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# REVIEW OF THE TRANSFORMING ENERGY ACCESS FOR HOUSEHOLDS AND IMPROVED LIVELIHOODS PROGRAMME

Final Report, March 2020

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## Disclaimer

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## List of acronyms and abbreviations

ACE	Africa Clean Energy
AfDB	African Development Bank
AMI	African Management Institute
BEIS	Department for Business and Energy Strategy
BSEAA	Bioenergy for Sustainable Energy Access in Africa
CCG	Climate Compatible Growth
CDC	CDC Group plc
CEPs	Clean Energy Partnerships
CO <sub>2</sub>	Carbon dioxide
DFI	Development Finance Institution
DFID	UK Department for International Development / UK Aid
E4I	Energy 4 Impact
EEG	Energy and Economic Growth research programme
ESMAP	Energy Sector Management Assistance Program
EV	Electric Vehicle
GCRF	The Global Challenges Research Fund
GDC	Global Distributors Collective
GESI	Gender, Equality, Social Inclusion
GOGLA	Global Off-Grid Lighting Association
IUK	Innovate UK
KPIs	Key performance indicators
LCEDN	Low-Carbon Energy for Development Network
LDC	Least Developed Country
LEIA	Low-Energy Inclusive Appliances
M7E	Monitoring and evaluation
MGCR	Mini-grid coordination, research and cost reduction
MoU	Memorandum of understanding
ODA	Overseas development assistance
OECD-DAC	Organisation for Economic Co-operation and Development Development Assistance Committee
OGTI	The Off-Grid Talent Initiative
PEII	Acumen Pioneer Energy Investment Initiative
P2PS	Peer to Peer Solar
PIDG	Private Infrastructure Development Group
PMO	Programme Management Office
POP	Powering Opportunities Partnership
PowerUp	Strengthening National Renewable Energy Associations
RPDC	Research Programme Delivery Consortium
SDGs	Sustainable Development Goals
SED	Developing Local Skills and Expertise
SHS	Solar Home System

SRO	Senior Responsible Officer
STFC	Science and Technology Facilities Council
SE4All	Sustainable Energy for All
TEA	Transforming Energy Access
TIME	Transforming Inclusive Energy Markets
UK	United Kingdom
USEA	Uganda Solar Energy Association

## Executive summary

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In 2016 the UK Department for International Development / UK Aid (DFID) introduced the Transforming Energy Access (TEA) programme to support the development of innovative technologies, business models, partnerships and skills that in turn could accelerate the access to affordable, clean energy services for households and enterprises in developing countries.

This report is the main output of the independent Mid-Term Review (MTR) of the TEA programme commissioned by the Carbon Trust and carried out by Ripple Economics Ltd (the 'MTR Team'). It sets out key findings and recommendations to support the adaptive management of TEA, based on the analysis of 35 semi-structured interviews and a review of a collection of relevant programme literature.

The review seeks to answer four key questions:

- 1. What have been the main TEA programme achievements per workstream?**
- 2. How has the TEA programme modality performed as a whole?**
- 3. What operational improvements and related changes are required within the existing programme scope?**
- 4. What operational improvements and related changes are recommended in the context of new partnerships being formed, such as in a scaled-up version as part of the new Ayrtton Fund?**

### **Q1. What have been the main TEA programme achievements per workstream?**

The relevance of TEA in addressing the energy access challenge was confirmed by all interviewees. TEA is providing pertinent support through its various workstreams through addressing the lack of energy access, generating new opportunities, and improving the well-being of low-income households. In regard to individual workstream performance, TEA has achieved the following results.

#### Stimulating Technology Innovation component run through Innovate UK's (IUK)'s Energy Catalyst competition

Energy Catalyst workstream has consistently scored high (A and A+ respectively) in the latest DFID annual reviews and has delivered well on its output indicators over the past year. Given the workstream's success, an additional total allocation of £17 million was made to Energy Catalyst in March 2019, on top of the standing budget of £18 million. Most interviewees stated that Energy Catalyst provides much-needed and timely support for the stimulation of new ideas and early-stage projects. In

terms of challenges, Energy Catalyst's model was described as not able to support the transition to commercially sustainable businesses. Energy Catalyst is working towards improving its financial management and forecasting and impact reporting. Going forward, some interviews suggested that Energy Catalyst should improve its incubation/business support (via the new Energy Catalyst Accelerator Programme).

#### Accelerating Enterprise-Led Innovation in Technologies and Business Models co-funded by DFID and the Shell Foundation via the Transforming Inclusive Energy Markets (TIME) partnership

Rated A+ in the latest annual review, the TIME partnership between DFID and the Shell Foundation has achieved all of its outcome targets and most output indicators have now been reached or exceeded. Good results have been achieved in three areas: (i) expanding household energy to new regions, including fragile states, and launching new appliances for low-income households; (ii) providing support to small and medium-sized enterprises and farmers to access cleaner and more reliable power; and (iii) promoting in market development by gaining traction with key stakeholders.

Over the past year, the Shell Foundation has scaled up its efforts to reach African-owned businesses and has continued to establish stronger links with the rest of the programme, as well as supporting more finance or market enablers for a greater reach. Furthermore, the transition of five TIME grantees to the new DFID-funded programme Catalysing Agriculture by Scaling Energy Ecosystems (CASEE) has evolved TIME's Energy for Business portfolio towards income-generating appliances and circular economy businesses. A large majority of respondents described the Shell Foundation as having a broad network and expertise in the energy space and TEA ecosystem, as well as a strategy for how to influence the sector (e.g. what businesses are required to make a difference). These features may, in turn, have helped TIME to deliver ahead of targets. Interviewees highlighted that TIME could improve its transparency (for project selection), portfolio diversification and risk management. It should continue to expand the share of African-owned enterprises, maximise linkages to UK capabilities and the rest of TEA, and develop updated approaches to clean cooking, next-generation utility models, climate mitigation, and universal electrification approaches in a geographical territory, for potential scale-up under the Ayrtton Fund.

#### Clean Energy Partnerships (CEP) programme

The CEP programme is on track to meet most target indicators and it was rated A in the latest annual review – an improvement from the B obtained in 2019. All partnerships are now contracted and have experienced an extended period of implementation, with the Acumen

Pioneer Energy Investment Initiative (PEII) and the Global Distributors Collective (GDC) showing particularly high performance. Interviewees suggested that the CEP programme has had many positive co-funding and innovation stories, but the funded projects have produced mixed results. CEP partners have been raising considerable amounts of money while also producing good research outputs. Acumen PEII (one of TEA's fast-track projects) has completed deliverables ahead of time and deployed the largest amount of capital so far per annum in the past year. GDC, which now has a membership of 140 last-mile distributors, has met or surpassed nearly all targets. Energise Africa had a successful year, reaching £15 million raised from 1,400 investors and running its first £1 million campaign for BBOXX. The Powering Opportunities Partnership (POP) experienced contracting delays after running two over-subscribed challenge funds and awarding a portfolio of high-quality and unique projects. Strengthening National Renewable Energy Associations (Power Up) is on track to meet its indicator targets. Under the Crowd Power Phase 2 project, Energy for Impact (E4I) has supported four campaigns in Myanmar, Zambia and Nigeria, and has developed a series of knowledge products: Crowd Power's State of the Market 2018 report, a white paper on loan syndication, a loan syndication study and an equity crowdfunding feasibility study (to be published in March 2020). Both literature and interview data indicate that the CEP programme's research uptake strategy can still be improved.

#### Skills and Expertise Development (SED)

All SED projects are underway and building the capacity required to scale up energy access in the short and long term. The workstream (rated A in the latest annual review) is on track or has exceeded most output indicators. Interviewees suggest that SED has produced mixed results but overall the academic institutions involved in the programme have worked well to design and deliver it. Eight African universities have been selected for the support to design and deliver TEA-related master's courses and programmes under the TEA Learning Partnership. The Off-Grid Talent Initiative (OGTI) is performing well, with the appointed contractors' Shortlist/African Management Institute (AMI) getting off to a very quick start. Interviewees suggested that Shortlist received positive feedback from clients, who immediately moved to sign up employers and applicants. The Low-Carbon Energy for Development Network (LCEDN) fast-track project has now delivered its final outputs and has closed out.

#### Faraday Overseas Development Assistance (ODA) Energy Storage Challenge

The Faraday Institution and Shell Foundation have been developing quick synergies in energy storage and their collaboration progressed very quickly. £3 million of the

scale-up funding was allocated via the Faraday Institution, set up by a coalition of leading universities, with funding from the Industrial Strategy Challenge Fund, to be the UK's leading institution on energy storage science.

Overall, most respondents indicated that the benefits of TEA are starting to emerge, as the focus is shifting to measuring outcomes and impacts. Regarding the achievement of outcomes, the programme has improved the lives of 2,399,959 females and 2,814,274 males – well above targets – and has created 14,494 generation/supply jobs for females and 40,088 for males. However, on the energy demand/use side, there has been no reported progress to date. Furthermore, £222 million private sector investment and £31 million public sector investment was leveraged, and 627,179 tonnes of carbon dioxide (CO<sub>2</sub>) have been avoided. Regarding innovation, 123 new energy access technologies have been prototyped and/or demonstrated in Africa, most of them funded by Energy Catalyst. Only 14 innovative businesses models have been tested in Africa, funded by TIME and Energy Catalyst.

Partnership creation is a crucial value of TEA. For example, M-KOPA is widely considered a success case, having developed strong partnerships and being supported through its growth process with different sources of finance. GDC focuses on the bottom of the pyramid and has so far enabled other TEA partners to further their own commitments to 'leave no one behind'. IUK has been beneficial in connecting Mobile Power with other companies interested in its technology. KopaGas, after a long and challenging process, has benefited from funding from Acumen. In-person interactions are very much valued, in particular for new joiners, but more can be done to encourage partnerships between UK companies and international partners. Overall, the value of each partner is well understood and there is limited competition. However, there is a trade-off between local- and regionwide-level content, especially on skills development, and TEA's hub in Nairobi is perceived as not being sufficient to address this.

For some, TEA's financial support is broadly considered to be innovative as it has allowed the leveraging of finance across the capital spectrum and through taking more risk than a commercial investor. TEA is trialling a number of very different approaches with a broad set of partners, including engaging with other risk-taking programmes in the sector. TEA funding can also decrease the lead time from idea/prototype to go-to-market, which is very necessary in order for countries with limited access to energy to leapfrog to clean energy. For others, TEA is not taking enough risk: it is reaching the poor, but not the bottom of the pyramid. It should manage the balance between reducing market distortion and kick-starting the market better. Grant calls are not designed to reduce risk



and access wider applicant pools (especially from Southern applicants). Furthermore, TEA is not doing enough on financial innovation, and contractual liability reduces the ability to take risks and also puts the burden of more risks onto beneficiaries.

Transformational change is at the core of TEA, which is evident both in its name and outcome indicators. The purpose of monitoring transformational change in the context of TEA is to encourage thinking forward and to ensure the programme's adaptive design and management levels implement the changes that are needed. TEA is now well established as an umbrella programme, with successful independent workstreams, but more can be done to unlock its potential as a whole.

TEA is ready to move towards a new phase focusing on coordinating efforts to maximise the chances of achieving transformational change. Stakeholders interviewed identified four areas that were acknowledged as unique to TEA and that have the potential to catalyse change: i) TEA strikes a good balance in supporting early-stage innovation that is ready to be tailored and tested in new locations; ii) TEA has a complementary and innovative approach to funding risky investments; iii) TEA proactively engages with the private sector; and iv) TEA is driving innovation and skills development on the ground.

Sustainability and 'exit' strategy are intended differently by interviewees. At the programme level, some considered it too early to focus on exiting as the programme is still midway into implementation. Some believe sustainability should be differentiated between workstreams, and before exiting a number of areas need to be strengthened (there is a need for knowledge creation and dissemination, more funding to more projects and companies and progress in co-funding and development of leads; some also considered it necessary to link the programme with policy). At the corporate finance level, most companies have not yet discussed commercial exits.

## **Q2. How has the TEA programme modality performed as a whole?**

The preferred option for TEA's implementation modality, as per the Business Case, combines expanding proven delivery channels (the Shell Foundation partnership, TIME), supporting open competitions (IUK's Energy Catalyst), and commissioning studies and research through the Research Programme Delivery Consortium (RPDC); it is also responsible for overall reporting, results monitoring and dissemination. TEA's choice of implementation modality allowed the programme to produce fast results and bring together a wide range of institutions and projects working towards a common goal: i) memorandums of understanding (MoUs) with IUK and the Shell Foundation allowed TEA to fund projects

without delays; and ii) the TEA set-up allowed DFID to outsource project management functions.

The monitoring and evaluation (M&E) systems, led by RPDC, are set up according to the RPDC M&E Strategy and in accordance with the standards of the Quality Management Strategy document. Responses on the adequacy of the M&E system were varied. For most respondents, the structure and requirements are suitable, and guidance and support are readily available from RPDC. However, some implementers were more critical, feeling not well informed about the theory of change and logframe, and stating that current reporting templates are prescriptive and fail to capture useful information – for example, on lessons learnt. DFID's commitment to keeping implementers focused on impact has pushed them to think through metrics and reporting better.

There are mixed opinions on the suitability of TEA's Gender, Equality, and Social Inclusion (GESI) strategy. Issues due to the differing timings for strategy implementation among partners, inadequate reporting guidance and frameworks, and a lack of clarity on the real motive behind GESI mean that results are slow to emerge. The enterprises involved in the TEA programme could benefit from a diagnostic tool on gender.

RPDC provides an adequate level of communication and guidance about operational issues to TEA implementing partners. The programme has now established a regular communications plan, including bi-annual calls and annual review meetings. However, communications about strategic issues and TEA thematic areas can be strengthened and there is no clear strategy to enhance collaboration. The annual review meeting in 2019 was very well received by interviewees not working directly with TEA.

There is so far limited dissemination of TEA's findings. TEA has a limited online presence, which could be improved and used for dissemination. However, there are mixed opinions about the creation of a 'TEA brand'. TEA should rapidly design and start implementing a knowledge dissemination strategy that fits the programme's needs, with concise knowledge products to enhance the dissemination of innovations, findings and lessons learned.

TEA's aim of increasing energy access focusing on the off-grid sector complements other DFID-funded applied research programmes, but stronger cooperation could be beneficial. More effort can be put into clarifying how TEA fits within DFID – in particular, with country offices and the Policy Division. Within DFID, TEA actively interacts with other DFID energy programmes (Energy and Economic Growth programme (EEG), Africa Clean Energy

(ACE), Results-based Financing for Low-Carbon Energy Access). RPDC has limited interaction with other energy-related DFID-funded initiatives (CDC Group Plc (CDC), Private Infrastructure Development Group (PIDG)).

### Q3. Recommendations for the short-term future of TEA

The TEA programme should continue facilitating partnership building and improving coordination and communication between partners. A more structured and systematic approach should be developed, including through:

- bi-annual calls and annual meetings used more proactively, and potentially more frequently, as opportunities to enhance partnerships and collaboration
- structuring engagements through themes that cut across the different workstreams
- allowing more time for bilateral meetings and smaller group settings
- facilitating more Southern-based and -focused interactions and events

Whilst the value addition of each member was well recognised by respondents, more can be done by the programme to improve localisation. This includes expanding regional hubs (not only Nairobi) and developing technical assistance that is tailored to each country. Given DFID's priorities, focusing more on 'leaving no one behind', not only on the poor, will increase the likelihood of TEA reaching its goals. This can be achieved by keeping riskier investments, such as GDC's, in the portfolio, developing an approach for harder-to-reach countries, developing innovations to reach last-mile consumers and more marginalised societies, and supporting companies to reach the poorest and most marginalised. It is recommended to scale up efforts on financing and increasing risk appetite. Improving interaction with policy is also considered necessary to catalyse change.

RPDC now has processes in place to manage TEA adequately. For the remainder of the programme, TEA can focus on being 'operationally good' by using the existing infrastructure to support the delivery of the programme and test the market appetite. This includes technical and financial reporting structures, forecasting and invoicing.

Some contractual clauses between the Carbon Trust and DFID have knock-on effects for the implementers and are worth revisiting. Almost all interviewees agreed that more work needs to be done to make TEA more than the sum of its parts. Stronger focus on measurement of outcomes and impact is needed. Further development of research uptake and dissemination of findings are considered a priority. As TEA is just starting to produce findings, it will be very important to focus on ways to

efficiently disseminate them. Better connection to other programmes will also be necessary.

### Q4. Recommendations for the future beyond TEA

All interviewees were asked to identify areas of future focus, and responses were triangulated and organised into the following categories: strategy and modality, skills and business support, finance and market innovation.

Beyond TEA, it will be necessary to reshape the programme; DFID's 'Investing in a better world' (2019) report can help to frame the strategy. Whilst there will always be a need for innovation and research in energy access, a Sustainable Development Goals (SDGs) multi-layered approach will be needed. Consideration of the 'Africa Strategy' that is being developed will be key. It is broadly agreed that a different modality is needed if the programme is expected to scale up considerably, and the main partners are currently considering what the future will look like. Localisation issues will need to be managed even more, and a stronger climate lens will be required.

The Shell Foundation is currently considering how to scale up venture building. Large amounts of funds are needed to fund non-human resource gaps, and it may be necessary to engage beyond the higher education sector in Africa in order to increase dissemination.

A full scope of instruments across the capital spectrum will be required. In particular, through scaling up of the programme, more commercial finance will need to be attracted, in addition to (early-stage) equity. Non-return forms of capital will still very much be needed, and more research on their impacts will be key.

Themes indicated as priorities to scale up beyond TEA include consumer protection, productive use of energy, clean cooking, off-grid/on-grid integration, urban poor, electric mobility, other geographies and research. Technologies include the next generation of solar and appliances, mini-grids and energy storage.

## SECTION 1: Introduction and background

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**The Transforming Energy Access (TEA) programme** is a research and innovation programme, funded by the UK Department for International Development (DFID), supporting the development of innovative technologies, business models, partnerships and skills that will accelerate access to affordable, clean energy services for households and enterprises in developing countries. TEA is implemented by the Research Programme Delivery Consortium (RPDC), under the leadership of the Carbon Trust, the Shell Foundation and Innovate UK (IUK). DFID is providing up to £99 million<sup>1</sup> through TEA until 2024.

**This report is the main output of the independent, Mid-Term Review (MTR) of TEA.** Its aim is to share findings and provide recommendations for the programme going forward.

