securing institutional investor debt financing for infrastructure projects and securitisations.
 - AMF's success in building a significant portfolio of green projects will encourage other monolines to be launched to assist in mobilising long-term green financing. (AMF may also raise additional capital in the future to expand its green portfolio.)

Threats (market)

- There is a number of possible impediments to AMF efforts to build a green portfolio.
- Some green projects depend on untested technology and entail construction and market risks which makes it more difficult (but not impossible) to qualify for a financial guarantee.
 - Project developers may opt for riskier foreign currency (unmatched to local currency revenues) financing due to lower nominal interest rates in developed country currencies. AMF views this as in effect a self-selection process, removing less risk-averse developers from its universe of transactions.

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
<p>Obtain market recognition of the potential role of monoline financial guarantees in the financing of green projects via discussions in various public fora and private meetings:</p> <ul style="list-style-type: none"> Prepare a list of organisations and companies that can help promote the green monoline concept. Work with each to include discussions on the potential for green monolines on their websites and at conferences and workshops. 	Reid Detchon David Stevens Dan Bond Michael Eckhart David de Ferranti Peter Goldmark John Simon	Make presentations at events throughout 2014
<p>Raise \$100m in additional equity for AMF Guarantee that will be earmarked for green projects:</p> <ul style="list-style-type: none"> Prepare a list of potential green impact investors that might have an interest in investing in AMF Guarantee. Market to each of these potential green impact investors 	David Stevens Michael Eckhart John Simon Daniel Bond Peter Goldmark	Complete capital raising by Sept. 2014
<p>Complete staffing and internal credit standards, financing procedures, monitoring and reporting capabilities necessary for AMF Guarantee to build a portfolio of green projects:</p> <ul style="list-style-type: none"> Prepare clear guidelines for selecting transactions for AMF'S green portfolio. 	David Stevens Dan Bond John Simon Peter Goldmark	Be prepared for AMF launch by the end of 2014
<p>Establish a pipeline of at least three green projects ready for financing with an AMF Guarantee in 2015. (These may be selected from among AMF's existing \$570m pipeline of green projects.)</p>	David Stevens Michael Eckhart David de Ferranti Peter Goldmark John Simon	Be ready to finance projects in early 2015

Key individuals & organisations

- Michael Eckhart, Citigroup (whose key role will be to help to raise equity capital for AMF and to build support for the green monoline concept in the financial community)
- David Stevens & Dan Bond, AMF Guarantee (whose key roles will be to raise additional equity capital for AMF from green impact investors, develop AMF's ability to source and manage green projects and securitisations and help to educate market participants about the potential role of a green monoline)
- Reid Detchon, UN Foundation (whose key role will be to raise awareness of the potential for monoline guarantees to mobilise institutional investor financing for green projects in emerging markets)
- David de Ferranti, Results for Development (whose key role will be to develop support for green monolines in the sustainable development community)
- John Simon, Total Impact Advisors (whose key role will be to work with green impact investors to build support for the green monoline concept)
- Peter Goldmark (ex-Pres. of Rockefeller Foundation) will work with Simon and de Ferranti and help AMF plan execution of its green business

Input from FiRe

- Work with the green monoline team (see above) to promote the concept of monoline financial guarantees as a useful green finance instrument.
- Support AMF Guarantee's effort to raise the \$100m in additional equity capital needed to provide \$2bn in financial guarantees to green projects in the emerging markets over the next 3-5 years.
- Assist AMF Guarantee in further building a pipeline of green project financings in emerging markets that could benefit from a monoline financial guarantee and meet AMF's credit requirements.

CHARACTERISATION TEMPLATE

INTERVENTION 11: *Make power plants bankable with insurance*

SUMMARY: *Accelerate and scale up insurance of power purchase agreements with emerging market utilities using a dedicated reinsurance fund*

Date	19 February 2014
Template version	4.0
Workstream	Project risk mitigation
Sector(s)	Clean energy
Region or country	Emerging markets
Champion 1 + contact	Andrew Gaines, andrew.gaines@deriskas.com , +44-7766-594-854
Champion 2 + contact	
Champion 3 + contact	
Coach(es) + contact	Mike Eckhart; michael.eckhart@citi.com , +1-212-816-8488
Working group member 1	TBD
Working group member 2	
Working group member 3	
BNEF mentor + contact	Sam Roots, sroots@bloomberg.net , +44-20-3525-8438

Submission to: jhoberg@bloomberg.net

Description

Too few power plants in developing countries harnessing renewable energy get financed. An important reason is that investors and banks fear that plants will not be paid by the government-owned utilities buying their power. If investors can be sure that utilities will not breach PPAs, more clean power plants in developing countries will get financed and come online.

PPA payments can be insured today, but existing insurance is too limited and too slow; and many projects are uninsurable because of high-risk utilities. This initiative will solve the 'PPA insurance deficit' in two phases: 1) maximise the throughput and capacity of existing PPA insurers, and 2) increase new PPA insurance capacity with CleanEnergy Re, a new reinsurance fund that backs MIGA, OPIC and other publicly backed PPA insurers – at below market cost.

Phase one of the intervention is an awareness campaign and insurance 'streamlining' service to power developers. It will identify renewables projects in emerging markets, select high potential, investment-ready projects and make them PPA-insurance-ready. It will fill and speed up the pipeline of existing insurers. Phase one needs the marketing reach of BNEF and partners.

Phase two will launch a reinsurance fund, CleanEnergy Re, that increases the capacity of existing PPA insurers, and expands the product remit to high-risk utilities. CleanEnergy Re would reinsure insurers at very low cost. It would be independent in order to work with multiple PPA insurers. Phase two requires technical assistance funding to make the concept 'investment-ready'. It would then capitalise the fund with development and 'impact' capital. CleanEnergy Re would also seek sovereign guarantees to give it a strong credit rating.

More and broader PPA insurance – by accelerating and then leveraging existing insurers with reinsurance – will get more renewables projects funded in emerging markets.

Relevant literature

- Healy, C. et al (2013) World Investment and Political Risk, A World Bank Group publication
- MIGA-EIU Political Risk Survey 2013
- Global Trends in Renewable Energy Investment 2013, BNEF / Frankfurt School
- BNEF Global Renewable Energy Market Outlook 2013

Scale & scope

There are new clean energy projects in emerging markets requiring \$50m to \$1bn in financing that are signing PPAs with state-owned / -backed utilities. Most emerging market power sign PPAs with independent power producers (IPPs). In the vast majority of countries, utilities are still (part-)owned or controlled / backed by regional or national governments. Less than 0.5% of renewables investment in emerging markets currently being covered by insurers (\$250bn estimate / 200GW capacity). If increased to 1-2%, market is \$2.5-5bn, 2-4 GW covered per year).

History

Only MIGA, OPIC and a handful of other publicly backed political risk insurers can cover PPA risk. However, these insurers typically insure less than \$1bn of new renewables projects per year. Their financial – if not HR – capacity is many times this figure. Too few project developers, banks, and equity investors understand that MIGA et al can make their power projects bankable. Equally important, however, is that too many utilities are too risky even for MIGA and other insurers. Insurers therefore deny coverage or limit their capacity in many emerging markets.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Emerging markets / clean energy
2) Market size of industry:	300GW to 2030
3) Annual investment in industry:	\$25bn (20GW) investment per year
Market growth opportunity:	
1) Future potential market size:	3,000GW to 2030
2) Future potential annual investment in industry:	\$250bn (200GW) investment per year
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$2.5-5bn/yr
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	<u>Idea</u> / Pilot / Existing / Other (describe):
Other key metrics:	
<p>Direct and indirect job creation / GDP growth in emerging markets. Direct (c. 500 per GW) and indirect job creation, and increases in GDP result (\$200m in wages and salary per GW) from reliable power coming online. Other metrics include better health outcomes and lower greenhouse-gas emissions that would be been emitted otherwise.</p>	

Alternative approaches
<p>Credit default swaps for exposures to utilities / projects, capital injections / concessionary lines of credit into emerging market utilities for dedicate use for renewables IPPs. Comprehensive, stand-alone World Bank Partial Risk Guarantee programme for renewables IPPs in all emerging markets (covering bank lending to projects, not necessarily backed by emerging market sovereign guarantees). Expanding the capital and HR capabilities of MIGA.</p>
Justification for scale metrics
<p>Market size</p> <p>Market size and annual investment data from BNEF’s Global Renewable Energy Market Outlook (GREMO) model. UNEP/BNEF report on Global Trends in Renewable Energy Investment.</p>
<p>Market growth opportunity</p> <p>From BNEF’s Global Renewable Energy Market Outlook (GREMO) model. UNEP/BNEF report on Global Trends in Renewable Energy Investment.</p>
<p>FiRe metrics</p> <p>DeRisk estimates that in 2-3 years, 6-10 new renewable projects at \$500m each could be closed. Based on experience with existing political risk insurers.</p>
<p>Other metrics</p> <p>Based on the power projects that DeRisk has closed and is working on with existing political risk insurers.</p>

QUALITATIVE ANALYSIS

Strengths (intervention)

- Low start-up costs due to existing pipeline, service provider, and insurers
- Proven demand and willingness to pay for the product
- Mechanism/product already exists and is viable
- Political will to improve on existing mechanisms
- Second phase of intervention could be adjusted / tweaked while success builds

Weaknesses (intervention)

- Moral hazard of backstopping unfunded/un-credit-worthy utilities and (potentially) unviable renewables IPPs
- Any backing by World Bank / DFIs could slow issuance of insurance
- Simple repackaging of existing projects could be seen as 'not new'; additionality not always evident

Barriers to implementation

- Cooperation with MIGA, OPIC and other publicly backed insurers is critical to the success of this initiative: only they have political leverage to ensure that government utilities stick to their contractual commitments. Indeed, **the CleanEnergy Re can only succeed if it stands behind insurers that can deter claims**. Utilities do not pay for power for many reasons: it's not just a lack of government funds. Government policy, power sector regulation and development, political instability all contribute to a risk that governments renege on power contracts. It's not enough to select the best insurance risks and provide cover: emerging market governments need to know that insurers are backed by sovereign and multilateral institutions.
- As the main multilateral insurer, expanding MIGA's capital base and HR capacity is an alternative approach **but this does not address the issue of risky utilities**. Low-cost reinsurance covering the majority of the PPA risk addresses this gap.
- The main barrier to implementation **is funding the reinsurance fund**: it would need concessionary capital and be guaranteed by one or more sovereign entities in order to provide below-market cost reinsurance to PPA insurers. It would also need technical assistance funding to provide additional insurance expertise and human resources to increase throughput and streamline the insurance process.

Opportunities (market)

- Short-term: publicise availability of existing products/providers to renewables IPPs; close first deals quickly to show success and viability
- Medium term: increase number of IPP deals closed; lower transaction costs for investors in target sectors / jurisdictions
- Long term: reinsurer has backing of governments worldwide, and that makes investing in emerging markets clean energy plants a boring, low-risk business

Threats (market)

- Emerging market sovereign crisis causes multiple governments to breach PPAs; causes reinsurer to fail
- Not enough capital available to fund reinsurer

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Develop 'qualifying template' for requirements of power project developers to qualify for insurance support	Champion + team	April 2014
Identify renewables power projects currently seeking backing for PPA (from MIGA or other)	Champion + team	May 2014
Publish request for proposals for other power project developers seeking insurance	Champion + team, FiRe team, BNEF liaison	May 2014
Select top candidates for coverage using existing mechanisms	Champion + team	July 2014
Proceed with insurance procurement	Champion + team	Throughout 2014 / early 2015
Build case for CleanEnergy Re fund to cover viable power projects not eligible for cover by existing providers	Champion + team	Sept. 2014
Work with interested impact investors, DFIs and national governments to pilot insurance expansion and reinsurance fund	Champion + team, FiRe team, BNEF liaison	Dec 2014
Pilot initial insurance policy for CleanEnergy Re	Champion + team	September 2015
Scale up CleanEnergy Re	Champion + team	April 2016 and beyond

Key individuals & organisations

Individuals

- Andrew Gaines and associates, DeRisk
- Reinsurance specialists yet to be confirmed

Organisations

Underwriters, reinsurance specialists and strategy team within MIGA
 Ditto OPIC and other multilateral / bilateral PPA insurers (ATI, ECIC, etc.)
 Advice and (potential) participation from re-insurers.

Input from FiRe

- Publicity to attract widest number of eligible power plants
- Collaborators (with reinsurance expertise) that can work with DeRisk to make this happen
- Decision-makers on project funding donor / DFI community to provide concessionary finance/development capital to get first pilot off the ground and CleanEnergy Re launched (Phase two)

CHARACTERISATION TEMPLATE

INTERVENTION 12: *Policy risk insurance mechanism (PRIME)*

SUMMARY: *This intervention is to develop a policy risk insurance mechanism for clean energy projects*

Date	3 March 2014
Template version	1.0
Workstream	Project risk mitigation
Sector(s)	All renewable energy and policy back revenue streams
Region or country	Global
Champion 1 + contact	Julian Richardson – jhr@parhelion.co.uk +44 20-7645-8331
Champion 2 + contact	Dean Cooper – UNEP - Dean.Cooper@unep.org
Champion 3 + contact	
Coach(es) + contact	
Working group member 1	Ben Warren, EY
Working group member 2	
Working group member 3	
BNEF mentor + contact	Sam Roots, sroots@bloomberg.net , +44-20-3525-8438

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Background: The drive to a low-carbon future currently relies on a range of policy incentives intended to internalise the environmental cost by creating additional revenue streams which will allow investors an appropriate rate of return for investing in the low-carbon sector. For these revenue streams and the policies that support them to be considered investment-grade they need to have longevity, transparency and certainty (*TLC*). Governments have made progress in both longevity of policy (eg, by offering 25-year feed-in tariffs), and transparency (eg, by establishing the policy targets). However 'certainty' is lacking. Without this final condition investors do not consider many of the policy-backed revenues streams to be bankable. Therefore significant 'policy risk' remains.

The Challenge: Unlike other risks that can be managed by existing market mechanisms, policy risks cannot. A lack of alignment of interest between the risk controller ie, legislator / regulator, and the risk carrier, makes the risk unattractive to investors and insurers alike. If investors are unwilling to accept this risk or unable to transfer it to insurers, they will seek to either mitigate the risk by significantly increasing the required return on capital, often making the project uneconomic or, avoid the risk and investment altogether.

The Intervention: PRIME is a **public / private insurance mechanism to offer insurance policies to remove policy risks from CCEGGS investments.**

How: By providing specific insurance coverage for policy risk through a specialist public / private underwriting vehicle, PRIME will provide certainty to investors in the countries' low carbon policy frameworks, enabling large-scale deployment of capital at reasonable cost to the CCEGGS sector. The significant benefits include:

- Attracting private sector re/insurers, a huge pool of capital that is being under-utilised for clean tech investment
- Enhancing the regulatory competitiveness of the participating countries
- Supporting the delivery of low carbon policy objectives
- Aligning the use of public funds with risk the government has control over
- Leveraging existing institutions expertise, capital and know-how
- Low risk and efficient use of public funds to leverage private investment.

Two country pilots are deliverable in nine months as proposal drafted.

Relevant literature

Deutsche Bank Climate Change Advisors, Dec 2000. Kirsty Hamilton, 'Unlocking Finance for Clean Energy: the Need for Investment Grade Policy', Chatham House, December 2009. 'Can Capital Markets Bridge the Climate Change Finance Gap' - Sep 2010 – S&P and Parhelion, 'Financing Renewable Energy in Developing Countries' UNEP FI Feb. 2012. Climate Policy Initiative Risk Gap Series 2013 – Policy Risk Instruments. Also Nick Robins and Mark Fulton, Richard B. Stewart, Benedict Kingsbury and Bryce Rudyk (eds.); and Green Investment Bank Commission (2010), Unlocking investment to deliver Britain's low carbon future. Profiling Risk in Solar & Wind – Swiss Re & BNEF

Scale & scope

PRIME is relevant to any CCEGGS investment that relies on a policy-backed revenue stream. This will include any feed-in tariff, renewable energy certificate or carbon finance-related investment. There are an estimated 433 such schemes globally (BNEF analysis) . These schemes will include all renewable energy technologies, carbon offset projects and other ecosystem service markets once developed. PRIME could play a powerful role in unlocking multi-billion-pound investment in the green economy and delivery of government decarbonisation policy objectives. We believe such a public-private initiative has the potential to create a game-changing mechanism.

