



# Energy services for local development

## Integrated and inclusive planning for county governments in Kenya

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Working Paper

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**Energy**

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*Keywords:*

Electricity, energy access, energy for all, inclusive investment, development planning

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The technical approach applied in this working paper arises from joint work with CAFOD under the project "Inclusive and integrated energy planning in Kitui County, Kenya" (2018, ongoing) and funded by the Charles Stewart Mott Foundation.

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Access to reliable, affordable, sustainable and safe energy is recognised as an enabler of many development objectives. Yet energy infrastructure is often planned as standalone investment, from a purely economic and technological standpoint and in a top-down way that does not take into account the needs of end users. To realise the full benefits of energy as an enabler of different development objectives across sectors, more inclusive and integrated approaches are needed. This working paper presents an innovative technical approach for inclusive and integrated energy planning for local governments by applying the Energy Delivery Model (EDM) planning approach developed by IIED and CAFOD.

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# Executive summary

Access to reliable, affordable, sustainable and safe energy is recognised as an enabler of many development objectives (including household and community health, education, livelihoods, and gender equality). Yet energy infrastructure is often planned as standalone investment, from a purely economic and technological standpoint and in a top-down way that does not take into account the needs of end users. If energy is genuinely understood as a ‘service’ that can help meet wider development needs, and the energy service provision is planned with participation of end users and multi-sectoral stakeholders, the impact of investments can be optimised and resources can be deployed more effectively.

To realise the full benefits of energy as an enabler of different development objectives across sectors more inclusive and integrated approaches are needed. The Energy Delivery Model (EDM) – a planning approach developed by the International Institute of Environment and Development (IIED) and the Catholic Agency for Overseas Development (CAFOD) – builds on research and practitioner experience of designing energy services at the community level. It is a problem-solving, participatory approach that uses a six-step process to identify and differentiate the priority needs of different target groups and build understanding of the barriers and enabling factors related to the local context. EDM identifies the ‘gaps’ preventing the needs being met (relating to both energy and other ‘non-energy’ factors), and develops solutions or delivery models to address them that are financially, environmentally and socially sustainable.

These solutions can be scaled in two ways: first, by finding synergies between solutions that respond to different needs and aggregating them; and second, by mapping financiers, delivery partners and other relevant

stakeholders across solutions and sectors and engaging them in the planning process. The engagement process is designed so that it strengthens planning capacity at the local level, builds wider stakeholder understanding on energy as an enabler, and creates buy-in among stakeholders and partners involved in delivering the proposed solutions.

EDM is therefore an approach which helps deliver energy services that both meet the needs and priorities of local communities and are better targeted and integrated with wider development planning. In summary, using EDM for energy service planning can:

- Maximise the wider development impacts of energy interventions
- Ensure financial, environmental and social sustainability of the energy service
- Create buy-in from end users and wider stakeholders
- Ensure solutions are appropriate for specific target groups and their contexts and are cost effective whilst also aggregating to allow for economies of scale
- Identify cross-sectoral synergies between solutions which can impact optimal choices
- Speed up implementation by identifying and engaging co-financiers and service providers throughout the planning process.

This working paper is based on the EDM Toolkit, first published in 2017, an innovative technical approach for inclusive and integrated energy planning for local governments. In 2018 IIED and CAFOD, with local partners Caritas Kitui and the Kitui County government in Kenya, applied EDM in Kitui to develop investment-ready solutions for the Kitui County Energy Plan (CEP). Kitui County has a population of more than one

million people. To address this scale of planning, the application of EDM outlined in this paper includes two stages:

- Stage 1: Sector-level planning: first applied at a sector level, with the energy sector being seen as an enabler for other development sectors
- Stage 2: Initiative-level planning: a rapid process applied following the CEP where priority investments are identified to move fast to implementation.

The work in Kitui is currently at the end of stage 1, and this working paper focuses primarily on introducing the steps taken to develop energy service solutions for the CEP. In stage 1, to develop context-specific solutions for Kitui, the process started with identifying (and differentiating) the development needs of target end users (in this case the one million citizens of Kitui County) and engaging with wider stakeholders. The community and stakeholder engagement continued throughout the planning process via different activities (eg data collection, participatory workshops, interviews) to understand Kitui's socio-cultural, environmental, economic and political context, and develop solutions through iterative learning. To ensure economy of scale, the in-depth analytical activities used allow the solutions to be aggregated (eg by geographies, community groups) and link better between sectors to address multiple objectives.

A key lesson from the work in Kitui is that there is interest from various sectors in understanding and embedding energy better within their work to maximise impacts and achieve sustainability. The planning team invested significant effort in building stakeholders' awareness and buy-in throughout the planning process.

Looking forward, the intention is that priority investments identified by county government in the CEP will be taken to implementation in stage 2, which uses the stage 1 solutions to rapidly plan and deploy initiative-level solutions by using the EDM process in specific locations.

IIED and partners also plan to scale the EDM approach by supporting counties across Kenya to develop their respective CEPs. This effort will include strengthening local and national capacity for undertaking inclusive and integrated planning, and creating an environment for multi-sectoral dialogues where energy will be seen as an enabler for achieving development goals. Beyond Kenya we are also exploring opportunities for embedding the approach and inviting interested energy planners and practitioners to take part.

## 1

# Introduction

Energy access is recognised as an enabler of other sectors. Indeed, many Sustainable Development Goals are enabled by access to reliable, affordable, sustainable, and safe energy. But energy projects are typically planned in a top-down manner – emphasising technical solutions and building out infrastructure – without consideration to socio-cultural elements of the communities that these projects are supposed to serve. This reduces the ‘enabling’ aspects of energy projects, as specific needs may not be wholly addressed, and is a missed opportunity to optimise scarce financing and investments while enhancing returns to communities and investors.

An upfront investment in more inclusive and integrated planning can enable bigger dividends to communities, governments, and investors and ensure energy is a true enabler of sectors and livelihoods. Developed by the International Institute of Environment and Development (IIED) and the Catholic Agency for Overseas Development (CAFOD), the Energy Delivery Model (EDM) is a planning approach that helps guarantee that energy services meet community needs and aspirations, while enabling broader development goals. EDM is the result of extensive technical and social research, practitioners’ experiences from around the world, and hands-on implementation with partners.

EDM is a problem-solving, participatory and inclusive approach that uses a six-step process to identify priority needs and differentiate them across target groups. The approach builds a common understanding of barriers and enabling factors that are relevant to community contexts and different representative groups (for example, intersectional categories such as gender, religion, vulnerability, etc). Integrating local knowledge, EDM identifies ‘gaps’ that prevent needs from being met (both energy gaps and other ‘non-energy’ factors), and subsequently builds solutions or delivery models that bridge those gaps. Together with community experts, EDM aims for solutions that are financially, environmentally, and

socially sustainable, building stronger business cases and better returns for communities and investors alike.

This working paper presents an innovative technical approach for planning local energy services in an inclusive and integrated way so that they maximise development impact across sectors. Since 2013, the International Institute for Environment and Development (IIED), the Catholic Agency for Overseas Development (CAFOD) and local partners have developed such an approach – the Energy Delivery Model (EDM). EDM draws together practical experience from energy programmes across the global South combined with testing of the approach in Indonesia, Myanmar, Nigeria, and Kenya by working with communities, social enterprises and nongovernmental organisations (NGOs). This experience and ground-truthing was distilled into the EDM Toolkit (2017), a six-step planning process using existing and innovative tools (the Delivery Model Map and the Delivery Model Canvas).<sup>1</sup>

This paper presents the application of the EDM approach beyond the community level for planning of energy services by local government, drawing on the ongoing experience of developing a County Energy Plan (CEP) in Kenya. It focuses on the methodology used in developing the CEP rather than the proposed solutions as the CEP is still in draft form and yet to be finalised by the county government of Kitui.

## Scaling up beyond the community level

In 2019, Kenya introduced a new framework for energy planning in the Energy Act 2019. The country’s 47 counties are now mandated to develop CEPs every three years to inform national energy planning. County governments will also develop five-yearly County Integrated Development Plans (CIDPs). This new framework offers a significant opportunity to put local development needs at the centre of national energy planning. However, it faces several challenges, including the capacity and experience of county governments to

<sup>1</sup> The Energy Delivery Model Canvas and Map are tools used as part of the six-step EDM process. See below for more detailed description.

undertake more inclusive and integrated planning of energy services within their wider development planning process.

