

De-central Energy Access Through Cross-sector Partnerships

By Philipp Gaggl, Gus Schellekens and Paolo Gentili*

The Business Case for Energy Access

Today the world faces manifold and increasing challenges in the economic, social and environmental context. One persisting challenge is the one of reliable, affordable and sustainable access to energy. Some 1.3 billion people or one fifth of the world's population¹ currently do not have access to modern energy facilities such as electricity and lighting. With 588 million people in Sub-Saharan Africa and 623 million people in India and developing Asia without access to electricity, the world's developing and fast growing regions are in focus. Access to affordable modern forms of energy is not only a prerequisite for economic prosperity, but also needed for social and environmental development and wellbeing. Approximately 470 TWh² of energy will have to be provided through off-grid and mini-grid solutions alone to address this challenge.

According to the International Energy Agency investment totalling US\$ 48 billion per year will be required by 2030 in order to ensure universal energy access. Considering current yearly investment amounts of US\$ 14 billion, there is still a significant gap of US\$ 34 billion. This represents a huge investment opportunity for the private sector, which is still struggling to create a business case to invest in this area today. Ironically, the market opportunity for business in enabling energy access is substantial. Large populations lack access to modern energy services worldwide and yet, despite low incomes, still spend US\$ 37 billion³ per year to meet their basic energy needs for cooking, lighting and productive activities. A yet largely untapped opportunity exists when it comes to enabling energy access through de-central electricity or mini-grids, where over 500 million people have the potential to be reached, with directly addressable spending of US\$ 4 billion. Today's market for electricity and lighting solutions for these populations represents 274 million households in total.

Innovative solutions and services, as well as substantial investments are needed to unlock this market at the bottom of the pyramid. A key issue to address is the development of market-based, financially viable and long-term sustainable business models. Isolated Corporate Social Responsibility (CSR) or well-intended but unsustainable development projects and aid alone will not provide the much needed transition to enable the access to energy challenge to be addressed at scale.

Cross-sector Partnerships - A New Way of Unlocking the Potential of De-central Electricity

When looking at successful projects and initiatives aiming to provide sustainable access to electricity in rural areas throughout the world, the value of partnerships becomes apparent. For example partnerships can be seen between providers of off-grid, renewable electricity and telecom operators, thus replacing dependency on diesel power and at the same time providing excess energy to nearby households. Other examples show the collaboration between energy providers and local entrepreneurs or NGOs in rural mini-grids, or leveraging the competency of ICT companies for mobile payments of electricity bills. It is clear that partnerships and cross-sector collaboration between business and civil or public sector players already play an important role in delivering off-grid solutions.

Examining this more closely, the specific value of cross-sector partnerships can be seen to:

- Bring together private sector companies (with operations of significant size, and multi-country presence) with local partners to ensure investment power is combined with local market knowledge and Bottom of the Pyramid (BoP)-ready solutions.
- Reduce transaction costs and capital expenses by leveraging core competencies and experience of each partner.
- Build on anchor load demand as a primary market for energy and securing energy beneficiary co-investment in the business model.
- Focus on decentralized, renewable or hybrid solutions which provide levels of energy for productive energy use.
- Provide a scalable and replicable base for business models to have impact at country-wide and global levels.

Partnerships thus hold the promise to overcome existing barriers that currently only favour silo focussed private sector investment. In many cases, they are better suited to do so than single player and single sector approaches.

* Philipp Gaggl is Manager, Sustainability & Climate Change, PwC Austria. Gus Schellekens is Director, Sustainability and Climate Change, PwC London and Paolo Gentili is Senior Manager, Energy, PwC Italy. Philipp Gaggl may be reached at philipp.gaggl@at.pwc.com

See footnotes at end of text.