TEA is divided into six main workstreams:

- **Stimulating Technology Innovation, led by IUK’s Energy Catalyst (£34 million, scaled up from £15 million).** Through annual open calls, this programme supports the development of low-carbon technologies and business models which meet the energy trilemma of affordability, reliability and low-carbon, and which target developing country energy needs<sup>2</sup>.
- **Accelerating Enterprise-Led Innovation in Technologies and Business Models (through Transforming Inclusive Energy Markets - TIME) (£30 million)** led by Shell Foundation. Through hands-on co-creation, incubation, catalytic grants and repayable grants, TIME supports energy innovations at household, business and off-grid utility scale via action research, market-enabling actions and the creation of new financial mechanisms. DFID and the Shell Foundation have committed £30 million to this programme to date<sup>3</sup>.
- **The Clean Energy Partnerships (CEPs) programme (£16.5 million, scaled up from £10 million).** Managed by the Carbon Trust, the CEPs programme seeks to address market barriers across a sub-sector that a single entrepreneur or researcher could not overcome on their own. This programme funds work and partnerships ranging from support to mini-grid research and development to innovative crowd investment platforms. CEPs are managed via the RPDC and involve seven different sub-sector partnerships targeting a range of finance, industry voice, last-mile delivery and sector cost-base challenges, as well as other challenges. As part of the scale-up, four new African-led partnerships are being added. The previous Bioenergy Component 5 has been merged with the CEPs programme from an administration and reporting perspective<sup>4</sup>.
- **Developing Local Skills and Expertise (SED) (£5.7 million, scaled up from £5 million).** Managed by the Carbon Trust, SED supports initiatives that tap into broad-based academic knowledge. These are the TEA Learning Partnership, which is supporting African universities to develop new curricula for the energy access sector, and the Off-Grid Talent Initiative (OGTI), which aims to improve the skills and expertise of African talent and to facilitate the pursuit of careers in the off-grid energy sector. SED started with a research project with the Low-Carbon Energy for Development Network (LCEDN) but is now solely focused on OGTI<sup>5</sup>.
- **Faraday Overseas Development Assistance (ODA) Energy Storage Challenge (£3 million from DFID plus £7 million from the Energy Catalyst).** This is a new component (added in 2019), working in collaboration with the UK Business Energy and Industrial Strategy (BEIS), which will research

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<sup>1</sup> The budget was increased to £99 million in March 2019 from an original £65 million in 2016, which has enabled the RPDC to evolve and support further services.

<sup>2</sup> TEA. (2020). ‘Annual Review’. Draft.

<sup>3</sup> *Ibid.*

<sup>4</sup> *Ibid.*

<sup>5</sup> *Ibid.*

the opportunities that different battery storage technologies can provide in regard to supporting energy access. The Faraday Institution is leading research in primary battery science, with £3 million, while £7 million of industrially led research is supported via Energy Catalyst<sup>6</sup>.

- **RPDC (£4.4 million).** The RPDC coordinates all TEA components, including programme management, reporting and evaluation, and communications. Three ‘value-added monitoring and evaluation (M&E)’ services have been added this year: energy portfolio analytics, gender mainstreaming, and lean data.

Table 1 presents a portfolio overview of TEA, including fast-track projects which started earlier on in order to accelerate critical work and mitigate the impact of delays in commencing scoping studies, and reviews on projects managed by the RPDC. These are: Acumen Pioneer Energy Investment Initiative (PEII), Energise Africa and LCEDN.

**Table 1. Programme portfolio showing budget allocation**

Work-streams	Lead implementers	Projects/beneficiaries	Budget			Fast-track
			Original	Additional	Other (e.g. co-funding)	
Stimulating Technology Innovation	IUK’s Energy Catalyst	116 projects in total	£18m	£17m (£5m for R6; £7m for R7; £5m for R8)	£15m (Global Challenge Research Fund (GCRF) support for R7 for Faraday ODA) £10m (BEIS for R7 for Faraday ODA)	
TIME	Shell Foundation and DFID	Household energy (e.g. M-KOPA)	£30m	N/A	£30m (co-funding from Shell Foundation)	✓
		Energy for business (e.g. BBOXX)				
		Off-grid utilities (e.g. Nigeria Electricity Sector Programme)				
		Access to finance (e.g. Lendable)				
		Market development (e.g. Global Off-Grid Lighting Association (GOGLA))				
CEPs programme	Energy for Impact (E4I)	Peer-to-peer solar (Energise Africa)	£10m	£6.5m	N/A	✓
	E4I	PEII				✓
	E4I	Powering Opportunities Partnership (POP)				
	E4I	Crowd Power Phase 2				
	Crossboundary	Mini-grid coordination, research and cost reduction (MGCR)				
	Practical Action	Global Distributors Collective (GDC)				
	GOGLA	Strengthening National Renewable Energy Associations (PowerUp)				
	LTS International	Bioenergy for Sustainable Local Energy Services and Energy Access in Africa (BSEAA)				
SED	University of Cape Town	TEA Learning Partnership	£5m	£700k	N/A	
	University of Cape Town	OGTI				

<sup>6</sup> Ibid.

	Loughborough University	Academic-, skills- and expertise-relevant partnerships (LCEDN)				✓
	RPDC	Africa-led skills and expertise partnerships: strengthening public national stakeholders in energy access in sub-Saharan Africa and TEA Learning Partnership Mentoring for Research Programme				
Faraday ODA Energy Storage Challenge	Universities of Lancaster, Sheffield and Cambridge, Oxford, University College London and Science and Technology Facilities Council (STFC)	Supporting the development of sodium-ion batteries for developing country applications (NEXGENNA)	£3m from Faraday Institution	N/A	£7m from Energy Catalyst £10m from BEIS	
	Faraday Institution	Research into alternative energy storage technologies				
	World Bank, Shell Foundation and the Global Battery Alliance	Supporting international energy storage research and collaborations				
RPDC	Carbon Trust	Coordination, communication, M&E, compliance and value-adding integration support	£4.4m		€5m from IKEA Foundation, matching £5m from DFID in POP Productive Energy Use, £502k from US Agency for International Development (USAID), matching £600k from DFID in POP e-waste component £4,849,110 private sector co-funding across the POP projects	
	Carbon Trust and TEA partners	Energy portfolio analytics	N/A	N/A		
	60 Decibels	Lean data	N/A	N/A		
	Value for Women	Gender support	N/A	N/A		

The graphical representation of TEA's original theory of change is included in Annex 1. The diagram in Figure 1 provides more detail on the positioning and interaction of the six different workstreams, and on how they impact distinct parts of the clean energy access ecosystem.

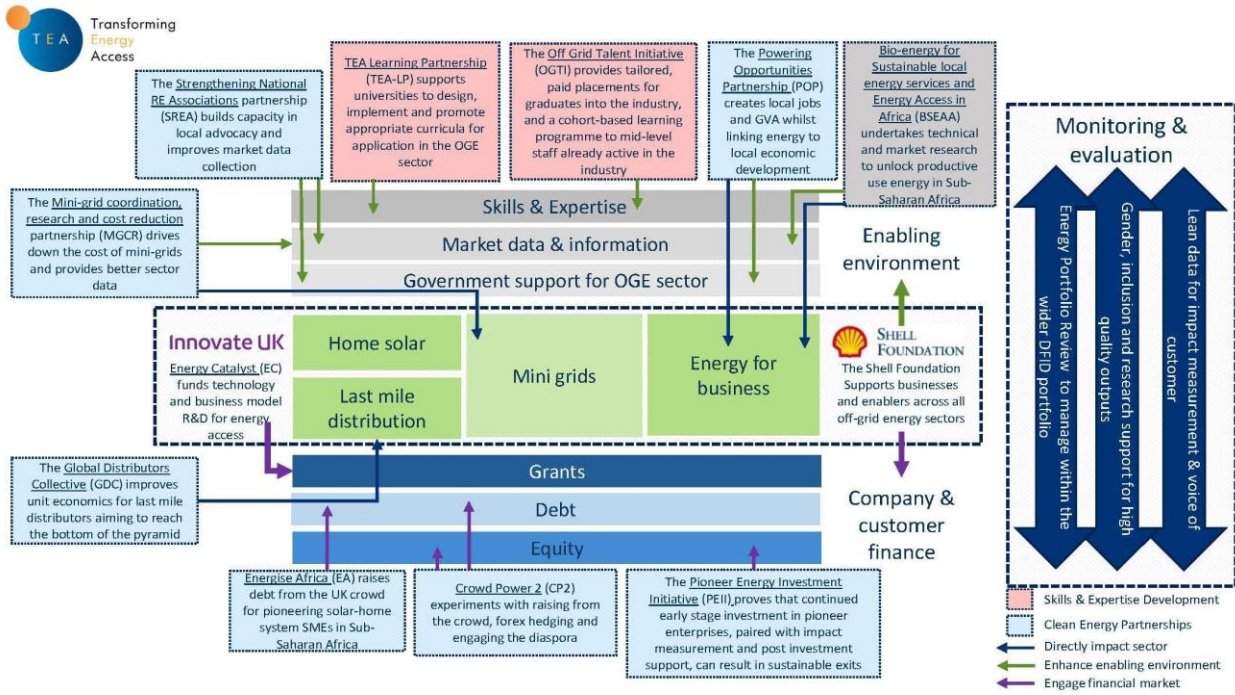


Figure 1. Overview of the TEA programme (Source: Carbon Trust, 2019)

## SECTION 2: Approach and methodology

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### 2.1. Scope of work

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**In December 2019 Ripple Economics Ltd (the ‘MTR Team’) agreed on the scope of work for this MTR<sup>7</sup> with DFID and the Carbon Trust, focusing on the following review questions:**

1. What have been the main TEA programme achievements per workstream?
2. How has the TEA programme modality performed as a whole?
3. What operational improvements and related changes are required within the existing programme scope?
4. What operational improvements and related changes are recommended in the context of new partnerships being formed, such as in a scaled-up version as part of the new Ayrton Fund?<sup>8</sup>

**The MTR Team accordingly designed and tailored the review’s approach, methods and tools.** The findings in this report are structured around the questions set out above.

- Section 2 describes the data collection and analysis activities employed in this study (further details on the scope and the review questions are included in the detailed review matrix in Annex 2).
- Section 3 analyses the programme’s achievements per workstream and presents key findings regarding TEA’s progress towards outputs, outcomes and impact (i.e. second review question).
- Section 4 summarises the results of the MTR analysis of the second question, which is related to programme modality.
- Section 5 draws upon the previous two sections and presents recommendations and specific guidance regarding some immediate changes that if enforced, will allow the TEA programme to achieve its goals.
- Section 6 introduces reflections and recommendations on future phases of TEA and the Ayrton Fund.

### 2.2. Methodological approach

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Our methodological approach takes account of two key success factors:

- **The approach needs to assess and promote transformational change.** We used the International Climate Finance definition of transformational change, as defined in the footnote below<sup>9</sup>. The purpose of monitoring transformational change in the context of TEA is to encourage thinking and programme design that brings about the sorts of transformations that are needed<sup>10</sup>.
- **The findings and recommendations of this review need to support the adaptive management of TEA.** Our approach aims to learn from failures, not just successes, and to generate conclusions that inform the uptake of pragmatic changes in the management and implementation of TEA’s workstreams.

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<sup>7</sup> For more details on the scope, methodology and approach, please refer to the MTR Inception Report.

<sup>8</sup> Up to £1 billion of aid funding is being made available to unleash the talent of British scientists and global innovators to tackle climate change: [www.gov.uk/government/news/british-scientists-to-help-tackle-climate-change-through-new-1-billion-fund](https://www.gov.uk/government/news/british-scientists-to-help-tackle-climate-change-through-new-1-billion-fund)

<sup>9</sup> By transformational change, we mean ‘change which catalyses further changes’, enabling either a shift from one state to another (e.g. from conventional to lower-carbon or more climate-resilient patterns of development), or faster change (e.g. speeding up progress on cutting the rate of deforestation). However, it can entail a range of simultaneous transformations of political power, social relations, decision-making processes, equitable markets and technology. Source:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/813600/KPI-15-extent-ICF-intervention-lead-transformational-change.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813600/KPI-15-extent-ICF-intervention-lead-transformational-change.pdf)

<sup>10</sup> HM Government. Climate Change Compass. (2018). ‘Extent to which ICF intervention is likely to lead to Transformational Change’, pp. 1–21.



**Programme monitoring, evaluation and learning are part of a three-part integrated system.** **Monitoring** provides an ongoing assessment of TEA's progress towards achieving its objectives. It is based on the monitoring of results through indicators, structured around TEA's logical framework (logframe), which link directly to the theory of change. **Evaluation** forms the primary aspect through which TEA's performance is assessed and forms the basis on which TEA can learn about itself and its context, support decisions about adaptation, and articulate its results for external accountability. This MTR is part of TEA's review framework. **Learning** incorporates inputs from M&E, as well as separate learning processes, to reflect on, explore and communicate why success (and/or failure) has occurred in certain contexts and specific activities and workstreams. This MTR presents learnings to inform TEA's adaptive management.

We have applied a formative<sup>11</sup> and participatory design for the MTR; this design has three main attributes:

- Being informed and guided by a **theory-based evaluation approach** that has been selected in order to respond to TEA's diversity and complexity. The review questions are linked closely to TEA's theory of change and form the structure for the data collection and analysis. The review questions are also tailored to the Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) criteria.
- Being informed by the principle of **contribution analysis**, which aims to assess the degree to which a programme contributes to specific results, versus external factors<sup>12</sup>.
- The **review questions** are aligned with the DAC's 'Principle 2 for the Evaluation of Development Assistance'<sup>13</sup>. The terms of reference identify preliminary evaluation questions which can be grouped into the different review topics (and we also proposed other evaluation questions), as shown in Annex 2.

### 2.3. Data collection and interview process

**The data collection process comprised a comprehensive desk review and semi-structured interviews<sup>14</sup>.** The interviews with TEA programme external and internal stakeholders, complemented with an examination of a range of documents (including programme documents, such as annual reviews, bi-annual reviews and impact reports, policy documents, case studies and academic papers), enabled triangulation during data analysis, preventing the risk of distortions in post-factual accounts and increasing internal validity.

**The MTR Team conducted 35 semi-structured interviews<sup>15</sup> across a five-week period (between 13 January 2020 and 12 February 2020).** On average, this comprised 2.4 interviews per day, but in some instances four interviews a day were conducted. In total, the team interviewed over 50 stakeholders (52% women and 48% men), comprising a range of people representative of all programme workstreams (including TEA implementers and beneficiaries), as well as of other DFID-funded programmes in the energy access, energy finance and international development space (see Table 2 for more information). On average, more than one member of a given organisation participated in each interview.

<sup>11</sup> Helping to develop learning and understanding within stakeholders. The focus is on the quality of the delivery process, the adequacy of the learning materials and the appropriateness of the delivery methods.

<sup>12</sup> Contribution analysis is an approach for determining if an intervention contributed to bringing about an observed result, and in what way, based on verifying solid theories of change (Mayne, 2011, Mayne, 2012). The contribution claims confirm the causal links between the intervention and the observed results, and the analysis of the intervention theory of change leads to understanding how and why the intervention has made a contribution. Contribution analysis will not be strictly applied within the scope of this review; however, key principles will be applied to inform analysis and thus to provide more confidence about TEA's contribution as such to change. Source: Mayne, J. (2008) 'Contribution Analysis: An approach to exploring cause and effect', ILAC methodological brief.

<sup>13</sup> DAC (1991) 'Principles for Evaluation of Development Assistance', OECD. Available at: [www.oecd.org/dac/evaluation/50584880.pdf](http://www.oecd.org/dac/evaluation/50584880.pdf)

<sup>14</sup> External stakeholders include entities not directly involved in the TEA programme, such as other and/or similar energy access and clean cooking-related development programmes, financial institutions and international development agencies other than DFID. Internal stakeholders include direct beneficiaries and implementers of the TEA programme, as shown in Figure 1 above.

<sup>15</sup> Interviews lasted between 45 and 90 minutes, depending on stakeholder type, their availability for interview and the richness of data being collected.



Table 2. Number of interviews per TEA workstream

No. of interviews	Stakeholder/s	Workstream/s
1	Acumen PEII	CEP
1	Africa Clean Energy (ACE)	Other
1	BBOXX	IUK and TIME
2	Carbon Trust	RPDC and CEP
2	CDC Group	Other
1	Crossboundary	TIME and CEP (MGCR)
6	DFID	N/A
2	Energy 4 Impact (E4I)	RPDC and CEP (Peer to Peer Solar - P2PS, POP and PEII)
1	Faraday Institute	Other
1	Practical Action, GDC	CEP and IUK
1	GOGLA	CEP and TIME
2	KopaGas	CEP
1	Loughborough University, LCEDN	SED
1	Low-Energy Inclusive Appliances (LEIA) Programme	Other
1	BSEAA	CEP
1	M-KOPA	IUK and CEP
1	Mobile Power	IUK and CEP
1	Other, independent	N/A
1	Oxford Policy Management Limited	Other and CEP
1	Shell Foundation	TIME
1	Energy Sector Management Assistance Program (ESMAP)	Other
1	OGTI: African Management Institute (AMI) and Shortlist Professionals	SED and TIME
1	Uganda Solar Energy Association (USEA)	CEP
1	UK	RPDC
2	University of Cape Town	RPDC and SED

**Interviews were carried out using internet communication software.** Each interview was audio-recorded and saved in a designated internally shared folder, along with notes taken during the teleconferences. Immediately after the interview ended, the interviewers elaborated on the notes and copied them into a Word document template. Some interviews were partially transcribed.

**The interview protocol involved ethical considerations regarding data collection, such as voluntary participation, informed consent, no risk of harm and confidentiality.** No issues related to these were reported during or after the interviews.

#### 2.4. Data analysis

**The MTR Team applied thematic analysis principles to get an overview of and discover the main themes in the body of data collected from the interviews and documents.** After the digitalisation of all relevant interview content the team mapped and coded the data in a spreadsheet to disaggregate and label it according to the research themes and questions proposed in the Inception Report (see the review matrix in Annex 2). This involved highlighting interesting sections of text (i.e. quotations) and then classifying topics and events, and the properties that characterised them, using as many categories as possible (i.e. 'coding'). The data was organised categorically, reviewed repeatedly and continually coded. The team then sorted the codes into themes, which involved an active interpretation of the codes and the data. The patterns and themes were identified and described from the perspective of the participant.

## SECTION 3: Analysis of TEA programme's achievements

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**This section presents the results of the MTR analysis of the first review question: What have been the main TEA programme achievements per workstream?** As per the review matrix (Annex 2), review questions and sub-questions were structured according to the OECD-DAC criteria<sup>16</sup>. Section 3.1 presents the **findings** regarding the relevance of TEA's objectives. Section 3.2 explores its efficiency and progress towards outputs. Section 3.3 focuses on the effectiveness of the programme in achieving the desired outcomes. Section 3.4 investigates impact and Section 3.5 looks at sustainability.

### 3.1 To what extent are the objectives of TEA still valid?

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**The TEA's main objective, according to its Business Case (January 2016), is to 'support early-stage testing and scale-up of innovative technologies and business models that will accelerate access to affordable, clean energy services for poor households and enterprises, especially in Africa'.**

**The relevance of TEA was backed by all interviewees that were asked to comment on this specific question.** The three arguments below were advanced by interviewees, who agreed that TEA is providing pertinent support through its various workstreams to address the energy access challenge.

- **Lack of energy access.** According to the Sustainable Development Goals (SDGs) Report of 2019, nearly nine out of 10 people now have access to electricity. Despite encouraging signs that energy is becoming more sustainable and widely available, 840 million people still did not have access to energy in 2017, mostly in sub-Saharan Africa. In that region, only 44% of the population had access, with an estimated 573 million people still lacking electricity.
- **New opportunities are emerging.** Despite the reduction in the price of solar photovoltaic panels and the availability of cheap, efficient lighting and mobile pay-as-you-go systems, significant challenges still exist in raising awareness on these options and unlocking the finance to enable the scaling up of electricity provision. These systems currently offer only limited scope for using energy for more transformative, productive uses in the future.
- **Access to electricity will improve the well-being of low-income households.** TEA's support in facilitating the access to decentralised, affordable, near grid-quality electricity services to low-income urban and rural communities will increase the well-being of the population. This is particularly so with regard to the most vulnerable parts of society and is well-aligned with the SDGs 'Leaving no one behind' agenda.