Kitui County in north eastern Kenya is one county attempting to use such an approach. From 2018 onwards, the Kitui County government in partnership with CAFOD and IIED and local partner CARITAS Kitui, have been using EDM to develop a CEP.

Using EDM to develop the CEP has meant applying the approach at greater scale – Kitui County has over one million inhabitants – while retaining its essential features of inclusive engagement with local stakeholders, building contextual understanding and working across sectors.

Having followed the EDM approach, the resulting Kitui CEP outlines priority investments to deliver solutions to meet the critical development needs of the county's inhabitants. These needs include improving income from crop and livestock farming; provision of basic health services in remote areas; access to clean water for households and institutions; and more reliable power and business development training for micro, small and medium enterprises (MSMEs). The CEP aims to maximise synergies across solutions and sectors, mapping and engaging potential delivery partners and co-financiers for piloting and implementation of the proposed solutions, aiming to quickly achieve scale.

The process has involved extensive research and analysis, first to identify the development needs of Kitui County citizens, including county-wide baselining and on the ground research, and then to identify the energy and non-energy barriers to meeting these needs and developing solutions. This has included value-chain analysis, market mapping, business modelling with cash-flow and mapping (co-)financing opportunities. In addition, the CEP process identified enabling policies and policy gaps, and specific socio-cultural barriers to and enabling factors for implementing successful solutions. It has also benefited from collaboration with the World Resources Institute (WRI) on least-cost electrification modelling and data visualisation (including use of WRI's Energy Access Explorer<sup>2</sup> tool).

This paper starts by summarising the EDM process and goes on to describe the methodology of applying EDM at local government level through a two-stage approach. Details of the activities carried out in Kitui county and examples of solutions are given, including discussion on some of the challenges and limitations. Finally, there is a section on looking forward to the next steps for this work in Kenya and elsewhere.

<sup>2</sup> See <https://www.wri.org/our-work/project/energy-access-explorer>

# 2 The Energy Delivery Model process

EDM is a six-step inclusive planning process which works with target end users to identify and prioritise their development needs, including disaggregating and differentiating the needs of different types of end user (for instance by gender). It then identifies the 'gaps' or barriers that are preventing the development needs being met and develops solutions, working with the end users and wider stakeholders, to address the gaps and meet the development needs. The gaps may be directly related to energy (eg the lack of a reliable or affordable electricity service) but equally to non-energy related factors. These can include lack of supporting services (eg lack of finance), and enabling environment barriers (eg policies, regulations) but also socio-cultural barriers (eg gender/power relationships; socially or culturally specific behaviours and practices). Although these 'softer' factors are often considered less significant, they are often decisive 'make or break' factors in the success or failure of a solution.

The initial solutions – or 'delivery models' – identified during the EDM process are subjected to further analysis to optimise them for the specific context, to identify and mitigate risks, and identify synergies between solutions to maximise development impact and potentially reduce costs. The end products are costed, financially, socially, and environmentally sustainable solutions that are ready to implement.

These solutions can be scaled in two ways: first, through identifying synergies between (aspects of) solutions for different needs and bundling them; and second, by mapping different finance providers, delivery partners, and other relevant stakeholders working across solutions and sectors and engaging them in the planning process. The iterative and participatory nature of the EDM process creates buy-in among end users, stakeholders and partners to ensure successful delivery of the proposed solutions. Just as important, it strengthens the wider problem-solving and planning capacity of participants and builds wider stakeholder understanding of the effectiveness of inclusive and integrated planning approaches. Figure 1 summarises the six steps of EDM the planning process.



Figure 1. The six steps of the EDM planning process

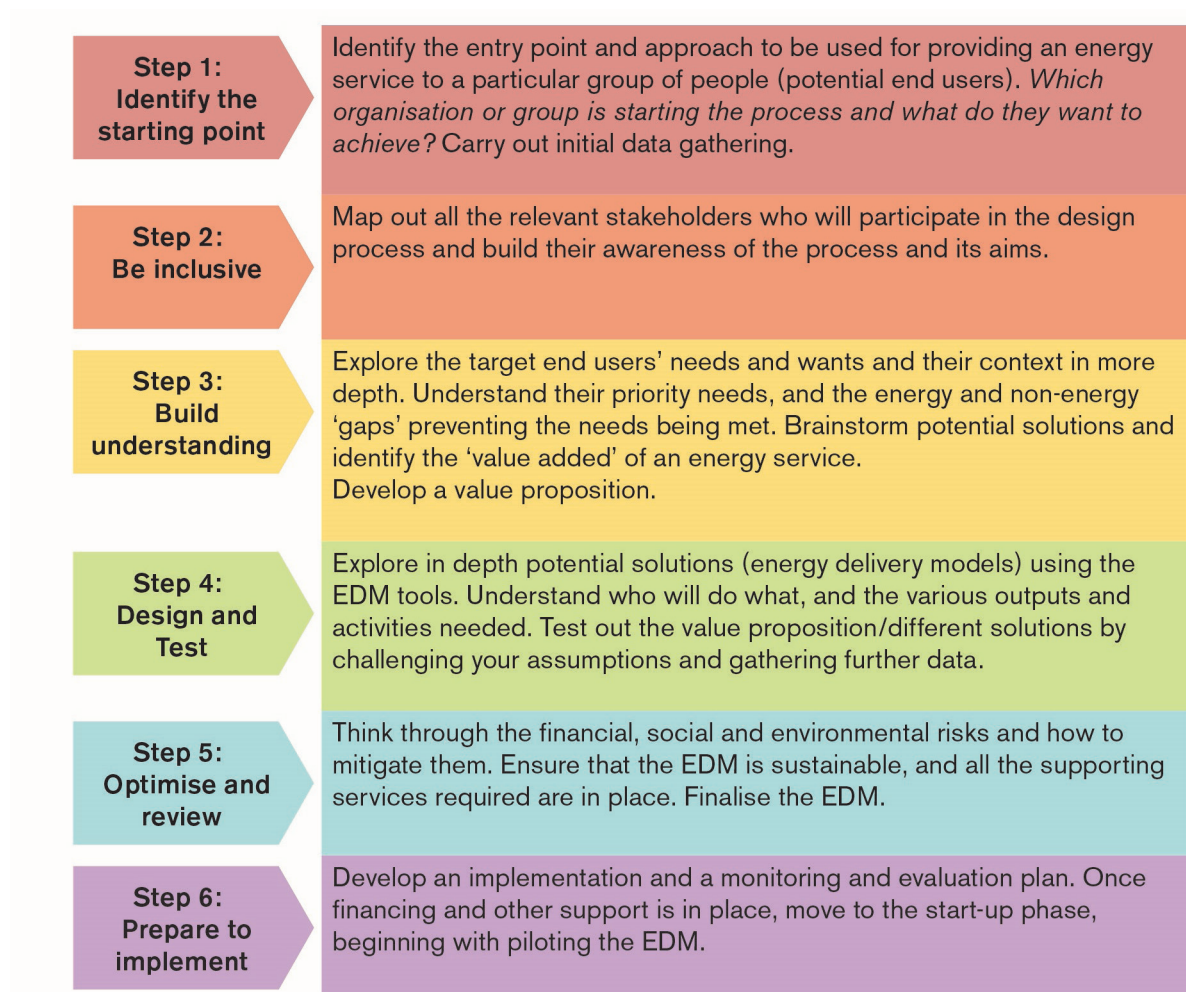


Figure 2 shows the Energy Delivery Model Canvas, an integral tool in the EDM Toolkit for systematic analysis of a proposed solution within a specific local context. The EDM Canvas is used iteratively in steps 4 and 5 for design and optimisation and includes:

- End users – identifying end-user market segments and different delivery channels and relationships that work best for each.
- Delivery infrastructure – identifying key activities, resources and skills needed to deliver the energy service and other supporting services.
- Accounting – a comprehensive analysis of financial costs and expected revenues of the delivery model – including ongoing operating costs, as well as social and environmental costs and benefits.
- Enabling environment – key policy, regulatory and financial service factors that will impact the delivery model.
- Socio-cultural context – more informal factors such as gender dynamics and attitudes towards payment for services with different ownership models that influence whether the overall model is likely to work successfully.
- Additional supporting services – this includes services needed to a) make the energy service itself viable (eg access to finance such as government energy subsidies, awareness raising, access to appliances, capacity building on maintenance and operations); and (b) address the non-energy gaps (eg access to market links and agricultural inputs, access to drugs in health facilities).