Working with the World Economic Forum during the course of 2012 and 2013, PwC proposed a framework to support new thinking on the use of cross-sector partnerships to unlock the potential of decentralised energy access.⁴ The framework, which was developed with more than 40 experts from various sectors including energy, telecoms, consumer goods, nongovernmental organizations, social entrepreneurs, impact investors and others, addresses the interests of all the private, civil and public sector stakeholders involved and looks to catalyse the creation of innovative business models.

The following sectors are exemplary partners that can benefit directly from this type of collaboration:

- **Energy sector:** The core business for energy technology manufacturers and utilities is the sale of energy products and solutions. Value is provided by a reliable anchor client, representing a large initial market. Further value is then expected by extending the service offering to households, enterprises, infrastructure and other energy clients through a mini-grid. Energy demand is expected to rise over time once basic needs have been fulfilled.
- **Telecom sector:** The core business for telecom providers is the sale of airtime. Stable energy is needed to keep tower operations going. Value is added by receiving energy services from an external energy provider, thus securing energy supply and freeing tied-up capital for core business. Additional value is added by reducing the carbon footprint if renewables are used as the source of electricity. Further synergies in business are attained by offering billing, payment and banking services.
- **Other anchor demand:** Agriculture, fast-moving consumer goods and mining need energy for their core business activities. Value is added by providing reliable and high levels of electricity throughout the business day.
- **Electronics sector:** The core business is the sale of devices and appliances. Value is added by stimulating demand through electrification for lighting appliances, electronic devices or healthcare solutions. Further value may be provided by using distribution channels to sell further products such as cooking stoves.
- **Local enterprises and social entrepreneurs:** The core business looks to provide products fulfilling local energy needs and creating a wider economic, social and environmental impact. Value is added by enabling productive activities through electrification and demand for market and consumer insights. Further value is developed by creating demand for metering, payment, maintenance or construction services.
- **Other potential beneficiaries of collaborating on energy access projects** would be local financiers and banks, multilateral organizations and other nongovernmental organisations.

The framework and respective cross-sector partners that could be involved in unlocking the partnership potential described above would look to do so through the following steps:

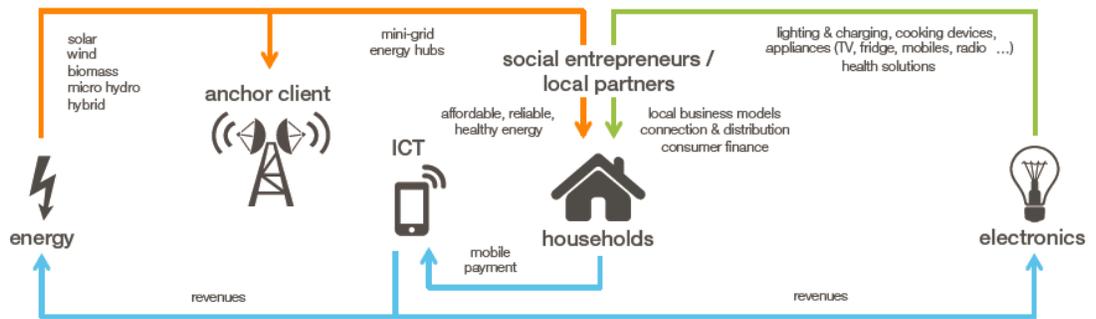
- Look to build on anchor demand that is present, this being a large part of the initial market (e.g., telecom towers, agriculture, SMEs, food processing, infrastructure, etc.). The energy sector electrifies the anchor clients through an off-take agreement.
- Then, the energy company connects households directly through a mini-grid or collaborates with local partners (e.g., energy service companies) and social entrepreneurs to provide access to energy services.
- The electronics sector provides energy dependent devices or appliances directly through local partners or social entrepreneurs; household energy demand is expected to increase over time with the use of products.
- The telecom sector can be an anchor client and also provides mobile payment, billing and banking solutions to the rural population; mobile airtime is expected to increase through cheaper and more frequent charging of mobile devices.
- Over time, energy services are expanded by the mini-grid to other clients (e.g., local companies, infrastructure, more remote clients, etc.).
- Scale is supported through the replicability of the model and the initial anchor client which partners on a large scale, the growing electrification of secondary customers, such as households and their growing energy demand.