### 3.2 Has TEA delivered the expected outputs?

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**TEA has achieved the following key results:**

- A reduction of 2 million tonnes of carbon dioxide CO<sub>2</sub>.
- Improved the lives of 3.2 million low-income people.
- Leveraged \$359 million worth of investment in clean energy from the public and private sectors.
- The TIME partnership has been delivering at a high level, with all DFID funds now deployed, making a strong contribution to overall TEA outcomes, being ahead of the target.
- Energy Catalyst had a very successful Round 7 of funding and is well ahead on output key performance indicators (KPIs), in part due to the £25 million co-funding of Round 7 from GCRF and BEIS.
- All CEP projects are running now, with some good results emerging. As part of the TEA scale-up, top-ups were provided to some high performers, and a new set of African-led partnerships have been added.
- SED is generally progressing well, with the OGTI standing out, having now placed 45 young Africans in placements with clean energy access companies, with over 56% of these being women – well ahead of target.
- RPDC has adapted well to the scale-up overall and is operating its M&E framework smoothly.

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<sup>16</sup> OECD. (n.d.). 'Evaluation Criteria'. Available from: [www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.html](http://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.html).

**We present below the progress towards outputs for five of TEA’s workstreams separately<sup>17</sup>.** This is followed by an assessment of each workstream’s performance, based on findings from interviews and other sources consulted.

### 3.2.1 Stimulating Technology Innovation: IUK’s Energy Catalyst

**The Energy Catalyst workstream<sup>18</sup> has consistently scored high (A and A+ respectively) in the latest annual reviews<sup>19</sup> and has delivered well on its output indicators over the past year. Most interviewees stated that Energy Catalyst provides much-needed and timely support for the stimulation of new ideas and early-stage projects.**

**According to DFID’s 2020 Annual Review<sup>20</sup>, Energy Catalyst has delivered well on its output indicators over the last year.** Energy Catalyst reached 116 innovative technologies and business models supported (up 61 from last year), £15.83 millions of private sector finance leveraged (up from ~£8 million last year) and 58 patents granted. Energy Catalyst has continued to increase its international presence through successful brokerage events in Myanmar, Ethiopia and Kenya for Round 7<sup>21</sup>.

**Given the workstream’s success, an additional total allocation of £17 million was made to Energy Catalyst in March 2019, on top of the standing budget of £18 million.** £5 million of the increase was allocated to nine high-scoring but originally out of budget projects from Round 6 run in 2018. £7 million was for energy storage projects to be allocated in Round 7 in 2019. A further £5 million will be available for Round 8 in 2020 co-funding, with £15 millions of GCRF support. These allocations followed recommendations made in DFID’s 2019 Annual Review. Round 7 winners were announced at the Africa Investment Summit in January 2020. Winners include 62 projects in 25 countries valued at a total of £51 million, co-funded by GCRF and BEIS.

**The success of Energy Catalyst was backed up by most interviewees.** They described it as having a strong track record as a grant provider for innovative technologies in the UK and recognised its transparency and provision of timely support for the stimulation of new ideas and early-stage projects. This includes the facilitation of collaboration and brokerage events for African countries and UK companies (including in-country visits to Africa by UK companies and research groups), which, in turn, led to a 70% bid success rate for those partnerships.

**In terms of challenges, Energy Catalyst’s model was described as not able to support the transition to commercially sustainable businesses.** A few interviewees challenged Energy Catalyst’s choice of experts for evaluation of proposals – in particular, for lacking context knowledge on working in low-income countries or in energy technology-related fields. This also leads to a large range of scores, as assessors come from different backgrounds. This is despite Energy Catalyst’s continuous efforts in trying to identify suitable experts to assess the proposals.

**Energy Catalyst is working towards improving its financial management and forecasting and impact reporting.** Energy Catalyst had a 30% underspend last year, mainly due to contracting delays. According to interview data, this was due to challenges raised due to the project’s focus on funding inherently risky<sup>15</sup> innovation projects that continuously change (according to Energy Catalyst).

<sup>17</sup> RPDC’s progress (the sixth workstream) is presented in Section 4.

<sup>18</sup> Since 2013, across six rounds, IUK, through its Energy Catalyst competition, has invested almost £140 million in grant funding across more than 840 organisations and 345 projects in Africa and Asia. With funding from TEA, Energy Catalyst is helping UK energy innovators to forge new international partnerships and directly address the energy access needs of poor households, communities and enterprises in sub-Saharan Africa and South Asia. The projects that have been funded range from micro to medium and large enterprises and academic research initiatives, and cover technology areas in renewable energy, bioenergy, hydrogen and fuel cells, carbon abatement, nuclear fission and energy efficiency, among others. Source: IUK. (2020). ‘Energy Catalyst, Directory of Projects’.

<sup>19</sup> TEA. (2019). ‘Bi-Annual Review – Post September 2019’. Confidential – Not for external circulation

<sup>20</sup> TEA. (2020). ‘Annual review. March 2020’. Draft.

<sup>21</sup> *Ibid.*

### 3.2.2 TIME partnership by Shell Foundation

**Rated A+ in the latest annual review<sup>22</sup>, the TIME partnership between DFID and the Shell Foundation has achieved all of its outcome targets and most output indicators have now been achieved or exceeded. Three out of five end-of-project targets have already been met a year early and 17 new applications and business models have been funded this year. Interviewees consulted described the Shell Foundation as a professional and competent partner to work with that meets financial requirements and delivers ahead of targets<sup>23</sup>.**

**Consistent with recommendations in previous annual reviews, over the past year the Shell Foundation has scaled up its efforts to reach African-owned businesses and has continued to establish stronger links with the rest of the TEA programme, as well as supporting more finance or market enablers for a greater reach. 14 learning pieces have been published in the last year and constructive engagement with the rest of the TEA partnership has increased: for example, partnering with the Faraday Institution on mini-grid battery testing in Nigeria.**

**The transition of five TIME grantees to the new DFID-funded programme Catalysing Agriculture by Scaling Energy Ecosystems (CASEE) has evolved TIME's Energy for Business portfolio towards income-generating appliances and circular economy businesses – for example, TIME's new support this year to the Waste Electronic and Electrical Equipment Centre in Nairobi<sup>24</sup>.**

**TIME has achieved good results in three areas:** (i) expanding household energy to new regions, including fragile states, and launching new appliances for low-income households; (ii) providing support to small and medium-sized enterprises and farmers to access cleaner and more reliable power; and (iii) in market development, by gaining traction with key stakeholders.

**A large majority of respondents described the Shell Foundation as having a broad network and expertise in the energy space and in working in the TEA ecosystem, as well as a strategy for how to influence the sector.** The Shell Foundation is believed to be at the cutting edge of the sector (i.e. the funding of early-stage businesses). The organisation maintains close contact with its partners and projects, and new partnerships build on its core of helping businesses grow and markets develop. It has a diversified portfolio and its own approval systems, which in turn helps to streamline activities.

**A few interviewees believe that these features may, in turn, have helped TIME to deliver ahead of targets.** For example, the Shell Foundation has helped to raise capital, has improved investor relationships, has brokered investments, and has facilitated annual international investors meetings. It has also set up in-country accelerators in Ethiopia, Uganda, Rwanda and Nigeria, and has created small teams and organisations to work on two the three market barriers. (e.g. Uganda - productive use). A Community of Champions, which aims to convene African government leaders to make the energy access space work better, is still pending commencement but appears to be on track to start.

**In terms of areas to be strengthened, interviewees mentioned that TIME could improve its transparency (for project selection), portfolio diversification and risk management.** These challenges have been documented in previous annual reviews. Some Shell Foundation investments are perceived as examples of 'putting all eggs into one basket' because of a focus on a small number of applicants (e.g. D-light in Ethiopia, M-KOPA Labs and Envirofit) and many coming from the USA (i.e. not many 'blue-sky' projects). At present, over 90% of the staff employed in the TIME Africa portfolio are African nationals; however, only 12% of founders in the Shell Foundation's Africa portfolio are African (five enterprises). By comparison, all partners headquartered in India are led by Indian founders<sup>25</sup>.

<sup>22</sup> TEA. (2020) 'Annual review'. March 2020. Draft.

<sup>23</sup> *Ibid.*

<sup>24</sup> *Ibid.*

<sup>25</sup> *Ibid.*

**The Shell Foundation has recently made progress on diversifying its portfolio and improving partner choice transparency.** An Investment Committee has been set up (on which DFID also sits),<sup>26</sup> which helps to improve the transparency in regard to partner choice, reduce overall project risk<sup>27</sup> and avoid conflicts of interest. In addition, a jointly funded liaison person has been appointed to improve communication between DFID and the Shell Foundation.

### 3.2.3 The CEP programme

**Overall, the newly enlarged CEP<sup>28</sup> programme is on track to meet most target indicators (i.e. six are on track and two are off track), and it was rated A in the latest annual review – an improvement from 2019 (when it scored B)<sup>29</sup>. All partnerships are now contracted and have seen an extended period of implementation, with Acumen PEII and GDC showing particularly high performance. Interviewees suggested that the CEP programme has many positive co-funding and innovation stories, but the funded projects have produced mixed results, as described in more detail below.**

**Nevertheless, respondents agreed that CEP partners have raised considerable amounts of money, while also producing good research outputs.** The CEP programme has been recognised for supporting risky investments, which complements and balances out the TEA portfolio. However, respondents highlighted that as more partnerships form, it becomes difficult to gauge how it all fits together in a coherent way under TEA. Furthermore, as some partnerships have just started, it is still difficult to see the real impact.

- **Acumen (one of TEA’s fast-track projects) has consistently delivered against its milestones and has often completed deliverables ahead of time.** It is actively engaging with reporting processes, providing timely information and helpful narratives on progress on its deliverables. For most respondents, Acumen is a positive co-funding story. It raises a lot of money (e.g. it exceeded its £20 million target) and has produced a number of good research outputs<sup>30</sup>. Thanks to TEA’s requirements and support in Phases 1 and 2, Acumen has become a thought leader in this sphere.
- **Acumen’s PEII deployed the largest amount of capital so far per annum in the past year.** £3.5 million was disbursed in 2019 into three new PEII companies (PowerGen, Promethean and RVE.Sol)<sup>31</sup>. Since the start of the PEII, Acumen has approved £7.6 million in investments, disbursed £5.5 million, and has eight PEII portfolio companies operating in East and West Africa, and India. These companies have leveraged invested capital 7x, raising an additional £38.4 million since 2017<sup>32</sup>.
- **GDC, which now has a membership of 140 last-mile distributors have met or surpassed nearly all targets.** Its primary research output, *Last-Mile Distribution: State of the Sector*, had a strong dissemination strategy, including two launch events (in London and Washington in 2019) and lunch-presentations with USAID, the World Resource Institute, Get.invest, Sustainable Energy for all (SE4ALL) and the World Bank. The report has been downloaded over 1,600 times. GDC ran a successful innovation challenge and is setting up a bulk procurement platform<sup>33</sup> to reduce costs

<sup>26</sup> The enterprises that TIME invests in are inherently risky: they are pioneering new and innovative business models in emerging markets that lack traditional infrastructure. In order to better manage the partnership with the Shell Foundation and mitigate delivery risk, DFID (with the Shell Foundation) introduced an investment committee and included market scoping to assess partner choice and various other measures. All of the partners go through two to three investment committees/approval processes, depending on the amount of funding.

<sup>27</sup> Although the Shell Foundation is comfortable with managing business risk, improvements are required to limit management risk should it arise. According to the Shell Foundation, it is now focusing on finding and maintaining good management teams and people, and on establishing more and stronger links with the rest of the TEA programme (e.g. the Innovation Lab, the GDC and Energy Catalyst portfolio).

<sup>28</sup> Eight projects are part of the CEP programme. BSEAA and Energise Africa have been brought in last year (PEII, Energise Africa, Crowd Power Phase 2, POP, MGCR, GDC, PowerUp and BSEAA), with many having substantial sub-projects with differing delivery partners. Source: TEA. (2019). ‘Bi-Annual Review – Post-September 2019’. Confidential – Not for external circulation.

<sup>29</sup> TEA. (2019). ‘Bi-Annual Review – Post-September 2019’. Confidential – Not for external circulation.

<sup>30</sup> Examples include ‘Lightening the Way: Roadmap to Exits in Off-Grid Energy’; ‘A Lean Data Guide: How to Guide Understanding Gender Impact’; ‘Accelerating Access: The Role of Patient Capital’; ‘Women and Social Enterprises: How Gender Integration can Boost Entrepreneurial Solutions to Poverty’.

<sup>31</sup> One existing PEII company as an equity tranche (Simusolar) and two existing investee companies as follow-on transactions (Burn, EasySolar).

<sup>32</sup> TEA. (2020). ‘Annual review. March 2020’. Draft.

<sup>33</sup> GDC has started working on the centralised purchasing platform phase two with Sollatek and is also in communication with CLASP, who will help perform the testing on identified non-verified products and is identifying non-qualified products for pre-tests to be conducted on.

across last-mile distributors in East Africa<sup>34</sup>. GDC is seen by respondents as a well compiled and established network, benefitting from DFID investment and co-funding<sup>35</sup>. However, despite promising deliverables, it is still too early to assess GDC's impact.

- **Energise Africa<sup>36</sup> has had a successful year<sup>37</sup>, reaching £15 million, raised from 1,400 investors and running its first £1 million campaign for BBOXX.** Interviewees indicated that Energise Africa is an example of technology and finance innovation achieving positive returns on investment and receiving good feedback from the market. Energise Africa is now self-sustainable. Energise Africa has links across companies to access funding and has raised debt from crowds with companies (e.g. M-KOPA). Respondents believe that Energise Africa's success is due to its set-up, its strong implementing partners, its flexibility, and the fact that throughout the project phases and activities the partners and donors have been kept continuously informed.
- **POP has experienced contracting delays after running two over-subscribed challenge funds and awarding a portfolio of high-quality and unique projects** in productive energy use and local value addition and employment creation, as well as co-funding (alongside the Shell Foundation and USAID) the Global LEAP Solar E-waste Challenge. The competition funded eight projects, bringing the total number of POP-funded projects to 25. Due to contracting delays, most projects have only recently begun implementation and have not yet produced a useful body of data or knowledge products.
- **PowerUp is on track to meet its indicator targets.** The PowerUp team has engaged with the energy accelerators funded by the Shell Foundation in Nigeria, Rwanda and Ethiopia and has coordinated with Coffey International, which is implementing ACE<sup>38</sup>.
- **Crowd Power Phase 2 began in 2018, following the successful Crowd Power Phase 1 programme, which was a pioneering programme that examined the role of crowdfunding and peer-to-peer lending in the financing of energy access companies and projects.** Under the Crowd Power Phase 2 project, E4I has supported four campaigns, including in Myanmar, Zambia and Nigeria<sup>39</sup>. Another campaign is due to be launched shortly. Approximately \$850,000 has been allocated to support campaigns through match funding, as well as debt protection and gift cards. Crowd Power has played an instrumental role in the growth of peer-to-peer lending and crowdfunding for energy access businesses and has supported over 250 energy access campaigns to raise £3.4 million in funding<sup>40</sup>. A series of knowledge products has been developed, including the Crowd Power: State of the Market 2018 report launched in 2019, a white paper on loan syndication, a loan syndication study and an equity crowdfunding feasibility study (to be published in March 2020).

**Both literature and interview data indicate that the CEP programme's research uptake strategy can still be improved.** There are gaps to be addressed in order to establish an effective and coordinated centralised dissemination. This includes elevating key messages and themes from the knowledge products through the TEA programme and external networks. A more concrete procedure is needed for knowledge product reviews ensuring branding compliance and sufficiency of funder recognition.

### 3.2.4 SED

**According to the latest annual review, all SED projects are underway and are building the capacity required to scale up energy access in the short and long term<sup>41</sup>. The workstream is on track or has**

<sup>34</sup> TEA. (2020). 'Annual review. March 2020'. Draft.

<sup>35</sup> It recently won €57,000 on a joint proposal with Solar Sister and the Energy Saving Trust from the Energy and Economic Growth Programme (EEP), which will support the dissemination of the lessons to its members on unlocking productive power through women-led distribution networks.

<sup>36</sup> Energise Africa is delivered under Peer-to-Peer Solar Africa's accountable grant, which ended in 31 December 2019.

<sup>37</sup> Crowd Power Phase 2, BSEAA, MGCR and PowerUp are largely on track, although there have been delays in some components. Innovations in the last year include the introduction of an investor guarantee to attract smaller investors and a temporary fee reduction and more flexible repayment schedules to attract additional borrower pipeline.

<sup>38</sup> TEA. (2019). 'Bi-Annual Review – Post September 2019'. Confidential – Not for external circulation.

<sup>39</sup> *Ibid.*

<sup>40</sup> Cogan, D., and Weston, P. (2018). 'Energy 4 Impact. Crowd Power Crowdfunding & P2P Lending for Energy Access State of the Market 2018'.

<sup>41</sup> TEA. (2020). 'Annual review. March 2020'. Draft.



**exceeded most output indicators and it received an output score of A. Interview results, on the other hand, suggest that SED has produced mixed results, although overall the academic institutions involved in the programme have worked well to design and deliver it.** Most interviewees agreed that SED is urgently needed to underpin other TEA initiatives. However, it could benefit from better integration within TEA and from creating better linkages with other partners and ensuring better responsiveness to business's needs.

SED's results include the following:

- **Eight African universities have been selected for support to design and deliver TEA-related masters courses and programmes under the TEA Learning Partnership.** The first course will come online by the end of 2020 and the others will commence in 2021. The research agenda on gender mainstreaming has been designed and will be implemented in 2020–21. The activities are on track to deliver on time and is engaging with potential co-founders, with the aim of securing a multi-year bursary support system on top of TEA support. The TEA Learning Partnership has also been awarded a £280,000 top-up to work with eight more universities and develop a standardised, open-access course that can be delivered by any African tertiary education establishment. At present, the university partners are drafting the curricula for their programmes. This includes local market needs assessment for graduates, sustainability plans, and accreditation plans.
- **OGTI is performing well, with the appointed contractors' Shortlist/AMI getting off to a very quick start.** After an initial period of marketing, OGTI has started delivering mid-management level training for the first cohorts and has placed 45 graduate young Africans in clean energy businesses, of which 26 are women. The OGTI initiative is on track to deliver outputs on time and within budget and is likely to be able to exceed logframe expectations.
- **Interviewees suggested that Shortlist professionals<sup>42</sup> received positive feedback from clients, who immediately moved to signing up employers and applicants.** There are 350 people already employed, ahead of the target (i.e. 350 graduates for one year) and the percentage of women is greater than 50% (the target is 68%). Shortlist is at the negotiation stage with 13 companies to enrol in a mid-management training programme. The challenge for Shortlist remains the lack of commercial relationships with universities.
- **The LCEDN fast-track project has now delivered its final outputs and has closed out.** Its work included five partnerships contracted to support UK/South or South/South training initiatives, five briefing papers and placements for four LCEDN fellows. Further activities included two international integrative conferences and webinar series and a comprehensive review of UK academic capacity for energy access research. Interviews provided mixed evidence on LCEDN's performance. On the one hand, it was instrumental in creating partnerships and collaboration opportunities, but, on the other, the delays in delivery in Phase 1 led to some degree of dissatisfaction.