Therefore, the EDM Canvas tool helps to develop a holistic solution that aims to address both energy and non-energy gaps. This chance to think holistically and not focus solely on the energy gaps, and develop an end product that is financially, socially and environmentally sustainable makes the EDM Canvas an innovative tool to guide planning.

Figure 2. Energy Delivery Model Canvas

More detail on the six steps of the EDM planning process, including key supporting tools such as the EDM Canvas and EDM map can be found in the EDM Toolkit (2017).

Delivery infrastructure		Value proposition	End users	
<p><b>Key activities</b></p> <p>What are the activities we need to carry out to deliver our value proposition, and to make sure that we are reaching our end-users and generating sufficient revenue?</p> <p>Which of these activities are the most important to fulfil our value proposition and which would be 'nice to have' but not essential?</p> <p>Would any of these activities disrupt existing businesses or upset power relationships? Is there the potential for conflict?</p> <p><b>Example:</b> Firstly, there are problem-solving activities eg how to connect and build different ways of distributing the energy services &amp; products, how to build trust with end-users. Then there are activities related to the 'nuts and bolts' of running the energy service: for example, acquiring SHS and appliances &amp; physically selling them; assembling &amp; customising them; and training and managing the technicians who will maintain &amp; repair them. There could potentially be issues with existing energy providers such as kerosene sellers.</p>	<p><b>Key stakeholders</b></p> <p>Who are our key stakeholders? Eg partners, suppliers, repair &amp; maintenance, local authorities, end-users etc.</p> <p>Which key resources are we acquiring from them? Which key activities do they perform? What do they expect from us? What do we expect from them?</p> <p>How do we add value with all the other stakeholders, including with the end users?</p> <p>How does the value proposition fit with government strategies and public policies?</p> <p><b>Example:</b> International suppliers provide products (SHSs and appliances). Retailers of appliances and gadgets (TVs, radios, phones) sell devices that enable end-users to use energy services, and retailers provide repair &amp; maintenance. National and local authorities give import permits, tax and other incentives etc and provide other subsidies and establish policies. Local bank manages micro-loans. International organisation provides funding for loans to farmers and supports training, as does the farmers' association, which is a trusted source of information.</p>	<p>What value are we adding to the end-user's life?</p> <p>What problem are we helping the end-user to solve?</p> <p>What needs of the end-user are we helping to meet?</p> <p>What collection of products and services are we using to add value or solve a problem or satisfy the end-user's needs?</p> <p>What are the social and/or environmental problems we are solving? Are we creating any risks?</p> <p>How is the wider community beyond the specific end-users going to benefit?</p> <p>By doing *** activities with *** people/ organisations, we will deliver *** impacts and/or meet *** needs and/or solve *** problems.</p> <p><b>Example:</b> The additional value delivered by the proposition is the following: the ability of the farmers and their families to access electric lighting for the first time, along with (improved) access to modern communications (TV, radio); the improvement of livelihoods by using appliances such as processors, refrigerators and water pumps; more educational opportunities for children and adults due to the availability of light at night for studying. There are also other benefits from actual and potential uses of electric appliances (eg labour-saving for women, health benefits from reduced kerosene use etc). Another co-benefit is the decreased use of diesel generators, leading to lower fuel costs for the farmers and also more environmentally sustainable fuel use. The SHSs and some appliances are imported but the rest of the value chain is local.</p>	<p><b>Target groups</b></p> <p>Which individuals or groups is the service creating value for? (eg services/ products for all users or targeted by gender/ age/ income etc.)</p> <p>Who are our most important end-users? Why?</p> <p>Are there local behaviours/attitudes towards innovation and risk that could affect the value proposition?</p> <p>Are there preferences and customs that could affect the value proposition?</p> <p>How do gender relationships affect the value proposition?</p> <p><b>Example:</b> The target group is subsistence farmers. This group can be further divided up by income. The farmers with lower incomes are most concerned about the affordability and durability of the appliances and they are likely to be interested in solar lamps with a phone charger. Farmers with higher incomes could be looking at SHSs and water pumps and potentially some kind of processing equipment. Crops are currently sold directly after harvest, and people are not used to processing them. Women are generally the ones who grow crops, but men are more likely to visit town and sell crops.</p>	<p><b>Ways of doing outreach &amp; delivery</b></p> <p>Do the end-users have preferred ways of being reached when it comes to: awareness-raising, purchase, delivery of the energy service?</p> <p>How can we make sure our ways of reaching end-users fit with their preferences/routines?</p> <p>How much do people use informal channels to build their understanding of services &amp; products?</p> <p><b>Example:</b> Most farmers visit stores in the market town to buy products directly but they also swap information through informal channels such as the farmers' association and they do not often make big purchases or try new products. Women trust information they get from their women's group &amp; feel comfortable asking questions in this environment.</p>
<p><b>Key resources</b></p> <p>What resources do we need to deliver our value proposition, reach our end-users, generate revenues and build our partnerships?</p> <p>Can we easily obtain all the resources (natural, financial, human, physical, institutional etc.) that we need? Do we need any extra supporting services? How will we obtain these?</p> <p><b>Example:</b> The following resources are available. Physical resources: the business has its shop premises in the town &amp; storage for imported goods. Human: the business employees, and other actors involved in awareness-raising. Financial: funding from the international organisation to start revolving loans, and micro-credit &amp; subsidies from the government to buy bigger SHSs and appliances, plus a reduction in import taxes for solar products.</p> <p><b>Constraints:</b> replacement parts for the SHSs and appliances need to be imported from abroad. Also, there is no electric grid connection and no plans to expand in the local region. There is poor transport infrastructure and the solar business will need to build a local distribution channel.</p> <p><b>Supporting services:</b> Funder to provide revolving fund start-up capital and to build relationships with local banks so that they will manage fund and eventually be willing to provide micro finance loans themselves. Awareness-raising for the farmers on SHSs and appliances; training on using appliances and also on improving agricultural techniques and enterprise development; training for technicians to do installation and maintenance of systems; lobbying government to improve transport infrastructure to improve access to markets.</p>			<p><b>Relationship with the end-users</b></p> <p>What type of relationship does each of our groups of end users expect us to establish and maintain with them? (eg individual service, people expect to be involved in creating the service etc.)</p> <p>Do end users expect services to be delivered by the private or public sector (eg private business, governmental agency, cooperative, intermediary such as international NGO, local NGO, church etc.)?</p> <p><b>Example:</b> Solar business with a shop in county capital does customised outreach to the farmers with the support of government incentives and working with the farmers' association. Micro-finance loans are made available from a fund supported by the international organisation but managed by the local banks. The farmers' association also acts as a trusted intermediary. Maintenance services are offered by the business through local technicians.</p>	<p>In this case, the farmers and the village as a whole are given demonstrations of products (appliances and SHSs) by local business (supplier) during awareness-raising and promotional campaigns. These are carried out with local associations (farmers' association, women's groups) with the support of trusted development partners. Examples of other similar products being used in neighbouring communities are also used for demonstration and, because evening radio soap operas are popular and used to transmit information, the government pays for awareness-raising through this channel.</p> <p>SHSs are customised according to the farmer's needs, then delivered &amp; installed by the business and maintained by locally trained agents.</p>
Accounting				
<p><b>Revenue streams</b></p> <p>Where will the revenues come from to pay for the service? What are the different sources? Eg from selling products or assets, fees, lending/ renting/ leasing, etc.</p> <p>Can the end-users pay for the service? In full or in part? How much does each source/ stream of revenue contribute to total revenue? Do donors or the government offer any subsidies or incentives that could be used? Can civil society offer any 'in-kind' resources (physical eg equipment or financial)? Can the end-users offer any 'in-kind' resources that could be used?</p> <p><b>Example:</b> Revenue stream comes from end-users selling crops. In addition, there are subsidies for the appliances from the government and funding from the international organisation for the payment schemes.</p>		<p><b>Other costs/ benefits</b></p> <p>What are the most important social &amp; environmental costs that this particular service will have? What are the benefits?</p> <p><b>Types of costs/ benefits:</b></p> <p><b>Social – Increasing conflict or cohesion among social or ethnic groups. Impacts of the EDM on gender relationships, job creation, health and well-being and empowerment.</b></p> <p><b>Environmental – Increased pollution or energy sustainability. Restoration/degradation/exhaustion of the natural resource base. Impact on ecosystems services and contribution to resource management (positive/negative).</b></p> <p><b>Example:</b> Increased information/educational opportunities &amp; increased income for farmers. Strengthened resilience through more sustainable energy use, enhanced energy security. Also improved resilience to increasing drought due to the possibility of pumping water. Job creation. Substitution of kerosene lamps &amp; diesel generators mean possibly decreased CO<sup>2</sup> emissions &amp; improved health outcomes.</p>	<p><b>Cost structure</b></p> <p>What are the biggest costs of delivering the energy service? Eg Fixed costs (salaries, rents and utilities); variable costs (depending on the amount of goods produced); economies of scale; economies of scope (incorporating other businesses)</p> <p>Which resources required are the most expensive? Which activities are the most expensive?</p> <p><b>Example:</b> The most important costs are supplying the SHSs and appliances, and ongoing repair and maintenance.</p>	

# 3

## Applying EDM to local government planning

This working paper describes how the EDM process is being applied at scale in planning energy services at county level in Kenya. The step-by-step guide below outlines the experience of using the EDM process to develop a County Energy Plan (CEP) in Kitui, Kenya. It introduces the use of such an integrated and inclusive planning approach with target end users (communities), government officials from different line ministries and other relevant stakeholders at sub-national or local level. This paper will be complemented at a later date by a more in-depth case study and analysis.