History

As a specialist in developing innovative risk finance and insurance solutions for the CCEGGS sector, it is Parhelion's experience that the most frequently asked question is for protection against 'policy risk'. Parhelion was successful in completing a limited number of transactions but recognised that due to the lack of alignment of interest, policy risk was as unattractive to insurers as it is to investors. Parhelion developed the PRIME proposal based on this experience and has added to this through working with UNEP. Terms of reference to support the creation of PRIME were drafted by Parhelion and circulated by UNEP to UNDP, IRENA, CPI & MIGA. All have indicated their support for the proposed concept.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Global / any policy stream
2) Market size of industry:	733GW 2013 cumulative
3) Annual investment in industry:	\$254bn (2013)
Market growth opportunity:	
1) Future potential market size:	103GW (2014), 111GW (2015)
2) Future potential annual investment in industry:	\$359bn (2014)
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	>\$1bn
2) Expected implementation time:	<u><1 year</u> / 1-3 years / >3 years
3) Current stage of development:	<u>Idea</u> / Pilot / Existing / Other (describe):
Other key metrics:	
<ul style="list-style-type: none"> Count of projects underwritten – target 50 projects Value of projects underwritten – target \$2bn of project investment Reduction in cost of capital for projects– target 10-20% reduction Private sector insurance capital committed 	

Alternative approaches
<p>Each project could seek to secure a host country letter of guarantee, although this is not realistic. Alternatively the policy risks may attempt to be contractualised within a power-purchase agreement (PPA), but this increases the offtake price required under the PPA and often the PPA is with a government-owned entity which therefore does not remove the risk.</p> <p>Existing multilateral guarantee agencies such as OPIC have sought to extend their remit to include feed-in tariff risk, but their offerings remain limited, do not leverage private sector capital, exclude SME projects, and are slow.</p>
Justification for scale metrics
<p>Market size</p> <p>2013: 733GW cumulative installed renewable energy market capacity, according to BNEF.</p>
<p>Market growth opportunity</p> <p>Short-term forecast: 2014 – 103GW / \$359bn; 2015 – 111GW / \$397bn; 2016 – 117GW / \$430bn (BNEF GREMO) (includes, wind, solar, biomass & waste, marine, geothermal and small hydro)</p>
<p>FiRe metrics</p> <p>Comparative analyses of countries with the intervention vs. those without. If investor confidence is boosted by FiT insurance, then there will be a statistically significant up-tick in investment once other variables are controlled for.</p>
<p>Other metrics</p> <p>Uptake of the insurance will be key demonstrator of success.</p>

QUALITATIVE ANALYSIS

Strengths (intervention)

- Enhances regulatory competitiveness of the host country
- Creates investment-grade policy
- Aligns interest between the party most able to influence the risk (ie, government) and those exposed to the risk (ie, investors/insurers)
- Engages and utilises host country capital
- Attracts large private market capital source (ie, insurers) to an area they have traditionally avoided.
- Greater capital efficiency and use of public funds
- Ensures credit-worthy counterparty by having host country government and financial institution backing
- Entrenchment of policy objectives without loss of government flexibility
- Covers SME & large-scale projects equally

Weaknesses (intervention)

- Aggregation and correlation of risk within and across countries
- Requires policy support mechanisms to be in place before it can be underwritten
- Requires host countries to be willing and able to put their money where their mouth is!
- Difficulty to accurately price 'Policy Risk Premium'

Barriers to implementation

- Structural barriers to innovation within the insurance industry
- Development and implementation funding
- Development and implementation team only partly established
- Willingness of governments to put their money where their mouth is
- Underwriting vehicle needs to be established (within existing institution as a preference to creating new institution)
- Underwriting criteria and policy coverage breadth to be established
- Requires public and private sector support
- Perceived constraints on future policy-making

Opportunities (market)

- Builds on proven successful model
- Leverages existing institutions
- Significant number of policy support mechanism already in place that PRIME can be applied to
- Low marginal cost to scale up once established
- Creates a 'race to the top' for effective policy implementation
- Applies to developed and developing countries
- Can also be applied to any other ecosystem service markets that emerge
- Significant learning for Green Climate Fund further development

Threats (market)

- Other commercial risks remain to be resolved – eg, integrated monopoly market structure, technology, resource risk.
- Policy support mechanisms no longer required

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Identification and selection of two host countries for pilot	UNEP / Champion	Selection within 3 months
Ongoing engagement with selected pilot Host countries	UNEP / Champion	Month 4 – 6
Domestic capacity building within insurance industry and investor community	Team	Months 2 - 9
International private sector engagement	Champion / Team	Month 3 - 9
Secure multilateral financial institution & other donor country support	Champion / UNEP	Month 1 – 6
Define legal and regulatory structure	Team	Month 1 – 5
Develop underwriting criteria and policy coverage	Team	Month 3 – 9
Risk pricing model development	Team	Month 3 – 9
Rating agency engagement	Champion / Team	Month 4 – 8

Key individuals & organisations

Individuals:

- Julian Richardson (Parhelion Underwriting) – inventor of PRIME proposal;
- Dean Cooper (UNEP);
- Marcus Williams (MIGA)
- Senior Advisory Board (5-6 members to be engaged)

Organisations:

The following organisations are already engaged in supporting the PRIME proposal: UNEP; UNDP; CPI; IRENA; MIGA

Additionally:

- Major private sector international re/insurers
- Private sector capital providers
- Africa Trade Indemnity (ATI) to act as a host organisation
- World Bank / IFC

Input from FiRe

- Secure host country participation at ministerial level
- Raise funding for implementation. This will cover legal, regulatory, management and capital raising costs. (NB marginal costs to add on additional countries are very low)
- Facilitate capital raising for underwriting entity for two country pilot programme
- Identification and engagement of senior advisory board
- Raise the profile of the intervention
- Data and analysis from BNEF

CHARACTERISATION TEMPLATE

INTERVENTION 13: *Geothermal drilling output insurance*

SUMMARY: *Improved geothermal project financeability by insuring against insufficient well productivity*

Date	28 February 2014
Template version	1.0
Workstream	Project Risk Mitigation
Sector(s)	Geothermal
Region or country	Global (likely pilots in Kenya and Ethiopia)
Champion 1 + contact	Julian Richardson, jhr@parhelion.co.uk , +44-20-7645-8331
Champion 2 + contact	Marcelo Augusto de Camargo, Geothermex Schlumberger
Champion 3 + contact	
Coach(es) + contact	
Working group member 1	Nick Percival, nick.percival@parhelion.co.uk
Working group member 2	Ann Robertson-Tait, Geothermex
Working group member 3	Jessica Thompson, Rinova
BNEF mentor + contact	Kieron Stopforth, kstopforth@bloomberg.net , + 44-20-7673-2619

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Background: Geothermal power is the only baseload renewable energy source; yet less than 10% of estimated global potential has been exploited. Geological and related risks associated with drilling an unproductive well, or a well that does not produce sufficient output (due to geological circumstances) at the development / confirmatory drilling stage are significant. Combining these risks with an initial outlay of typically \$50–100m to confirm whether a resource merits development makes the risk profile prohibitive to would-be investors and developers. There is a number of existing concessional finance tools available for geothermal projects but none addresses the critical development / confirmatory drilling phase. They also lack scale and are reliant on donor support.

The Challenge: The high costs combined with significant risks at the development stage remain a significant barrier to private sector financing of geothermal project developments. It is therefore necessary to improve the project risk profile at the development drilling phase. Barriers to innovation and a lack of technical knowledge of geothermal drilling risk within the insurance industry are challenges for the provision of underwriting capacity.

Intervention: The establishment of a dedicated underwriting facility (Managing General Agent) to provide an ‘Aggregate Well Output’ insurance for the development drilling phase of geothermal projects worldwide.

How: This intervention will provide the underwriting capacity and expertise backed by private sector re/insurers and alternative capital providers, to improve the risk profile of geothermal drill projects. By removing the downside risk and improving the overall risk profile of the drilling phase of the project, significantly more capital will be attracted to this sector, reducing the cost of capital and facilitating direct investment. This intervention can be rapidly deployed at scale as the product and technical work has already been completed following work initially supported by the IFC. Additionally, a number of potentially underwritable projects has already been identified. Underwriting capacity will be provided by international insurers and reinsurers. Implementation would be possible within 6-9 months.

Relevant literature

- Financing the Kenya Geothermal Vision – March 2012, Paul K. Ngugi Geothermal Development Company Limited
- Insights from NAMA development - Case Study: Kenya - November 2013, a Mitigation Momentum Project
- BNEF / Rinova – Geothermal White Paper May 2013
- ESMAP Geothermal Financing Handbook 2012
- IFC Success of Geothermal Wells: A Global Study, June 2013

Scale & scope

The product is scalable globally since it is geographically agnostic, albeit geologically specific. A significant number of potential projects could be mobilised with such an insurance. Many of these projects have potential reservoirs well in excess of 100MW and accordingly the amount of capital that could be mobilised as a result of applying the insurance should easily exceed \$2-3bn per annum. Capital can also be recycled rapidly as each project drilling programme lasts 6-9 months.

History

The product was initially developed by Parhelion working in conjunction with Geothermex for the IFC to help promote geothermal development in Turkey. But it quickly became clear that the product’s applicability was global. In conjunction with the World Economic Forum the concept was discussed at the Unlocking Financing for Clean Energy in Kenya Forum in October 2012 where there was substantial interest in the product. Parhelion has since been approached by a number of developers in respect of projects with well over 1,000MW of potential capacity to discuss the applicability of the insurance for their projects.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Global / geothermal power
2) Market size of industry:	12.5GW (0.5GW added annually)
3) Annual investment in industry:	\$1.2bn (2012), \$0.5bn (2013)
Market growth opportunity:	
1) Future potential market size:	1GW/yr (growth)
2) Future potential annual investment in industry:	\$2bn
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$2-3bn/yr
2) Expected implementation time:	<1 year / 1-3 years / >3 years
3) Current stage of development:	Idea / Pilot / Existing / <u>Other</u> (describe): Product and project pipeline established
Other key metrics:	
The success of the implementation will most easily be measured by the number and value of geothermal projects which utilise the well output insurance product. It is expected that two projects will be underwritten in the first 12 months, with a further five projects in the following 12 months, mobilising nearly \$2.5bn of capital and \$2bn pa thereafter.	

Alternative approaches
Pure equity funding is an option, but is prohibitively expensive or simply unavailable, resulting in the low uptake of new projects. A fund of sufficient scale to invest directly into a sufficiently large portfolio of projects to generate sufficient diversification may be possible. However, this capital would have to be committed for a significant period, increasing the cost, whilst insurance capacity is easily recyclable into future projects.
Justification for scale metrics
Market size
12.5GW with only 6% of global potential realised. Total global untapped potential is 208GW (113 GW in developing countries and 95GW in developed countries). Market size and annual investment data taken from BNEF GREMO.
Market growth opportunity
Expect to double rate of Non FiRe growth assumed.
FiRe metrics
Estimate leverage of finance from this intervention is initially between 1:10 and 1:45 depending on project size. This will continue to rise over time as the same insurance capacity is recycled into new projects. This ability to recycle capital and limit underwriting exposure to the development drilling phase enables these significant leverage opportunities and mobilisation of capital.
Other metrics
Uptake of the insurance will be the key demonstrator of success.

QUALITATIVE ANALYSIS

Strengths (intervention)

- Supports baseload renewable power
- Scalable at multi-country level
- Existing developing country interest
- Fully developed product concept
- Established implementation team
- Client market product awareness and demand established
- Exploits existing insurance industry infrastructure and distribution chain
- Opportunity to recycle capital providing ongoing sizeable (\$2bn+) financing mobilisation

Weaknesses (intervention)

- Insurance capacity not yet sufficiently available
- Requires local host country regulatory compliance
- Significant due diligence and premium costs
- Geothermal resources only present in one-fourth to one-third of the planet's surface

Barriers to implementation

- Structural barriers to innovation within insurance industry
- Development cost to include legal fees, regulatory structuring costs, actuarial fees, management time, capital / underwriting capacity raising costs etc.
- Lack of geothermal technical expertise within insurance industry
- Timely responsiveness of multilateral organisations
- High upfront due diligence costs
- Availability and affordability of drilling costs (decreasing due to competing demand for drilling rigs from shale gas sector)
- Host country insurance industry (required to insure locally authorised insurance paper) has limited sector and product knowledge
- Local laws and regulations may not be in place to allow exploration and drilling, or even non-state-owned power production assets

Opportunities (market)

- Engage developing country insurance industry leading to local capacity building
- Significantly scale up use of geothermal power as a cost-efficient baseload power source
- Enable countries to meet climate-compatible development objectives, diversify energy sources and protect against future energy cost increases
- Bring alternative capital (beyond debt and equity) to CCEGGS sector
- Minimal additional costs if further scaling up needed

Threats (market)

- Alternative sources of cheap finance become available
- Requires host countries to have mechanisms to allow geothermal exploration and development
- Significant reduction in other clean energy project costs
- Insufficient projects at appropriate stage of development suitable for insurance

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Further identify geothermal projects suitable for insurance including initial review	Champion + team	April - June 2014
Define legal and regulatory structure including host country participation	Champion + team	April 2014
Socialise insurance concept with host country insurance industry and initial training	Champion + GeothermEx	April - May 2014
Identify and secure underwriting capacity both domestically and internationally – aim to announce at UK-hosted Energy Ministers Conference in June	Champion + team + FiRe team + BNEF	April – June 2014
Develop risk pricing and underwriting model	Champion + team	April – May 2014
Provide indicative quotation to initial projects	Champion + team	May – July 2014
Commence formal underwriting for initial projects	Champion + team	July – Sept. 2014
Premium payment and commencement of insurance for first transaction.		October 2014
Implement insurance in additional countries	Champion + team	From October 2014

Key individuals & organisations

Individuals:

- Julian Richardson & Nick Percival, Parhelion Underwriting,
- Anne Robertson-Tate & Marcelo Augusto de Camargo, GeothermEx

Organisations:

- Geothermal engineering consultant – eg GeothermEx
- Host country governments – particularly Kenya and Ethiopia
- Multilateral Development Institution eg, IFC Geofund
- Major private sector re/insurer / broker / capital providers

Input from FiRe

- Raise funding for final development and implementation
- Possible additional funding necessary, if a SPV insurance vehicle required
- Share BNEF geothermal data and analysis
- Secure commitment of capacity/capital providers
- Investigate donor funding for premium buy down and due diligence costs
- Raise the profile of the intervention to improve product awareness and transaction flow
- Consider development of parallel investment fund to take advantage of improved project risk profile

CHARACTERISATION TEMPLATE

INTERVENTION 14: *International Solar Investment Initiative*

SUMMARY: *Develop investment ecosystem necessary to (i) pool distributed solar cash flows into tradable and highly liquid securities and (ii) build investor and rating agency confidence in this emerging asset class*

Date	2 March 2014
Template version	2.0
Workstream	Project risk mitigation
Sector(s)	Renewable energy
Region or country	Multilateral
Champion 1 + contact	Michael Mendelsohn, michael.mendelsohn@nrel.gov , +1-303-218-0456
Champion 2 + contact	John Joshi, jjoshi@capitalfusionpartners.com , +1-818-294-3381
Champion 3 + contact	
Coach(es) + contact	
Working group member 1	
Working group member 2	
BNEF mentor + contact	Stefan Lindner, slinder9@bloomberg.net , +1-212-617-9104

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Background: To facilitate broad capital market participation in distributed solar assets, relevant projects must be designed with significant consistency and transparency to allow: (i) the pooling of project cash flows into tradable and highly liquid securities and (ii) due diligence research by rating agencies and investors necessary to build market confidence in the asset class.

Objective – Critical Infrastructure for Capital Market Investment: The proposed intervention is designed to leverage and replicate the success of the Solar Access to Public Capital (SAPC) working group (see *History*, right). SAPC has developed or is currently developing the critical infrastructure necessary to attract institutional investment, including:

- Standard contracts and other documentation
- Best practices for installation and operation and maintenance (O&M) to minimise necessary due diligence and ensure confidence assets are well built and well maintained
- Robust datasets of technology and customer credit performance to facilitate investor research and understanding of long-term cash flows
- Asset performance metrics and risk analysis methodology.

Proposed Intervention: The intervention champions will initiate the International Solar Investment Initiative (ISII) working group to organise the critical stakeholders across the investment (public and private), legal, accounting, development, and engineering industries, and create the proposed assets necessary for wide-scale institutional investment. Members will participate in a document / asset aggregation process. SAPC assets will be offered as US versions. ISII will prioritize contract standardization but will promote development of all assets over time. Working group subcommittees will lead in asset creation over some 4-6 months until available for broader working group comment and finalisation.

Promotion for ISII participation and asset adoption will continue at conferences for policy-makers, clean energy developers, and project and institutional investors to facilitate broad engagement and international collaboration.

Relevant literature

- *The Potential for Securitization in Solar PV Finance* (2013) Lowder, T.; Mendelsohn, M.; NREL ; <https://financere.nrel.gov/finance/publications>
- *Financing U.S. Renewable Energy Projects Through Public Capital Vehicles: Qualitative and Quantitative Benefits* (2013) Mendelsohn, M.; Feldman, D. ; <https://financere.nrel.gov/finance/publications>
- *Renewables 2013 Global Futures Report* (2013) REN21; http://www.ren21.net/Portals/0/documents/activities/gfr/REN21_GFR_2013.pdf

Scale & scope

The intervention, as designed, could open hundreds of billions of dollars of new investment to distributed solar projects. The assets to be developed through this process – standard contracts, best practices, detailed technology and credit datasets – are foundational and relevant to essentially all financial innovations and structures, and will open capital and reduce yield requirements across the development spectrum. The intervention will start with standard solar contracts (lease and PPA), and leverage the other SAPC assets as group capabilities and organization flourish.

History

In November 2012, NREL initiated the SAPC working group designed to bring the development, legal, financial, and advisory communities together to facilitate capital market investment in US solar projects. At present, SAPC represents 200+ entities including numerous leaders in each sector, many of whom have a global presence. The proposed intervention is designed to leverage SAPC capability and assets to benefit international distributed solar deployment and global capital engagement. These protocols have been accepted as the agenda for the Clean Energy Ministerial finance roundtable, in May 2014 in Seoul, South Korea.