### 3.2.5 Faraday ODA Energy Storage Challenge

**The Faraday Institution<sup>43</sup> and the Shell Foundation have been developing quick synergies in energy storage and their collaboration has progressed very quickly.** Faraday joined a research programme with the Shell Foundation (as part of the TIME partnership) with the aim of supporting the Shell Foundation in deciding what energy storage to install in future projects. Faraday is now receiving scale-up funding, including £10 million for the ODA Energy Storage Challenge, matched by £10 million from BEIS. Key

<sup>42</sup> Shortlist is a graduate work placement programme, part of OGTI, which in turn is one of the constituent projects of SED. OGTI aims to sustainably develop a generation of leaders in African enterprises. TIME has supported Shortlist to develop new talent screening and training software, applying data science techniques to improve recruitment, and to expand to new markets in Africa.

<sup>43</sup> The Faraday Institution is the UK's independent institute for electrochemical energy storage research and skills development. It brings together scientists and industry partners on research projects to reduce battery cost, weight, and volume; to improve performance and reliability; and to develop whole-life strategies, including recycling and re-use. It has joined TEA to progress research on low-cost battery systems for emerging markets in Africa.

activities have been scoped (including the design of the challenge) and a call for proposals for industry-led projects has been announced via the Energy Catalyst Round 7<sup>44</sup>.

**£3 million of the scale-up funding was allocated via the Faraday Institution, set up by a coalition of leading universities with funding from the Industrial Strategy Challenge Fund to be the UK's leading institution on energy storage science.** In addition, Vivid Economics was commissioned by the Faraday Institution to produce a rapid market assessment of storage in developing countries. This comprehensive study highlighted a series of opportunities and needs for energy storage in developing countries, and compared these with the state of the art in energy storage science and capabilities.<sup>45</sup> Tesla also participated in the launch of the report, which provided an opportunity for further interactions as they contributed to the review.

**After a due diligence process and scoping and design work by Faraday, an accountable grant was signed at the end of February for a programme of research, which will include the following<sup>46</sup>:**

- NEXGENNA – Sodium-ion Battery Research – £1.2 million of the TEA funding will be allocated to creating a new international dimension in the Faraday Institution Round 2 next-generation sodium-ion batteries (NEXGENNA) project, led by the University of St Andrews.
- Research into alternative technologies – £930,000 will be invested in researching promising new battery technologies, which are expected to include redox-flow (which may offer particular scalability benefits for mini-grid electrification) and zinc-air.
- Supporting international projects – £400,000 will be used to support the Faraday Institution's role in the delivery of projects seeking to address issues related to unlocking the successful commercialisation of batteries within developing countries. These projects are being led by the World Bank, the Shell Foundation, and the Global Battery Alliance, and are clearly aligned with TEA's wider goals.

### 3.3 To which extent have outcomes been achieved and why/why not?

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**This section has two parts:** we first summarise TEA's progress towards outcome-level indicators. Subsequently, we document reasons why this has/has not happened, including the development of partnerships within TEA (with various examples), TEA's added value and its financing and risk appetite.

#### 3.3.1 Achievement of programme outcomes

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**TEA's programme outcome, as per Business Case, is the following:** *'Increasing use of affordable decentralised clean energy options for poor households and enterprises, through innovative technologies and delivery models, leveraged financing and enhanced capabilities, accelerating energy access and low carbon development<sup>47</sup>'.*

**The programme has six outcome indicators.** During the past year, a standardised logframe was developed to allow comparability across TEA's overall delivery. These indicators are presented in the table below.

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<sup>44</sup> Vivid Economics. (2019). 'Rapid market assessment of energy storage in weak and off-grid contexts of developing countries', prepared for the Faraday Institution.

<sup>45</sup> The unique contribution of the study is to analyse and raise awareness of market opportunities through estimates of demand to 2030, based on existing literature, which can help target detailed market projections in future work. The report also seeks to assist in identifying and prioritising areas where research institutions can assist, based on a mapping of technologies to key market segments and assessment of technical challenges. Based on the market and technological needs for storage, the report set out recommendations for the commercialisation and deployment of more mature technologies based on an assessment of market barriers. Source: Vivid Economics. (2019). Rapid market assessment of energy storage in weak and off-grid contexts of developing countries, (Prepared for Faraday Institution)

<sup>46</sup> TEA. (2020). Annual review. March 2020. Draft.

<sup>47</sup> TEA. (2016). 'Business case: Summary Sheet'. Unpublished.



**Table 3. TEA programme outcome indicators**

Outcome Indicator P1: Lives improved
P1.1: People with improved energy access
P1.2: Graduates/trainees/placements
Outcome Indicator P2: Jobs created
P2.1: Sustainable long-term jobs created – energy generation/supply
P2.2: Sustainable long-term jobs created – energy demand/use
Outcome Indicator P3: Investment leveraged
P3.1: Private sector
P3.2: Public sector
Outcome Indicator P4: Clean energy
P4.1: Installed off-grid clean energy capacity (megawatts (MW))
P4.2: CO2 avoided
Outcome Indicator P5: Innovation
P5.1: Number of new energy access technologies prototyped and/or demonstrated in Africa
P5.2: Number of innovative businesses models tested in Africa
Outcome Indicator P6: Communications and Research-Into-Use
P6.1: Citations of research work, energy impact reports
P6.2: Expansion of businesses

- **Lives improved (P1):** The programme has well exceeded targets, with 2,399,959 females and 2,814,274 males experiencing improved lives due to TEA. The main contributors to date are the TIME portfolio, Energise Africa and Acumen PEII. The graduates/trainees/placements indicator has only just started but is ahead of schedule via OGTI.
- **Jobs created (P2):** TEA has created 14,494 generation/supply jobs for females and 40,088 for males, most of these contributed to by the TIME programme. On the energy demand/use side, there has been no progress to date<sup>48</sup>.
- **Investment leveraged (P3):** £222 million private sector investment was achieved (vs. a target of £36 million), alongside £31 million public sector investment (vs. a target of £7 million). Most of the private sector leverage is attributed to large organisations supported by TIME (Calvert Impact Capital, Persistent Energy Capital and Dharma Life) and most of the public sector leverage is attributed to Energy Catalyst (£10 million), Acumen (£4.12 million) and a blend of TIME-supported organisations<sup>49</sup>.
- **Clean energy (P4):** 627,179t CO<sub>2</sub> have been avoided, above the target of 167,000t CO<sub>2</sub>. This comes mainly from work from Envirofit, Sistema.bio Persistent Energy Capital and InspiraFarms (part of the TIME portfolio)<sup>ibid</sup>.
- **Innovation (P5):** 123 new energy access technologies have been prototyped and/or demonstrated in Africa (versus a target of 12), most of them funded by Energy Catalyst. However, only 14 of innovative businesses models have been tested in Africa (vs. a target of 46) funded by TIME and Energy Catalyst.

**Most respondents indicated that the benefits of TEA are starting to emerge, as partners and implementers are beginning to focus on measuring outcomes and impacts.** As additional partnerships develop, the programme expects benefits to increase. In addition, SED will start to contribute to outcomes in the area of graduates/trainees. Although many of the CEP and SED projects have not yet started to deliver outputs, the programme is overall still ahead of key outcome milestone targets for this year.

### 3.3.2 Development of partnerships

**Partnership creation is a crucial value of TEA.** All respondents indicated the strong benefits obtained from leveraging on the complementarities and creation of an ecosystem that can progress the energy access space. Partnership creation is the most important value of being part of TEA, and many respondents

<sup>48</sup> TEA. (2020). 'Annual review. March 2020'. Draft.

<sup>49</sup> *Ibid*.

provided examples of how partnerships have been created and how they have benefited them, including by creating financial and business leads, some of which may continue even independently of TEA.

**M-KOPA was mentioned by numerous interviewees as a success: a company that has developed strong partnerships and is being supported through its growth process with different sources of finance.** The M-KOPA case study is discussed in Box 4 in Section 3.3.4.

**GDC, managed by Practical Action, was highlighted by respondents as an initiative that focuses on the bottom of the pyramid and that has so far enabled other TEA partners to further their own commitments.** GDC is described in Box 1.

***Box 1. The GDC – creating partnerships to ‘leave no one behind’***

The GDC comprises 140 last-mile distributors working in 40 countries. GDC’s broad aim is: (1) to support members to make life-changing products available to marginalised individuals in a more effective and efficient way; and (2) to advocate for last-mile distributors within the broader energy access ecosystem.

GDC was formed to address the urgent needs of distributors working in the last mile – in communities that are remote, poor and/or marginalised. These distributors often struggle to access finance, due to the challenging economics of last-mile distribution, as well as market data and investors’ lack of experience in investing in the sector<sup>50</sup>. Distributors also lack a collective, strong voice in decision-making processes for addressing development challenges, making it difficult for governments, aid agencies and investors to design policies, programmes and portfolios that support the distribution sector<sup>51</sup>.

The partnership-based model acts as a one-stop-shop and a community of practice for last-mile distributors and has three principal objectives:

- To provide a range of support services to distributors that reduce costs and save time, enhancing efficiency and unlocking economies of scale. Services will help distributors to more effectively select products, procure stock, train staff and more. These services will be offered on a fee-for-service basis, as the sector matures.
- To facilitate matchmaking and collaboration, enable the exchange of information and expertise, as well as drive research and innovation across the sector.
- To act as a collective voice for distributors to ensure their voice is heard, helping to attract investment, shape policy and create an enabling environment for distributors to thrive.

The GDC develops services to meet these needs. In the longer-term the GDC will explore other services that leverage economies of scale and processes, including logistics support, after-sales service and end-of-life product management, and will also work with partners in development and service delivery.

Partnerships

GDC’s proposition is considered unique within TEA: it works mostly with local companies and supports on-the-ground initiatives. This has allowed GDC to collaborate with other partners, to increase the focus on the poorest and most vulnerable, hence strengthening the ‘leaving no one behind’ efforts. For example:

- GDC has recently submitted a joint funding proposal with AMI to develop a training facility, combining GDC’s technical facilities with AMI’s soft skills capabilities.
- GDC is also in discussion with Value for Women to focus on GESI aspects.
- With Shortlist, GDC is supporting IUK in carrying out innovation trips, linking them with relevant players and people within Southern countries.
- GDC’s work with Acumen and AMI would continue informally, even independently of TEA.
- Whilst there is some concern about the sustainability of GDC programmes, it has been highlighted that TEA has facilitated the development of strong leads, which will be beneficial to GDC’s future.

**For Mobile Power, IUK has been beneficial in connecting Mobile Power with other companies interested in its technology.** This has led to partnerships such as the one with Genesis Energy, which led to a joint

<sup>50</sup> Practical Action. (2017). ‘Solving the Last Mile Distribution Challenge: A call to action from the Global Distributors Collective’, pp. 1–19.

<sup>51</sup> *Ibid.*

grant application in Nigeria. TEA has supported Mobile Power by funding spaces at trade events, including at Ignite – an incubator for tech start-ups. Mobile Power was placed in an incubation with the Carbon Trust and E4I, which was beneficial to its fundraising.

**KopaGas, after a long and challenging process, benefited from funding from Acumen.** KopaGas has highlighted how DFID has been innovative in thinking about grants: the grant to KopaGas was instrumental to allow the company to get so far in the development of technology, which would have been impossible without DFID’s support (see Box 2).

### **Box 2. KopaGas –a completely new segment for the clean cooking sector**

KopaGas designs, manufactures and deploys Internet of Things devices and software that enable customers to pay and consume small amounts of gas at a given point in time using mobile wallets such as M-Pesa, whilst providing timely and granular usage and payment information<sup>52</sup>. The company makes clean, efficient liquid petroleum gas (LPG) affordable and available to low-income households through its pioneering pay-as-you-go smart metering technology and partnership with Tanzania’s leading LPG importer<sup>53</sup>. KopaGas’ uniqueness lies in having proprietary technology, which includes home-delivery (for safety reasons due to the nature of gas), affordability and convenience. In business since 2014, the company received early financial support<sup>54</sup> from entities including Acumen Fund Inc.

#### **Support from TEA**

TEA was critical in encouraging the development of the technology, in particular through its involvement in the GSMA Innovation Grant<sup>6</sup>. This funding was used to validate market and operational assumptions to strengthen the pay-as-you-go business model for scale, with the objective of providing safe and affordable clean cooking fuels to low-income customers.<sup>55</sup> The grant helped the company to scale its products and operations in Tanzania and deepen relations with the leading mobile network operators. KopaGas has created a completely new segment for the clean cooking sector by digitising the LPG value chain— which in turn put the company on track to change the lives of 1 million people by 2020 with cleaner and more affordable fuels.<sup>8</sup>

KopaGas has recently been acquired by Circle Gas – an investment which is expected to facilitate energy access for the mass market via the scale-up of its innovative pay-as-you-go technology, accelerating market penetration in East Africa (without requiring government financing). Thanks to its experienced team in the downstream distribution of LPG, Circle Gas aims to expand the existing business in Tanzania and to launch in Kenya in 2020<sup>6</sup>.

Throughout this entire fundraising journey, KopaGas has grown significantly. For example, when the due diligence process started, it had only 100 customers engaging with pay-as-you-go, of which 90% were women. The focus was primarily on poverty. At present, there are over 1,500, customers in Tanzania alone.

#### **Challenges**

The company experienced funding approval challenges. The fact that gas continues to be seen as a fossil fuel caused delays in funding approvals due to inconsistencies with funding criteria (funding ‘clean energy’ and not fossil fuels). The due diligence process took 1.5 years because there was no precedent.

#### **Future opportunities**

KopaGas respondents, in particular, highlighted during the interviews that clean cooking in urban areas has received less attention (and funding) than other themes (namely, electricity access in rural areas). If equitable access is to increase substantially, further technology development and partnership creation are needed<sup>56</sup>. Reducing poverty in sustainable ways in urban areas is considered necessary due to the high increase in

<sup>52</sup> KopaGas. (2020). ‘Circle Gas completes acquisition of PAYG technology’. Available from: [www.kopagas.com/blog/2020/1/12/acikf5n2r0hj1vkusz8vqbbjb43wz7](http://www.kopagas.com/blog/2020/1/12/acikf5n2r0hj1vkusz8vqbbjb43wz7).

<sup>53</sup> Acumen (n.d.) ‘Our Companies: KopaGas’. Available from: <https://acumen.org/?investment=kopagas>.

<sup>54</sup> In this sector, finance includes infrastructure, technology and logistics.

<sup>55</sup> GSMA. (n.d.) ‘KopaGas Grant Details’. Available from: [www.gsma.com/mobilefordevelopment/mgrantee/kopagas/](http://www.gsma.com/mobilefordevelopment/mgrantee/kopagas/)

<sup>56</sup> Clean Cooking Alliance. (2018). ‘Partner Spotlight: KopaGas’. Available from: [www.cleancookingalliance.org/about/news/03-29-2018-partner-spotlight-kopagas.html](http://www.cleancookingalliance.org/about/news/03-29-2018-partner-spotlight-kopagas.html)

urbanisation. This focus can also open opportunities for at-scale growth, due to the high population density, particularly in a number of African cities.

**E4I/Energise Africa also highlighted that TEA facilitated a number of strong partnerships.** These include the following:

- Some new partnerships emerged as a result of discussions held during TEA's Annual Meeting in 2019. For example, Energise Africa started discussions with GDC to understand which of the companies it represents might be suitable for the crowdfunding platform. Most of these companies are not mature enough yet but could be supported by a venture debt platform. As they mature, they could join Energise Africa's pipeline.
- Energise Africa highlighted that the Shell Foundation is an important partner that is interested in supporting financial intermediaries through equity and crowdfunding.
- Energise Africa is now also starting off collaboration with 60 Decibels on developing an M&E framework.

**In-person interactions are very much valued, in particular for new joiners.** The meetings in London were highlighted as an excellent opportunity to meet and collaborate and it was suggested that they could be more frequent. Bi-annual meetings in London were particularly helpful in forging collaborations, and RPDC has been considered key in making connections and in helping to navigate through such a large programme. For some respondents, the project has only just started, and they are keen to engage more with partners soon, in particular on content.

**There have been some challenges and missed opportunities so far.** For example:

- It is challenging to have a clear picture of roles and projects, given the size of TEA.
- There is no systematic way to establish partnerships, limiting some partners who have less opportunities to engage in interaction (for example, due to geographical limitations).
- More can be done to encourage partnerships between UK companies and international partners (in particular for the work led by IUK).
- There is no clear guidance for GESI (see Section 4.4), despite the recent inclusion of Energia (an international network on gender and sustainable energy) in TEA.

### 3.3.3 Value addition of partners

**Overall, the value of each partner is well understood,** leading to limited competition, increased synergies and a high potential for knowledge sharing, collaboration and replication across geographies.

**However, there is a trade-off between local and regionwide-level content, especially on skills development,** and TEA's hub in Nairobi is perceived as not being sufficient to address this. Sometimes a 'one size fits all' approach may not work, as different countries have different needs. This is explored further in Box 3 below. Difficulty in attracting, and carrying out due diligence on, proposals from Southern-based companies and researchers has been raised as a challenge, as has such companies/researchers winning calls for proposals.

#### **Box 3. GOGLA, GDC, USEA and ACE – building the market and skills through associations**

A number of associations exist that aim to facilitate a better enabling environment in the energy access sector.

For example, GOGLA works to grow the off-grid lighting market by focusing on mobilising investment, undertaking advocacy and promoting quality. National associations for sectors such as renewable energy and clean cooking are active at a national level in many countries. Effective to varying degrees in their efforts to shape policy and attract investment, these entities play an important role and demonstrate the power of a collective approach in a sector<sup>57</sup>. GDC represents an opportunity to build on the successes and lessons of global and national associations – and to work closely with those associations – to develop a better representation

<sup>57</sup> Practical Action. (2017). Solving the Last Mile Distribution Challenge: A call to Action from the Global Distributors Collective', pp. 1–19.

for the last-mile distribution sector as a whole. Based on GDC consultations to date, existing associations are interested in and supportive of efforts to strengthen distributors’ collective voice<sup>58</sup>.

GDC and GOGLA have been mutually supportive. Relationship building has been important for USEA, and it was appreciated that TEA and GOGLA would communicate with associations across Africa. As a result, USEA is engaging in deeper discussions with its counterparts in other countries, such as Kenya, Rwanda and Burundi, and has thus benefited from knowledge sharing from Sierra Leone and Nigeria on how to work with the bureau of standards. However, different countries have different needs. Whilst associations may experience similar challenges, such as on governance and fundraising, each association also faces contextual issues, such as not knowing where to fundraise from. Therefore, trainings which include representatives from more than one country, sometimes do not allow to reap all the benefits. For example:

- For a call for proposals, USEA’s priority was policy and tax issues. This was also a priority for Tanzania but for the rest of the countries that did not have this priority, it was hard to get them on board. So, there is a need for flexibility in core proposals.
- It is difficult to mobilise resources as an association. It is good to have a programme like TEA working through GOGLA but it is also good for an association to develop according to its own path. After two years, if an association shows a level of maturity, then TEA should work with it directly.
- Advocacy can be done regionally, but consumer protection issues or quality issues are very contextual and thus might be best delivered through, for example, a consultancy project directly in-country or through secondment and with more local presence.