Core aspects of the EDM approach are that it is needs-based and context specific. Through an iterative and inclusive planning process, it started with identifying (and differentiating) the development needs of target end users (in this case the one million citizens of Kitui County), engaging with wider stakeholders and understanding their socio-cultural, economic and political context (including environmental factors). Retaining the benefits of this approach while also making it workable at greater scale required aggregation or bundling of different solutions to meet these needs so as to better attract service providers and finance. Increasing scale also required expanding the number of possible solutions and substantially increasing linkages between sectors.

### Applying EDM for county planning

The EDM process was first applied at a 'sector level' across the county, exploring energy as an enabler for other development sectors. This required understanding needs across the county in all these sectors from the perspective of end users (the diverse set of communities across Kitui), thus allowing for identification of synergies across the sectors as solutions were developed, and

quantifying the numbers and groupings of solutions for easier aggregation (or 'bundling'). This could help attract finance and service providers, and facilitate decision making on priority investments by the county authority at the 'macro' level of county development planning and budgetary processes (multi-year and annual).

The resulting CEP identified countywide priority investments that could then proceed to a second phase where individual projects or initiatives were identified – and customised or tweaked – for implementation in specific locations and for targeted local users in the county. This second stage 'initiative-level' planning used the EDM process to build the awareness and buy-in of the targeted groups to the solutions, and to carry out (where needed) further selection or tweaking of solutions in the CEP. This should be a rapid process that moves quickly to implementation.

The two stages in which EDM was applied can be summarised as:

- **Stage 1: Sector-level planning** – following the EDM six steps, a baseline was carried out followed by a sampling methodology to engage communities, identify needs and gaps, and develop in-depth solutions. Solutions were bundled together and presented to sectoral line ministries and decision makers in the CEP (county government) to facilitate evidence-based decision making.
- **Stage 2: Initiative-level planning** – further site-specific planning in priority locations that were identified in Stage 1 step 6. The purpose of this is to engage local stakeholders, deciding which solution to deploy and, if needed, to customise for locations. This will be followed by implementation and monitoring and evaluation (M&E).

Figure 3 shows how the six-step EDM was applied in a two-stage planning process. Aspects of the research and analysis undertaken to develop solutions and assist

in stakeholder engagement are summarised in box 1. Each of the stages and specific activities are described in more detail below.

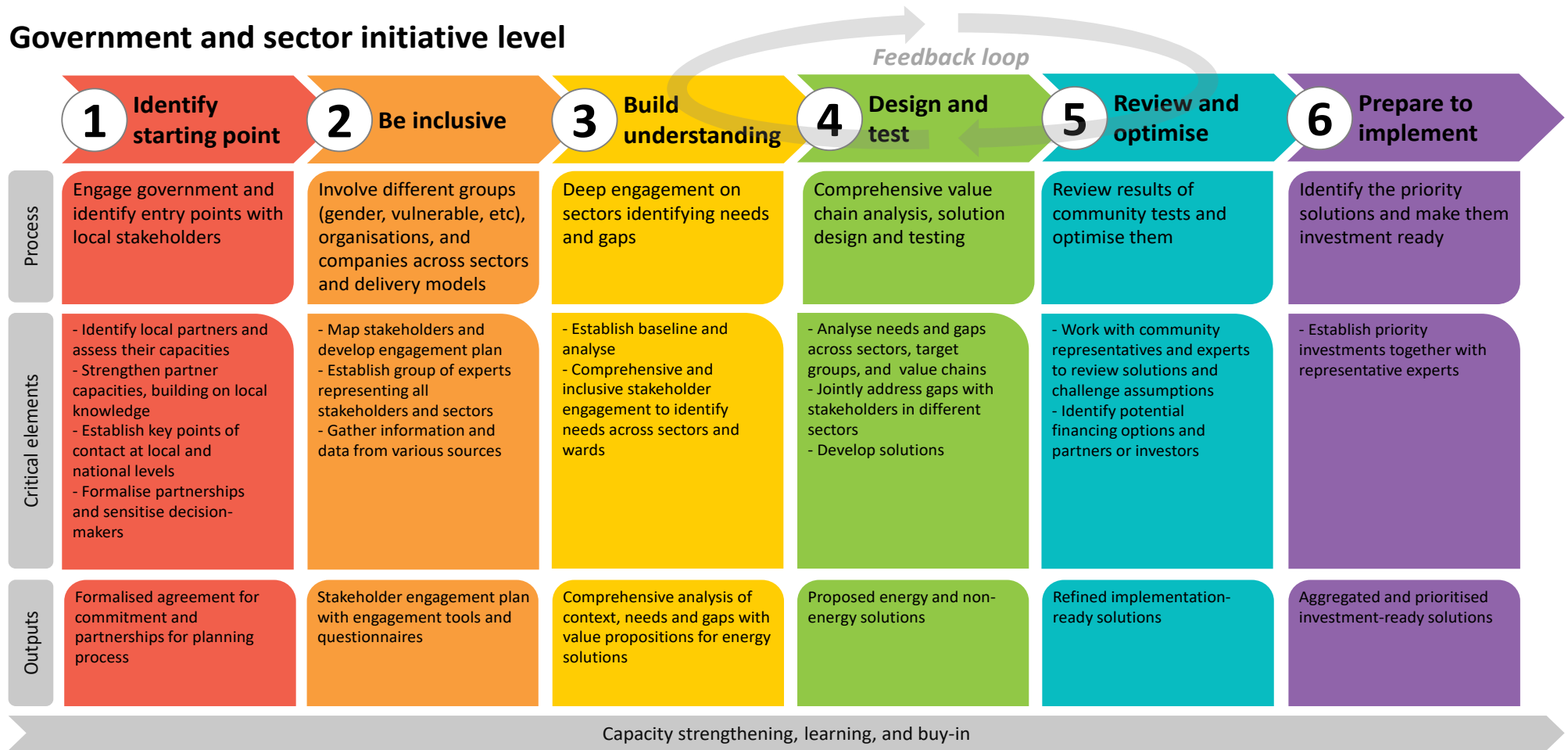
## BOX 1: SOLUTIONS FOCUS: RESEARCH AND ANALYSIS

The application of EDM in two stages was the approach used to achieve scale. To develop specific solutions and identify how many of each were needed across the county, the following aspects were covered in the analysis:

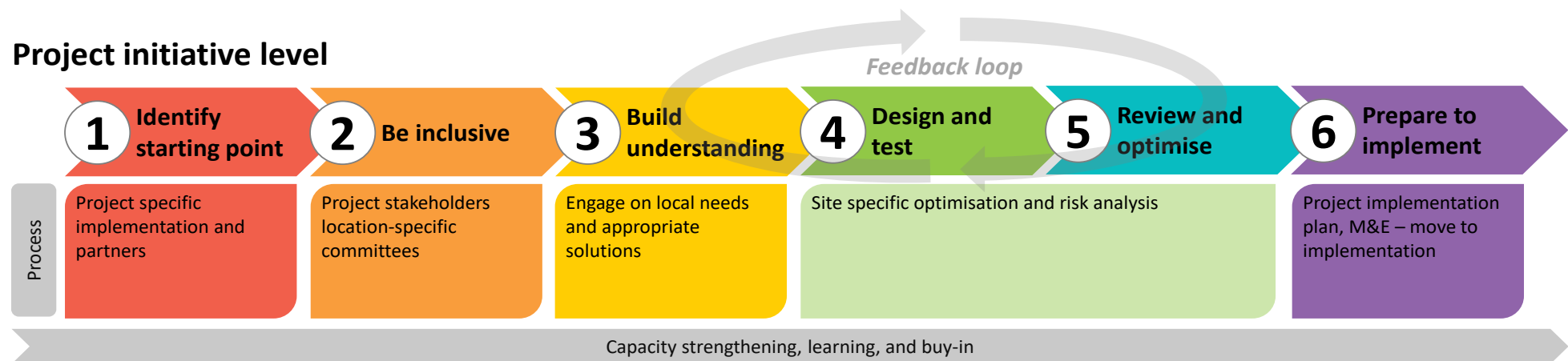
- **Sector analysis including value-chain mapping** and further analysis of each value-chain sub-component (eg market studies of different agricultural crops).
- **Technical design and costing of energy service options**, including consideration of economies of scale, and analysis of pros and cons of different options to assist decision makers.
- **Business cases for different solutions from the perspective of the end user** including cash-flow analysis.
- **Least-cost electrification and data visualisation.** Collaboration with the WRI helped to identify which locations and solutions were more cost effective for grid connection versus off-grid electricity options such as mini-grids or standalone solar. Having visual representations of where (and how many) solutions were needed also facilitated decision making, particularly with respect to their distribution across the county and decision making on priority investments. This can be summarised as follows:
  - o Mapping of existing grid availability and least-cost electrification planning to identify the financial implications of using grid-extension versus off-grid technologies
  - o Use of geospatial (GSI) mapping tools to plot where and how many solutions will be needed, and to facilitate solution aggregation, stakeholder and decision-maker engagement and buy-in through visualisation.

Figure 3. EDM applied in a two-stage process in country planning

## Government and sector initiative level



## Project initiative level



## 3.1 Stage 1: Sector-level inclusive energy planning

Here we outline the EDM process with associated activities for sector-level inclusive planning used in the Kenyan context. In each step we begin with the rationale for undertaking the activity and follow with an overview (in blue text) of how we delivered these activities when developing the Kitui County CEP.

### Step 1 Identify starting point

The starting point here was that the Kitui County government is mandated to develop a CEP under the new national planning framework (2019). The overall objective of the various activities under this step was to: strengthen understanding of the benefits of inclusive and cross-sectoral, integrated energy planning; and build buy-in to the EDM approach among the county government, other stakeholders and local partners. This starts with assessing how access to energy can deliver the Kitui County government priorities (eg Kitui County Governor's 'High 5' agenda, the CIDP objectives etc.) and wider stakeholder development objectives.

Key activities include:

#### Engaging local partner

- **Identifying a local partner and assessing their capacity/resourcing needs for the rest of the planning process.** Having a trusted and respected local partner with strong local networks was central to the success of the planning approach. It facilitated building and maintaining relationships with communities and key stakeholders, and ultimately getting their buy-in for the solutions developed. The local partner does not have to be an energy project implementer; in fact knowledge of other sectors is invaluable to an energy team. Government may play this role, but needs sufficient resourcing and skills to engage in a timely way throughout the planning process. Key criteria for identifying a partner include (1) operationally present across the target area (2) known and trusted by communities and other relevant stakeholders (in this case government and local civil society organisations) (3) track record in data gathering and recording (4) track record in community workshop facilitation (5) experience in sectors impacted by energy.

In Kitui, the local partner, Caritas–Kitui, is a civil society organisation (CSO) with a strong standing among key local stakeholders, and they provided valuable local knowledge and networks from across non-energy sectors (eg agriculture, livestock, water, health).

- **Strengthening capacity of local partners and tapping into their knowledge.** While local partners bring rich local knowledge, they often work in silos in specific sector-focused projects. Therefore, an initial training workshop not only helped to build their knowledge on cross-sectoral energy planning but also provided a platform to share valuable information for the project. It was also important to consider the diversity of team members, for example a balance of men and women. This was important for both tailored engagement with community stakeholders, for example separate discussions with women, and to have broad knowledge within the team when analysing the local context and inputting into solutions.

In Kitui a two-day training workshop was carried out with the local partner, introducing the concept of energy as an enabler for development with associated linkages to other sectors, the impacts of inclusive and integrated energy planning and the EDM planning process. It also introduced data requirements (prepared by IIED/CAFOD) and discussed appropriate ways to collect data from different sectoral stakeholders. We also gathered partners' knowledge on marginalised groups, initial views of local gaps/challenges across sectors and information on local decision makers and key stakeholders during these workshops.

- **Establishing a key point of contact at local and national levels.** Having key contact points and maintaining them throughout the project helped embed the planning process while strengthening local stakeholders' trust in the approach.

In Kitui, two key roles were identified and established at the start of the CEP process that were critical throughout:

1. County level coordinator: set up through the local partner to undertake county level coordination activities throughout the planning process. This role was critical to build trust of stakeholders and engage in data collection and workshop logistics.
2. National level coordinator: set up through the CAFOD Kenya office based in Nairobi to lead on the national and county stakeholder engagement processes, and coordinate activities. National level engagement was critical for sharing lessons, scaling up the planning approach beyond Kitui, accessing national electrification data and receiving planning-related information.

#### Strengthening local government buy-in

- **Formalising a partnership with the responsible planning entity.** Formally setting up an agreement, for example a memorandum of understanding (MoU), with the responsible planning entity helped to secure resource commitment for the planning process.

In Kitui, the energy department within the Ministry of Environment and Natural Resources led the CEP

development process. An MoU was signed at the start of the planning process, setting out the agreed activities, timelines, and resource commitments.

- **Sensitising of key institutional decision makers.** While the primary agency involved was aware of the need for the planning process, there were other sector stakeholders and institutional decision makers who needed awareness raising to understand the role of energy in relation to their own priorities and objectives. Engaging with them earlier on helped avoid potential bottlenecks and get wider buy-in to the planning process (eg data sharing, participation, validating solutions).

In Kitui, a two-day sensitisation workshop was carried out at the start of the process by bringing together representatives from the key sectoral ministries, politicians (eg Members of County Assembly) and local level administrative officers. The workshop included sessions introducing energy as an enabler, why it is important to ensure inclusion of key stakeholder groups, and the EDM planning approach. It also included interactive sessions to discuss sectoral priorities and gaps/challenges for achieving them; cross-sectoral linkages that are important for Kitui development planning; data needs and commitment to share data for CEP development.

## Step 2 Be inclusive

Inclusion is core to the EDM planning process. Therefore, this step is critical to gain understanding of the different stakeholders to be engaged throughout the planning process and to identify the best ways to engage them.

Key activities include:

- **Stakeholder mapping and developing a stakeholder engagement plan.** Initial stakeholder mapping started in Step 1 to identify key decision makers and local agencies and stakeholders to engage at the outset. In Step 2 a subsequent detailed stakeholder mapping was done by local partners to inform a 'stakeholder engagement plan' which would include levels of interest and influence of different stakeholders; champions and blockers; and engagement methods. The stakeholders also included community level representatives such as local decision makers, community groups across urban and rural areas, community members with specific sector knowledge (eg health professionals, water committee members). This provided the basis for selecting participants of a 'technical committee', identifying valuable source of information, and stakeholders to engage with through the process.

Tools for carrying out stakeholder mapping can be found in the EDM Toolkit.

In Kitui the initial stakeholder mapping identified several contact points within key ministries. Engaging with these stakeholders from the start helped secure important data such as health centre locations and their electrification status from the Ministry of Health, and rehabilitation plans for water from the Ministry of Agriculture, Water and Livestock. This type of data was not shared between ministries previously nor used for energy sector planning. The mapping also helped identify local CSOs including those working specifically with women's groups. Stakeholders contacted shared useful project lessons and knowledge products from various sectors and helped fill data gaps.

- **Forming an inclusive technical committee.** One aim of the planning process was to ensure that the cross-sectoral ministries and agencies understood why energy planning is an important enabler for achieving their own objectives. The technical committee was therefore formed of representatives from the key ministries and agencies, geographies (eg sub-counties) and community groups (eg CSOs working with women and youth), private sector, and relevant technical experts (eg agricultural experts or businesses working in the area).