QUANTITATIVE ANALYSIS

Analysis	
1) Relevant geography and industry:	Global. Solar, wind, geothermal
2) Market size of industry:	480 GW (non-hydro)
3) Annual investment in industry:	~\$25bn
Market growth opportunity:	
1) Future potential market size:	3-4% annual growth
2) Future potential annual investment in industry :	\$465bn
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$25bn+
2) Expected time for implementation:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / Pilot / <u>Existing</u> / Other
Other key metrics:	
Participation in working group (# of entities, geographic representation):	
<ul style="list-style-type: none"> Up to 50 in year 1 100 in year 2 150 in year 3 	
Adoption of standard contracts and documents (# of entities, geographic representation):	
<ul style="list-style-type: none"> 25 one year after completion, 50 two years after completion 	
Size of datasets:	
<ul style="list-style-type: none"> 1,000 systems in year 1 2,500 in year 2 5,000 in year 3 	

Alternative approaches
Really, none. Importantly, individual components of the proposed intervention have been raised before, but there is often incomplete follow-through to build and promote assets that are agreed to by a wide array of stakeholders and adopted by the development community at significant scale. Wide-scale adoption and use of the assets is critical and requires extensive coordination within and among the various stakeholder communities.
Justification for scale metrics
Market size Renewables 2013 Global Futures Report, REN21
Market growth opportunity Renewables 2013 Global Futures Report, REN21, BNEF 2030 scenario (Figure 5)
FiRe metrics The infrastructure proposed will replicate the creation of a new asset class similar in size, at a minimum, to the securitised time-share market or other esoteric asset class based on innumerable conversations and interviews with investment banks, capital managers, and others.
Other metrics Based on SAPC history where project participation has grown by roughly 3-4 firms per week based on our ability to promote the initiative through conferences, research and other forums.

QUALITATIVE ANALYSIS

Strengths (intervention)

The proposed intervention can leverage the:

- Methodology proven in the US through SAPC process
- Assets created in US (standard contracts, best practices, datasets) which can serve as initial starting points for proposed international infrastructure
- Global footprint of SAPC working group (ie, 30+ international law firms, 15 investment banks, 10+ intl. accounting and engineering firms, etc.)
- Strong interest from World Bank and other MDBs, DOE Secretary Moniz, and State Dept.

Opportunities (market)

The proposed infrastructure will facilitate:

- Distributed solar projects to be deployed with lower transaction costs
- Quicker access to project finance funds
- Investor confidence via opportunities to conduct due diligence faster and/or simpler
- Project cash flows to be organised into tradable and highly liquid securities
- Meaningful investment by institutional money managers
- Significant growth in clean energy deployment

Weaknesses (intervention)

- Securitisation will be difficult in emerging markets with minimal experience in consumer or secured credit
- Will not eliminate need for credit enhancements – even in modestly developed countries – only mitigate the size and duration of credit enhancement required
- Will need to limit scope to single technology (solar) at first, then leverage assets created for other technologies (wind, geothermal, storage, etc.)
- Current SAPC effort is US-based and solar only

Threats (market)

- **Lack of follow-through:** the project needs to be well coordinated to organise and maintain engagement from all the relevant actors and continue the process until the assets are created. The proposed effort will require 2-3 years of sustained commitment
- **Lack of brand awareness / adoption:** the project must continually promote the activity to engage all the relevant stakeholders from public and private sectors to facilitate consistency and universal adoption (to the extent possible)

Barriers to implementation

The ideas proposed in this intervention are not new. However, to date no initiative has created the proposed infrastructure assets on a significant scale. The primary reasons:

- **The organiser must be able to show vision and organisational capability.** Participants must be easily convinced of the benefits to the project and the organisational capability of the moderator.
- **The effort needs to be sustained.** Participants must recognise they are part of an ongoing, committed effort. Participation will wain for any effort that is not committed to by leadership and other participants.
- **The intervention must produce real assets.** Sustained interest is conditioned on production of real assets for comment and issuance. Initial assets must be produced with the first year of working group creation, subject to feedback loops of continuous improvement
- **The process must be apolitical and non-profit.** The organiser must show no patronage to country, region, or other demographic, and without favouritism for any corporate entity. The assets created must be useful for a broad range of development and have sufficient flexibility and/or version opportunities to account for a wide array of business models, legal environments, and other relevant differentiation criteria.
- DOE Funding for Michael Mendelsohn and John Joshi must be secured for ISII initiation.

ACTION PLAN

Action plan + timeline for implementation

Milestone	Actor	Date
Organise broad stakeholder ISII working group, promote through conferences, research and direct dialogue; organise subcommittees	Champions	Jun 2014-Jun 2017
Develop contractual assets through “straw man” process (ie, proposed documents are collected and aggregated by committee process, etc.)	Champions & team	Jun 2015: Initial set of contracts, version Jul 2015-June 2017: Follow-on sets, versions
Develop best practices for system installation and O&M via straw man process	Champions & team	Oct 2014-Oct 2015: Initial vers. Nov 2015-Jun 2017: Adoption and field feedback, follow-on versions
Organise performance and credit datasets, acquire data	Champions & team	Oct 2014-Mar 2015: Build datasets Oct 2014-Jun 2017: Acquire data
Hire critical experts in legal, securitisation, accounting, etc. to lead in asset development	Champions	Jun-Dec 2014
Develop asset performance metrics and risk analysis methodology with international rating agencies, banks	Champions	Mar 2015-Dec 2015: Initial version Jan 2016-Dec 2016: Field test
Convene ISII via conference calls and 3-4 in-person meetings per year (coinciding with conferences)	All participants (as avail.)	7/15/14 – 6/15/17

Key individuals & organisations

Key individuals: Michael Mendelsohn (NREL), John Joshi

Potential members: international development and regional investment banks, international rating agencies, private banks and financiers, institutional investors, global law firms, developers and EPCs, energy ministries, NGOs, accounting firms, independent engineering firms, other stakeholders.

Individuals and entities that have indicated strong interest in the proposed ISII program include:

- Mary Spelman, IFC (World Bank)
- Craig O'Connor, U.S. Ex-Im Bank
- Lynn Tabernacki, U.S. OPIC
- Alejandro Medrani, Inter-American Development Bank
- Anthony Jude, Asian Development Bank
- Michael Eckhart, Citi
- Ari Huhtala, Climate and Development Knowledge Network
- Nikolaus Schultze, Global Green Growth Institute
- Sean Kidney, Climate Bonds Initiative
- Secretary Moniz, Department of Energy

Input from FiRe

- Promote working group participation and asset adoption among investors, law firms, developers, accounting firms and other stakeholders
- Assist value explanation to Department of Energy for funding
- Convene meeting to promote effort in second half of 2014
- Conduct micro and macro analysis to quantify benefits of asset adoption
- Assist in review of infrastructure assets
- Promote investor interest in asset class through ongoing BNEF activities

5. INTERNATIONAL FINANCE

INTERVENTIONS:

15. Sunset Credits – A tool for removing fossil fuel subsidies (p.80-84)
16. Building public first loss support mechanisms to facilitate investments in African renewable energy infrastructure projects (p.85-89)
17. Global Energy Efficiency and Renewable Energy Fund 2.0 (p.90-94)
18. Clean energy access in Africa (p.95-99)
19. Supporting sustainable energy trade initiatives (p.100-104)
20. Perpetuity funds for climate and development (p.105-109)

CHARACTERISATION TEMPLATE

INTERVENTION 15: *Sunset credits*

SUMMARY: *Phase out fossil fuel subsidies by replacing them with credits for clean energy technology*

Date	26 February 2014
Template version	1.0
Workstream	International finance
Sector(s)	Fossil fuels / clean energy technology
Region or country	Global (pilot in Indonesia)
Champion 1 + contact	Arthur Hanna, arthur.hanna@accenture.com
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Coach 1 + contact	Joan MacNaughton, joanmacn@me.com
Coach 3 + contact	Michael Moore, m.p.moore@accenture.com , +44-77-3701-6914
Working group member 1	Freddie Darbyshire, freddie.darbyshire@accenture.com , +44-77-4867-8028
Working group member 2	
BNEF mentor + contact	Kieron Stopforth, kstopforth@bloomberg.net , + 44-20-7673-2619

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Challenge: Subsidies for fossil fuel energy generation are fundamentally embedded in a number of developed and developing countries. Not only do they distort a potentially liberal and competitive market, they also incentivise burning of carbon-intensive resources. This implicitly gives a negative indicative price to greenhouse-gas use.

Intervention: The Sunset Credits intervention would establish a system to redirect fossil fuel subsidies into financing clean energy technology or energy efficiency measures. In a Sunset Credits scheme, instead of directly subsidising fossil fuels, governments would issue credits that could either be set against the resulting increased energy bills or invested in various types of clean energy. By announcing a final year for governmental support 3-10 years in advance, the authorities incentivise the credit recipients to divest from fossil fuels, reduce energy demand through efficiency gains and switch to clean energy technologies.

Potential: The IEA and the Overseas Development Institute both estimate that fossil fuel subsidies in 2012 reached over \$500bn on a pre-tax basis, and \$1.9 trillion on a post-tax basis. Shifting only a marginal fraction of this finance flow into clean energy will break the FiRe threshold of \$1bn p.a. This would further help meet the commitment made in 2009 by the G-20 and APEC to “phase out inefficient fossil-fuel subsidies that encourage wasteful consumption”.

Pilot: Pilot programmes in a low-impact sector with a government that is already convinced of the benefits can be implemented moderately easily and quickly. Indonesia has been identified as a potential pilot as it features the necessary political motivation for a Sunset Credits pilot programme, based on recent attempts to reform their use of energy subsidies. The country’s subsidies for petroleum products accounted for 2.58% of GDP in 2011, equivalent to \$21bn, and 0.66% of GDP on electricity subsidies, equivalent to \$5.5bn, providing a large finance flow that could be re-directed through FiRe into clean energy technologies. This would help Indonesia reach its goal of increasing the share of renewable energy in the mix to 17% and improve energy efficiency by 30% by 2025. Once a pilot is established, there is potential to expand the system to other countries with a similar set-up.

Relevant literature

Liebreich, M. (2012) *Sunset Credits – a tool for removing fossil fuel subsidies*, BNEF White Paper
 Whitley, S. (2013) *Time to change the game – Fossil fuel subsidies and climate*, Overseas Development Institute (ODI)
 IEA (2013) *World Energy Outlook*, International Energy Agency (IEA)
 Overland, I. (2012) Subsidies for fossil fuels and climate change – a comparative perspective, *International Journal of Environmental Studies*, 67:3, 303-317
 IMF (2013) *Energy subsidy reform: Lessons and implications*, International Monetary Fund (IMF)

Scale & scope

In recent years fossil fuel subsidies have outstripped their renewable counterpart more than five-fold, reaching over \$500bn annually on a pre-tax basis, and \$1.9 trillion on a post-tax basis (2.5% of global GDP). While a Sunset Credits pilot scheme would start with a confined scale and scope covering only one country and thus only a fraction of this amount to make the intervention easier and quicker to implement, the potential scope encompasses all countries that have fossil fuel subsidies in place and the scale is only limited to the global volume of these subsidies plus potential secondary trading of credits.

History

The Sunset Credits intervention is based on the BNEF white paper published by Michael Liebreich. The theoretical inspiration for the scheme comes from the Tobacco Transition Payment Program (TTPP) in the USA (‘Tobacco Buyout’). The scheme phases out all marketing quota and price support loan programs for tobacco farmers until 2014 by providing transitional payments that could be sold to third parties with the cash generated to help farmers move into other crop production or leave farming all together.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Indonesia / clean energy
2) Market size of industry:	9.8GW (2012)
3) Annual investment in industry:	\$3.14bn (2012)
Market growth opportunity:	
1) Future potential market size:	19.8GW (2025)
2) Future potential annual investment in industry:	\$6.34bn (2025)
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	~\$1bn/yr
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	<u>Idea Pilot</u> / Existing / Other (describe):
Other key metrics:	
As a consequence of rising costs on world markets, total subsidies for electricity and fuel were expected to reach \$32bn in 2013, accounting for 20% of the national budget. The current programme disproportionately benefits the middle classes, with the top 50% of households by income consuming more than 80% of subsidised fuel.	
2014 will be a ripe period for adjustment, as we would engage the government following fresh elections.	

Alternative approaches
To the ease the removal of fossil fuel subsidies, temporary tax redemptions, loan guarantees and grants for R&D into alternative energy sources could be used. Sunset Credits differ in two ways: first, fossil fuel companies (in this case the state utility) retain the option to liquidate their credits and use the revenues for more fossil fuel generation with no immediate difference to the status quo, while consumers are free to use the credits to offset rises in costs. Second, the direct link of the credits to clean energy technologies encourages companies to adopt a low-carbon strategy in the medium term.
Justification for scale metrics
Market size
Market size taken from REN21 and annual investment data from BNEF's Global Renewable Energy Market Outlook (GREMO) model
Market growth opportunity
Targeted additional installed renewable capacity is based on REN21 / Renewable Energy World estimates; presumed rise in investment reflects rise in capacity
FiRe metrics
Shifting at least \$1bn/yr into clean energy using a Sunset Credits scheme seems feasible given that Indonesia's 2011 petroleum subsidies were \$21bn, and electricity subsidies were \$5.5bn (IMF) . Routes would be explored for both petroleum products and electricity.
Other metrics
Indonesian Ministry of Finance, World Bank, Indonesia Economic Quarterly, REN 21

QUALITATIVE ANALYSIS

Strengths (intervention)

- Scalable to other countries, pending pilot outcome
- Triple-win solution: enhances energy security, reduces emissions and brings economic gains
- More equitable approach to social support (with Sunset Credits being distributed based on need)
- Use of existing systems of government agencies
- More robust balance sheets for utilities previously negatively affected by subsidies
- Visible and predictable phase-out of credits over time, giving opportunities for labour force and investment to move to the clean energy industry

Weaknesses (intervention)

- Early development stage: might take longer than one year to begin a pilot
- Scalability to other countries could be hindered by the need to adapt to local regulations
- Reliant on an effective communications strategy given the ability to liquidate their Sunset Credits, and thereafter funding investment in fossil fuels
- An international Sunset Credits system could potentially prompt trade disputes between countries

Barriers to implementation

- Lack of government credibility and administrative capacity, especially in countries with less well-developed institutions
- Difficulty of dismantling existing fossil fuel subsidies and supporting regulation
- Need to establish a supply chain for credits and clean energy technology
- Lack of information regarding the magnitude and shortcomings of subsidies (the full fiscal cost of energy subsidies are rarely reflected in the budget)
- Concerns regarding the adverse impact on the poor, and potential for widespread public protests, if communicated ineffectively
- Opposition from politicians and the specific interest groups, such as the fossil fuels industry
- Foreign currency exposure for imported clean energy equipment
- Possibility of fraud

Opportunities (market)

- Medium term: finance boost to the clean energy industry
- Opportunity to improve institutional capacity, especially in developing countries
- Long term: creation of a new market, with Sunset Credits as a new commodity

Threats (market)

- Political opposition from the fossil fuel industry expected
- Possible risks to affordability, inflation and international competitiveness if not well administered
- Possibility for financial fraud, cyber-crime etc. (as with EU ETS): market would need to be secure and well-designed

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Set up team to drive delivery of action plan (estimate 2-3 FTEs)	Champion + team	April 2014
Complete country-specific analysis of Sunset Credits set up, working with an expert panel from IEA, IMF, WEF, WEC & BNEF. Validate through round tables	Champion + team; BNEF; IEA and IMF; WEF GAC; WEC	April-May 2014
Reach out to government officials from Ministry of Energy & Mineral Resources & Ministry of Finance to introduce proposal	Champion + team + expert panel	June-July 2014
If buy-in secured, approach Office of President	Champion + team + Sponsor Minister	June-July 2014
With support of the President, top-down push to gain support of industry	Champion + team + Office of President	July-August 2014
In collaboration with government & industry stakeholders, develop a comprehensive reform plan & pilot scheme (targeting a part of the value chain / specific region eg, Java)	Champion + team + BNEF liaison + stakeholders + expert panel	August-October 2014
Support set-up of national administrative body / PMO to implement pilot scheme	Champion + team + stakeholders	Oct-Dec 2014
Develop communications campaign to generate broad political and public support	Champion + team + local team	Oct-Dec 2014
End-of-year progress report to FiRe team	Champion + team	End Dec 2014
Begin roll-out, evaluate need for modification	Champion + team	From Jan 2015
Identify additional value chain segments / regions for roll-out & other nations	Champion + team	From Jan 2015
If successful, consider set-up of Sunset Credits organisation to deliver roll-out	Champion + team	From Jan 2015

Key individuals & organisations

Individuals:

- Michael Liebreich, inventor of Sunset Credits and founder of FiRe
- Benedict Clements, Division Chief, Expenditure Policy Division, Fiscal Affairs Department – lead of energy subsidy reform study
- Fatih Birol, Chief Economist, IEA
- Presidential and parliamentary elections take place in April 2014 – specific members of the government have therefore not been named

Organisations:

- Global Agenda Council, New Energy Architecture, WEF
- World Energy Council; IEA; IMF
- Coordinating Minister of Economy
- National Development Planning Agency
- National Energy Council
- Ministry of Energy and Mineral Resources
- Ministry of Finance
- Pertamina
- Perusahaan Listrik Negara (State Electricity Company)
- Office of the President

Input from FiRe

- Support with introduction to country government
- Support from BNEF team (analysis) and Michael Liebreich (involvement in working session) in defining application of Sunset Credits to Indonesia
- Support from BNEF team (analysis) in modelling various options
- Funding support required to complete country-specific analysis of Sunset Credit set-up – estimate requirement of \$250k to cover costs of small full-time team (fix and variable, eg., travel)
- Further funding for development of comprehensive plan and roll-out to be estimated following in-country stakeholder engagement

CHARACTERISATION TEMPLATE

INTERVENTION 16: *Building public first loss support mechanisms to facilitate investments in African renewable energy infrastructure projects*

SUMMARY: *The intervention is aimed at developing a first loss public support mechanism that would reduce the risk perception for renewable energy projects in Sub-Saharan Africa and catalyse investment in the sector.*

Date	27 February 2014
Template version	3.0
Workstream	International finance
Sector(s)	Clean energy
Region or country	Sub-Saharan Africa (West Africa initially)
Champion 1 + contact	Charlotte Aubin-Kalaidjian, GreenWish Partners
Champion 2 + contact	Christophe Nuttall, R20
Champion 3 + contact	Gilles Parmentier, CDC Infrastructure
Coach(es) + contact	
Working group member 1	Priyankar Agarwal, GreenWish Partners
Working group member 2	Manu Kaila, Aspirance Renewable Energy IPP
Working group member 3	Mamadou Saliou Sow, R20, West & Central Africa
BNEF mentor + contact	Janis Hoberg, +44-3525-8303 (preliminary)

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Issue at hand: Sub-Saharan Africa has an acute shortage of energy, with a 29% electrification rate (excluding South Africa) and relies heavily on expensive imported fuel. In 2010, Africa's oil import bill was \$18bn, greater than the development aid it received despite the abundant renewable energy resources (quasi unlimited solar resources and 150GW of realisable hydro power).