Effective collaboration with other DFID programmes has been beneficial in regard to addressing the localisation issue. One piece of work is commencing with ACE which highlights the complementarity between TEA and ACE: TEA has already started an institutional self-assessment and ACE will pick this up and go into more depth, including understanding the deep underlying challenges.

### 3.3.4 Financing and risk appetite

**TEA’s financial support is broadly considered to be innovative as it has leveraged finance across the capital spectrum (see Figure 2).** TEA is looking at the whole energy access ecosystem and testing different levers in different areas of the sector. It has managed to catalyse the financial sector in off-grid energy and has done so within the programme itself (in particular through Crossboundary, Lendahand, the Shell Foundation and Acumen). TEA has also been influential in raising additional crowdfunding. The syndication product that Energise Africa partners and Lendahand are working on is considered crucial to the crowdfunding sector. TEA also collaborated with other UK programmes, in particular with CDC through its role in investing in companies. M-KOPA has been highlighted as a success story in this regard (see Box 4), in addition to Aceleron (see Box 6).

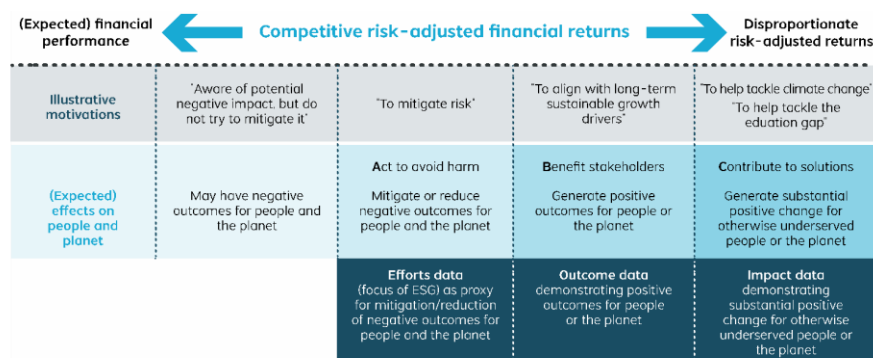


Figure 2. Sustainable investing: the capital spectrum<sup>59</sup>.

<sup>58</sup> *Ibid.*

<sup>59</sup> The term ‘sustainable investing’ describes a broad range of investment practices that consider the impact on people and the planet alongside financial performance. This is intentionally broad and includes practices that both seek to avoid causing harm as well as those that

**Box 4. M-KOPA – a success story**

M-KOPA built one of the world's most advanced and successful pay-as-you-go platforms to provide low-income homes<sup>60</sup> with affordable asset financing for connected solar technology and other life-changing products and services.<sup>61</sup>

**Support from TEA**

M-KOPA received different sources of funding from TEA (indicating that even more robust companies need support at different stages). TIME provided funding to M-KOPA Labs to pursue R&D on larger capacity power devices capable of interfacing with the grid and larger off-grid appliances. More recently, M-KOPA has started to benefit from POP.

**Impact and results to date**

To date, the company has sold over 750,000 off-grid solar systems, providing 3 million individuals with clean, safe lighting solutions. The majority of households suggest that they save money by displacing kerosene and phone charging expenditure with M-KOPA. Customers saved approximately \$650 over five years, which amounts to over \$400 million in increased household budgets<sup>62</sup>. Furthermore, 25% of M-KOPA's customer base uses available cash to purchase food and 24% dedicate extra funds to children's education. Many use these savings to acquire additional life-changing assets and services from M-KOPA. Since inception, the company has unlocked nearly a quarter of a billion dollars in micro-loans for low-income customers across East Africa and it has enabled over 450,000 low-income Kenyans to establish their creditworthiness to date, thus creating a pathway out of poverty<sup>63</sup>.

M-KOPA estimates that 140,000 customers directly generate income through local phone charging services, hosting movie screenings, or using solar lighting for business. This has been proved to increase household budgets by as much as 32%. Anecdotal evidence suggests that the women in these households are the ones who capitalise on solar ownership, enjoying increased agency in the home, and thereby shifting the role of women in rural communities.

M-KOPA provides full-time employment to 855 staff globally, 50% of whom are women. The company has more than 2,100 active direct sales representatives across East Africa; 60% of these solar entrepreneurs are aged 30 years or younger and have been recruited from the last-mile communities served by M-KOPA. Since 2012 it has invested over \$63 million in recruiting and sustaining the workforce<sup>64</sup>.

Based on GOGLA's Impact Framework for the Off-Grid Solar Energy Sector, it is estimated that M-KOPA Solar systems will avoid 1.7 million metric tonnes of carbon dioxide and black carbon over the system lifetimes<sup>65</sup>.

**Lessons learnt**

- M-KOPA indicated that it has been very strategic about funding, accessing and mobilising the finance source or instrument that best suits its state and growth ambition – which has led to efficiencies and effectiveness, and a good relationship with funders, also with regard to meeting reporting requirements.
- Developing high-quality, affordable, connected devices that offer reliable service to customers over a long period of time in challenging conditions requires high technical skills across mechanical and electrical engineering, battery technology, software and firmware engineering, form factor and product design and prototyping. Although M-KOPA has built a strong team in the market with many of these skills, the Shell Foundation support has enabled M-KOPA to strengthen its core technical competencies in these areas. It has also enabled M-KOPA to work more closely with its suppliers to

seek to benefit stakeholders and actively contribute to solutions). HM Government. (n.d.) 'Investing in a Better World: Understanding the UK public's demand for opportunities to invest in the Sustainable Development Goals'.

<sup>60</sup> Approximately 80% of M-KOPA's households are low-income, earning \$2–3 per day per household member.

<sup>61</sup> M-KOPA Solar. (2019). 'Impact report. Upgrading 'Lives' (ppt).

<sup>62</sup> *Ibid.*

<sup>63</sup> *Ibid.*

<sup>64</sup> *Ibid.*

<sup>65</sup> *Ibid.*



ensure that maximum advantage is gained in terms of the quality, cost and specification of new products.<sup>66</sup>

- There are several appliance technology providers in the market that have interesting off-grid appliance product prototypes, but no large-scale manufacturing capabilities. Even with external grant funding support, M-KOPA cannot take on the very significant costs and risks of end-to-end design and manufacture of new appliances. Therefore, M-KOPA has sought to partner with partners that have both manufacturing capabilities at scale and a commitment to serving mass-market customers in sub-Saharan Africa. This approach to co-development will result in high-quality appliances being offered to M-KOPA customers, powered by M-KOPA devices, with M-KOPA's flexible financing spreading the costs of purchase.

#### The future of M-KOPA

Although M-KOPA is scaling up, the company does not yet generate a cash flow large enough to invest in new product development beyond its immediate product suite. In addition, as new (larger) products require more up-front capital, the risks associated with bringing new products to market increase substantially – and become more challenging to fund with equity/debt capital.

**DFID is an investor that can take more risk than a commercial investor.** TEA has been instrumental in providing early-stage risk capital in the form of grants and assistance for the creation of companies that would otherwise not have existed, to support the development of proof of concepts and early-stage companies with good business models or that are not able to attract capitals from impact investors and Development Finance Institutions (DFIs), and TEA has accepted a high degree of risk of failure. Once the sector matures, DFID can then shift focus (such as from solar home systems to mini-grids and storage).

**TEA is trialling a number of very different approaches with a broad set of partners and Energy Catalyst's role in this has been crucial.** IUK has been established to fund all risky innovations that no bank would fund. This is programmed in the way projects are appraised. The higher risk is in the technology transfer and is particularly relevant in regard to making a business model work for those who earn less than 1\$ a day. This high risk-taking is having an impact on efficiency.

**TEA is also engaging with other risk-taking programmes in the sector.** CDC has a higher risk portfolio called 'Catalyst Strategies'. This portfolio funds projects such as the new modelling of national utilities with more tailored access to energy in communities.

#### Box 5. Aceleron – accessing the capital spectrum

Aceleron is a circular economy-focused lithium battery company with a social impact mission to increase worldwide clean energy access. The company re-purposes batteries from equipment in developed markets that would otherwise be discarded, to be used in the off-grid sector as storage or power sources. Its patented battery assembly technology enables the easy remanufacture, re-use, recycling and repair (4R) of lithium batteries, thus significantly reducing battery waste and the lifetime cost of the battery, as it can be serviced, maintained and upgraded without needing a complete replacement – something that is novel in the industry<sup>67</sup>.

Aceleron offers this technology in three core products: Solaron – suitable for energy demands of households in emerging markets; Essential – a lead-acid battery replacement for scalable energy storage use (e.g. data centres, telecoms, etc); and Offgen – residential/commercial energy storage<sup>68</sup>.

Aceleron received funding from TEA via an IUK EC4 grant for project Zebra (comprising a partnership between Aceleron, Blue Vine Consulting and ALP Technologies) – which aimed to repurpose end-of-life automotive batteries to electric storage devices. Furthermore, the Shell Foundation has also been working with Aceleron

<sup>66</sup> M-KOPA LABS. (2017). 'Lessons Learnt Note'. November.

<sup>67</sup> Current News. (n.d.). 'Aceleron: Manufacturing advanced circular economy lithium-ion batteries'. Available from: [www.current-news.co.uk/hub/aceleron/](http://www.current-news.co.uk/hub/aceleron/)

<sup>68</sup> *Ibid.*

since 2017 to pilot its model in Kenya, and is currently helping Aceleron position itself for scale, providing mentoring, connections to corporate partners and support with investors. Demand for lithium batteries is increasing annually, as a way of improving off-grid storage costs and reducing environmental impact. The Shell Foundation is supporting Aceleron to match that growth, piloting an 'energy storage as a service' model in East Africa.

Aceleron is a successful case study, where TEA funding enabled the company to develop battery technology, while also facilitating de-risking and private investment.

In a short time span, the company transformed its product from an early-stage prototype to a mature technology, and is currently delivering it in large numbers throughout sub-Saharan Africa. It is currently in discussion with Acumen for equity funding (so through a financial equity intermediary). There is potential then for CDC to invest in Acumen, which in turn invests in Aceleron. Once Aceleron matures, with a strong demonstrated pipeline and commercial robustness, it could also access CDC equity funding directly, and, further to that, also debt. Thanks to the TEA bi-annual meetings, Aceleron has undertaken two projects with Shell Foundation partner BBOXX, to investigate the viability of replacing lead-acid batteries currently in use with Aceleron's advanced Li-ion offering. The BBOXX pilot has demonstrated the ability for Aceleron to successfully build and deploy advanced Li-ion batteries that are fit for purpose and that have a number of advantages over their lead-acid counterparts. In addition, both projects have demonstrated an ability to utilise and upskill the local workforce with pop-up builds in-country<sup>69</sup>.

**TEA funding can decrease the lead time from idea/prototype to go-to-market.** For example, there is a high-carbon legacy in mini-grid development and power generation globally. Many African countries can leapfrog towards the end game. However, the supply chains and value models need to be designed, so it will take a few rounds of understanding before it can be got right. TEA is working to install novel energy approaches that will take some time to get to the next level.

**According to some interviewees, DFID is not taking enough risk;** specific examples are given below.

**TEA is reaching the poor, but not the bottom of the pyramid.** TEA is not taking enough risk to effectively 'leave no one behind', with the exception of the support to GDC. GDC is very high-risk, and it has appreciated TEA's focus on the last-mile distribution. Through TEA, GDC has been able to reach the most marginalised people at real risk of being left behind in the progress towards achieving the SDGs, through a holistic approach (as illustrated in Section 3.3.3).

**There are questions on managing the balance between reducing market distortion and kick-starting the market.** Ideally, the market would be able to fund this sector, but until now companies have struggled on this, thus there will be a need for public funds for some time yet. OGTI, for example, takes a market need and identifies a pain point that is not matched by the ability to scale if there was no public funding available.

**Grant calls are not designed to reduce risk and access wider pools.** Funding calls tend to be very specific as on programmes, but often do not align with the company/sector objectives and priorities. In addition, it has been highlighted that it might be best to identify more jointly where the opportunities are. Designing calls in a more flexible manner could lead to a more strategic outcome and could reduce risk.

**Others are of the opinion that TEA is not doing enough on financial innovation.** TEA includes crowdfunding and impact investment through Acumen, although is not considered very innovative, and more should be done. BBOXX (see Box 6) has been supported by the Shell Foundation and is an example of a company that has put financial innovation at its core.

<sup>69</sup> Aceleron. (2019). 'Aceleron Pilot – Lessons Learnt'.



**Box 6: BBOXX digital innovation to reach the poor**

BBOXX designs, manufactures, distributes and finances solar energy systems to improve access to energy across the developing world. BBOXX's smart systems deliver power for lights, home appliances and smartphones, and enables financial inclusion through mobile money. BBOXX has developed an innovative proprietary payment mechanism ('Pulse') through mobile money and integration and is offering loans. It provides clients with a flexible plan that gives them 10 years to pay back the loan. Strategic partnerships have enabled BBOXX to scale to 11 markets in West and East Africa, and to improve its product mix. It provides energy to 600 new households daily<sup>70</sup>. BBOXX is currently developing, with Aceleron, a new medium-/home-size solar system with lithium batteries, to run a TV or a fan. There is a demand for these in the new markets and the grant from IUK is being used for this.

**There is a need to manage trade-offs between favouring UK businesses and operating in Least Developed Countries (LDCs) and with companies on the ground.** It has been highlighted that it will be necessary to include more African actors, which comes with added risks, and to be more accepting of risks of failure, but this is expected to be the only way to drive success on the ground.

**Contractual liability reduces the ability to take risks and also puts more risks on beneficiaries.** Expectations of liability insurance in regard to local partners are high. The effectiveness of delivery meets outcomes the partners want to achieve, and DFID leniency on contracting would make delivery nimbler. A number of respondents have asked to remove the intellectual property clause because it is legally flawed. Even with ad-hoc modifications, there are still high risks for companies, relating to TEA in some instances potentially receiving royalties in relation to the hardware.

**Difficulty in attracting, and carrying out due diligence on, proposals from Southern-based companies and researchers, and on such proposals winning a call, has been raised as a challenge.** At times, programmes are designed in such a way that it makes it impossible for Southern-based institutions to apply and win proposals. Subsequently, during contract negotiations and programme implementation due diligence and funding requirements make it difficult for partners to stay in the programme. Up-front funding requirements are needed, and some cannot afford it, impacting on the formation of partnerships and consortia.

### 3.4 What has changed as a result of TEA?

This section analyses TEA's progress in responding to the energy access challenge.

**According to TEA's theory of change impact statement, the programme aims to build inclusive, clean energy access markets via innovation in technology, business models, finance and skills, especially in Africa.** Impact-level indicators in TEA's logframe include MW mini-grid capacity in Africa, Solar Homesystems (SHS) unit sales in Africa, last-mile distribution sector total sales in Africa, frontier power market size in Africa, and TEA transformational impact. To date, no progress on impact measurement has been documented in TEA's reporting.

**This section analyses TEA's progress in responding to the energy access challenge as a whole: in other words, as the sum of its parts and in its ability to promote 'transformational change'.** TEA's approach to addressing the energy access challenge has been documented in Section 1. TEA aims to strengthen the evidence base on what works and to support technological innovations that will scale up energy access. This initiative is expected to have significant implications for communities and businesses in developing countries through assisting energy enterprises, investors, project developers, policymakers and planners to make better decisions about when and how to provide affordable modern energy services (TEA's Business Case, 2016). TEA's progress towards output-level indicators has been documented in Sections 3.2 and 3.3, respectively.

<sup>70</sup> Shell Foundation. (2020). 'Portfolio: BBOXX'. Available from: <https://shellfoundation.org/?s=BBOXX>

**According to HM Government, Climate Change Compass (2018) transformational change is ‘change which catalyses further changes’.**<sup>71</sup> This process enables either a shift from one state to another (e.g. from conventional to lower-carbon or more climate-resilient patterns of development), or faster change (e.g. speeding up progress on cutting the rate of deforestation). However, it can entail a ‘range of simultaneous transformations to political power, social relations, decision-making processes, equitable markets and technology’.

**Transformational change is at the core of TEA.** This is evident not only in its name (and in TIME’s) but is also reflected in two of its outcome-level indicators: ‘a highly effective, transformative research and innovation programme’ and ‘transformative technologies and business models that enhance the lives of the poor’. TEA’s impact-level statement speaks of the role of energy access in contributing to the transformation towards a low-carbon and climate-resilient economy.

**The purpose of monitoring transformational change in the context of TEA is to encourage thinking towards, and to ensure the programme’s adaptive design and management levels work towards, the sorts of transformations that are needed** – to ‘design-in’ learning. TEA is in its fourth year of implementation, which is a good time to more proactively reflect on its contribution towards the energy access challenge and transformation.

**TEA is now well established as an umbrella programme, with successful independent workstreams, but more can be done to unlock its potential as a whole.** The way in which TEA was operationally set up led to quick wins: two workstreams that produced early results (TIME and Energy Catalyst), and DFID’s outsourcing of a Programme Management Function (PMO) function to allow more projects to be funded. Most interviewees with an active role at TEA agreed that they now feel part of TEA and understand their role in the programme, but that further work can and should be done to allow the programme to produce more catalytic changes.

### 3.5 Sustainability and exit strategy

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This section presents some key insights from our research and provides recommendations regarding TEA’s exit strategy.

**Overall, it was considered by interviewees to be too early to focus on an exit strategy as the programme is still moving the market.** It was highlighted that the important thing now is to support the market to become more commercial and to keep assisting companies that need it.

**‘Exit’ is intended differently by different interviewees and should be differentiated across workstreams.** This is due to the complexity of the programme. Thus, it is considered more effective to differentiate exit strategies by components, linked to the progress on SDG7 and on funding coming into the programme.

**The creation and delivery of low-cost and low-carbon technology needs to be able to fund the next wave of early innovations.** There is no exit strategy for Energy Catalyst, which should continue until it can create low-cost and low-carbon sustainable technology. Exit strategy conversations revolve around how to get the business readiness level up and how to get private investors on board to fund the next chapter of these companies so that they can fund the next wave of early innovations.

**Whilst most respondents were not sure about the overall exit strategy for the programme, there are some indications of exit strategies being taken forward.** E4I is now in the process of handing over all the DFID funding to Energise Africa so it can operate on a more standalone basis. E4I will no longer attend the

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<sup>71</sup> HM Government. Climate Change Compass. (2018). ‘The extent to which ICF intervention is likely to lead to transformational change’, pp. 1–21. Available from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/813600/KPI-15-extent-ICF-intervention-lead-transformational-change.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813600/KPI-15-extent-ICF-intervention-lead-transformational-change.pdf).

quarterly meetings with DFID, as Energise Africa will be part of TEA, but will maintain a monitoring role. This is considered a sign of maturity, to enable Energise Africa to grow.

**Most companies have not yet discussed commercial exits.** Except for a few companies, such as KopaGas, most have had no discussions yet on exits, and where they have received equity or debt the exit will depend on the lending or on investment contracts.

**Additionally, at the overall programme sustainability level there are some sustainability risks linked to DFID circling people, and other retention issues.** Despite DFID's usual high turnover in staff, the current Senior Responsible Officer (SRO) has remained since the early stages of the programme. There is some concern that institutional knowledge might be lost if they were to leave. At the beneficiary level there is some risk of not retaining in the country the students that have benefited from training. Some mitigation measures are being considered, such as students who are given bursary support being tied back to the country, but this is considered beyond the scope of the programme.