In Kitui, a key output of the workshops in step 1 was identifying members for a technical committee<sup>3</sup> that in subsequent steps were engaged for validation of data gathered and proposed solutions, as well as to strengthen buy-in across the county. A technical committee workshop was held at every milestone of the planning process – following the initial solution analysis to address data gaps; first draft of the solutions and first draft of the full CEP. In addition to workshops, bilateral meetings were held with key representatives from each ministry to update them on the solutions. This helped ensure a good understanding of cross-ministerial budget planning and project status, which is an important revenue source for CEP solutions.

- **Initial data gathering.** Desk research was carried out as well as in depth discussions with the local partner to ensure that the resourcing and next steps of the planning process were inclusive. Key data collected included: basic geographic information on the county; basic socio-economic conditions disaggregated by gender and different social groups; livelihoods and resource availability; social structures and power dynamics; external

<sup>3</sup> The technical committee included representatives from all key sectoral ministries and agencies in Kitui County, and was led by the Department of Energy. Energy stakeholders also included Kenya Power Limited Company (KPLC) and Rural Electrification and Renewable Energy Corporation (REREC). CSOs included: agriculture development organisation Sahelian Solutions Foundation (SASOL); gender focused organisation Grassroots Women Operating in Sisterhood (GROOTS); and livelihood development organisation Kitui Development Centre (KDC). Private sector representation included institutions such as the Chamber of Commerce.

stakeholders working in the area (eg private sector, CSOs, donors); and existing energy infrastructure (access levels, reliability issues, suppliers etc). The outputs of this activity mainly included questionnaires for the detailed data gathering activities noted in steps 3 and 4.

In Kitui the starting point was reviewing key policy documents – the County Integrated Development Plan (CIDP), Annual Development Plan (ADP) and County Energy Outlook. In addition, local partners provided inputs from their own experience working with communities. Some targeted stakeholder interviews were done to gather additional data or clarify local partner views. Using this knowledge, targeted interview and survey questionnaires were developed by the teams to feed into the subsequent in-depth engagement activities.

### Step 3 Build understanding

This step engages communities and key stakeholders to identify their key priorities for development. Two stages of activities were carried out. To ensure a good understanding of the diverse contexts and needs across the county, this activity was the most important and resource intensive of the whole process. Community workshops first focused on the development needs, reasons why these needs were not being met (gaps) and only then moved to discussing initial solution ideas. This approach helped uncover from the outset the real-world impact or ‘value proposition’ from a proposed solution. The solutions and associated value propositions were then worked up in detail as part of steps 4 and 5.

### Baseline survey and analysis

An in-depth baseline survey can provide sufficient information to understand the local context, which is useful for designing engagement tools and approaches for needs assessment and initial solution design.

This can include different data gathering methods. A sampling approach used across the county provided a comprehensive view of the context. Discussing the criteria for this with the county government helped build trust and political buy-in.

In Kitui, the context analysis included a data gathering exercise and site visits:

- **County-wide baseline survey using sampling across the 40 wards covering the eight sub-counties in Kitui.** The aim of the survey was to collect demographic and socio-economic data; information on road infrastructure; levels of access to electricity and cooking fuels/technologies; access to community services (health and education); and information on priority development needs and gaps at the household level. The data was gender disaggregated.

- **Key informant interviews with ward and sub-county administrators across Kitui’s 40 wards.**

This enabled understanding of localised challenges, ongoing interventions, and socio-economic dynamics across the county, but unique to specific wards and community groups.

- **Semi-structured interviews and focus group discussions with key community stakeholders.**

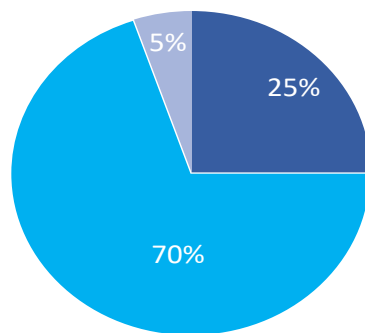
This included those involved in providing community services such as health, education, agriculture and livestock extension services, and enterprise development training; local businesses; women’s and youth groups.

Another critical activity throughout was ensuring local partners understood the activities, were supported with the right tools (eg questionnaires, checklists, reporting templates) for capturing data effectively and were given enough time to discuss issues, addressing any challenges they foresaw in undertaking these activities.



Figure 4. EDM Baseline Survey in Kitui, Kenya (conducted by project partners in Q1 2019)

### Baseline survey: scope and focus



■ Female headed ■ Male headed ■ Not mentioned

- 96 households across 8 sub-counties
- 66% of respondents were women
- Socio-economic and demographic data
- Focus: livelihoods; access to electricity and reliability of grid connection; cooking methods and fuels; water sources; access to health and education services; road infrastructure
- Focus group discussions and interviews (including all ward and sub-county administrators)

### Community workshops: needs assessment and initial solution thinking

The baseline survey was followed with a series of in-depth, participatory needs-assessment and solution-design workshops. These workshops facilitated communities and key stakeholders to identify end user needs and gaps, and brainstorm initial solutions ideas using participatory tools. The EDM Toolkit provides several examples of participatory needs assessment tools that can be used. Once needs were identified and prioritised, the gaps – or reasons why these needs were not being met – were discussed in groups. These included both energy and non-energy barriers.

For each set of needs, solution ideas were worked through and challenged in well facilitated group work. Questions posed to the groups were derived from the EDM Canvas, covering disaggregation of end users, activities and resources needed for the solution (delivery infrastructure), and financial, social and environmental costs and benefits/revenues.

In Kitui the activities included:

- **Two-day facilitation training for local partners:** Local partners were trained to support workshop participants' engagement in the EDM process. This focused on asking open-ended questions; encouraging all participants to participate (eg encouraging women to speak); and seeking justifications for opinions and challenging assumptions. The workshop was led by IIED and CAFOD.
- **Three-day community and key stakeholder workshops:** Community workshops were held in Kitui's eight sub-counties, selected by considering their geographic and socio-economic characteristics

and energy access levels. Participants were also selected to ensure a representative socio-economic and cultural mix as well as inclusion of vulnerable and marginalised groups (see Figure 5). Each workshop covered a range of community needs and a process of prioritisation, followed by identification of gaps and working on ideas for solutions through a guided process focused on group work and challenging assumptions.

Content of the three days:

- **Needs assessment (two days):** The first two days were designed to build community awareness, identify needs, gaps and priorities. This resulted in participants (community members and other stakeholders) identifying priority development needs for the county which were ranked in order and selected across the eight workshops (Table 1). There was significant consensus among the workshop participants across all the sub-counties regarding the top development needs. The top three needs identified were: improved farmer income from rain-fed crops; access to clean water nearby for drinking and washing; and better access to health services in remote areas.
- **Initial solution thinking (one day):** The third day of the workshops discussed initial solution ideas pre-developed by the project team using baseline data, allowing communities and stakeholders to challenge them by considering risks and gaps, and then identify potential stakeholders for financing and implementing them. These discussions provided enough information for the project team to develop detailed solutions.