Still, scant and only prohibitively expensive capital is available to fund renewable energy greenfield projects due to:

1. High development risk perception as independent power producers lack a proven track record
2. High construction risk perception due to lack of bankable engineering, procurement and construction guarantees
3. Offtaker risk due to political instability, unreliability of local utilities' contracts.

Proposed Intervention: A *first loss* public support mechanism to unlock capital for renewable energy projects in Africa by reducing risk perception and, so, the cost of capital from international investors. The initial intervention is proposed as a pilot portfolio of EUR 400m over 3 years, to be scaled up and replicated subsequently.

How it works: The first loss support mechanism to address risks 1. and 2. consists of a pool of public capital (contributed by DFIs, multilateral organisations, governments...) to fund early-stage development and construction of renewable energy projects through financial instruments such as:

1. Mezzanine financing: junior to project debt at competitive cost to equity, reducing required equity during construction and enhancing return on equity. Mezzanine debt finances development and construction, as a revolving facility, maximising the multiplier effect by recycling capital to new projects.
2. Subsidised equity: equity stakes with a lower required exit return
3. First loss shares issued to protect common shares.

Implementation: The pool of public and private capital will be mutualised in a portfolio holding company managed by GreenWish Partners with technical and political support of R20 on development of new projects. The governance of the holding company will be assumed by a steering committee comprising all investors. The steering committee will decide the company's investment objectives and plan. Further, we will identify suitable investment opportunities, carry out due diligence and perform asset management services for equity and debt stakeholders.

Relevant literature

- Scaling Up renewable energy in Africa, UNIDO (2009)
- Renewable energies in Africa, JRC- European Commission (2011)
- Africa Development Report 2012: African Development Bank (2013)
- Renewables 2013 : Global Status Report, REN 21 (2013)
- Africa's Renewable Future: The Path to Sustainable Growth, IRENA (2011)
- The Future of Clean Energy in Africa, Clean Energy Pipeline (2013)
- Sustainable Energy for All: Global Action Agenda, UN (2012)

Scale & scope

- Initial pilot targets 8-10 renewable energy projects (solar and hydro) in Sub-Saharan West Africa by 2016 with a total capacity of 250MW/ EUR 400m. Subsequently, the project will lead to an addition of ~600MW annually.
- Net carbon emission savings of ~0.36MtCO_{2e} annually
- Countries encouraged and enabled to move towards cost-reflective tariffs
- Demonstration of the commercial and technical feasibility of renewable energy projects in Sub-Saharan West Africa.

History

R20, created by Governor Schwarzenegger, is leveraging California's clean energy experience by engaging with regional leaders, developers and investors to stimulate investment in renewable energy through its initiatives. R20 has signed an agreement with the United Nations Office for Project Services (UNOPS) to set up a pre-investment facility to fund renewable energy project development with a target of funding 30 projects adding up to 1GW between 2015 and 2020. This will supply a pipeline of developed projects for this intervention. GreenWish and Aspirance are currently structuring a 250MW portfolio of projects in 5 West African countries. Our proposed intervention draws on the experience of similar interventions in the past including the Africa Development Fund of the AfDB and the Green Africa Power initiative by the Private Infrastructure investment Group.

QUANTITATIVE ANALYSIS

Analysis

Current market size:

1) Relevant geography and industry:	Sub Saharan Africa / Clean energy
2) Market size of industry:	3.155 GW
3) Annual investment in industry:	\$5.3bn

Market growth opportunity:

1) Future potential market size:	11.976 GW (2016)
2) Future potential annual investment in industry:	\$400bn cumulative till 2030

FiRe metrics:

1) Expected annual new finance raised through FiRe intervention:	EUR 900m+
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / Pilot / <u>Existing</u> / Other (describe):

Other key metrics:

- Deployed capital : EUR 400m in first 3 years, EUR 900m thereafter
- Installed capacity : 250MW within 3 years , ~600 MW annually thereafter
- Carbon emission saving : 0.36 mtCO2e annually
- Increased electricity access : ~ 15m people to benefit annually

Alternative approaches

- Increase budget of grants from Multilateral Development banks
- Support Feed-in-Tariff scheme
- Institute PPA insurance mechanism
- Multinational Guaranteed Fund as a contract for difference to cover African governments' utilities counterparty risk on PPAs (risk 3.)

Justification for scale metrics

Market size: Information sourced from Bloomberg New Energy Finance

Market growth opportunity:

Future renewable market size information sourced from BNEF
 Future potential investment in the industry from IFC

FiRe metrics: The initial pilot capacity of 250MW is composed of the portfolio developed by GreenWish Partners and Aspirance. This will be scaled up to more than 600MW in new annual installed capacity through expansion and replication of the initiative. Of this, we expect to finance 200MW on our own while another 400MW will result from replication of the successful pilot. R20-UNOPS Development Fund that aims to develop 1GW capacity between 2015 and 2020 will supply part of our 200MW ready-to-build project pipeline.

Other metrics: The CO2 saving estimate assumes diesel as the alternative. We use a standard conversion factor of 0.245kgCO2e per kWh of diesel based power. Increased access estimates account for the low current access and per capita consumption. Cost of generation will be lower because thermal power relies on imported fossil fuel whose prices are high and likely to increase further.

QUALITATIVE ANALYSIS

Strengths (intervention)

- Increased energy access for people in one of the most energy-deprived regions of the world
- Strong demonstration effect: successful implementation will see investment flowing in rapidly because of the acute demand supply gap
- Backing of credible institutions will reduce risk perception and lower cost of capital
- The intervention has the potential to unlock private capital and to be scalable for the continent

Weaknesses (intervention)

- High exposure of public money to project risks: checks and balances will need to be carefully implemented to ensure that only technically and financially viable projects are funded
- It may take time to raise funding for the proposed pool of public money as investors often have very strict rules and have difficulty in adapting to create innovative mechanisms or even partnerships with donors.

Barriers to implementation

- Public stakeholder long decision process
- Fund-raising: sensitise potential contributors to the facility about the proposed intervention and secure commitments from them
- Tedious administrative procedures in some countries could mean that the time taken to set up the vehicle and begin operations could be longer than desired
- Lack of availability of development budget for the proposed pipeline of projects
- Lack of availability and expensive insurance packages
- Lack of project finance and renewable energy experience from local governments leading to non-bankable PPA contracts
- Poor credit ratings of state-owned African electricity utilities leading to higher counterparty risk for developers
- Limited number of suitable sites due to lack of grid connections in many locations. So, to start with, only projects that have proximity with the grid may be supported

Opportunities (market)

- Acute shortage of reliable power
- Heavy reliance on expensive imported fossil fuel
- Abundant renewable energy resource potential
- Extremely low electricity access rates
- Economies are expanding and the growth rate is among the highest in the world
- Renewable energy has comparative cost advantage over generation from conventional fuel
- Appetite from private capital (debt and equity) for African infrastructure including power

Threats (market)

- Non-cooperative governments
- Political instability in target countries
- Lack of technical expertise among developers
- Delays in regional infrastructure development projects (such as construction of power evacuation infrastructure)
- Singular focus on grid-connected power projects could mean that renewable energy in Africa may never take off. Therefore, where feasible, off-grid applications of renewable energy should also be considered for support.

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Finalise investment proposal and support mechanism structure	GreenWish Partners, BNEF	April 2014
Finalise financial model for the pilot portfolio	GreenWish Partners,	April 2014
Finalise development of first two projects of the pilot phase – PPA and contract negotiation, feasibility studies, insurance, supplier selection, land agreements...	GreenWish Partners, Aspirance Services	April 2014 to August 2014
Engage with international DFIs, multilateral agencies and private investors for project debt and portfolio holding equity and mezzanine	GreenWish Partners, BNEF, R20	April 2014 onwards
MoU with first equity investors	GreenWish Partners, R20	May 2014
Financial closure of first two PV projects - 100MW (debt at the project level and equity commitment at the holding level)	GreenWish Partners, R20	September – October 2014
Commence construction for the first two projects	Aspirance Services	November 2014
Develop second batch of pilot portfolio projects (150MW)	GreenWish Partners, Aspirance Services	December 2014 onwards
Engage with international DFIs, multilateral agencies and private investors for project debt and portfolio holding equity and mezzanine	GreenWish Partners, R20, BNEF	January 2014 onwards
Final holding equity commitment of the pilot portfolio of 250MW/EUR 400m	GreenWish partners	April 2015

Key individuals & organisations

- GreenWish Partners: will lead the intervention. It structures holding, project debt and performs asset management services for the proposed holding under the leadership of Charlotte Aubin-Kalaidjian.
- R20: Coalition of global leaders to promote and implement projects leading to economic and environmental benefits. R20 is the strategic partner of GreenWish Partners for its African initiative. R20 will contribute to project pipeline, educate African governments and facilitate dialogue to design modal PPA contracts acceptable for DFIs. R20 also contributes through its Global Finance Network (GFN) of sovereign wealth funds, public and private equity investors, capital markets.
- CDC Infrastructure: Infrastructure investment arm of the French government and potential equity investor in the project
- Aspirance Services: Project Developer with outstanding telecom infrastructure track record in Africa; develops, builds and operates the pilot portfolio
- Ylios: Strategic consultant on energy for the French government and major utilities; brings strategic input for implementation of the initiative
- European and African DFIs

Input from FiRe

- Access BNEF network of private investors, foundations
- Leverage relationships with international DFIs and multilateral development agencies to add to existing public partners
- Accelerate timing of structuring and public entities commitment
- Support GreenWish Partners with research and market data
- Provide technical, financial expert resources to optimise timing and scale
- Strategic inputs for developing the support mechanism and business plan
- Assistance in franchise building
- Contribution to educate local governments and other stakeholders in building bankable PPAs

CHARACTERISATION TEMPLATE

INTERVENTION 17: *Global Energy Efficiency and Renewable Energy Fund 2.0*

SUMMARY: *Scaling an existing model for public funding to catalyse up to EUR 50bn of climate finance in developing countries.*

Date	28 March 2014
Template version	2.0
Workstream	International finance
Sector(s)	Clean energy infrastructure
Region or country	Non-OECD
Champion 1 + contact	Cyrille Arnould, c.arnould@eib.org
Champion 2 + contact	Alex Murray, amurray@beetlecapital.com
Champion 3 + contact	
Coach(es) + contact	
Working group member 3	
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net , +44-20-3525-8303

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

FiRe: This intervention is to design a potential successor for GEEREF (the Global Energy Efficiency and Renewable Energy Fund, www.geerefdev.com) in order to raise up to EUR 500m of public and private capital which could in turn catalyse up to EUR 25bn of total clean infrastructure investment over 10 years (Project “GEEREF 2.0”). FiRe could help refine the structure and strategy of GEEREF 2.0 so as to scale up the fund operation to perhaps double this level. FiRe could also identify new public and private partners for GEEREF 2.0 and help grow the pool of new climate finance infrastructure funds globally for it to invest in.

Existing model: GEEREF is an emerging market fund-of-funds launched in 2008 by the European Commission and supported by the European Investment Bank Group, one of the world’s largest financiers of renewable energy and climate related projects. GEEREF has been structured to leverage public sector funding to mobilise private sector capital to build clean energy generating capacity in developing economies.

Preferred return: Germany, Norway and the EU committed EUR 112m from their Official Development Assistance (ODA) budgets as first loss capital, underwriting a 10%/yr preferred return to private investors. This accelerates liquidity to them, targeting rapid reflows and positive net cashflows. Overall net IRRs to private investors in the model base case are thus boosted to 25% with significantly reduced risk (born by public investors, whose ODA funding benefits from massive efficiency gains).

Fund commitments: GEEREF has so far committed EUR 80m to seven new funds, which have in turn committed over EUR 135m to projects so far. GEEREF began fundraising with private investors in 2013 and has commitments of up to EUR 50m from them to date. The fundraising target is EUR 112m of private sector commitments.

Multiplier: At EUR 224m GEEREF could cornerstone some 15 clean energy infrastructure funds across Asia, Africa and Latin America, enabling them to raise up to EUR 100m equity per fund each. Each fund aims to deliver additional capital through co-investment and debt into the underlying projects, creating a dramatic multiplier effect for GEEREF investors of up to 50 times (GEEREF estimates it will catalyse up to EUR 10bn).

Relevant literature

GEEREF fund documentation – *available on request*
World Energy Outlook, 2013 (IEA)

Scale & scope

The team envisages that GEEREF 2.0 would continue to focus on funds investing in renewable energy and energy efficiency projects and potentially in other clean infrastructure segments. GEEREF’s analysis indicates that EUR 10-15m commitments to individual funds catalyses over 7x as much again from other LPs into the underlying GP funds. These in turn catalyse a further 2.5x equity into the actual infrastructure projects, with co-investment. With leverage this further increases from 2.5x to 6.6x, taking the total multiplication effect to over 47x the initial GEEREF commitment.

If with FiRe’s help GEEREF 2.0 can be sculpted to then raise EUR 500m - EUR 1bn in public and private commitments, it could lead to EUR 25bn - EUR 50bn of total capital formation into new build climate infrastructure in developing countries over the fund life (or up to EUR 5bn per annum), clearing the FiRe threshold of an additional EUR 1bn per annum.

History

GEEREF was launched in November 2008 with EUR 112m of commitments from the EU, Germany and Norway. The intention at the outset was to raise a similar amount of capital from the private sector but, with the financial crisis, it was resolved to put the private round on hold and build the fund portfolio from the initial public commitments. In 2013, the process was restarted and the first private investors committed to GEEREF in Q4 2013. Initial commitments are up to EUR 50m and a total of EUR 112m is targeted for the Final Close in Q3 2014. GEEREF aims to be fully committed in 2015. Currently the team is starting to gather market feedback and FiRe thus presents a timely opportunity to develop the strategy for GEEREF 2.0 with the help of its participants.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Non-OECD / clean energy
2) Market size of industry:	2,365TWh (2011, IEA)
3) Annual investment in industry:	\$97.5bn (2013)
Market growth opportunity:	
1) Future potential market size:	7,178TWh (2035, IEA)
2) Future potential annual investment in industry:	\$137bn/yr
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	EUR 2.5bn to EUR 5bn
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / Pilot / Existing / <u>Other</u> (describe): GEEREF is an existing fund operation while GEEREF 2.0 is purely conceptual.
Other key metrics:	
<ul style="list-style-type: none"> Total capital formation of EUR 50bn would imply new build clean energy capacity of around 25GW Output would be c 66TWh per annum, nearly 40% of Africa's current residential consumption (or 90m households, assuming 0.75MWh per household per annum) Implies 46MtCO₂e averted per annum 	

Alternative approaches
In terms of raising capital from the private sector, fund managers can always raise capital from institutional LPs without support from GEEREF 2.0. However, it is highly likely that they would take much longer to launch and raise less capital, where they succeed. Equally, projects may be financed outside of private equity funding. However, delivery of finance at scale requires more structured routes such as GEEREF 2.0.
Justification for scale metrics
Market size
BNEF forecasts WEO forecasts
Market growth opportunity
BNEF forecasts WEO forecasts
FiRe metrics
GEEREF methodology outlined in 'Scale & scope' section.
Other metrics
EIB data; Energy Statistics of Non-OECD Countries 2013 (IEA); Energy data - World Energy Council; IEA CO ₂ Emissions from Fuel Combustion Statistics (average value for non-OECD countries, 2009-2011)

QUALITATIVE ANALYSIS

Strengths (intervention)

- **Building on established platform:** GEEREF has been in existence since 2008 and has capital committed from both the public and private sectors. Its investee funds have committed over EUR 135m to projects.
- **GEEREF multiplier:** GEEREF 2.0 could potentially catalyse EUR 25 - EUR 50bn in clean infrastructure investment, with only EUR 250-500m of public funding (<0.25 - 05% of global annual ODA budgets).
- **Compelling private investment proposition:** GEEREF 2.0 would offer private sector investors enhanced returns for lower risk, with well managed diversification in large, high growth markets.

Weaknesses (intervention)

- **Structure:** for many private sector investors, a fund-of-funds structure is not a viable option, particularly those that are fund-of-funds themselves. Many also prefer to invest directly into assets rather than through funds.
- **Liquidity:** a significant number of investors are unable to consider the illiquidity of a multi-year fund commitment, for regulatory or cash management reasons.

Barriers to implementation

- Need for support of public sector sponsors
- Lack of appetite for emerging markets
- Lack of appetite for sector
- Lack of appetite for FOFs
- Need for liquidity
- Lack of financial capacity
- Immaturity of markets
- Limited investable fund propositions still

Opportunities (market)

- **Scale up:** GEEREF 2.0 could perhaps reach five times the size of its predecessor fund with FiRe's input, particularly in addressing structural issues and investor concerns
- **Broaden strategy:** GEEREF 2.0 could expand its investment strategy to include other segments of the clean infrastructure market such as agriculture, forestry, water and waste.
- **New partnerships:** through FiRe, GEEREF 2.0 could identify new public and private investor partners globally as well as attractive investment opportunities. FiRe may spark collaborations with other initiatives, such as Climatescope.