**Some recommendations across a number of areas that should be strengthened before TEA's exit are below:**

- **There is a need for knowledge creation and dissemination.** For a research programme like TEA the exit strategy needs a strong communication and knowledge dissemination strategy. There is never a clear start and endpoint for research projects. A very clear set of outputs, a communication and dissemination document/strategy, as well as the next steps for forming partnerships will be key for the next stage of the programme (see Sections 4 and 5).
- **There is a need for more funding to more projects and more companies.** At the moment there is some perception that the majority of funding is directed to a small number of companies, so new companies cannot access funding (especially in terms of equity investments) as there is already investment in the current companies.
- **There is a need for more progress in co-funding and development of leads.** The M-KOPA example shows how even the more robust companies need support; it will take time for the sector to be profitable without grants. One interviewee requested that when the programme comes to end, TEA should have a strategy to help them exit. For some, sustainability is a concern, but they have developed strong funding leads already – also through partnerships created in the programme. For example, GDC's work with Acumen and AMI is expected to continue, with or without TEA. Some have designed matching funding to avoid depending on DFID funding in the longer future.
- **Interviewees also considered it necessary to link the programme with policy.** As ACE works with governments, it will be handing over to them its work and will be training them to gather relevant information. In terms of knowledge management, it wants to ensure a repository is there and is embedded. As ACE is more government- and association-facing it wants to ensure that it will be able to hand over to governments/associations.

## SECTION 4: An assessment of the TEA programme's modality performance

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**This section synthesises the main findings related to the second MTR question: how has the TEA programme modality performed as a whole?** It starts with an assessment of TEA's modality (Sections 4.1 and 4.2). It then presents findings related to the main roles of the Carbon Trust as the lead of RPDC (on M&E, GESI, communications and knowledge dissemination), and it ends with findings on TEA's collaboration with other DFID-funded programmes.

### 4.1 Programme modality

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**The preferred option for TEA's implementation modality, as per its Business Case, combines expanding proven delivery channels (Shell Foundation, partnership TIME), supporting open competitions (IUK's Energy Catalyst), commissioning studies and research through RPDC, and also being responsible for overall reporting, results monitoring and dissemination.** TEA's theory of diagram shows the linkages between these three main components (see Annex 1).

**TEA's choice of implementation modality allowed the programme to produce fast results.** DFID signed memorandums of understanding (MoUs) with the Shell Foundation and IUK in 2016, and the contract with RPDC in 2017. The performance of the Shell Foundation and IUK has been strong (consistently scoring A and A+ in all DFID annual reviews). The contract between RPDC and DFID suffered administrative challenges and delays, mainly during its procurement and when updating the contract between the design and implementation phases (June to October 2018). More recently there was a lack of clarity around the VAT implications of the programme, which delayed the signature of the sub-agreements on the CEP and SED projects<sup>72</sup>. Today, all workstreams are being implemented.

### 4.2 Programme additionality

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**The initial success in the implementation of TEA provides two useful operational lessons:**

- MoUs allowed TEA to hit the ground running. By working with IUK and the Shell Foundation, TEA was able to fund projects without delays.
- The TEA set-up allows DFID to outsource project management functions. RPDC has been a successful way for DFID to effectively outsource these functions to a capable organisation, given that DFID does not have the resources to manage contractual relations.

**The set-up puts together a wide range of institutions and projects working towards a common goal.** The coordinating nexus of policy, academia, NGOs and private sector stakeholders is considered to provide better value for money as compared to implementing each programme and workstreams separately. TEA brings together programmes and partnerships under one big umbrella and allows different instruments, which work together for different purposes but to achieve a common objective.

**TEA is ready to move towards a new phase focusing on coordinating efforts to maximise the chances of achieving transformational change (see Section 3.4.2).** During the first three years of implementation, TEA established strong building blocks and created the momentum to move towards a new, more ambitious phase. Evidence shows that TEA has made solid progress on output-level indicators (documented in Section 3) and in some cases has overachieved.

**The stakeholders interviewed identified four areas that were acknowledged as unique to TEA and that have the potential to catalyse change:**

- **TEA strikes a good balance in supporting early-stage innovation that is ready to be tailored and tested in new locations.** According to stakeholder interviews, TEA addresses a market gap in supporting small and medium-sized enterprises and initiatives that are perceived as too risky by traditional investors. By doing so, it supports the creation of sustainable energy access in low-

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<sup>72</sup> For more details see DFID's annual review of TEA, 2019.

income countries and the growth of small enterprises in the UK and in countries where new technologies and businesses are deployed.

- **TEA has a complementary and innovative approach to funding risky investments.** What TEA does in the area of venture capital (led by the Shell Foundation) is an interesting addition to more usual funding mechanisms. This approach contrasts and complements the more traditional approach of Energy Catalyst, which instead operates through open calls that are perceived as transparent and that ensure value for money, but which do not provide continuity from one round to the next of funding.
- **TEA proactively engages with the private sector.** The role of the private sector in achieving universal energy access is widely acknowledged. TEA supports UK- and Africa-based entrepreneurs and both incentivises them to enter the market and supports the ones that are already operating in the space.
- **TEA is driving innovation and skills development on the ground.** According to local beneficiaries, 'TEA is a flexible programme design that responds to the needs of the final beneficiaries. TEA is seen by most Southern-based interviewees as a good example of enhancing entrepreneurial innovation on the ground.'

#### 4.3 Monitoring, evaluation (M&E) and reporting

**M&E is a key activity that is led by the RPDC, which has set up systems according to the RPDC M&E Strategy and to the standard of the Quality Management Strategy document, which stipulates key meetings and claims processing.** M&E is performed with the support of tracking tools including Gantt Charts and red, amber, green (RAG) scoring of components and sub-components. Reporting to RPDC by implementers on activities and outputs occurs every six months, providing the opportunity to get regular feedback and raise issues in advance. Reporting between DFID and RPDC is monthly, making it possible to keep both parties onboard. There are bi-monthly meetings with implementers, where activities related to reporting are discussed. The Shell Foundation and IUK, which originally reported to DFID directly, now report via RPDC.

**Responses on the adequacy of the M&E system were varied.** For most interviewees, the structure and requirements are suitable, and guidance and support are readily available from RPDC. However, some implementers were more critical, feeling not well informed about the theory of change and logframe and stating that current reporting templates are prescriptive and fail to capture useful information – for example on lessons learnt<sup>73</sup>. Some implementers think that reporting requirements are onerous or not relevant (e.g. BSEAA, since the business case for the project is lacking, there is no baseline to compare it with, so discussing value for money, for example, can only be done generally).

**DFID's commitment to keeping implementers focused on impact has pushed them to think through metrics and reporting better.** Some have developed robust metrics and more robust data collection approaches (e.g. Acumen and 60 Decibels).

#### 4.4 GESI

**TEA has not been designed to address the complexity of GESI.<sup>74</sup>** Multiple opportunities exist to positively influence women's lives and there is evidence of positive financial returns, as well as the potential for long-term, scalable impact. For example, by integrating gender throughout the business model and engaging both women and men throughout the enterprise value chain there is potential to increase

<sup>73</sup> RPDC has developed a matrix in which lessons learned are documented. More dissemination of this information could support knowledge sharing among partners.

<sup>74</sup> A pilot study by the Shell Foundation to design and test 13 customised gender inclusion strategies across key business areas, together with five Shell Foundation partners, found: i) a 33% reduction in technical support calls from clients handled by call centre agents after applying gender-specific messaging to customer service calls; ii) an increase in sales of 85% after testing the impact of training women direct sales agents to sell in strategic sales locations; and iii) an increase in sales of 73% after testing the impact of training women direct sales agents to sell using demonstration kits in public areas. Source: Shell Foundation, UKAid, Value for Women (2018) 'A business-first approach to gender inclusion. How to think about gender inclusion in small and medium enterprise operations'.

customers' perceptions of the value of products/services, as well as their adoption and use. Furthermore, products and services may be better aligned to customers' preferences, potentially leading to improved sales, increased customer loyalty and improved access to talent<sup>75</sup>.

**Achieving equal gender representation within TEA needs further work.** One Southern beneficiary explained that in their organisation they try to ensure that collaborating companies (in particular distributors) are gender-sensitive. Despite this observation, women are significantly underrepresented at the senior management and board level (e.g. within the companies in which Acumen invests), which could slow progress in broader efforts to integrate gender. These gaps often reflect a limited pipeline of women in entry- and mid-level roles<sup>76</sup>. Local event participation is also not balanced. However, a few interviews reported the opposite: gender representation is good in local training events such as (USEA-GOGLA proposal writing training events), with 50:50 gender representation.

**There were mixed opinions among respondents regarding the suitability of TEA's GESI strategy. Issues due to the differing timings for strategy implementation among partners, inadequate reporting guidance and frameworks, and a lack of clarity on the real motive behind GESI, mean that results are slow to come.** Reporting on GESI strategy occurs through TEA quarterly mechanisms and progress is documented in the logframe. Respondents shared mixed feedback on this process. For some Southern respondents, the metrics in the logframe may have influenced how their work is delivered and the GESI toolkit was described as providing insightful guidance and tools for integrating gender considerations into their projects and programmes. However, for others the GESI strategy has only been recently defined and its development has been driven more internally to the company than by TEA. A number of beneficiaries reported that there is no guidance on achieving excellence, just on meeting minimum requirements. Others said that there is no real benefit from TEA on this aspect and that the GESI strategy is driven internally, to tick boxes.

**One interviewee explained that during the inception phase of their TEA funded project, a GESI strategy was developed with targets and indicators** (e.g. looking at gender balance within the team and in research endeavours). However, no indicators were developed in order to create an impact on the ground. Nevertheless, he acknowledged that when it comes to identifying pathways to commercialisation, gender considerations become more important. This is when sex-disaggregated data becomes an essential first step for incorporating GESI strategies into an enterprise's work and testing the impact on business performance.

**The enterprises involved in the TEA programme could benefit from a diagnostic tool on gender.** This would enable them to assess where they are effectively integrating gender into their business models, and where there are opportunities to further integrate it to achieve increased business and social impact. This could also be used to drive excellence in logframe reporting. Such a tool has been developed by Acumen<sup>77</sup>. Annex 4 provides a summarised diagnostic tool for companies to gauge how effectively they are integrating gender into their business models and outlines additional steps that can be taken to further integrate gender in a specific area of the business.

#### **Box 7. GESI stories – The case of Mobile Power**

GESI is a complex issue, especially in the energy access space. In the African villages where Mobile Power operates, the decision-making power lies with the chief and the elders. When Mobile Power expands its services to a new village, they set up a hub and invite the elders to join – they then invite their family members, who take the profits from running the hub.

<sup>75</sup> Example: female distributors and sales agents may be able to position companies to better serve female markets and increase sales/ Acumen and International Centre for Research on Women (n.d.). 'Women and Social Enterprises: How Gender Integration Can boost Entrepreneurial Solutions to Poverty?'

<sup>76</sup> *Ibid.*

<sup>77</sup> Acumen and International Centre for Research on Women (n.d.) 'Women and Social Enterprises: How Gender Integration Can boost Entrepreneurial Solutions to Poverty?'



Mobile Power tries to train women as agents, but as soon as they start making money it is taken away from them. When Mobile Power was involved in the Energy Catalyst R6, it pushed for 50% women agents, partnered with a local NGO, and hired a gender specialist (to address the social dynamics of how to keep women in post/s) and thus to support the female agents. The company also produced a female energy entrepreneur's manual, which discusses issues of women empowerment.

There was a situation in a hub that was run by both a man and a woman, where the former ended up having an affair with another woman and ran away. His wife ended up running the hub on her own for a while until the man returned, abused her and took her money. Thus, there is a risk in employing women in this kind of work. However, thanks to the Energy Catalyst grant, Mobile Power now has support to address these kinds of issues. Mobile Power is addressing the energy access challenge and not GESI issues. Both are important but difficult undertakings. The GESI-related work of Mobile Power would not have happened to the same degree without the Energy Catalyst funding (and related GESI eligibility requirements).

The company believes that by leveraging on its other applications (e.g. USAID), it could help to avoid the elders and go straight to the women and help them to better control the assets and the money. With the support of World Vision NGO, Mobile Power believes it could achieve this. It has already demonstrated that women are more hard-working and tend to keep money longer in the target community than men. If the company cannot find a way to keep women in posts for longer, it can change business policy and hire only women. Grant money to support this important work on gender equality would be much appreciated.

#### 4.5 RPDC-level communications

**The Carbon Trust provides an adequate level of communication and guidance about operational issues to TEA implementing partners.** The Carbon Trust team is seen as very responsive and as providing the right level of involvement. However, the role of other RPDC members is not clear and they do not feel centrally involved in the process.

**Communications about strategic issues and TEA thematic areas can be strengthened.** For example, several partners interviewed mentioned that they received limited advice and feedback about TEA's dissemination aims and options, or about the quality of their products.

**The programme has now established a regular communications plan,** including bi-annual calls and annual review meetings. The bi-annual calls are exclusively for TEA partners and the annual review meetings combine sessions for TEA partners only with others, where external partners are also invited. Both the bi-annual calls and the internal sessions in the annual review meetings received mixed feedback from TEA partners. The purpose of these activities is not clear, with some people understanding them as an opportunity to report on progress to the Carbon Trust and DFID, and others as providing the opportunity to create partnerships and share lessons learned among implementers.

**There is no clear strategy to enhance collaboration.** Despite the programme's interest in the creation of new partnerships, there is no strategy or guidance for TEA partners to develop them. The bi-annual calls and the annual meetings could be more proactively used as opportunities to enhance partnerships and collaboration.

**Mixed views were also expressed about the use of SharePoint.** This is seen by many as a depository of information. A few stakeholders referred to the potential use of SharePoint in more active ways, which would support programme needs around content development and partnership creation.

#### 4.6 Knowledge dissemination

**There is so far limited dissemination of TEA's findings, especially at a centralised level.** The Shell Foundation produces information which is disseminated via its own website. IUK advertises its calls and results on its website. DFID's annual reviews document publications coming out of the Energy Catalyst workstream. The Carbon Trust has a list of knowledge dissemination outputs which it shares with DFID in

its reporting, which are expected to then be uploaded into Results for Development (DFID's database of funded research outputs)<sup>78</sup>. However, it is very hard to get a picture of the knowledge that is being produced by TEA in a simple way.

**TEA has a poor online presence, which could be improved and used for dissemination.** The Carbon Trust has a website for TEA that is used mainly for advertising tenders. The programme has no presence on social media, nor a newsletter.

**TEA should rapidly design and start implementing a knowledge dissemination strategy that fits the programme's needs<sup>79</sup>.** TEA is a research and innovation programme, whose findings need to be disseminated appropriately in order to reach audiences that will be able to put these findings into use, thereby contributing to the programme's intended change. Some specific feedback received during interviews included requests for this plan to address both strategic issues (what is the role of TEA?) and more specific ones (developing two-page summaries of TEA's work and its results that could be used as a feedback mechanism to feed research findings into other activities and programmes).

**Research uptake and quality assurance were also discussed with respondents.** Partners are keen for their research to be used, both by business and policymakers, but cannot yet understand what the research value of the programme is. There has been a commitment from TEA to carry out more research, but so far little has been done. With a few exceptions, the research that has been delivered lacks robustness in terms of contribution to academic excellence. There is a perceived gap in the organogram on good academics for research methods and strategy development and delivery. Some respondents have said they would welcome their research outputs being quality-assured, or quality-assured more extensively.

**The annual review meeting in 2019 was very well received by interviewees not working directly with TEA.** In particular, external participants highlighted that it was useful to learn about all the different workstreams and initiatives that TEA is funding. However, it was suggested by many that the event should be organised around themes that would allow participants to effectively and efficiently plan for it beforehand, and to focus on topics that are more relevant to their work.

**Concise knowledge products can enhance the dissemination of innovations, findings and lessons learned.** The scope of work of TEA and its successful start is widely understood among other DFID-funded programmes, but there is limited synthesised results coming out of TEA research. Several interviewees suggested the production of thematic two-page summaries that could serve to disseminate research findings.

**Interviewees provided very mixed opinions about the creation of a 'TEA brand'.** What is essential for DFID is that the programme adheres to DFID branding guidelines. Within DFID, some people are of the opinion that building a brand is expensive and time-consuming. In addition, there is no clarity on the advantages of a TEA brand against using TEA's implementing partners, some of which already have credibility and robust knowledge dissemination strategies. Advocates of a 'TEA brand', combined with a thorough communications strategy led by RPDC, argue that this can ensure a wider dissemination of TEA research and innovation, designed for audiences which may differ from those of TEA's implementing partners.

#### 4.7 Collaboration and coordination with other DFID-funded programmes

**TEA's aim of increasing energy access focusing on the off-grid sector complements other DFID-funded applied research programmes.** These programmes include:

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<sup>78</sup> Department for International Development. (n.d.). Research for Development Outputs. Available from: <https://www.gov.uk/dfid-research-outputs>.

<sup>79</sup> The urgency of a knowledge dissemination strategy is acknowledged by DFID and the Carbon Trust, who are currently discussing a plan.



- The Energy and Economic Growth (EEG) programme, which focuses on the grid-based provision of electricity and on power sector challenges.
- The Modern Energy for Cooking programme, which works on research about the cooking sector.
- ACE, which supports the development of solar off-grid markets, with a focus on enabling the policy environment in African countries.
- LEIA, working on research and innovation that seeks to double the efficiency and halve the cost of a range of electrical appliances suited for off-grid and weak-grid household, small business, and industrial consumers.
- Result-Based Financing for Low-Carbon Energy Access offers incentive payments, on the basis of results achieved, to businesses which deliver pre-specified outputs within the low-carbon off-grid energy sector.

**We found evidence that companies implementing DFID energy research programmes hold coordination calls, but more can be done to increase collaboration.** Sporadic calls have been organised between the EEG and TEA teams, and TEA and ACE has monthly catch-up calls with TEA partners where they discuss activities, overlaps and complementary opportunities. For example, both programmes are coordinating their work with GOGLA.

**More can be done to clarify how TEA fits within DFID – in particular, with country offices and the Policy Division.** According to DFID interviewees, there is no systematic approach within DFID to connect programmes working in the energy space, with the risk that some opportunities are being missed and/or there are some overlaps. TEA is seen as a successful programme that proactively engages SROs of relevant programmes by inviting them to participate in their annual review meetings.

**Within DFID, TEA actively interacts with other DFID energy programmes.** The SROs of ACE and TEA hold regular meetings and attend the Group of Experts in order to try to identify areas of synergies. ACE holds monthly catch-ups with TIME to fund the market accelerator and see how a market facility can be built. The TEA SRO also holds regular catch-ups with the teams working on EEG, CDC, Private Infrastructure Development Group (PIDG), Modern Energy Cooking Services (MECs), Low Energy Inclusive Appliances (LEIA) and Results-Based Financing for Low-Carbon Energy Access.

**RPDC has limited interaction with other DFID energy-related funded initiatives.** CDC's portfolio is 80% infrastructure, of which most is in energy. CDC has been invited to participate in TEA's annual review meetings and its Catalyst Strategies programme was introduced by DFID to the TIME programme. It should be noted that PIDG has a five-year strategy, but only one paragraph in it focuses on energy. Our research identified limited collaboration between TEA and CDC/PIDG so far.