Figure 5. Needs assessment workshops in Kitui County

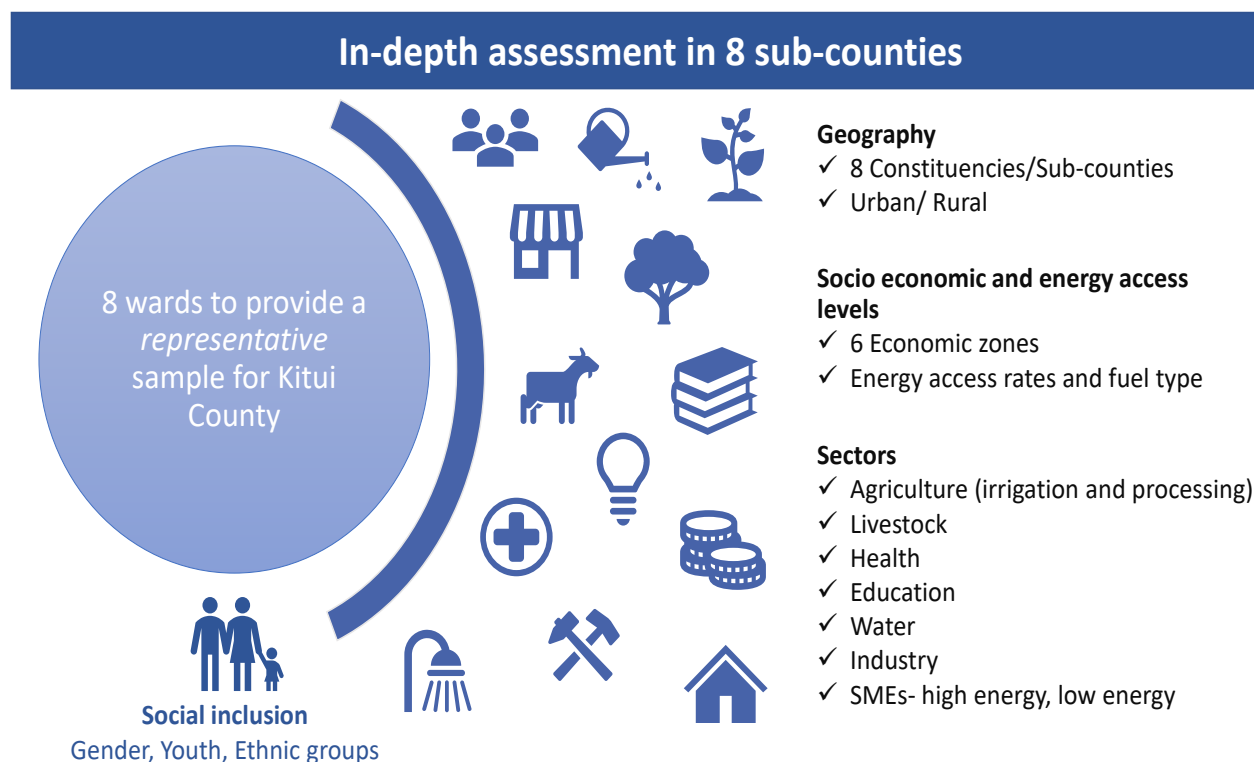


Table 1. Priority development needs in Kitui identified from eight workshops

## NEEDS PRIORITISED BY COMMUNITIES

- Improved farmer income from agriculture
- Access to clean water nearby for drinking and washing
- Better access to health services in remote areas
- Improved productivity and income from livestock
- Better quality lighting for cooking and working at night, general purpose lighting, learning and security
- More reliable electricity and supporting services for MSMEs
- Cleaner, cheaper and faster cooking fuels and methods to reduce health impacts, costs, time and drudgery, and allow more time for relaxation

## Step 4 Design and test

While discussions on the initial solutions were initiated in already began in step 3, further analysis was needed to design comprehensive and holistic EDMs that met priority development needs and addressed the energy and non-energy gaps identified by the communities and key stakeholders. In step 4 the analysis brought together the content and data gathered so far, and identified further gaps which needed addressing. The aim of doing an in-depth analysis is to ensure that there is robust evidence to aggregate solutions that reflect everyone's needs. In particular it helped to identify delivery models that can target different community groups (eg women farmers, youth, poorest farmers).

### In-depth analysis

The EDM Canvas outlined above and described in detail in the EDM Toolkit can guide deeper analysis of the initial solutions identified in step 3. This included: identification of target groups, their needs and preferences (end users); key resources, initiatives, and stakeholders for delivering solutions (delivery infrastructure); and financial costs, revenues and cash-flows for the end users and revenues (accounting). The analysis also looked closely at social and cultural factors (socio-cultural context) and factors such as policies, laws, institutions (enabling environment) that can impact the EDM.

### Addressing data gaps

Any further data gaps identified during this analysis require strong engagement with various stakeholders and working with additional experts:

- **Reaching out to key stakeholders for additional data.** This required the local and national coordinators engaging frequently with non-energy sectoral ministries and others involved in various programme delivery to seek sector-specific data. In Kitui, this engagement provided access to crucial data sources (eg electrification status of health facilities, operational status of water points) that helped design both energy and non-energy parts of the solution.
- **Commissioning experts to gather specific data.** This is sector and solution dependent but can, for example, include further analysis of value chain components such as market linkages for specific products such as a range of horticultural crops or dairy, where existing data is weak. In Kitui this included bringing in experts for value-chain analysis and market mapping for agriculture and livestock; gathering local data (eg local input prices) needed for cash-flow and business model design for farmers; and exploring supporting services and non-energy parts of the solution.

- **Targeted mini-surveys to address data gaps.** Local partners carried out small surveys to collect data essential for designing technical specifications for energy systems (eg water requirements of crops, appliance usage in health facilities).
- **Additional literature reviews and stakeholder interviews.** Engagement with stakeholders provided access to new and more up-to-date resources and policy documents. In Kitui, project monitoring reports of ongoing and completed projects provided a good understanding of best practices in different contexts (eg lessons from poultry incubation with women farmers groups, innovative delivery models for water point maintenance). This also helped identify further stakeholders for delivering supporting services and non-energy aspects of the different solutions. The final CEP included mapping of these linkages to existing initiatives and potential delivery partners, and co-financing opportunities.

### Developing proposed solutions

Analysis and data collection required working with several additional experts such as agronomists, livestock experts and energy system design experts. In addition, the project collaborated with the WRI on least-cost electrification modelling and data visualisation (including use of WRI's Energy Access Explorer tool).

The data mapping and visualisation provided a strong evidence base to identify how certain solutions can be clustered and targeted. For example, in relation to the water solution identified, there was sufficient data to indicate clearly which existing malfunctioning water points are near the grid and therefore suitable for electric water pumping with back-up, and which water points are too far from the grid and thus suitable for solar water pumping.

The solutions developed for the Kitui CEP included these EDMs and supporting services (with further examples of worked up solutions in table 2):

- Household lighting – better quality, reliable lighting for households
- Water – improved access to clean, affordable and reliable water for drinking and general-purpose household needs
- Health – improved health service provision through level 2 (dispensary) and level 3 (health centres) facilities for communities in remote and poorly served areas
- Agriculture – better incomes for smallholder farmers from irrigated and rain-fed crops

- Livestock – higher yield and productivity of small-scale livestock (poultry and dairy) farmers
- MSMEs – stronger business capacities to deliver quality products and services for communities in remote and poorly served areas, and increased revenue of existing MSMEs
- Cooking – improved access to cleaner, faster, reliable, and more affordable fuels and technologies for households.

Each solution proposal developed by the community and local stakeholders included a comprehensive overview of its context including a summary of the priority needs identified, and the energy and the non-energy gaps.

The solution proposals set out in detail:

- Target groups: the community identified which groups the solution intended to impact
- EDM: this included details of several possible energy intervention options, each option included a 'system design' based on a comprehensive analysis of energy demand (eg types of appliances used in health centres, capacity and hours of use, water needs of different crops, type of lighting needs of households). It also included a 'cost analysis' covering both costs of energy systems and cashflow analysis from the end user perspective. This detailed costing enabled the recommendation of potential financing models for different community groups (eg cooperative model, subsidies). Finally, it included supporting services that are required for the success and sustainability of energy systems, including maintenance and repair functions, access to appliances and other enabling environment factors.

- Non-energy component: additional supporting services and interventions to address non-energy gaps/barriers were presented as they are often essential to deliver the outcome and maximise the impact and sustainability of the energy investments in each sector.

Table 2 provides an overview of the solutions for household lighting and the agriculture sectors in the Kitui context. This table is intended to demonstrate the breadth and depth of analysis and associated solutions, stretching beyond just the energy component. The details of each solution, including quantification of numbers of users, costs, and maps used as part of decision making are not included as this information is considered sensitive.