Threats (market)

- **Lack of capital:** while GEEREF 2.0 could be designed to mitigate investor concerns even further, the market may develop too slowly due to insufficient private capital.
- **Lack of track record:** given the immaturity of these markets, investors question the investment returns that are available.
- **Emerging market risk:** many developing countries are perceived to have significant risks around regulation, governance and other enabling infrastructure elements.

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Incorporate FiRe feedback to overcome barriers and sculpt fund investment proposition	Champion + team	May 2014
Map relationships / targets among potential public and private partners	Champion + team, FiRe team	May – July 2014
Final close for GEEREF	Champion + team	July 2014
Reach out to potential public partners to introduce GEEREF 2.0 proposal	Champion	July – Sept 2014
Report progress to FiRe team	Champion + team	Sept 2014
Map pipeline of potential climate infrastructure investee funds	Champion + team	Sept to Dec 2014
End-of-year progress report to FiRe team	Champion	End of Dec 2014
Report on achievements of GEEREF 2.0 and provide outlook on fundraising and investment programme	Champion + team	BNEF Summit 2015
Finalise strategy for GEEREF 2.0 and launch fundraising	Champion + team	2015 & 2016

Key individuals & organisations

Individuals:

- Cyrille Arnould, Head of GEEREF
- GEEREF team
- Alex Murray, Beetle Capital

Organisations:

- EIB Group (EIB / EIF)
- European Commission

Input from FiRe

- Sculpt investment proposition for GEEREF 2.0 to raise up to EUR 1bn:
 - Refine strategy
 - Overcome barriers / address investor issues
- Identification of new potential public and private partners for GEEREF 2.0
- Identification of potential investee funds for GEEREF 2.0
- Share experience of emerging market clean energy investment, build awareness of investment landscape and success stories

CHARACTERISATION TEMPLATE

INTERVENTION 18: *Clean energy access in Africa*

SUMMARY: *Create a model for 100% electricity access in one African country and replicate across the continent*

Date	3 March 2013
Version	4.6
Workstream	International finance
Sector(s)	Clean energy
Region or country	Africa
Champion 1 + contact	Yariv Cohen, yariv@kaenaat.com
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Working group member 1	
BNEF mentor + contact	Kieron Stopforth, kstopforth@bloomberg.net

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Problem

Access to energy in Africa is low, which greatly slows down economic growth. Substantial amounts of capital are needed to create conventional power generation and distribution, which also create a burden on the country in the future balance of payment.

Proposed intervention

Our intervention is to build an integrated technical, policy and financial plan on how to implement large-scale clean energy deployment to provide nationwide access (even as high as 100%). We believe that the proposed plan is cheaper and faster to deploy than current conventional energy. Our intervention includes forming the implementing private-public body to define roles and put together all stakeholders in a coordinated way. The initial focus is Rwanda, where there is a willing and able government that can execute quickly. The learning would then become a blue print that can be replicated in other countries.

How can the intervention increase capital flows

The potential for 100% access in Rwanda is possible. By combining government engagement, robust technical planning and new country-level specific financing structures & repayment models (eg, credit wraps, consumers repayment mechanisms based on savings over kerosene, light industry creation), we believe a substantial amount of capital can be directed and drive the increase in access.

Execution and Implementation

We suggest to continue resourcing the Clean Access team to move ahead with the creation of the policy / technical roadmap. This would take 3-6 months to complete. Further, we propose moving ahead with the most promising sectors – off-grid solar, that can be enhanced very quickly in Rwanda – 1m connected in three years.

Key success factors and status

Clean access plan creating and implantation

- Strengthening and resourcing the Clean Access body to define and supervise the execution of the plan
- Finalising the nationwide technical plan and policy recommendations
- Scaling up of first vertical – off-grid solar
- Utilise the government willingness and ability to act by defining a clear role in providing distribution and collection, which would enable quick deployment
- Reducing the cost of capital – using the government commitment and a credit wrap by the WB or commercial bank would greatly reduce the cost of capital
- Strong technology partners that can provide high-quality solution.

Relevant literature

BNEF White paper – Rwanda’s clean energy leapfrog opportunity

FiRe application for prepaid solar by Simon Bransfield-Garth

Scale & scope

Rwanda alone will require \$5bn to reach 100% clean access. If successful, the potential addressable market for clean energy across Africa is over \$56bn in 2018.

The clean access would open that market and accelerate deployment of renewable generation.

History

The engagement with the government started in a dialogue with Rwanda’s President about the energy needs of the country. From there the team conducted a thorough stakeholders consultation and a full analysis of strategic plans, policy roadmap and local players.

Following this Initial assessment, the “Clean Access” Initiative was created with the support of local government. The steering committee includes professionals ranging from local and international project developers, policy advisors, technical consultants, leading investment banks and investors.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Sub-Saharan Africa / clean energy
2) Market size of industry:	\$16bn
3) Annual investment in industry:	\$6.5bn/yr
Market growth opportunity:	
1) Future potential market size:	\$56bn
2) Future potential annual investment in industry:	\$8bn/yr
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$1bn/yr
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / Pilot / Existing / <u>Other</u> (describe): Initiative with momentum
Other key metrics:	
<ul style="list-style-type: none"> • Access to power: number of people granted access to electricity through intervention (off-grid and on-grid) and percentage of country with electricity access. • Clean capacity installed under the plan. • Amount of off-grid energy equipment supplied. • Job creation, GDP benefit. 	

Alternative approaches
<p>Rwanda already plans to expand the grid and increase capacity by 563MW by 2017/18. The government's electricity access target is 70% in the same period, with approximately 50% of this on-grid. There are no significant plans for the off-grid portion – which gives the need for this intervention.</p>
Justification for scale metrics
<p>Market size</p> <p>\$281bn invested in clean energy in 2012 worldwide, 2.3% in sub-Saharan Africa. \$15.7bn invested in clean energy in sub-Saharan Africa between 2006 and Q3 2013. Development banks invested \$5.6bn/yr in 2012. Source: BNEF Research Notes.</p>
<p>Market growth opportunity</p> <p>USAID Power Africa to invest \$7bn in financial support and loan guarantees from 2013–18, assuming this contributes ~\$1.5bn/yr (Source: Power Africa). Assume development banks contribute \$6bn/yr and non-development bank contribution \$0.9bn/yr continues. For \$56bn market size, assume the \$8bn/yr growth continues for five years.</p>
<p>FiRe metrics</p> <p>Phase I focus on Rwanda, needs \$5bn in total (source: Rwanda Govt.). Assume FiRe leads to \$1bn/yr new finance in this phase.</p>
<p>Other metrics</p>

QUALITATIVE ANALYSIS

Strengths (intervention)

- First country-level intervention that addresses multiple barriers at once. Can be highly effective and provide best practice and learning for other countries
- Integrated approach, policy, capital and skills
- Multi-stakeholder engagement, once mobilised, has high chances for success
- Medium-scale intervention, small enough to be done quickly, but have a meaningful size to have an impact and learn
- First success (solar) can be done quickly with active involvement from the government

Weaknesses (intervention)

- We focus on only one country; unless successful and replicated will only have limited impact
- Multiple stakeholder engagement can slow the initiation stage
- Technology risk of applicability of solutions in the country
- The country is slowly progressing non-clean solutions, which might become operational soon

Barriers to implementation

- Mobilisation of \$5bn to a \$7bn economy in a sustainable market-based way, not through donations, is a hard task that requires new paradigms for repayments
- Rwanda has a great credit rating in the financial markets, but the government will not be able to borrow the full amount without credit solutions
- The country is in great need of power, and therefore considers all options, including thermal generation. To change course, and mobilise more parties on the ground, indication of the capital available is needed
- Uncertainty in regards to the level of available resources (solar, hydro and geothermal), Further analysis need to be done on each vertical
- Regulatory framework not in place yet and needs to be developed as part of the clean access full plan
- Solar is only starting in the country, with the first project to reach financial close last month
- Clean Access is an independent initiative that requires capital, technical skills and international support

Opportunities (market)

- Willing and able government to learn, implement and support new initiatives. Ability to have an active role in policy shaping and collection to address main risks.
- This provides the opportunity to have a quick win that would be replicated across Africa
- Access to power has a transformative impact on a country's sustainable growth, creating higher buying power, and ability to scale up faster

Threats (market)

- The potential of the resources in the country is not yet clear, and there is a risk that a high percentage of clean power can not be reached
- If the government is not fully engaged, we will not be able to progress

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Drill down to each part of the power mix, assess real potential and design the full implementation plan	Kaenaat, BNEF, Vestas, Azueri,, GoR	In process
Further resource and strengthen the “Clean Access” entity, making it a full PPP	Clean Access	Q2 2014
Technical design and development of the policy roadmap for full clean access in Rwanda including repayment mechanisms	BNEF, Ecofys, local teams	Q2-3 2014
Choose first sector for intervention – potentially off-grid distributed solar	Clean Access	Q2-3 2014
Engage with different technology suppliers, potential capital providers, debt providers and insurance providers	BNEF, Clean Access Initiative	Q2-3 2014
Define the roles for the government’s, development banks, investors, developers, and the links between them	BNEF, Ecofys, DFI’s, Clean Access	Q3-4 2014
Communicate the roles clearly to all members, pass the needed policy	Clean Access, BNEF, GoR	Q3-4 2014,
Build the financial structure for large-scale deployment and acceleration. Secure the capital	Clean Access, GoR, Investment bank (TBD)	Q4 2014
Execute	All	2015-2018
Move to the next country, and replicate	Clean Access, BNEF	FiRe summit 2015

Key individuals & organisations

- Clean Access Initiative member and steering committee
- BNEF
- Government of Rwanda
- International Financial Institutions
- UN Se4All and team members
- Ormat
- Vestas
- Azueri
- Mainstream
- Kaenaat
- Ujenge

Input from FiRe

- Support resourcing and strengthening of the “Clean Access” entity, with steering committee members, technical experts and capital
- Contribute to the high-level engagement process with all stakeholders
- Introduction to key experts from the private sector that can support drilling down to each vertical
- Endorse the plan, and help promote it among FiRe members
- Suggest ideas, plan, technology models that can be used to achieve the access goal
- Share BNEF analysis and data

CHARACTERISATION TEMPLATE

INTERVENTION 19: *Supporting sustainable energy trade initiatives*

SUMMARY: *Stimulate and support an upcoming trade negotiation on environmental goods, making it relevant for clean energy and thus for climate action*

Date	3 March 2014
Template version	2.0
Workstream	International finance
Sector(s)	Trade policy
Region or country	
Champion 1 + contact	Ricardo Meléndez-Ortiz, rmelendez@ictsd.ch
Champion 2 + contact	Ingrid Jegou, ijegou@ictsd.ch
Champion 3 + contact	Peter Brun, pbrun@ictsd.ch
Coach(es) + contact	Sandra Winkler, winkler@worldenergy.org
Working group member 1	Mahesh Sugathan, smahesh@ictsd.ch
Working group member 2	Thomas L. Brewer, tbrewer@ictsd.ch
BNEF mentor + contact	Anna Czajkowska, aczajkowska@bloomberg.net

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Context: International trade in the area of sustainable energy goods and services allows for specialisation, economies of scale and competition, helping push prices down and thereby trigger additional investment. Therefore, it is crucial to address obstacles to trade, including tariffs as well as a range of “behind-the border” measures such as local-content requirements and standards.

Momentum has been building over the past few years, making it possible for a group of countries to announce this past January that they will negotiate a multilateral trade agreement on environmental goods, including a shortlist of clean energy goods. It is necessary to ensure that this agreement becomes relevant for the clean energy sector in particular.

The intervention: The intervention will serve to offer support to the upcoming trade negotiation so as to ensure that the ambition is at a high enough level to make a difference for climate action and sustainable development. This will be done through three concrete actions: exploring, with a view to maximising, the investment potential linked to trade reform; an enhanced involvement by the private sector; and increased outreach and communications efforts regarding the potential gains from SETI.

The opportunity: With a policy process already having been launched, the journey toward scaling up sustainable energy through trade is already underway. An enhanced understanding of the benefits will offer crucial support to the process, and it is necessary not to lose momentum. The win-win for the private sector, for policy-makers and for broader sustainable development objectives, combined with the low costs of implementation, make a compelling case for action, and promise good prospects of success.

Relevant literature

- Fostering Low Carbon Growth: The Case for a Sustainable Energy Trade Agreement, by ICTSD, Issue Paper, November 2011.
- Removing Trade Barriers on Selected Renewable Energy Products in the Context of Energy Sector Reforms. By Veena Jha, ICTSD.
- Transforming the APEC Outcome on Environmental Goods into a Broader Sustainable Energy Trade Initiative: What are the Options? ICTSD

Scale & scope

The starting point would be the upcoming trade agreement on environmental goods, launched by 14 countries (G14), including EU-28. ICTSD is proposing to add at least 24 more renewable energy goods to the APEC-list, the basis for the negotiation, which in itself includes 15 goods in the REN-sector, plus eventually addressing non-tariff barriers and expanding country coverage. ICTSD analysis shows that the elimination of tariffs on a shortlist of 15 clean energy products by 12 countries which account for 90% of all trade would lead to an increased output of \$1.5bn.

History

The SETI concept evolved out of an initiative led by Michael Liebreich under the World Economic Forum’s Global Redesign Initiative, which proposed the creation of a Sustainable Energy Trade Agreement. ICTSD and partners have developed the analytical case for this and for other types of trade initiatives in the area. ICTSD has hosted numerous policy dialogues and bilateral meetings, engaging with the global trade and energy communities, and initiated a public-private partnership, the SETI Alliance, to support the formalisation of a SETI.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Australia; Canada; China; Costa Rica; the EU; Hong Kong China; Japan; Korea; New Zealand; Norway; Singapore; Switzerland; Chinese Taipei; US. Clean energy goods and services.
2) Market size of industry:	6 42.1GW in 2013 (excl. HK and Singapore)
3) Annual investment in industry:	\$221bn (2013)
Market growth opportunity:	
1) Future potential market size:	876.7GW (2016)
2) Future potential annual investment in industry:	N/A
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$1.5-2.3bn/yr
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / Pilot / <u>Existing</u> / Other (describe):
Other key metrics:	
Observations from recent developments point to the importance of market barriers for trade flows. A forthcoming UNEP paper points to a fall in world exports of solar PV (HS 854140) by 27% in 2012 compared to the previous year, which is partly explained by the chilling effects of anti-dumping and countervailing duties on exports from China to the EU and the US.	

Alternative approaches
Unilateral trade reform could address market barriers. Regional trade agreements have already contributed to significantly lowering tariffs primarily in many developed countries. These approaches have their limitations though, much because of the mercantilist approach that usually dominates trade policy. It is also difficult to effectively address non-trade barriers unilaterally.
Justification for scale metrics
Market size
BNEF data
Market growth opportunity
BNEF data. Forecasts missing for Norway, Switzerland, Korea, New Zealand, Taiwan and Costa Rica so the figures are based on assumed average growth based on each country's five-year average historical growth.
FiRe metrics: Analysis using GTAP-E, commissioned by ICTSD. Trade reform on a shortlist of 15 clean energy products by 12 countries which account for 90% of all trade would lead to an increased output of between \$1.5bn and \$2.3bn. Trade would expand by \$190-210m. If a future trade agreement were to address services as well and other behind-the border-measures, the benefits would be expected to multiply.
Other metrics : UNEP (forthcoming)

QUALITATIVE ANALYSIS

Strengths (intervention)

- Additional analysis in investment in relation to trade reform would fill a gap and could attract more support.
- There is demonstrated demand for strong stakeholder support to the new trade negotiation through letters, op-ed, etc. which the FiRe intervention could help meeting through an enhanced private sector engagement and strengthened communications.
- A rich body of research and analysis is available, ready to be communicated to the stakeholders and policy-makers without delay.

Weaknesses (intervention)

- Decision-making is not in the hands of the champions or of the FiRe community.
- Even if the governments involved can be persuaded of the value of an ambitious trade agreement in the area of clean energy, through FiRe, the conclusion of an agreement is sensitive to other political developments. For example, political tensions between some of the key countries, even if on an unrelated topic, could scupper the possibility of a new trade agreement.

Barriers to implementation

- SETI is a very promising concept with a growing group of supporters. In order to build on this, it is necessary to be able to meet new demands on additional analysis and on communications. A key barrier in this respect is lack of human- and financial resources in ICTSD, the champion for the initiative. Increased funding through FiRe could make an important difference
- SETI is based on a technical message which is hard for non-trade experts to grasp. This motivates the additional efforts proposed in the area of communications and outreach.
- Sometimes a lack of interest for and understanding of trade policy as a tool for climate action is observed. This again motivates enhanced efforts with relation to outreach and communications, and the involvement of the private sector

Opportunities (market)

- A successful SETI would mean that market barriers for sustainable energy goods – at the borders as well as behind the borders (at least in the next phase) – would be removed.
- This would lead to a more efficient resource allocation where the more competitive countries will expand their production and exports.
- Specialisation, economies of scale and competition will further innovation and development and contribute to pushing down the prices of clean energy equipment and scaling up demand. A market with less risk for distortions would also be able to stimulate confidence in investors.