The envisioned outcome is that projects create a sustainable impact through collaboration of cross-sector partners (energy, telecom, mining, agriculture, public infrastructure, electronics, etc.) with local partners (social entrepreneurs, small businesses, etc.), supported by local enablers (NGOs, multilateral organizations, banks, financiers, academia, etc.). This supports a business driven approach towards de-

livering access to energy to rural households and businesses.

Measuring the Impact of Energy Access - Total Impact Measurement and Management (TIMM)

Bringing cross-sector partnerships and mini-grid business models to scale and facilitating the replication of successful models will both be a viable business case for the energy, telecom and electronics sector to co-invest, and also create an economic, social and environmental impact in that location.



Source: World Economic Forum and PwC 2013
 Figure 1: Cross-sector Framework for Energy Access

A better understanding of the latter may also help overcome some of the challenges typically faced in developing the business case. Having studied numerous examples of decentralised energy access projects and respective partnership based business models, some of the following impacts can be seen to result:

Economic Impacts

- Costs: Reduction of costs for energy and lighting at the household level as a result of replacing expensive kerosene lighting; reduced operating costs for telecom towers versus conventional sources of energy supply.
- Economic activity: Improved business development and productive activities, through availability of high levels of electricity, e.g., running machinery and devices; jobs created through freed up time for productive activity.
- Sales: Increased sales of energy-dependent devices such as TVs, fridges, radios, blenders, water pumps, fans, irons, mobile phones, healthcare devices, sanitation devices and communication devices.

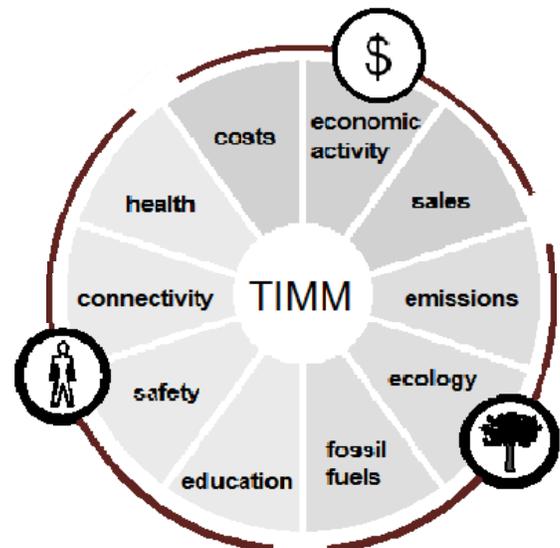
Social Impacts

- Health: Improved health through replacement of kerosene lighting and better quality of light, powering medical devices, cooling of vaccines, provision of clean water, improved sanitation.
- Safety: Improved sense of safety due to better home and street lighting; increased social cohesion through community lighting.
- Connectivity: Improved access to information, communication and entertainment services, through powering mobile phones, internet services, radio or TV.
- Education: Ability to pursue education and improved quality school work, by making lighting available in the evenings and at night; ability to access information for education purposes, through increased network and IT connectivity.

Environmental Impacts

- Emissions: Reduction in use of fossil fuels and respective GHG emissions, due to replacement with renewable, clean and healthy energy sources (e.g., solar, wind, hydro); reduction of transport emissions (diesel supply).
- Ecology: Reduced deforestation due to lower demand for wood collection; reduction of environmental pollution (e.g., diesel leakages, spills).
- Fossil fuels: Reduced dependency on fossil fuels, increasing energy resilience due to replacement with renewable energy.

In order to understand the non-financial and the monetary value of these positive economic, social, fiscal and environmental impacts, it is necessary to measure all of these in detail. More informed business decisions can then be taken on the basis of a holistic profit and loss for any energy access projects and support a better understanding of the wider benefits to all affected stakeholders. This then also provides further



Source: World Economic Forum and PwC 2013
 Figure 2: Impact Areas of De-central Energy Access

incentives and arguments for project partners interested in creating a measurable impact.