**DFID and TEA can do better at using the programme as a platform for the promotion of good practices.** DFID is a good platform in terms of global voice, and it has a reach that extends to the public sector as well. More brown-bag talks and more links to country offices, which DFID can facilitate, would help to amplify that voice. An example is the thought leadership reports that were produced thanks to DFID's push and support. TEA and its partners could have amplified the work even more and generated more impact.

## SECTION 5: Recommendations for the short-term future of TEA

**This section presents findings related to the third MTR question: What operational improvements and related changes are required within the existing programme scope?** Firstly, we suggest strategic level recommendations for TEA's individual workstreams, next we recommend potential specific activities that may improve the programme implementation process, and lastly, we tackle the programme's modality and additionality.

**All interviewees were asked to identify issues that needed attention in order for TEA to achieve its programme goals.** The MTR Team identified recommendations that emerged from the previous sections, in addition to thematic trends, and triangulated them with findings relative to achievements and the modality for implementing the recommendations set out in this section.

### 5.1 TEA workstreams recommendations

The table below summarises recommendations per workstream, based on findings in Section 3.2.

Table 4. Summarised MTR recommendations per workstream

Workstream	Recommendation	Description
IUK Energy Catalyst	Continue	<ul style="list-style-type: none"> <li>Being a grant provider for innovative technologies</li> <li>Having transparent processes</li> <li>Providing timely support for the stimulation of new ideas and early-stage, risky projects</li> <li>Facilitating collaboration and brokerage events for African countries and UK companies</li> </ul>
	Improve	<ul style="list-style-type: none"> <li>Choice of experts for evaluation of proposals – in particular for low-income countries</li> <li>Incubation/business support, including enhancing the support for technologies to move quicker from early /mid stage to late stage</li> <li>Communications, including with international partners and investors</li> </ul>
TIME	Continue	<ul style="list-style-type: none"> <li>Leveraging broad networks and expertise</li> <li>Funding early-stage businesses</li> <li>Keeping close contact with partners and projects</li> <li>Expanding portfolio share of African-owned enterprises</li> <li>Maximising linkages to UK capabilities and the rest of TEA</li> </ul>
	Improve	<ul style="list-style-type: none"> <li>Transparency in project selection</li> <li>Portfolio diversification – less focus only on the strongest applicants</li> </ul>
	Start	<ul style="list-style-type: none"> <li>Developing updated approaches to clean cooking, next-generation utility models, climate mitigation, and universal electrification approaches, for potential scale-up under the Ayrton Fund</li> </ul>
CEP	Continue	<ul style="list-style-type: none"> <li>Raising co-finance</li> <li>Producing good research outputs</li> </ul>
	Improve	<ul style="list-style-type: none"> <li>Ensuring research uptake strategy is fully implemented for each project</li> <li>Creating knowledge and synergies across projects</li> </ul>
SED	Improve	<ul style="list-style-type: none"> <li>Integration within TEA</li> <li>Linkage with business requirements</li> </ul>

<b>TEA Learning Partnership, OGTI, LCEDN</b>	<b>Continue/Start</b>	<ul style="list-style-type: none"> <li>• No specific recommendations as programmes are new or have been delayed and need to be accelerated</li> </ul>
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## 5.2 Programme implementation recommendations

**As indicated in Section 3.3.2, TEA should continue to facilitate partnership building and improving coordination and communication between partners.** A more structured and systematic approach should be developed, including through:

- bi-annual calls and annual meetings used more proactively, and potentially more frequently, as opportunities to enhance partnerships and collaboration
- structuring engagements through themes that cut across the different workstreams
- allowing more time for bilateral meetings and smaller group settings
- facilitating more Southern-based and focused interactions and events.

**Whilst the value addition of each member was well recognised by interviewees, more can be done by the programme to improve localisation.** Approaches that were suggested from Section 3.3.3 include:

- expanding regional hubs (not only Nairobi)
- developing technical assistance that is tailored to each country.

**Given DFID's priorities, focusing more on 'leaving no one behind', not only on the poor, will increase the likelihood of TEA reaching its goals.** A few specific ways to do this include:

- keeping riskier investments such as GDC's in the portfolio
- developing an approach for harder-to-reach countries
- developing innovations to reach last mile-consumers and more marginalised societies
- supporting companies to reach the poorest and most marginalised

**It is recommended to scale up efforts on financing and on increasing risk appetite.** As identified in Section 3.3.4, TEA should continue to facilitate the raising of crowdfunding, providing early-stage risk capital in the form of grants and assistance, trialling a number of very different approaches with a broad set of partners (with Energy Catalyst's role in this being crucial). Continuing the financing of the 'bottom of the pyramid' will be necessary, through smarter and more targeted subsidies, and improving grant calls (including making them more flexible, and continuous). Financing is discussed further in Section 6.

## 5.3 Programme modality and additionality recommendations

**As emerges from Section 4.3, RPDC now has processes in place to manage TEA adequately.** For the remainder of the programme, TEA can focus on being 'operationally good' by using the existing infrastructure to support the delivery of the programme and to test the market appetite.

**The following procedural aspects were considered to be positive and should be continued**

- The level of delegation between RPDC and DFID is considered to be appropriate.
- Technical and financial reporting structures, forecasting and invoicing – the requirements are considered to be adequate (especially for larger and established partners), and guidance and support are readily available from RPDC.
- Bi-annual reporting on activities and outputs through the logframe, which has been useful to receive regular feedback and raise issues in advance. In addition, the monthly reporting between DFID and RPDC is considered a good practice, to keep both parties onboard. Also, the bi-monthly meetings with implementers, where activities related to reporting are discussed, should be continued.
- Impact measurement has improved. This has been enabled in particular by the support to 60 Decibels, which in turn has already begun to support partners, such as Acumen.

**Specific recommendations for improvements include the following:**

- Revisit budgeting, including on management and coordination, and plan for and spend the remaining budget, including in regard to communications, dissemination and uptake.
- Continue with the same reporting structure, albeit with more sophisticated tools than Excel.
- To increase transparency, agree and make public the principles for funding for each workstream.
- The reporting templates fail to capture lessons learnt. Sharing of informal lessons learnt, as well as more formal documents or events, is considered very valuable to the implementers, so more opportunities should be created to showcase these (for example, through anecdotes).

**In particular, some contractual clauses between the Carbon Trust and DFID have knock-on effects for the implementers and are worth revisiting:**

- Funding should be made available in advance (at least for some programme activities). This is the case for start-ups and small companies that lack the financial capacity for up-front funding.
- Clarify the VAT issue at an early stage in projects (during negotiations) in order to optimise the use of resources from DFID and partners.
- Consider changing the intellectual property clause, as even with the side agreement the companies are taking a lot of risks and can lose the ability to raise money (with the Ayrton Fund the contractual issues such as the intellectual property liability clause could be resolved via a MoU, or clarified early on).
- Reconsider the adequacy of funding calls – there could be more joint identification of the opportunities and one could envisage calls that are more flexible, and so more strategic, and that can reduce risk. Or do both: open calls would allow innovative ideas that could then be supported in follow-up stages by the Shell Foundation.

**Almost all interviewees agreed that more work needs to be done to make TEA more than the sum of its parts.** As documented in Sections 3 and 4, TEA has made good progress in all of its workstreams, with TIME and Energy Catalyst overachieving relative to its targets. There is also increasing evidence of partnerships starting to form between a number of TEA partners (Section 3). In order to move to the next phase, there is a suggestion that more needs to be done to move to a phase that catalyses transformation. Specific recommendations include:

- Wide agreement came across regarding the need to think and work on TEA's strategy in a more inclusive way. So far, the perception is that this happens in a hierarchical way, with DFID and the Carbon Trust leading and then informing other TEA partners. For example, annual workshops and bi-annual meetings could be used to discuss and inform the process. While it does not make sense for all partners to develop the entire strategy, the rich knowledge that is held among partners can be used as an opportunity to create and materialise new ideas.
- The theory of change has not been used or communicated with TEA partners. TEA can use the theory of change as a tool to clarify the goals, pathways to change and specific roles between partners.
- A specific recommendation was made around setting aside a budget for partners to apply for, to further efforts on GESI.

**Stronger focus on the measurement of outcomes and impact is now necessary.** The Carbon Trust is well placed to lead TEA's work in reflecting on lessons learnt, impacts and related policy changes. For example, the programme can learn from Acumen's approach, with a robust set of sector-by-sector indicators and metrics.

**Further development of research and dissemination of findings are considered a priority, as identified in Sections 4.5 and 4.6.** As TEA is just starting to produce findings, it will be very important to focus on ways to efficiently disseminate them. A robust communication, dissemination and uptake strategy urgently needs to be put in place, communicated and implemented. In particular, this strategy should:

- develop a knowledge management and communications plan linked to SDG7 progress

- capitalise more on the research through, and interaction between, academia and implementers, through more citations of research work, expansion of businesses, energy impact reports, using data, analysing and supporting businesses, and better defining the audience
- leverage on work to present and synthesise information (60 Decibels' work in particular was highlighted)
- develop a short two-page summary of TEA's work and its results (succinct dissemination is key)
- push for more to become thought leaders and to improve academic robustness through peer reviewing and leveraging on the academic partners
- monitoring dissemination and uptake of all knowledge products and reporting this to DFID

**Better connection to other programmes will be necessary.** Despite progress by TEA in connecting with other DFID-funded programmes and institutions, as documented in Section 4.7, more can be done. For example:

- TEA should connect more with other DFID programmes in different spaces, including water access, through transferring models and lessons learned, and also through the Evidence into Action Team. Within TEA, there are policy links in different workstreams that should be further exploited.
- Coordination between the Climate Compatible Growth (CCG) programme and TEA should be enabled. While CCG is planned to lead on the economics of markets, including tariff design, TEA's work focuses on the technological components. CCG's Business Case, which is currently being developed, considers DFID's investment in the energy space in three areas:
  - R&D, which will be part of the Ayrton Fund – with TEA as its platform for implementation.
  - Market shaping technical assistance – markets and policies and affecting the enabling environment.
  - Investment and incentives.
- More tracked interactions and links to the infrastructure strategy being prepared by CDC. Synergies with TEA are, in particular, in the mini-grid space and in the medium term. PIDG could benefit from TEA from learnings around innovation in energy, and TEA could benefit from PIDG from their early-stage infrastructure financing.

**Linked to the above, improving interaction with policy is also considered necessary to catalyse change.** The ACE programme can provide the linkage with investments and incentives and can be further used to apply the results of TEA in policy and market shaping. Specific actions include:

- strengthening the linkage between research outputs and policy (also through TEA programmes and their implementation in countries)
- continuing to support associations to make policy changes on the ground (also through Shell's Community of Champions, Country Accelerators working on policy, the partnership with GOGLA).

#### **Snapshot: Learnings from other programmes**

EEG and LEIA shared a few lessons learned from working in similar applied research programmes.

Learnings from EEG: Have quarterly meetings with reporting and findings. Look across the programme to see how to combine information and events. Focal points meet on a quarterly basis with the reporting and talk strategy. Focus of conferences, training to deliver so findings fully understood, etc. Capacity building: a lot more demand from officials than research. Research topics have helped to determine what is needed. Researchers not best placed to do capacity building so it is outsourced.

Learnings from LEIA: They consider themselves lucky to have a comms and brand strategy providing a good platform. They don't have a newsletter, but have a social media presence, a mailing list. They work with amplifiers such as GOGLA and have secured confounding from other donors that support part of this work.

## SECTION 6: Recommendations for the future beyond TEA

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**The last question in this MTR concerns the thinking beyond the TEA programme.** The focus is on identifying what operational improvements and related changes are recommended in the context of new partnerships being formed, such as in a scaled-up version as part of Ayrton funding?

**All interviewees were asked to identify areas of future focus, and responses were triangulated and organised into the following categories:**

- strategy and modality
- skills and business support
- finance
- market innovation

We divide our long-term future recommendations as per categories above.

### 6.1 Technologies strategy and modality recommendations

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**Beyond TEA, it will be necessary to reshape the programme; DFID's 'Investing in a better world' (2019) report can help to frame the strategy in this regard.** An ecosystem approach will avoid continuously adding components and losing track of the bigger picture. Tapping into the wider world of donors and countries, and at the same time strengthening the focus on affordability to serve the poorest and most marginalised, will be key. If scale is to be achieved, it will be necessary to think about how to develop interconnectivity and to communicate on a much bigger scale, through multiple platforms and industry collectives, potentially separated into themes.

**Whilst there will always be a need for innovation and research in energy access, an SDG multi-layered approach is needed.** TEA's approach is still relevant, and a concerted effort to achieve SDG7 will be needed, through focusing on: i) local companies that show more potential to scale; ii) mini-grids; iii) use of a value for money approach; iv) using a tiered approach, and v) having incubation and value chain strengthening where linkages do not exist yet.

**Consideration of the 'Africa Strategy' that is being developed will be key.** The strategy is aimed at forming a more joint scaled-up approach to tackle issues in Africa, and, so far, the process has identified the climate and the environment as some of the most important areas to work on, with energy being a strong part of the remit.

**It is broadly agreed that a different modality is needed if the programme is expected to scale up considerably.** This modality may be in the form of a more collaborative approach led by a service provider organisation that has the systems and processes in place to do so. MoUs would allow the programme to be more flexible and will make it possible to set up country offices or make other amendments without needing to change the underlying contracts. The provider would be required to absorb more risk and include hand-on liaison functions to improve the flow of information in a complex environment.

**The main partners are currently considering what the future will look like.** A co-design with the main partners is recommended, to create the right ecosystem for players with different focuses to work together.

- The Shell Foundation is currently considering what the next partnership with DFID will be. It is considering how best to focus its role: whether on finding the best companies to work with or filling the biggest gaps in the market.
- The Carbon Trust can focus on innovation and effectively use its strength and build programmatic innovation partnerships that can deliver impact on specific problems.

**Localisation issues will need to be managed even more.** DFID will need to find a balance between being sensitive to the contextual situations and country priorities in which the programme operates, and at the

same time providing flexible support that can be operational on the ground. As described in this report, contextualisation is particularly important in the areas of technical support and skills development, and can be improved through the strengthening or scaling up of in-country offices and interaction with other DFID programmes, such as ACE and Results-Based Financing for Low-Carbon Energy Access, which are more country-focused. This will also allow DFID to leverage on lessons learnt in other sectors.

**A stronger climate lens will be required.** The focus on access to energy has increased the focus on climate change. This is intended not only in terms of greenhouse gas emissions reductions and displacement of individual projects, but also the overall impact of the access to energy programmes and the impact on green growth through providing more energy to businesses.

## 6.2 Skills and business support recommendations

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**The Shell Foundation is currently considering how to scale up venture building.** It is keen to build on the platforms developed (VentureBuilder, Persistent Energy Capital, Factor E), to build pipelines for better local entrepreneurs to be move viable commercially, and to have higher retention. To do this, more incubation, knowledge and partner exchange would be needed, and more support on the ground, potentially through moving part of the team to African countries. More support to UK innovation is needed, building on BBOX and Aceleron.

**Large amounts of funds are needed to fund non-human resource gaps.** Capacity building should be a focus as many gaps and challenges have been identified, especially at vocational level. It was indicated that funding could be directed to help one research centre, which could provide incremental change in numerous countries. Sustainability needs to be considered to further sustain initiatives through bursary support.

**It was indicated that the decision to engage purely with the higher education sector in Africa could be restricting the hinterland of dissemination.** This is because of how limited access to higher education in Africa is. Engaging more with technical education and training could be needed; this is extensive in Africa, but of variable quality. Therefore, it will be important to consider wider dissemination conduits and organisations.

## 6.3 Finance recommendations

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**A full scope of instruments across the capital spectrum will be required.** Towards 2030 there will be a need to carefully design products that blend finance, to bring in at the same time more private sector funding, and also to leave no one behind.

**In particular, through scaling up of the programme, more commercial finance will need to be attracted, in addition to (early-stage) equity.** It will be critical to enable local commercial banks to lend, connect more with investors on the ground and understand how DFID funding can help de-risk investments, as debt finance holds back scale potential. Seed financing will increasingly be needed (so TEA needs to link in particular with SCAF, the Seed Capital Facility funded by DFID and the African Development Bank - AfDB). TEA will need to connect more with investors and see how DFID funding can work with de-risking. There are issues with pipelines, but syndication and local currency deals can help. Also, additional awareness on impact investment is needed, to unlock market growth.

**Non-return forms of capital will still very much be needed, and more research on their impacts will be key.** These will include smart subsidies, vehicles for financing productive use equipment in the last mile, and continuous funding for incubators. Also required are grants to ensure no one is left behind within Tier 1, as not everyone can afford a connection or a solar home system. Also, grants are still needed to fill the viability gap on mini-grids. However, grants and guarantees, while they accelerate the market and reallocate risks, do not fund companies to scale up in a sustainable way and graduate to intermediate equity, then equity and debt, so this support needs to be effectively linked to the development of business



models. Link with policy, especially through CCG’s work on tariff reforms, will be key. Lessons can also be learned from BBOX’s receipt of subsidies in Togo and replicated in other countries<sup>80</sup>.

## 6.4 Market innovation recommendations

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### 6.4.1 Themes

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**Themes indicated as priorities by interviewees include the following:**

- **Consumer protection.** One of associations’ main needs is a consumer protection policy. There is no real engagement with consumers, and they are seldom asked what they want, so real data is not produced. A consumer protection programme could be beneficial to convince governments to improve quality. This will enable them to confirm products, understand user problems and help them to advise companies better on what to do. Without this it can be difficult to narrow down what are the bad products. A phone line that consumers can use to report and find bad products would be much more useful than developing a standard that may or may not be respected.
- **Productive use of energy.** If people were wealthier there would not be an energy access problem, and vice-versa, so making money through energy provides a pathway out of poverty. Productive uses and appliances are not accessible to the poor as yet. There is a need to increase consumption in rural areas to enable financially viable systems, through: 1) forecasting productivity/suppressed demand for rural energy and guiding businesses and government decisions; 2) stimulating productive uses so as to generate the required demand to invest in infrastructure. POP has been innovative in this space.
- **Clean cooking.** More innovation may be needed to make cooking (and electric cooking) more affordable. A clean cooking fund to mobilise \$500 million and \$1 billion from World Bank projects has been launched, so TEA may engage with the World Bank on this going forward – in particular in filling some of the gaps to identify how best to scale it up, given its high risk.
- **Off-grid/on-grid integration.** So far, the off- and on-grid sectors have been separated, and to a certain degree in competition, with the off-grid sector being heavily subsidised. However, going forward it will be important to consider the strategic fit of the off-grid sector in the wider sector. There is a need to smooth the transition between on- and off-grid: firstly in order to make it work at the household and utility levels. Improved and integrated planning, increased data and improvements in standards are needed. The Shell Foundation is already working on this, and CDC/PIDG will be crucial in order to fund the next stage.
- **Urban poor.** It will be important to consider more support targeting the urban poor, especially within urban slums, as this is a very fast-growing area and there is a large opportunity to increase sustainable commerce.
- **Electric mobility.** 80% of people’s budgets in Africa are spent on transport (Mobile Power interview), so there is a high potential for the diffusion of electric vehicles, leading to high savings in terms of carbon and money. Mobile Power has carried out innovative market research on tuk-tuks. The Indian tuk-tuk market is very volatile to price changes, so transforming this into an electric vehicle market with the current technology would be very expensive. In comparison, in Sierra Leone, fuel is very expensive even with subsidies from the government, and the fuel quality is poor.
- **Other geographies.** The need for expansion into other geographies was also considered key – in particular, to promote the growth of the off-grid market in fast-growing markets, new frontiers need to be explored by using learnings in East Africa, but also some of the partners’ work in South Asia. Other markets include southern and West Africa, as well as francophone countries, and, for the urban poor, other (mega) cities and their slums.
- **Research.** The need to strengthen research and capacity in some areas was raised. Themes include:

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<sup>80</sup> Reuters. (2019). ‘Togo subsidises off-grid solar to extend electricity access to all’. Available from: <https://af.reuters.com/article/commoditiesNews/idAFL5N2004AJ>

- the impact of electrification
- the impact of cooking fuels on (reduction of) deforestation
- support to companies to assess demand and credit risk; companies are in fact often driven by the product and focus less on assessing the market demand and the creditworthiness of consumers

#### 6.4.2 Technologies recommendations

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**Technologies indicated as priorities by interviewees include the following:**

- **The next generation of solar and appliances.** Three respondents highlighted how today solar is already cheap, so the problem is not generating new technologies but integrating them into the system. And DFID's role is doing this in particular for DFID countries. A focus on appliances should be a critical part, not just on development and innovation but on ways to reach people.
- **Mini-grids.** This is an area that is moving very fast but is still not feasible, and at scale, without grant or concessional finance support, due to the high risk and the limited availability of commercially sustainable business models. It offers strong space for leveraging synergies with other programmes, namely CDC (and CDC's Gridworks).
- **Energy storage.** The next development in mini-grids will be affected by developments in energy storage. It was highlighted that it will be key to understand how TEA's mini-grids work is going to be affected by these developments. Faraday's collaboration with the Shell Foundation in this space, and the generation of data and evidence in Nigeria, will be key in generating lessons to enable the transformation of the sector, with the potential of Africa to leapfrog to a green pathway.