Threats (market)

- Limiting the scope of a SETI would make the intervention less effective and leave barriers unaddressed.
- Only addressing market access, although constituting an important political first step, would have limited impact on trade. It is therefore crucial to eventually address other possible barriers such as local-content requirements, subsidies, government procurement, and trade remedies.
- A topo Arrow group of countries joining the initiative would mean missed opportunities with regard to those countries not participating

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Adopt strategy for scaling-up outreach	ICTSD, BNEF, SETI Alliance	July 2014
Commission research on investment in REN associated with trade reform	ICTSD, BNEF	July 2014
<p>Endorsement of upcoming plurilateral trade agreement as a tool for climate mitigation; link to UNFCCC.</p> <p>FiRe contribution:</p> <ul style="list-style-type: none"> - present new research on investment potential of a trade agreement, - communicate findings using new outreach strategy 	ICTSD; BNEF; G14; UN	SG summit on climate change; September 2014
<p>Active support of 3GF-partners, beyond G14, including for an ambitious agenda.</p> <p>FiRe contribution:</p> <ul style="list-style-type: none"> - Bring additional private sector supporters - Make additional, compelling arguments based on new research 	ICTSD; 3GF; governments which can take the lead; private sector	3GF, Copenhagen; October 2014
<p>Stocktaking of trade negotiations towards a SETI</p> <p>FiRe contribution:</p> <ul style="list-style-type: none"> - Reach out to WEF-community with data and arguments - Build partnership 	ICTSD G14 World Economic Forum	WEF, Davos; January 2015
Consolidate additional government support in Geneva negotiations	ICTSD; G14; 3GF-partner countries	July 2015

Key individuals & organisations

- ICTSD
- BNEF- CEO Michael Liebreich
- World Economic Forum- Managing Director Rick Samans
- SETI Alliance- Managing Director Peter Brun
- Governments of G14
- Government of France- H.E Nicole Bricq, Minister of Trade; H.E. Philippe Martin, Minister of Ecology, Sustainable Development and of Energy
- 3GF: H.E. Helle Thorning Schmidt; Prime Minister of Denmark; H.E. Mogens Jensen, Minister of Trade of Denmark
- UNFCCC
- WEC: CEO Christoph Frei; Sandra Winkler
- SE4A: SG Kandeh Yumkella
- James Bacchus, Greenberg Traurig
- Gary Hufbauer, Peterson Institute of International Economics
- Andrew Steer, President, WRI

Input from FiRe

- ICTSD would like to benefit from the expertise of BNEF and FiRe in the area of finance and investment, to complement ICTSD's expertise in the area of trade policy.
- Specifically, ICTSD would like FiRe to contribute with analysis on investment in the area of clean energy and how this relates to trade policy reform under SETI
- Additional champions in the clean energy industry who can act as spokespersons in favour of a SETI, possibly through the SETI Alliance
- Support to ICTSD in developing and implementing an outreach strategy,
- In order to carry out the FiRe intervention, ICTSD would require additional funding and would welcome donations from the FiRe community

CHARACTERISATION TEMPLATE

INTERVENTION 20: *Perpetuity funds for climate and development*

SUMMARY: *Revolving or 'perpetuity' funds to provide concessional finance for climate-compatible development*

Date	4 March 2014
Template version	2.0
Workstream	International finance
Sector(s)	finance
Region or country	Least developed countries
Champion 1 + contact	Edward Hanrahan, edward.hanrahan@climatecare.org
Champion 2 + contact	Tom Morton, tom.morton@climatecare.org
Coach 1+ contact	James Cameron
Coach 2 + contact	Ben Caldecott
Working group member 1	Tom Morton, tom.morton@climatecare.org
Working group member 2	Rupert Edwards, Forest Trends
Working group member 3	
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net , +44-3525-8303 (preliminary)

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Intervention: Create a perpetuity fund initially seeded with concessionary finance from public sector agencies in development (donors) and climate (energy agencies), providing a marketplace for project developers, which delivers project income against both climate and development outcomes. Profits are returned to fund the new projects.

Objective: Provide valuable income for stalling carbon projects and satisfy the growing appetite for moving development finance to a results basis.

Benefits: In the absence of a sufficiently high price on carbon fuelling an efficient, functioning carbon market (where carbon credit prices provide sufficient incentive to stimulate capital investment), we believe that the provision of concessional finance in the form of a perpetuity (or revolving) fund – providing debt, equity, or both at rates and terms better than those available on the market – is one way to ensure that we do not lose the advances and potential (in cost efficiency, climate impacts and development impacts) that have been achieved to date from dual outcome climate and development projects formed under the frameworks of the carbon markets. Dual-outcome clean development models have been developed that deliver specific measurable climate (emission reductions) and development (health, poverty alleviation, education, safe water, energy access, gender) outcomes through single project interventions. The efficiency of such interventions is generally such that the climate outcome is cross-subsidised by the development outcome and vice versa (ie, on the ground costs for a single project intervention are usually considerably cheaper than running two separate interventions).

How and why it will work: Together with compounded interest, all returns from investments would be reinvested back into the fund, so the fund's value would steadily build up, thus, increasing its ability to fund projects and deliver outcomes without further upfront concessionary finance. Over time, the need for upfront concessionary finance would be replaced with private sector finance, which would be able to fund the project, knowing that successful delivery would yield returns to the investor secured by government agencies. In the last 12 months, several government agencies have indicated their interest in supporting stalled clean development projects that also deliver 'co-benefits or development outcomes'. The perpetuity fund takes this one stage further, valuing the development outputs and providing two uncorrelated income streams.

Relevant literature

No public domain literature but several submissions have helped shape this iteration of the perpetuity fund intervention.

Scale & scope

In initial years the scope is limited to a percentage of the value and volume of emission reduction credits (or tonnes) that may be required by participant governments/concessionary finance providers. However, as the fund essentially stimulates a market for development outcomes and is designed to provides efficiency in delivery of both climate and development outcomes, the scale is likely to be factor/proportion of participant government budgets for both aid/development and climate intervention in the developing world.

History

The fund structure as envisaged (very briefly) here is one possible iteration that has developed out of a series of proposals and submissions conceived and created between Edward Hanrahan and Tom Morton of ClimateCare, Rupert Edwards of Forest trends and Ben Caldecott of Smith School throughout 2011-13.

QUANTITATIVE ANALYSIS

Analysis	
1) Relevant geography and industry:	International; energy (Emission) aid and development
2) Market size of industry:	Aid – ~\$75bn per annum
3) Annual investment in industry:	NA
Market growth opportunity:	
1) Future potential market size:	7.5bn
2) Future potential annual investment in industry:	NA
Fire metrics:	
1) Expected annual new finance raised through FiRe intervention	£100m –500m
2) Expected time for implementation:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	<u>Idea</u> / Pilot / Existing / Other
Other key metrics:	
<p>We believe that the efficiencies gained through cross-subsidy of climate and development outcomes could deliver exceptional savings across a proportion of the international aid budgets of \$75bn per annum. Various agencies have indicated a desire to move at least 10% of budget to RBF. Further the widespread acceptance of results-based payments for development outcomes which this fund supports could deliver further efficiencies – which will vary intervention by intervention but are likely to be >15%.</p>	

Alternative approaches
<p>It is quite feasible to achieve the individual project outcomes on a unilateral basis without initiating a fund – however the fund creates impetus, spreads risk for participants and signals intent. Donors gain vehicles that are enduring and better able to make longer-term decisions and mobilise co-investment from other donors, philanthropists and private investors; ensure value for money through high levels of leverage and permanence; and have better aligned donor-recipient-project developer interests.</p>
Justification for scale metrics
<p>Market size</p>
<p>Market growth opportunity</p>
<p>FiRe metrics: Obtain GBP 100m in concessionary funding for perpetuity fund by July 2015</p>
<p>Other metrics: Fund metrics to be agreed with donors.</p>

QUALITATIVE ANALYSIS

Strengths (intervention)

- Excellent efficiencies for governments are obvious to see
- Helps move delivery risk away from governments over medium term
- Availability of current stalling projects makes implementation straightforward
- The payment for outcomes model will survive the end of a 'tradeable' carbon credit regime as it is the tonne reduction metric that can be paid for rather than a 'credit'

Weaknesses (intervention)

- There are a lot of moving parts that require coordinated buy-in from many actors
- This idea is not new and has suffered from 'indifference' (as opposed to pushback) in the past
- Limits on profit opportunity risk limiting private sector engagement in early years

Barriers to implementation

- Silos in government sector make it difficult to identify funding for cross-sector initiatives
- Preference in government departments to deploy funds in established manner through existing channels
- Administrative burden on champions in near term

Opportunities (market)

- Helps establish markets for concessionary products in least developed countries, thus alleviating requirement for aid over long term
- Helps accelerate the acceptance of RBP for development outcomes over the medium term, creating more of a market opportunity – bringing in private sector capital and in turn accelerating deployment of low-carbon development across least developed countries

Threats (market)

- The champions are all busy, working on day jobs that have to take precedence until initial momentum is gathered

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Develop and Refine PF model, metrics and target donors for round 1 Soft syndication for EOIs	Champions + team	June 2014
Syndicate model to potential donors Look for stage 1 donor to fund development and readiness - \$250-450k	Champions +team	October 2014
Recruit team and put legal structure in place OR identify existing potential fund manager	Champions + paid fund managers, pro bono legal	Dec 2014
Syndicate to pre-identified donors with a view to close round 1 funding at >\$25m	Champions/fund managers	Jul 2015
Deploy round 1 funding		Dec 2015
Syndicate to close round 2 (dependent on round 1 interest) > \$50m		Dec 2015

Key individuals & organisations

Individual:

- Edward Hanrahan, CEO
- Tom Morton, Projects Director
- Ben Caldecott
- Rupert Edwards
- James Cameron

Organisation:

- ClimateCare
- ClimateCare
- Smith School
- Forest Trends
- Climate Change Capital/Bunge

Other:

- Legal representative(pro bono) – suggest Chris Staples, Melanie Shanker, Amy Merrill or similar
- Government representatives – Sweden, Norway, Denmark, HM Treasury, DFIF, DECC, US Govt.
- World Bank

Input from FiRe

- Help with research, provision of analysis to quantify benefits
- Publicise and legitimise programme through BNEF and Bloomberg
- Share contacts

6. CAPITAL MARKETS

INTERVENTIONS:

21. Mainstreaming four types of green bonds (p.111-115)
22. Sustainable credit rating system for infrastructure projects (p.116-120)
23. Developing a broadly-diversified, forward-looking equity index (p.121-125)

CHARACTERISATION TEMPLATE

INTERVENTION 21: *Mainstreaming four types of green bonds*

SUMMARY: *Catapult green bond volumes to the next level by eliminating ‘gating’ items*

Date	5 March 2014
Template version	2.0
Workstream	Capital markets
Sector(s)	Clean energy and environmental sustainability
Region or country	OECD
Champion 1 + contact	Suzanne Buchta, suzanne.buchta@baml.com +1-646-855-9088
Champion 2 + contact	Sean Kidney, sean@climatebonds.net
Coach 1 + contact	Mike Eckhart, michael.eckhart@citi.com , +1-212-816-8488
Coach 2 + contact	Sean Kidney, sean@climatebonds.net , +44-75-2506-8331
Working group member 1	Jonathan Plowe, j.plowe@baml.com , +1-646-855-2931
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Working group member 4	Mark Fulton, mark.fulton@et-advisors.com , +1-917-655-3182
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net +44-20-3525-8303 (preliminary)

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Background:

In order to bridge the 'Valley of Death' to a clean energy economy, we need to mobilise trillions of dollars in capital investments. The most obvious form of long-term capital injection is through bond investments. In the Green Bond Principles we describe four categories of such 'green bonds':

1. Use-of-proceeds/recourse-to-issuer taxable bonds
2. Muni green bonds
3. Project bonds
4. Securitisation bonds.

Throughout this proposal we will break down our responses across each of these four categories so that the intervention can push the envelope on investment dollars flowing into all four.

Proposed Intervention:

1. Allow US and UK pension funds to allocate investments to green bonds by targeting the advice and guidance approvals of their advisors.
2. Use FiRe connections to target leaders of three key municipalities for issuance of a green muni bond.
3. Use FiRe connections to begin discussions on a clean energy appendix to Basel III and an extension of wind and solar tax credits in the US.
4. Establish a PPA contract standardisation and use FiRe to promulgate this as the market standard.

Each of these goals is feasible with the assistance of a FiRe intervention. Achieving them in concert will double the scale of investor capital into green project financed by green bonds.

Relevant literature

- (2014) Green Bond Principles
- Liebreich, M., (2014) CERES Investor Summit on Climate Risk
- Salvatore, J. (2013) Green Bonds Market Outlook 2013: Ripe pickings at the green bond market
- Salvatore, J. (2013) SolarCity, Calvert and the \$8bn year: an update on the green bond market

Scale & scope

Green Bond types are currently small percentages of the following markets:

- The global investment-grade bond market is ~\$2.5 trillion/yr.
- The US municipal bond market is \$350bn/yr.
- The OECD infrastructure bond market is currently \$20bn/yr.
- The ABS market is ~\$200bn/yr.

Green bonds help finance clean energy, energy efficiency, transportation and other environmental sustainability projects across emerging markets and OECD geographies.

History

In 2013 green use-of-proceeds bonds moved from a niche supra-issued MTN market to a corporate-issued liquid benchmark market. We also saw the first muni-issued green use-of-proceeds bond. Project finance, too, recently entered the capital markets with rated public project bonds such as Topaz and Solar Star. Finally, CS brought the first solar lease ABS transaction from SolarCity in late 2013. In January 2014 the Green Bond Principles were published, providing guidance to issuers, investors and underwriters on transparency and disclosure standards.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	OECD / Clean energy
2) Market size of industry:	\$29bn (outstanding in 2014)
3) Annual investment in industry:	1. \$10bn, 2. \$100m, 3. \$2bn, 4. \$55m
Market growth opportunity:	
1) Future potential market size:	\$67bn (outstanding by end-2015)
2) Future potential annual investment in industry:	\$18bn (2014), \$24bn (2015)
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	See below
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / Pilot / <u>Existing</u> / Other (describe):
Other key metrics:	
We expect to achieve the following targets for each type of green bond for annual investments one year from now and annual investments five years from now:	
1. Use of proceeds GBs: \$20bn (year 1), \$200bn (year 5)	
2. Munis: \$400m (year 1), \$4bn (year 5)	
3. Project bonds: \$4bn (year 1), \$20b (year 5)	
4. ABS: \$200m (year 1), \$2bn (year 5)	

Alternative approaches
Encourage more state and regional development banks to provide support to the development of local and regional project bond markets, through the provision of first loss tranches, co-lending with the private sector, guarantees, technical support etc.
Justification for scale metrics
Market size: We used the following sources, summing where necessary: <ul style="list-style-type: none"> • UoP green bonds: \$19bn total outstanding, \$10bn issued in 2013; Bloomberg • Munis: Mass \$100m done in 2013; this is the first Muni Green Bond • Project bonds: ~\$10bn total outstanding, \$2bn issued in 2011, \$2bn issued in 2012, \$3.5bn issued in 2013; BNEF • ABS: SolarCity \$55m done in 2013 was the first ABS green bond
Market growth opportunity Current total annual investment is \$12.2bn. Even without FiRe, we expect it to increase to \$18bn next year and another \$24bn in 2015. With FiRe we project \$4bn in 2014 and \$9bn in 2015.
FiRe metrics The focus, scale and momentum that FiRe will bring to green bonds will cause current investment flows to at least double within the next year (quadruple for less mature markets) and to increase 10-fold within the next five years.
Other metrics Models exist to calculate these other metrics; however, over time we look for a standardisation of the model(s) used and the metrics chosen.