PwC has independently developed a new methodology called Total Impact Measurement and Management (TIMM)⁵. It can be adopted and applied to support a better understanding of the holistic business case for energy access. The key elements of the TIMM approach are:

- Total: A holistic view of social, environmental, fiscal and economic dimensions – the big picture.
- Impact: Look beyond inputs and outputs to outcomes and impacts – understand your footprint.
- Measurement: Quantify and monetise the impacts – value in a language business understands.
- Management: Evaluate options and optimize trade-offs – make better decisions.

TIMM enables management to develop a detailed financial understanding of the social, fiscal, environmental and economic impacts of their activities, while still, of course, making a profit. The real benefit to business of including such analysis is in decision making. With hard data, management has the ability to compare any number of different strategies, make business decisions such as investment choices with confidence as well as being able to evaluate the total impact of each decision and choice they make. There is then also a better understanding of which stakeholders will be affected by which decisions which can help to create more robust buy in from local and international stakeholders.

Outlook

Looking at the global demand for decentralized energy access solutions, the proposed cross-sector approach for new business models and the value of measuring the economic, social and environmental impacts has the potential to provide new avenues to support private sector engagement in this area. Although huge potential exists in emerging markets, developing business models and solutions for decentralized access to energy can also be a new source for innovation in developed markets such as Europe or the USA where similar energy

access issues exist. Encouraged by the enthusiastic and engaged approach by business during the development stages, next steps for this area involve more testing and implementation of these new and innovative business models. By focusing on specific project opportunities, taking these all the way to implementation and sharing lessons learned, there is the opportunity to finally scale up efforts aimed at addressing the access to energy challenge globally. We welcome further discussion on the opportunities associated with cross-sector partnership models and the value that measuring energy access impacts can have to support both better decision making and stakeholder engagement.

Footnotes

¹ International Energy Agency, World Energy Outlook: “Energy for All – Financing access for the poor”, 2011

² International Energy Agency, World Energy Outlook: “Energy for All – Financing access for the poor”, 2011

³ International Finance Corporation (IFC), “From gap to opportunity”, 2012

⁴ <http://www.weforum.org/issues/powering-growth-through-transformative-energy-access-partnerships>

⁵ PwC TIMM methodology: <http://www.pwc.com/gx/en/sustainability/publications/total-impact-measurement-management/index.jhtml>

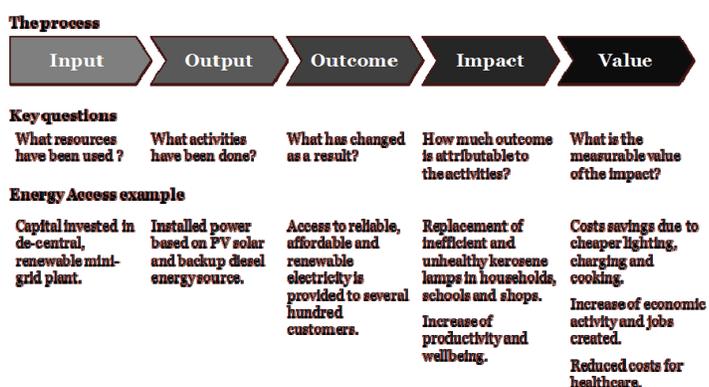
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International Energy Agency, World Energy Outlook: “Energy for All – Financing access for the poor”, 2011

International Finance Corporation (IFC), “From gap to opportunity”, 2012.

PwC, “Measuring and managing total impact: A new language for business decisions”, 2013: www.pwc.com/totalimpact.

World Economic Forum, <http://www.weforum.org/issues/powering-growth-through-transformative-energy-access-partnerships>.



Source: PwC 2013

Figure 3: Process of Applying TIMM to an Exemplary Energy Access Project