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Annexes

Annex 1: TEA's theory of change

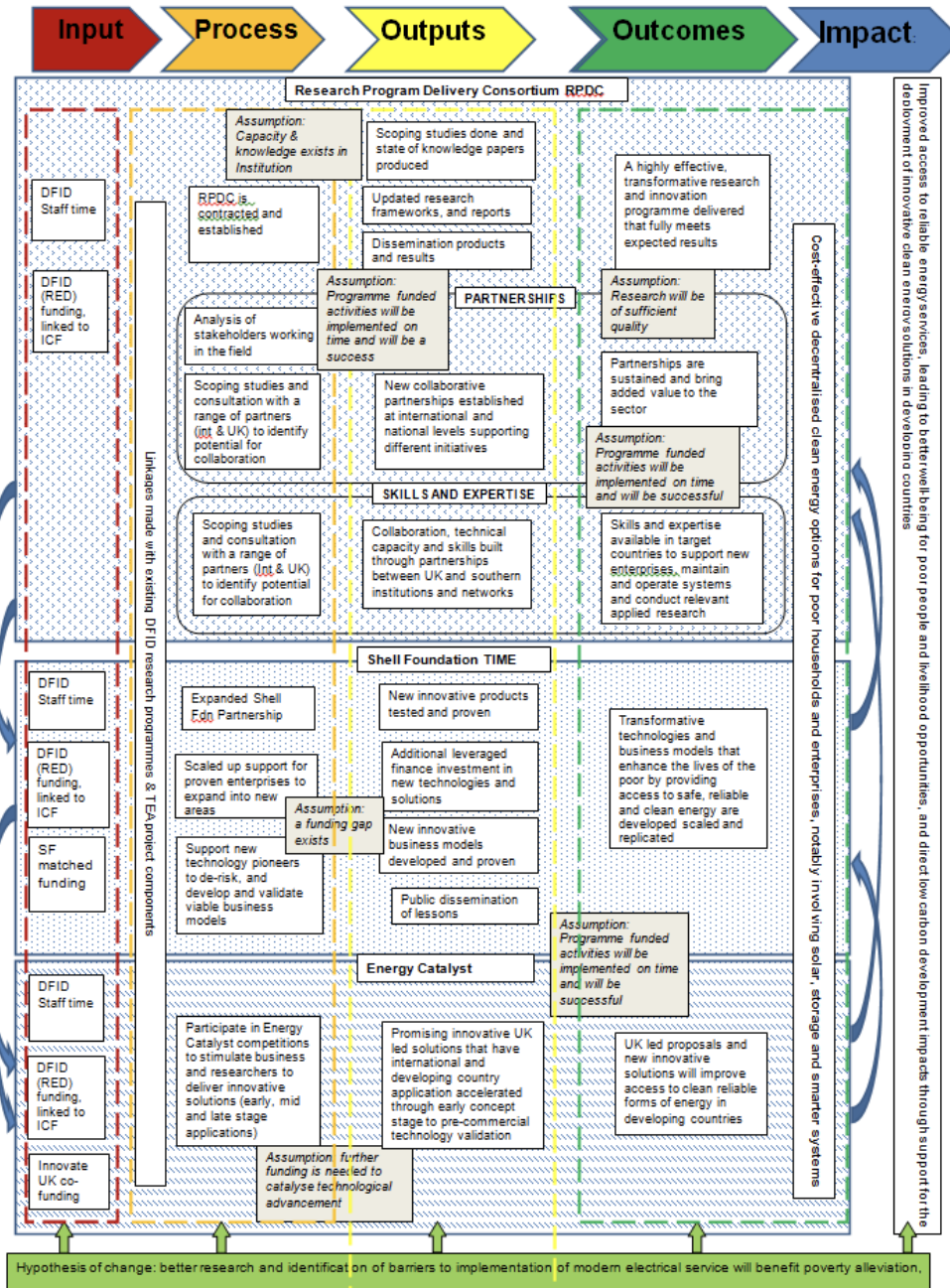


Figure 3. The overall TEA theory of change, as presented in the Business Case

## Annex 2: Review matrix

Table 5. Review matrix, showing research themes and questions explored during the stakeholder interviews

Themes and questions	Stakeholder interviews									
	RPDC	DFID RSO	DFID other	Implementers	Adjacent programmes	Funders	Co-funders	Beneficiaries	External reviewers	External sectoral
<b>TEA progress and achievements</b>										
<b>Overall</b>										
How well is TEA/workstream responding to the energy access challenge?	x	x	x	x	x	x	x	x	x	x
How well is TEA/workstream responding to the theory of change?	x	x		x		x	x			
How well is TEA/workstream managing the identified risks?	x	x	x							
What have the main challenges been?	x	x		x		x	x	x	x	
<b>Efficiency</b>										
Are RPDC and the implementers operating efficiently? Make reference to budget management	x	x		x		x				
Are the outputs (proven technology applications and business models that are affordable and scalable, and the capacity to extend near grid-quality energy services to the unserved and underserved populations in sub-Saharan Africa) achieved, and as efficiently as possible? (also, qualitative)	x	x								
How has each workstream performed separately? (quantitative comparison)	x	x								
Has one workstream performed better than others, and if so, why?	x	x								
Are there any initiatives similar to TEA and how do these compare to it in terms of efficiency?	x	x	x							
What more could the implementers do to improve value for money?	x	x	x			x	x			
<b>Effectiveness</b>										
What is the evidence regarding achieving the programme outcome (increasing use of affordable decentralised clean energy options for poor households and enterprises, through innovative technologies and delivery models, leveraged financing and enhanced capabilities, accelerating energy access and low-carbon development)?	x	x		x		x	x	x	x	
How effectively are the different TEA implementers working together to achieve the outcomes of the programme?	x	x		x		x	x	x		
Are the implementers creating bilateral partnerships? If not, why?	x	x		x		x	x	x		
Is the value added of each implementer well understood and valued – in particular, enhancing the value of Southern researchers and professionals?	x	x		x				x		
Are there any initiatives similar to TEA and how do these compare to it in terms of effectiveness?			x	x	x	x	x	x	x	x



Is the risk appetite of the programme in line with the needs of the sector?	x	x		x	x			x	x	x
<b>Impact</b>										
Is the programme on track to improve access to reliable energy services, leading to better well-being for poor people and improved livelihood opportunities? (also qualitative through SE4All tracking framework)	x	x		x		x			x	
Is the programme on track to achieving transformational change?	x	x	x		x				x	x
<b>Sustainability</b>										
What is the exit strategy and is it on track to be achieved?	x	x								
<b>The TEA programme modality</b>										
Is the M&E Strategy fit for purpose?	x	x	x	x		x	x			
Is the Quality Management Strategy fit for purpose?	x	x	x	x		x	x			
Is the GESI Strategy fit for purpose?	x	x	x	x		x	x			
Is the Communication Strategy fit for purpose?	x	x	x	x		x	x			
Is the TEA programme and delivery modality providing additionality to the energy access ecosystem – especially in comparison to other business case appraisal options? (Including, is the vision appropriate)?	x	x	x	x	x	x	x	x	x	x
What more/differently should the three levels (RPDC, DFID, implementers) be doing in order to deliver impact?	x	x	x	x		x	x	x		x
How well is TEA working with other DFID programmes in the energy access sector?	x	x	x	x						
How is TEA perceived by external stakeholders in the energy access ecosystem? i.e. – what is the TEA brand?					x	x	x	x	x	x
How well is TEA communicating its activities externally, both at the programme and workstream levels?	x	x	x	x	x	x	x	x	x	x
Is the TEA programme scalable?	x	x	x	x	x	x	x		x	x
What should RPDC do to maximise the chances of TEA delivering transformational change?	x	x	x	x		x	x	x		x
Have any relevant changes in the system occurred that could require a (radical) change in the programme delivery?	x	x	x	x	x	x	x	x	x	x
<b>The future of TEA</b>										
Is the programme still relevant to the needs?	x	x	x	x	x	x	x	x	x	x
Are the workstreams and partnerships the right ones, and of the right size?	x	x	x	x	x	x	x	x	x	x
What, if any, have been relevant changes in the ecosystem since the start of the programme, or that the programme did not include and should?	x	x	x	x	x	x	x	x	x	x
Is the UK Government support still deemed critical and required?						x	x	x	x	x
Are there gaps in the TEA programme that could be filled with future funding?	x	x	x	x	x	x	x	x	x	x
Are there overlaps with other work, or areas TEA should stop doing or place less emphasis on?	x	x	x	x	x	x	x	x	x	x
Are there any new partnerships that TEA should seek to develop?	x	x	x	x	x	x	x	x	x	x
What are key recommendations for DFID’s scaled up version as part of the Ayrton Fund?	x	x	x	x	x	x	x	x	x	

## Annex 3: Interviewee list

Table 6. List of interviewees by organisation and their respective ranking as suggested by DFID and Carbon Trust

No. of interviews	Stakeholder	Importance ranking
1	Acumen	Silver
1	ACE	Bronze
1	BBOX	Bronze
2	Carbon Trust	Gold
2	CDC	Bronze
1	Crossboundary	Silver
6	DFID	Gold
2	E4I	Gold
1	Faraday Institute	Bronze
1	GDC by Practical Action	Silver
1	GONGLA	Silver
2	KopaGas	Bronze
1	LCEDN, Loughborough University	Silver
1	LEIA programme	Bronze
1	LTS International, BSEAA	Bronze
1	M-KOPA	Bronze
1	Mobile Power	Bronze
1	Other, Independent	Bronze
1	Oxford Policy Management Limited	Bronze
1	Shell Foundation	Gold
1	ESMAP	Bronze
1	OGTI	Bronze
1	USEA	Bronze
1	UKI	Gold
2	University of Cape Town	Silver

### Annex 4: Example of a gender integration diagnostic tool

For the complete tool, please see Acumen and International Centre for Research on Women (n.d.), pp. 49–50.

Table 7. Gender diagnostic tool

<b>Design of the product/service</b>			
<b>Incorporation of specific needs, desires and preferences of women in product/service design</b>	We did not consider how our product/service could or should serve women's needs during the design process	We were interested in understanding how our product/service could serve women's needs, but this didn't drive the design process	Meeting women's needs/preferences was a priority for us during design; our product/service was specifically designed to meet women's needs or to include features that meet women's needs
<b>Inclusion of input from women consumers/users during design and creation</b>	We didn't seek women consumers' input when designing the product/service	We sought women's input when designing the product/service, but it didn't strongly affect how the product was designed in the end	We actively sought female consumers' input and their suggestions are evident in the final design
<b>Potential for product/service to fundamentally improve or transform the social and/or economic status of women in society (for example, improve her income, increase her assets, enhance her decision-making power/voice/influence, improve her educational status, employability)</b>	The use of our product/service does not challenge stereotypical gender roles; in some cases, it could reinforce them	Our product/service has the potential to improve the lives of women by increasing their access to resources, but likely will not shift broader gender norms	Our product/service has the potential to shift broad social norms related to women's access to resources and well-being (e.g. through saved time, improved health, increased capital, enhanced safety), status, empowerment, self-confidence, sense of voice, and/or decision-making power
<b>SCORE (add numbers from all 'Design of the product/service' rows) Divide by highest possible score (15)</b>			
<b>Production, manufacturing and processing</b>			
<b>Representation of women and men in formal wage labour positions in production, manufacturing or processing</b>	We do not employ women in formal wage positions throughout our production/manufacturing/processing	We employ both women and men in formal wage positions throughout our production/manufacturing/processing, but women are a minority	We have as many women as men (or more women than men) in our formal wage positions throughout production/manufacturing/processing
<b>Representation of women and men in lower-skilled and higher-skilled jobs</b>	Most women occupy lower-skilled jobs	We employ some women in higher-skilled jobs, but there are more men than women in these roles	We employ roughly equal numbers of men and women in lower-skilled and higher-skilled jobs
<b>Representation of women and men in 'traditional' and 'non-traditional' roles</b>	We employ women and men in positions that align with stereotypical gender roles (e.g. women in clerical positions, men working with machinery)	We employ a few women and men in positions that do not align with stereotypical gender roles, but this is not the norm	We specifically build the capacity of female and male employees to serve in roles that challenge gender norms and stereotypes; we are trying to use our employment opportunities to shift gender norms
<b>SCORE (add numbers from all 'Production, manufacturing, processing' rows) Divide by highest possible score (15)</b>			
<b>Sales and after-sales service</b>			
<b>Employment of women in sales and/or after-sales service</b>	We have no women engaged with sales and after-sales service	We have female sales agents, but they are the minority	Our sales team includes as many women as men (or more women than men)
<b>Provision of the tools and resources needed for women sales agents to do their jobs effectively and competitively</b>	We do not monitor the needs and performance of our female and male sales agents	We try to provide tools and resources that will enable our sales agents to enhance their sales performance, but we do not differentiate	We provide our sales agents with tools and resources that are specifically tailored to support and improve female sales agents' sales

		between the needs of female and male sales agents	performance (e.g. appropriate transportation, safety precautions)
<b>Provision of sales and after-sales service aligned to female and male clients' preferences</b>	We do not know the specific preferences of our female and male clients	We have identified the specific needs of our female and male clients, but have not yet proactively addressed these needs in our sales strategies	Our sales and after-sales services cater to women's and men's specific needs/desires (e.g. flexible schedules, services provided at sales points frequented by men and women)
<b>Provision of financing options catered to women's specific needs/desires</b>	We do not offer financing for our products/services	We offer financing/ credit (either directly or through an arrangement with a credit institution) to help consumers pay for our product/ service, but we did not take the specific needs or preferences of women into account when determining and designing these financing mechanisms	We specifically take the needs and preferences of women into account when designing the financing / credit mechanism(s) we offer (either directly or through an arrangement with a credit institution) to help consumers pay for our product / service (e.g. informal, group-based lending, or longer repayment periods)
<b>SCORE (add numbers from all 'Sales and after-sales service' rows) Divide by highest possible score (20)</b>			
<b>Marketing / advertising: strategies and messages</b>			
<b>Promotion and advertising placement and methods</b>	We do not consider gender when selecting our marketing/ advertising methods or locations	The product/service is purposefully promoted and advertised in places where both women and men have access (e.g. at markets, churches, or schools)	Both women and men are engaged in promoting the product/service through gender-specific networks and we utilise methods that resonate well with both women and men (e.g. marketing to women's self-help groups through in-person demonstrations)
<b>Incorporation of input from women customers when designing marketing/advertising messages</b>	We don't seek women consumers' input when designing marketing/ advertising messages	We aim to understand the benefits women experience from using our product/service, but we don't really incorporate those experiences in our marketing messages	We actively seek to understand how female customers benefit from and what they like most about our product/services, and we incorporate these findings into the messages we use to market our products/services
<b>Degree to which advertising/ marketing messages challenge traditional gender roles (for example, promoting women as decision-makers in the home or men as people who could help with domestic duties)</b>	We don't seek women consumers' input when designing marketing/ advertising messages	A few of our advertising/ marketing messages challenge gender norms, but for the most part, we use messaging that aligns with local gender norms	Our advertising/marketing messages purposefully promote roles for women and men that go against gender norms and stereotypes; we are trying to use our marketing to shift gender norms
<b>SCORE (add numbers from all 'Marketing/advertising: strategies and messages' rows) Divide by highest possible score (15)</b>			
<b>Equitable systems and structures</b>			
<b>Provision of an entry point to formal employment for women and men who are unskilled and/or previously not formally employed</b>	We do not provide employment opportunities for women or for men who are unskilled and/or previously not formally employed	We provide formal employment to women and men who are unskilled and/or previously not formally employed, but we prioritise men over women	
		We employ women across many levels of our value chain. These distinct levels include:	

<b>Engagement of female staff members across the value chain</b>	We only employ female staff in a few distinct positions	<ul style="list-style-type: none"> <li>• in product/service design</li> <li>• in production/processing/manufacturing</li> <li>• as sales agents</li> <li>• on our marketing team</li> </ul>	
		We engage female staff members in two of the above levels	We engage as many women as men (or more women than men) in three or more of the above levels
<b>Provision of professional development (for example, training, mentoring) equally to women and men</b>	We do not offer training and professional development opportunities to either women or men	We offer training and professional development opportunities to both women and men, but we do not include any elements that are specifically tailored for women	We engage women and men equally in training and mentoring opportunities that include elements that are especially important for women (e.g. communication skills, empowerment training)
<b>Existence of formal workplace policies and procedures designed to equalise opportunities and competitiveness of female and male workers</b>	Our current human resources system reproduces unequal opportunities and practices (e.g. men are paid more than women, men are given more opportunities for advancement, and there is a lack of protective policies)	We actively promote gender equality in the workplace in a variety of ways. We implement some of the following policies/ procedures for gender integration in the workplace: <ul style="list-style-type: none"> <li>• equal wages for women and men</li> <li>• employment contracts</li> <li>• maternity leave</li> <li>• flexible work schedules</li> <li>• sexual harassment prevention policies</li> <li>• health insurance</li> <li>• job promotion systems that enable women and men to equally rise within the company</li> </ul>	
		We have implemented up to three of the above policies/ procedures	We have implemented four or more of the above policies/ procedures
<b>Women and men are equally represented in the highest levels of leadership in the enterprise</b>	We primarily employ men in management and leadership positions	There are some women in management and leadership positions, but they are still a minority	We actively promote gender diversity in management and leadership positions and the gender ratio within these positions is roughly equal
<b>SCORE (add numbers from all 'Equitable systems and structures' rows) Divide by highest possible score (25)</b>			