QUALITATIVE ANALYSIS

Strengths (intervention)

- These markets are already existing and starting to grow; therefore, these are solutions that CAN work if they can be scaled to greater volumes
- Scale should be easy if we can get the required attention from investors and intermediaries
- The attention to these markets from the standard investor base is growing; interest is the precursor to demand; we need FiRe to speed up this process

Weaknesses (intervention)

- Debate about whether use-of-proceeds green bonds move the needle on financing clean energy
- Project bonds still have a lot of risks which create barriers for many investors
- ABS still looking for greater standardisation across PPA contracts

Barriers to implementation

- Lack of issuers willing to do the work to come to market with a use-of-proceeds green bond given lack of pricing benefit
- Lack of knowledge from investors about green use-of-proceeds bonds
- Unwillingness of advisors to change advice and guidance to include green bonds
- Inability to get ratings for projects backing project bonds
- Political opposition to extending tax credits for solar/wind
- Political opposition to changes in Basel III
- Lack of standardisation of PPA contracts to be securitised into an ABS
- Need to understand technology risk profile in aggregated pools
- In some markets, banks are reluctant to release assets for securitisation

Opportunities (market)

- Green use-of-proceeds bonds are liquid, index-eligible securities with the same credit and yield as a normal bond; no approvals required
- Provides investors with the ability to “vote” with their fixed income investments and align their interests with their investments
- Project bonds provide longer-term fixed-income investments for pension funds
- Project bonds and ABS provide potential for higher yields in a low rate environment

Threats (market)

- If we do not achieve scale in the near term, the green bond concept will be marginalised
- Lack of momentum will cause the market to peter out
- Lack of product results in fewer investors allocating attention and percentage of portfolio to the product => remains a niche market

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Identify : i) three key advisors to pension funds each in US and UK, ii) three key muni issuers, iii) target political contacts for US tax credit extension and Basel III qualifications and iv) expert on standardisation	Champion and Team together with FiRe/BNEF network	May 2014
Arrange meetings with: i) advisors to present green bond basics ii) key municipalities, iii) political contacts on tax credits and Basel III and iv) expert on standardisation	Champion and Team together with FiRe/BNEF network	June 2014
Promote Environmental Finance Green Bond conference in London to promote investor education and GBP adoption	Suzanne Buchta Mike Eckhart FiRe/BNEF network	June 2014
Target : i) one US and 1 UK advisor to add green bonds to their advice and guidance, ii) one US muni to issue GB in Q3	Champion and Team together with FiRe/BNEF network	July 2014
Publish regular and distinct league tables for i) green use-of-proceeds bonds, ii) green muni bonds, iii) green project bonds, and iv) green securitisation bonds	Joe Salvatore, BNEF Sean Kidney, CBI	Aug 2014
Publish regular investor stats on who has either green bond funds or portfolio allocation (either percentage or \$ amt) to green bonds	Joe Salvatore, BNEF Sean Kidney, CBI	Sept 2014
With success of one UK and one US advisor adding green bonds to advice and guidance, revisit other two advisors in each of UK and US; with success of one muni issuer, revisit other two munis for Q4 issuance	Champion and Team together with FiRe/BNEF network	Oct 2014
Raise profile of tax credit and Basel III during US congressional elections	FiRe/BNEF network	Nov 2014

Key individuals & organisations

- Suzanne Buchta, Bank of America Merrill Lynch – key role to help raise awareness of use-of-proceeds green bonds with both potential issuer base and with investors and their advisors.
- Maulin Shah, Bank of America Merrill Lynch – key role to speak with US municipalities regarding green bond issuance
- Ray Wood, Bank of America Merrill Lynch – key role to exploit existing pipeline of clean energy projects for financing in the project bond market and liaise with Dan Weiner on Basel III impediments to clean energy project finance
- Mike Eckhart, Citigroup – key roles to target US and UK pension advisors in adding green bonds to their advice and guidance, and to liaise with Dan Weiner on Basel III impediments to clean energy project finance
- Daniel Wiener, CEO of ECOS – key role to advocate for an appendix to Basel III that differentiates capital charges for clean energy projects
- Mark Fulton, ET Advisors and Jonathan Plowe, Bank of America Merrill Lynch – key role to standardise the PPA solar lease contracts for securitisation

Input from FiRe

- Provide contacts with and focus from key advisors who should add green bonds to their advice and guidance for pension funds
- Provide and widely disseminate regular league tables of investors with green bond funds or specific portfolio allocations
- Provide and widely disseminate regular league tables of underwriters in each green bond category
- Produce quarterly BNEF research reports on state of GB market across all GB types
- Promulgate the Green Bond Principles to investors and potential issuers
- Identify pipeline of potential green project bonds
- Provide political contacts for discussion on extending tax credits for wind and solar in order to increase clean energy project finance pipeline
- Provide access to government expert working to adjust Basel III Annex with lower capital requirements for renewable project finance loans to allow for bank balance sheet financing
- Promote standardisation of PPAs for green securitisation bonds

CHARACTERISATION TEMPLATE

INTERVENTION 22: *Sustainable Credit Rating System for Infrastructure Projects*

SUMMARY: *Develop and apply a sustainable credit rating system to reduce borrowing costs of environmentally, socially and economically sound infrastructure projects and projects based securities.*

Date	26 March 2014
Template version	final
Workstream	Capital markets
Sector(s)	Finance and infrastructure
Region or country	Global
Champion 1 + contact	Daniel Wiener, daniel.wiener@ecos.ch
Champion 2 + contact	Scott Harder,, seharder@efg.com
Coach(es) + contact	
Working group member 1	David Bresch, Swiss Re
Working group member 2	Adrian Rimmer, The Gold Standard
Working group member 3	Paul Clements-Hunt, The Blended Capital Group
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net (preliminary)

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Background: 50-70% of the infrastructure that will be in place in 2050 does not exist today. Estimates speak of \$5-6 trillion per year, needed to develop, refurbish and maintain the global infrastructure in the next 20-30 years.

Problem: This unprecedented and fundamental development represents a major opportunity to create the backbone of a sustainable future. Both the supply and demand side of our energy future are determined by the design and configuration of the infrastructure: if we get the planning and construction right, these installations become the most powerful levers for saving CO_{2e}.

Solution: The key strategy is to make the right choices more profitable. The Sustainable Credit Rating would communicate the de-risking potential of distinct sustainability features of infrastructure projects. 10 criteria were identified based on empirical studies and stakeholder consultation, and a methodology has been developed for application at the feasibility stage of a project. Reducing sustainability-oriented risk would allow for lowering borrowing rates by 30-80 basis points. Over a credit period of 10 years a sustainable infrastructure investment of \$100m would thus save up to \$8m. This would make such investments more profitable and create competitive advantage over non-sustainable choices.

Action: The Sustainable Credit Rating Project consists of a) creating a project-based Sustainable Credit Rating capability and b) establishing it alongside of conventional project rating tools.

Point a) will be carried out with the help of a risk team of Swiss Re and backtracked with the support of an established credit rating agency, eg, Standard & Poor's. Point b) is a roll-out and marketing effort, initially funded by the Global Infrastructure Basel (GIB) Foundation with the help of its sponsors. For the first two years, funding has been secured in order to apply the credit rating to 100 projects with a debt capacity of over \$3bn (of which \$2bn are demand-side green infrastructure and \$1bn supply-side renewable energy). This includes the GIB Project Pipeline, which is fuelled by partners such as the C40 Climate Leadership Group, ICLEI, the Gold Standard and multilateral banks. To mainstream the approach, GIB will seek collaboration with established credit rating agencies, asset managers and capital owners. The strategy for the following years will be determined based on the results of the initial phase.

Relevant literature

- Estimates from various sources (OECD, World Economic Forum and others) speak of \$5-6 trillion per year needed to develop, refurbish and maintain the global infrastructure in the next 20-30 years.
- Thomas Idzorek / Christopher Armstrong: Infrastructure and Strategic Asset Allocation: Is Infrastructure an Asset Class? (January 2009)
- Paul Clements-Hunt, Daniel Wiener: Infrastructure for a Changing World, Summary Report on four Round Tables with Investors in London, New York, Cape Town and Hong Kong (February 2013)

Scale & scope

The goal of the Sustainable Credit Rating is to make the added value, including the de-risking potential, of sustainability accessible to capital markets. Institutional investors and other strategic asset allocators are the main source of funding large enough to make a difference. Their main overall concern is to generate superior risk adjusted returns that correlate with their liabilities. With Sustainable Credit Rating and respective cost savings in place, they could be motivated to reallocate over \$10 trillion into sustainable infrastructure within a few years (estimate based on market volume, which is at \$5-6 trillion a year). For the initial phase GIB will focus on the markets of its partners, in Europe, China, Indonesia, South Africa and Latin American Cities.

History

The GIB Sustainable Infrastructure Grading is the result of an empirical study that analysed a large number of infrastructure projects with the help of several hundred experts and stakeholder representatives. Two Swiss government agencies and Swiss Re contributed \$1.5m to the development of the grading, which helps set the course of infrastructure projects at feasibility study stage in 10 key areas: accountability, transparency, balanced partnership, result orientation, resource protection, shared incentives, proactive risk management, sound financing mechanisms, customer focus and poverty alleviation. Version 2.0 is currently available on the website of the Global Infrastructure Basel Foundation www.gib-foundation.org.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Global / finance, insurance and infrastructure
2) Market size of industry:	~ \$500 trillion (in assets)
3) Annual investment in industry:	\$3 trillion
Market growth opportunity:	
1) Future potential market size:	\$1,000-2,000 trillion
2) Future potential annual investment in industry:	\$5-6 trillion
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$10bn/yr (3bn projects and 7bn of securities)
2) Expected implementation time:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / <u>Pilot</u> / Existing / Other (describe):
Other key metrics:	
On the energy demand side, each investment decision for infrastructure can be made in a sustainable way. Expected results:	
<ul style="list-style-type: none"> - Overall cost savings on renewable energy and energy efficiency projects of \$80m in the first two years (rating projects of \$1bn) - Tripling this volume/effect every year for the following five years. - Saving 100k t CO_{2e} by improved design and configuration of infrastructure based on Sustainable Credit Rating in the first two years. 	

Alternative approaches

While Green Bonds lend money to businesses and institutions that develop green infrastructure, the Sustainable Credit Rating represents the bottom-up approach based on project finance. Sustainable Credit Rating assesses a project at inception, while Green Bonds will lend to existing and running installations/assets (eg, in the refinancing business).

Justification for scale metrics

Market size OECD and the World Bank, in their literature, consider the whole infrastructure market as the place where GHG savings can be achieved (on the supply side, the efficient use and the demand side of the equation). Superior Sustainable Credit Ratings will become the main indicator/taxonomy to certify that sustainability criteria have been applied. The growth plan takes into account that the Sustainable Credit Rating Market has yet to be developed and – as every new market – cannot grow beyond a certain rate.

Market growth opportunity Since Sustainable Credit Rating creates competitive advantage for its customers by potentially lowering borrowing rates, market growth opportunities are mainly restricted by the roll-out capacity of the rating agencies (for marketing, for implementation, for monitoring/recertification).

FiRe metrics Cost savings in the credit market make sustainable energy more profitable and thus spur investments. The same is true for infrastructure that mitigates carbon on the demand side. In addition, demand-side management helps avoiding rebound effects, which may be triggered by an abundance of (renewable) energy supply. Growing supplies provoke the injection of cheap fossil energy into the system, which in turn hurts the competitiveness of non-fossil sources. The complexity of these mechanisms make it is very difficult to quantify the effect of the proposal without further studies.

Other metrics GIB Sustainable Infrastructure Grading available and fully implemented.

QUALITATIVE ANALYSIS

Strengths (intervention)

- Strong empirical basis (\$1.8m of research)
- Speaks the language of capital markets (by offering attractive risk-adjusted returns)
- Sends the message: sustainability is more profitable and less risky
- Project-based, early stage, easy to apply
- High leverage, gets to scale quickly
- Catches the attention of mainstream investors
- No need for public policy change
- Strong supporting network of GIB and partners

Weaknesses (intervention)

- Needs to convince capital markets
- Must collaborate with established rating agencies (once system is in place)
- Some evidence based/scientific criteria are qualitative and need to be translated into quantitative assessment
- Track record is only backtracking (like in every new product in financial market)

Barriers to implementation

- Need of funding for marketing (partially resolved, needs to be scaled up further).
- Need of understanding for demand-side approach (in addition to supply side).
- Need of creating a track record (beyond empirical evidence, backtracking and stakeholder dialogue based benchmarking).
- There are basically three possible avenues for implementing the Sustainable Credit Rating, which should be commended by project owners from an independent agency to demonstrate sustainability oriented de-risking features of their projects.
 - One option is to outsource the Sustainable Credit Rating and its distribution to a subsidiary of the Global Infrastructure Basel Foundation.
 - The second option is to partner with an existing, established rating agency that would commit to promote the additional Sustainable Rating in their channels-
 - The third option is to work with one of the newcomers in the rating business. This new player is interested to create competitive advantage and enhanced visibility based on such an innovative offer.

Opportunities (market)

- Sustainable Credit Rating's development is timely, since project finance for infra has doubled within one year and will grow further based on needs.
- Market demand for Sustainable Credit Rating is enhanced by raising concerns regarding effects of non-sustainable solutions (air pollution, floods, droughts, storms, cost of adaptation)
- Capital markets starving for new opportunities, but are looking for de-risking them
- Pension funds and endowments have started to recognise sustainability as in line with their constituent's interest
- Strong engagement of stakeholders and funders

Threats (market)

- Sustainability is still perceived as an obligation or – worse – as a threat to profits, instead of an opportunity
- Markets might be slow in adopting the idea of de-risking with sustainability
- Established rating agencies may feel threatened
- Distrust in public policy regarding infrastructure

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Start working with a risk team of Swiss Re on the methodology (develop the established grading into a rating system)	Swiss RE GIB	April 2014
Present and discuss fundamentals of methodology and alliance of partners at Global Infrastructure Basel (GIB) Summit	GIB Team	21/22 May 2014
First draft (beta) out for discussion in stakeholder groups and leading as well as emerging credit rating agencies for benchmarking	Sustainable Credit Rating Team, including all relevant stakeholders	September 2014
First Sustainable Credit Rating live (Beta) at World Economic Forum; MoUs with major credit rating agencies	Sustainable Credit Rating Team	January 2015
Launch Sustainable Credit Rating Version 1.0 and the Sustainable Credit Rating Partnership (stakeholder platform for establishing the Rating, including major credit rating agencies) at the FiRe Conference 2015	Sustainable Credit Rating Team	April 2015
Rollout the global campaign for Sustainable Credit Rating at GIB Summit 2015 at the GIB Summit	Sustainable Credit Rating Team together with partners	May 2015
First investments and GHG savings through the Sustainable Credit Rating	Sustainable Credit Rating Facility	Summer 2015
Global recognition of Sustainable Credit Rating System, competitors start to seriously look at the space	Sustainable Credit Rating Facility	Winter of 2015/16

Key individuals & organisations

(Potential) stakeholders include:

- Standard and Poor's, Finch, Moody's, Dagong credit rating agencies
- World Bank, IFC, MIGA, GEF, ADB, EBRD, CDB and other MDBs
- 2-3 large pension funds and sovereign wealth funds that invest directly into infrastructure (Calpers, Calstrs, Singapore, Norway)
- 2-3 important investment management firms (BlackRock, Amundi etc.)
- 2-3 of the global banks (Citi, UBS, HSBC)
- 2-3 key contractors and technology providers (Siemens, Arup, GE)
- 2-3 institutions from academia (Harvard, EPFL, Columbia, Tongji)
- 2-3 government agencies.

(Desired) advocacy by:

- UN Secretary General Ban Ki-moon
- World Bank CFO Bertrand Badré
- Doug Peterson, CEO of McGraw Hill
- Christiana Figueres, UNFCCC

Input from FiRe

- Liaise with partners, coaches and launching partners
- Get systematic feedback (eg, by a short survey in the conference app)
- Discuss the concept with representatives of institutions mentioned in the box above in a breakout session (for 2-3 hours)
- Clarify the question of the branding (Green Credit Rating vs. Sustainable Credit Rating) with experts (may be included in the breakout session)
- Finding a partner (eg, from academia) who is interested in working on the complex metrics mentioned in the box "Justification for Scale Metrics"
- Reach out to potential funders
- Being introduced to CEOs of credit rating agencies
- Being introduced to potential investors into the credit rating facility

CHARACTERISATION TEMPLATE

INTERVENTION 23: *Developing a broadly-diversified, forward-looking equity index*

SUMMARY: *Aligning portfolio diversification strategies with climate investment scenarios*

Date	5 March 2014
Template version	2.0
Workstream	Capital markets
Sector(s)	Asset management
Region or country	Non-region specific
Champion 1 + contact	Stan Dupré, standupre@2degrees-investing.org
Champion 2 + contact	Jakob Thomä, Jakob@2degrees-investing.org
Champion 3 + contact	Ulf Clerwall, ulf@2degrees-investing.org
Coach(es) + contact	
Working group member 1	
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net , +44-20-3524-8303 (preliminary)

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

The intervention is designed to develop the methodology for broadly-diversified, forward-looking equity indices that reflect the diversification of the real economy and the alignment of the index constituents' forward-looking carbon strategies with climate and investment scenarios. The intervention will mobilise investment for clean energy investment by changing the portfolio diversification strategy of institutional investors and asset managers.

Currently, cap-weighted equity indices determine the portfolio diversification of passive investors (by default) and a large number of 'closet' active asset managers, who mirror a benchmark index diversification in their portfolios. This is problematic for two reasons. First, cap-weighted indices over-weight 'high-carbon' assets and under-weight climate-friendly assets vis-à-vis their share in the economy. Second, for long-term investors, 'current' diversification does not provide optimal exposure to growing industries and technologies that will take up a growing share of the economy. As a result, current diversification strategies are sub-optimal both from an optimal portfolio strategy perspective and from a climate perspective.

The intervention will develop the methodology for an index that will provide a more optimal economy exposure, while increasing the share of climate-friendly assets in the portfolio of institutional investors. Part of the reason current 'low-carbon' mainstream indices have been unable to address this issue is that they do not provide a compelling case for mainstream investors in terms of satisfying the diversification criteria. This intervention does.

The intervention will be executed in three steps. First, highlighting the extent to which current portfolio diversification strategies bias against clean energy investment and constitute sub-optimal portfolio diversification strategies. Second, using the roadmap currently being developed by the IEA (in partnership with the 2°ii) for the finance sector as a basis for the development of a methodology for a broadly-diversified, forward-looking index. Thirdly, using these two elements to roll out and market the index among institutional investors and asset managers. The bulk of the intervention can be implemented within 12 months (see milestones), with a total timeframe (including development, marketing, and adoption) envisioned of 24-30 months.

Relevant literature

PWC (2014) "Assets under Management: Brave New World"; Vanguard (2011) "A review of alternative approaches to equity indexing"; EDHEC (2010) "Does finance theory make the case for capitalisation-weighted indexing"; Wurgler, Jeffrey (2011) "On the Economics Consequences of Index-Linked Investing"; Fidelity (2013) "Benchmark, Better Beta and Beyond"; Scottrade (2013) "Index Weighting: Cap Weighted or Equal Weight"; Jarvis, William (2013) "Rethinking Asset Allocation: The Case for Portfolio Diversification"; Rudin, Alexander and Jonathan Morgan (2006) "A Portfolio Diversification Index"

Scale & scope

The intervention is set in the context of expected \$23 trillion passive asset management by 2020 (Source: PWC), in addition to the asset managers that benchmark their portfolio diversification on cap-weighted equity indices. The mobilised investment of this intervention will be a function of the extent to which institutional investors and asset managers adopt the intervention to align their portfolio diversification strategies with the diversification of the economy and low-carbon investment scenarios. In this respect, the scale is potentially enormous. The scope thus includes an index that is both 'investable' and can serve as a benchmark for diversification.

History

There is a growing amount of critical literature regarding the use of cap-weighted equity indices and their negative impact on climate-friendly investment. Low-carbon indices attempting to address this issue have remained marginal. The literature has had a limited impact on investment processes, partly due to 'unconvincing' alternatives.

The 2° ii has worked on this issue through its work on 2° investing metrics, research on benchmark investing, and financial regulation. Partners of the 2° ii in this process include HSBC, Allianz, Axa, UNEP-Fi, the French government, MSCI, the IEA, et al.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Global / asset management
2) Market size of industry:	\$63.9 trillion
3) Annual investment in industry:	N/A
Market growth opportunity:	
1) Future potential market size:	\$101.7 trillion
2) Future potential annual investment in industry:	N/A
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$ 25bn/yr
2) Expected implementation time:	<1 year / 1-3 years / >3 years
3) Current stage of development:	<u>Idea</u> / Pilot / Existing / Other (describe):
Other key metrics:	
Key metrics include the level of adoption regarding the new index, the actual share of climate-friendly assets in the new index, the regional breakdown of this adoption vis-à-vis regional investment scenarios/needs. While there are currently no baseline metrics regarding these values, estimates regarding forecasts can be provided. These metrics are being developed as part of the IEA WEO 2014 (where the 2° Investing Initiative is serving in an advisory capacity) and the ongoing research of the 2° Investing Initiative.	

Alternative approaches
The most prominent alternative approach are basic, so-called 'low-carbon indices'. A number of these indices have been developed, including by mainstream index providers. Despite their growth, they have remained marginal. Another alternative is developing mechanisms that will lead to a broader move away from passive index investing to portfolio diversification strategies with a prominent 'climate-friendly' component. While these approaches may be developed in the future, they currently do not exist and would likely require a more fundamental philosophical shift than aligning
Justification for scale metrics
Market size: The market for the intervention is not related to a specific energy or technology, but assets under management, which explains the large market size (either defined as the whole industry or by passive investors directly investing in indices). Investment in industry data is thus not applicable. The actual application of the instrument will then be a function of the adoption of the index by asset managers as a portfolio diversification benchmark and the subsequent share of climate-friendly finance in that index. The market size data is taken from PWC (2014, see literature).
Market growth opportunity: The market growth opportunity is based on PWC estimates of the growth of the asset management industry until 2020 // PWC (2014) "Assets under Management: Brave New World". As outlined above, annual investment in industry data is N/A for this intervention.
FiRe metrics: The intervention addresses the stock of assets under management and not flows, which complicates the flow calculation of FiRe metrics. The FiRe metrics are thus estimates based on assumptions regarding expected index adoption rates, portfolio turnover, market growth, and the share of the clean energy sector in the economy. While some of these variables will remain rough estimates, more detailed explanation of the calculation can be provided for the summit.

QUALITATIVE ANALYSIS

Strengths (intervention)

- The index will satisfy the requirement of portfolio diversification on behalf of investors, while at the same time increasing the share of climate-friendly equities in the index composition.
- Adoption of the index does not require 'climate-consciousness', but simply a more scientific approach to portfolio diversification.
- A new methodology can be further developed by a range of index providers (inc. regional indices).
- The intervention aligns with the growing interest among institutional investors to move away from classic cap-weighted index investing.

Weaknesses (intervention)

- The index does not by itself address the entrenched investment process associated with cap-weighted index investing, which requires increasing the awareness on issues related to cap-weighted indices .
- The intervention is limited to portfolio diversification strategies of asset managers and as a result does not address the specific risk-return profile of climate-friendly investment.

Barriers to implementation

- **Technical issues:** While the intervention can draw on the substantial body of work done on index development and low-carbon indices, technical barriers may arise in the course of the intervention (notably related to data).
- **Barriers to adoption:** Barriers to adoption include winning mainstream index providers as partners in the process and finding support by both the index providers and the investment community in the course of the road-testing and review. A second type of barrier concerns the investability of the index in terms of liquidity and transaction costs of the constituents. These are criteria that are technically important for the adoption of an alternative index. This barrier however is only likely to affect the extent to which the index is 'investable' and not necessarily the role of the index in serving as a benchmark for portfolio diversification.
- **Other barriers:** The intervention is currently only partly funded and requires additional investment in R&D and marketing to be realised.

Opportunities (market)

- The index can be used as both an investable index and a diversification benchmark for active asset management.
- Methodologies can be developed for bond indices.
- The opportunity exists for these indices to be integrated in the process of 'greening' financial regulation (as performance indicators and regulatory benchmarks).
- These indices can provide insight into developing performance and risk indicators that measure the alignment of a financial portfolio with climate and investment scenarios.

Threats (market)

- A potential short-term performance deficit of the newly introduced indices vis-a-vis traditional cap-weighted indices could significantly bias their adoption.
- Entrenching cap-weighted equity indices (implicitly and explicitly) in financial regulation will create barriers for adoption of alternatives.
- The intervention may be stifled by the push-back of the major index providers in terms of developing and adopting alternatives.

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
Publish the investment roadmap for the energy and finance sectors (absolute financial investment needs in different scenarios based on analysis of ownership and sources of financing)	IEA, 2° Investing Initiative, various review board members of the IEA WEO	June 2014
Publication and launch of study on <i>Implications of Benchmark Investing for Long-Term and Climate Finance</i>	2° Investing Initiative (conducted in partnership with HSBC and Allianz)	July/ August 2014
Development of first pilot indicators to be road-tested by index providers	2° Investing Initiative, index providers (MSCI)	December 2014
Review and first road-testing by index providers and asset managers	Index providers (MSCI, etc.), BNEF FiRe + partners	January-April 2015
Planned study on <i>Extending the investment horizon of asset managers</i> (focus on 'beating the benchmark')	2° Investing Initiative + potential partners	February/ March 2015
Present the methodological blueprint for broadly-diversified, forward-looking equity indices at the BNEF Conference 2015	2° Investing Initiative, BNEF, + intervention partners	April 2015
Roll-out new index, marketing, road-shows with major institutional investors, workshops, broad push for adoption	2° Investing Initiative Bloomberg, BNEF, index providers	May 2015 – April 2016
Review and update of intervention, development of next steps vis-a-vis index investing	2° Investing Initiative, BNEF, index providers	April 2016

Key individuals & organisations

- Stan Dupré (Director, 2° Investing Initiative)
- Jakob Thomä (Program Manager China, 2° Investing Initiative)
- Ulf Clerwall (Senior Economist, 2° Investing Initiative)
- IEA World Energy Outlook Special Report Team (Laura Cozzi, Timur Gül, Fabian Kesicki, et al.)
- Nick Robins (UNEP-Fi)
- Annie Degen (UNEP-Fi)
- Frédéric Samama (Amundi)
- Karsten Löffler (Allianz)
- MSCI (Thomas Kuh, Veronique Menou, Linda-Eling Lee)
- BNEF FiRe/Bloomberg (Michael Liebreich)
- Other index providers (FTSE, S&P, etc.)
- Long-term institutional investors functioning as early adopters (pension funds, insurance companies, etc.)

Input from FiRe

- Connecting the intervention with major institutional investors as part of the outreach and adoption of the intervention.
- Support in developing visibility for the issues around benchmark index investing and the potential for alternatives, in particular in terms of mobilising multipliers with regard to changing the narrative on benchmark index investing. This includes providing a platform for the review of the intervention.
- Support in the fundraising necessary to execute the intervention. While the first research piece is financed by HSBC, Allianz and Axa, more funding will be needed to execute the R&D components of the project. Cost estimates are still being finalised and can be provided by the time of the summit.

7. DISCLOSURE

INTERVENTIONS:

24. [CDP: From disclosure to carbon action \(p.127-131\)](#)

CHARACTERISATION TEMPLATE

INTERVENTION 24: *CDP: from disclosure to carbon action*

SUMMARY: *Use sector-specific disclosure to facilitate company engagement in high-emitting sectors and to shift capex to low-carbon technologies with significant carbon emissions reductions*

Date	28 February 2014
Template version	1.0
Workstream	Disclosure
Sector(s)	Disclosure & action
Region or country	Global
Champion 1 + contact	Chris Fowle, chris.fowle@cdp.net
Champion 2 + contact	
Champion 3 + contact	
Coach(es) + contact	
Working group member 1	
Working group member 2	
Working group member 3	
BNEF mentor + contact	Janis Hoberg, jhoberg@bloomberg.net , +44-3525-8303 (preliminary)

Submission to: jhoberg@bloomberg.net

DESCRIPTION

Description

Challenge: Energy, utilities and materials companies represent less than a quarter of the Global 500 but are responsible for well over three-quarters (87%) of scope 1 and 2 emissions. Energy has the highest overall emissions of all sectors, being responsible for 28.3% of total reported Global 500 scope 1 and 2 emissions. Since 2009, the overall emissions of the 10 biggest emitters in the sector have increased by 53% and the sector also has the highest number of companies without emission reduction targets (24%).

CDP: The Carbon Disclosure Project (CDP) is the largest global platform for corporate disclosure on climate change. In 2013, 81% of the FTSE Global 500 responded to the CDP request for climate disclosure, but in the energy sector, the response rate was only 67% (38 out of 55 companies).

Intervention: CDP will increase efforts to improve disclosure rates, quality of disclosure and the emissions reduction performance of high-emitting companies. To enhance efforts to inform and challenge investors and companies on the nature of high-carbon investment, we will expand CDP's Carbon Action programme which enlists motivated investors in a global effort to reduce investment in carbon-intensive activities in high-emitting sectors.

How: CDP will provide investor-focused analysis on the actions and performance of carbon-intensive companies and facilitate investor engagement with those companies through the Carbon Action programme.

Outcome: Efforts to reduce emissions in the energy sector are essential to the global mitigation of climate change. CDP is the only global platform that captures the data investors need to engage with asset owners. Enhancing disclosure of higher-quality data and facilitating engagement will result in increased carbon action by asset owners.

Relevant literature

CDP's 2013 Global 500 report:

<https://www.cdp.net/CDPResults/CDP-Global-500-Climate-Change-Report-2013.pdf>

CDP's 2013 Carbon Action report:

<https://www.cdp.net/CDPResults/Carbon-action-report-2013.pdf>

Scale & scope

Carbon Action has been in place for three years and support from BNEF will increase its visibility and results. The goal is to divert \$20bn of capital away from carbon-intensive activities by the end of 2015, a doubling of the 2012-13 results.

Each year, letters are sent to 300 companies in 17 high-emitting industries, requesting: targets publicly disclosed; emissions reduction (year on year); and ROI-positive investment projects.

History

Backed by 254 institutional investors with assets of \$19 trillion, CDP's Carbon Action initiative aims to accelerate company action on energy efficiency and carbon reduction activities by targeting high-emitting sectors. In 2012, Carbon Action reported reductions of 497MtCO₂e resulting from a total investment of \$11bn in emission reduction activities.

QUANTITATIVE ANALYSIS

Analysis	
Current market size:	
1) Relevant geography and industry:	Global high-emitting sectors: energy, utilities, materials, industrials & automobiles.
2) Market size of industry:	\$33bn invested in 2013 as reported to CDP
3) Annual NPV in industry:	\$15.1bn in NPV of current projects
Market growth opportunity (assuming 10% growth):	
1) Future potential market size in 2015:	\$36.bn
2) Future potential annual NPV in industry:	N/A
FiRe metrics:	
1) Expected annual new finance raised through FiRe intervention:	\$1.5bn
2) Expected time for implementation:	<1 year / <u>1-3 years</u> / >3 years
3) Current stage of development:	Idea / Pilot / <u>Existing</u> / Other:
Other key metrics:	
<p>In 2012, CDP built a financial model in response to a simple question - what do returns from emission reduction activities look like? In our Carbon Action report, we showed that emission reduction activities generate positive returns on investment averaging 33% - well in excess of cost of capital (typically 8-12%). These investments have resulted in reduced emissions of 169MtCO_{2e} (vs. 100MtCO_{2e} in 2012). The increase is due in part to an increase in the number of companies targeted by Carbon Action from 256 in 2012 to 300 in 2013, a 17% increase.</p>	

Alternative approaches
<p>CDP is the only global system for companies to measure, disclose, manage and share environmental information. A regulatory approach to mandating changes in company investment patterns may have a similar effect. In fact, CDP also works to recommend amendments to accounting rules that support capital allocation. This work is done through the Climate Disclosure Standards Board (CDSB), a coalition of climate change and accounting experts working to embed high-quality climate change disclosure in regulatory filings.</p>
Justification for scale metrics
<p>Market size : In 2013, disclosure to CDP revealed that \$33bn had been invested in 1,050 emission reduction projects compared to 860 projects in 2012. The investments had an NPV of \$15.1bn and an IRR of 33.6%. NPV-positive emission reductions projects augment the business case for future investments.</p>
<p>Market growth opportunity : In 2012, the NPV of investments was \$11.7bn across 860 projects, an almost 30% increase in NPV. Assuming a conservative 10% increase in investment and NPV, we might expect \$36.9bn in market size and \$16.6bn annual investment.</p>
<p>FiRe metrics : As more NPV-positive opportunities for emission reductions investments are identified, the market should grow. More companies will be engaged by investors with data from the enhanced disclosure which will in turn support emission reductions investments.</p>
<p>Other metrics : CDP's driving action by inviting more investors to target more companies to allocate capital to emission reductions activities while generating a satisfactory positive return on investment.</p>

QUALITATIVE ANALYSIS

Strengths (intervention)

- Existence of analysis based on 2013 disclosure will facilitate intervention with non-responding companies in 2014
- Carbon Action is part of an in-depth collaborative engagement facilitated through the PRI Clearinghouse. In 2012-13, 14 investors with assets of \$1.5 trillion engaged collaboratively with 26 emission-intensive companies

Weaknesses (intervention)

- Potential lack of investor engagement at sufficient scale. However, Carbon Action already has more than 250 investors globally with more than \$19 trillion in assets
- Poor disclosure of target details and quality of targets. For example, some companies have not disclosed key information which helps to evaluate the quality of a target, while others have disclosed details after the target has concluded, or have disclosed targets that apply to a minority of the company's emissions

Barriers to implementation

- Company resistance to setting emission reduction targets. Some feel that setting absolute or intensity targets related to emission reductions will limit their opportunities for growth. The analysis provided by CDP, with the input of BNEF, should point to specific examples of NPV-positive investments that both reduce emissions and contribute to the bottom line
- Receptiveness of companies to diversity their business mix given long-term nature of technology investments. As part of its disclosure process, CDP is focusing on sector-specific issues for oil and gas, for example. Benchmarked capex information will help companies determine best-practice investment strategies. BNEF can assist in driving to 100% adoption of the oil and gas sector supplement as an industry standard for disclosure
- Facilitation of engagement with 'mainstream' investors who have not traditionally focused on environmental issues. Asset owners, particularly endowments and pension funds, are the natural fit for long-term focus on emission reductions activities. BNEF can help with an effective communications strategy aimed at enlisting the widest possible range of investors. Proactive investors have a range of issues on which they choose to engage companies and our goal is to make this a primary priority for asset owners

Opportunities (market)

- Shifts in investment patterns to low-carbon technologies
- Carbon Action is designed to increase understanding of portfolio company carbon management and energy efficiency initiatives and to increase risk management in areas including regulation, operations, fiduciary duty and reputation
- Investors benefit from corporate climate and energy management data, analysis of emissions, targets and investments in emission reduction activities and engagement facilitation

Threats (market)

- Company reluctance to set emissions targets and make emission reductions investments
- Company resistance to engagement by investors
- Policy within companies. CDP's question on policy helps make company policy strategies more transparent. Recent media stories on GE & Apple's responses to the National Center for Public Policy Research engagement highlight the need for further climate-related policy transparency

ACTION PLAN

Action plan + timeline for implementation

Milestone	Relevant actor	Date
The action plan + timeline illustrate the cyclical and on-going nature of the Carbon Action program. As the new round of 2014 disclosure is occurring, company/investor engagement is already happening based on the 2013 results.		
CDP facilitates engagement with high-emitting companies by Carbon Action investor signatories to encourage disclosure and action using evidence from 2013 disclosure cycle.	CDP, Investors, facilitated by CDP	April – October 2014
Analysis of 2014 disclosure results in preparation for the next round of engagement with companies encouraging action	CDP, BNEF stakeholders	June – August 2014
Engagement with companies based on 2014 disclosure results and analysis	Investors, facilitated by CDP	October 2014 – October 2015
Kick-off of annual CDP disclosure cycle	CDP	February 2015

Key individuals & organisations

- James Hulse, CDP, Global Head of Investor Initiatives
- Chris Fowle, CDP, Investor Initiatives North America

Carbon Action Signatories: 254 investors representing assets of \$19 trillion. CDP offers signatories the choice to engage with companies either by joining collaborative engagement coordinated by the PRI, or through individual dialogue with companies. CDP supports investors by providing analysis and benchmarking tools, background information on each company, coordinating individual or joint letters and where appropriate helping investors to file shareholder resolutions.

UN PRI Clearinghouse has helped facilitate investor engagement with companies for the Carbon Action programme. In 2012-13, 14 investors with assets of \$1.5 trillion engaged collaboratively with 26 emission-intensive companies.

Input from FiRe

- **Awareness:** The more investors understand the need for and usefulness of CDP disclosure, the more successful engagement with companies will be both in terms of higher-quality disclosure and in terms of evidence justifying action.
- **Analysis:** The disclosure received from high-emitting companies provides the justification for companies to make investments in low-carbon technologies. Successful, NPV-positive projects with returns equal to or better than alternative capex options prove the business case that CFOs are seeking.
- **Reporting:** Tracking of re-directed capital as reported by companies. BNEF stakeholders can identify technologies that have performed well, highlighting them to companies. Publicity will also play a role in emphasising the need for more disclosure, analysis and engagement.
- **Funding:** As an NGO, CDP's work is supported by a diverse mix of grants, membership and fee for service options. To support prioritised, dedicated focus, enhanced staffing for disclosure engagement and analysis of results and carbon action is critical.