Table 2. A summary of two EDM solutions in different sectors (analysis conducted by project team)

SECTOR	HOUSEHOLD LIGHTING
Need	Better quality, reliable lighting for households across Kitui county
Context – key gaps	<ul style="list-style-type: none"> <li>▪ Lack of grid in remote areas</li> <li>▪ Low reliability of the grid</li> <li>▪ Low access levels to off-grid solar systems and their poor management</li> <li>▪ Affordability issues – high recurrent/connection cost for grid and stand-alone systems</li> <li>▪ Lack of enabling policies and financing options</li> <li>▪ Low knowledge and awareness of energy options</li> </ul>
Target group	<ul style="list-style-type: none"> <li>▪ Households that currently do not have access to electricity</li> </ul>
Energy solution components	<p><i>Examples of energy intervention options and system design provided:</i></p> <ul style="list-style-type: none"> <li>▪ Grid connection: for households who are not connected to the grid and are near a grid transformer</li> <li>▪ Solar mini-grids: for remote households without access to the grid, and who live in areas that are unlikely to have the grid extended in the near future</li> <li>▪ Solar home systems: for remote households without access to the grid, and live in areas that are unlikely to have the grid extended in the near future or are not economically and technically feasible for mini-grids.</li> </ul> <p>Cost analysis: For each option, the analysis included capital/connection costs, tariffs, maintenance costs, financing options available, type of lighting service available and possible activities given lighting availability (intensity and duration)</p> <p><i>Example of supporting services for energy intervention options:</i></p> <ul style="list-style-type: none"> <li>▪ Solutions for infrastructure maintenance and strengthening local availability of qualified technicians</li> <li>▪ Enabling environment aspects such as linking with supplier standards,</li> </ul>
Non-energy solution components	<p><i>Example of solutions to address non-energy gaps:</i></p> <ul style="list-style-type: none"> <li>▪ Access to affordable finance options for all household energy options, including connection costs and off-grid systems.</li> <li>▪ Community awareness programmes on energy solutions, supplier options, quality and costs</li> </ul>
SECTOR	AGRICULTURE
Need	Improved income of smallholder farmers from high-value crops on farms with reliable access to water through improved irrigation and better market linkages
Context- key gaps	<ul style="list-style-type: none"> <li>▪ Lack of access to affordable and reliable electricity to run irrigation equipment</li> <li>▪ Lack of access to and knowledge of reliable irrigation equipment</li> <li>▪ Lack of finance for irrigation equipment and agricultural inputs</li> <li>▪ Lack of knowledge of irrigation farming techniques</li> <li>▪ Socio-cultural issues on uptake and changing behaviours</li> <li>▪ Security issues for equipment left on the farm</li> <li>▪ Lack of access to market information and inability to link with more reliable buyers</li> </ul>
Target group	Farmers near permanent riverbed water or reliable sand dam sources with some savings or other income

**Energy solution components**

*Examples of energy intervention options and system design provides:*

- A standalone solar-powered system for drip irrigation: for many farms where grid connectivity will not be possible in the near future or where only occasional mobility of equipment is needed

- Grid connected system for drip-based irrigation: for the locations where the grid can be accessed and fixed-location pumping is fine

*Cost analysis:*

- For each option, the analysis included: capital costs, operational costs, financing options available, cash-flow for the farmer (looking at total costs and revenues from improved productivity) and appropriate business models

*Example of supporting services for energy intervention options:*

- Maintenance and repair service for irrigation systems, and support to build wider technical capacity for ongoing operation and maintenance of electricity systems ensuring long-term sustainability

**Non-energy solution components**

*Example of solutions to address non-energy gaps:*

- Improved access to good quality agricultural inputs, including seeds, fertiliser and pesticides

- Provision of good agricultural practice to farmers, including on irrigation techniques for a variety of horticultural crops, and addressing socio-cultural barriers in farmer practices

- Improving knowledge on markets and supporting farmer links with reliable and fair market channels

- Improving farmer knowledge and access to inclusive financing options for maintaining and expanding business

**Step 5 Optimise and review**

During this step, solutions are further refined. There was extensive, ongoing engagement with stakeholders throughout this planning process. The technical committee formed in step 2 brought together different stakeholders including local government ministries, local experts, and interest groups such as CSOs to review solutions. This technical committee acted as a forum for validating analysis and solution design, bringing in new ideas, testing views, challenging assumptions, and building ownership with local stakeholders. The optimising of the near final solutions took place towards the end when a draft county energy plan was produced. However, frequent meetings of the technical committee throughout contributed to an iterative process of optimising and reviewing the solutions.

In Kitui, three workshops organised for technical committee members fed into the optimise and review process:

1. Workshop for testing initial solution idea and additional data gathering following the community workshops in Step 3. This workshop was critical for testing initial concepts before investing more time and resources in analysis, and also to get additional data from the key ministries.

2. Workshop to present and discuss first draft of the solutions proposal. This involved presenting and discussing well developed solutions.

3. Final workshop to present the developed solutions and get feedback from stakeholders. This workshop aimed to present solutions to a wider group of stakeholders including decision makers in relevant ministries so they could consider ways to fund priority solutions.

**Step 6 Prepare to implement**

The prioritisation process by county government is ongoing, but the aim is to identify several solutions where the Ministry of Environment and Natural Resources and other key ministries can create linkages to their existing programmes and upcoming new funding that can be allocated in the immediate future. Further quantification of how many solutions (aggregation) are required including where the solutions will be implemented is also important for national level planning – such as decision making on grid-extension versus standalone systems. Identifying cross sectoral synergies will also help resource allocations by the various ministries in the county to support energy requirements across the various sectors analysed.

## 3.2 Stage 2: Initiative-level inclusive energy planning

This stage takes sector-level plans with agreed priority investments back to the local level in the specific locations – the real-world projects or ‘initiatives’ where implementation will take place.

Priority investments for solutions proposed through the CEP fall into three categories. Some can be integrated into existing energy sector initiatives and associated funding to improve and strengthen those initiatives. Establishing linkages with other sectors and their programmes has already been identified as part of developing the CEP. Others are ready to scale up if appropriate partners and finance can be found but might merit a phased roll out to ensure M&E and learning – feeding back into steps 4 and 5 of the EDM covering design and optimisation. Finally, a number of the identified solutions are new for Kitui and need further activities to test and demonstrate their viability on the ground.

To ensure speedy progress to implementation, the ambition is that each priority investment will have a rapid second stage ‘initiative-level’ EDM planning cycle. This could be carried out as an inception phase for initiatives that are funded, or if more information is required to secure funding it could act as a detailed feasibility study.

### *Summary of the initiative-level EDM process*

#### **Step 1: Identify starting point**

##### **Identify target locations and partnerships**

Moving from sector-level to initiative-level, it is important to define the scope of the initiative or intervention on the ground, and then its associated partnerships will depend on the specific solution and investment choice. This includes choosing locations based on the evidence gathered and formalising partnerships to carry out the initiative.

Much of the evidence for the scope and appropriate locations have already been gathered in stage 1. For example, for household lighting the CEP identifies locations where it is much more cost-effective to use off-grid rather than grid-extension solutions. In Kitui, more work is needed to encourage private sector providers to engage as well as to build demand and raise awareness at the customer level. For agriculture, more work is needed at the pilot level to test out different delivery models for irrigation, which in turn involve different partners. The scope (or scale) of intervention for this irrigation-oriented intervention will be smaller at the start than for lighting.

Stage 1 also largely identified where aggregating or bundling of different solutions can be useful to attract finance and service providers.

This includes identifying where clusters of the same solution can be deployed or critical components of multiple solutions such as equipment maintenance could be managed by a single service provider – benefiting from economies of scale. Further identifying detail to optimise bundling may be carried out at this stage which in turn helps determine target locations and partnerships. Political economy issues will also need to be considered for different initiatives. For example, ensuring that priority interventions are perceived as fairly distributed across the county. For larger interventions this may mean working in all of Kitui’s sub-counties. For smaller interventions it may mean distributing different interventions evenly across the county in locations that make the most sense. For example, piloting irrigation will work better in locations with permanent river water supply. This may be balanced against other priority investments being deployed in dryer areas.

#### **Steps 2 and 3: Be inclusive and build understanding**

##### **Engage with end users and relevant stakeholders**

Stakeholder engagement is vital in target locations to build understanding and buy-in, and where needed tweak solution options identified in stage 1 to location-specific needs. Depending on the intervention, this will be done through bilateral meetings, workshops, and awareness-raising campaigns. Other relevant stakeholders include local officials and those relevant to the solution elsewhere – for example regulators at the national level.

#### **Steps 4 and 5: Design and test, optimise and review**

As noted earlier, much of the solution design has already been done in stage 1. Any further tailoring of the solution, including location-specific costing and revenue forecast and social/environmental costs and benefits, will be carried out. Location-specific risks will also be identified with inputs from end users and stakeholders. This will include a deeper assessment on gender and climate risks across value chains. To ensure this is done systematically, the EDM Canvas will be used.

#### **Step 6: Prepare to implement**

A detailed delivery plan will be produced for each solution. This will include details of partners and (co-) financing; a workplan and delivery milestones; M&E with review points to feed back into implementation; and plans for scaling up beyond the immediate funding. Based on this a go/no-go decision can be made to move to implementation.

### 3.3 Potential challenges and limitations

Using the EDM planning process helped to minimise some of the key challenges faced when conducting evidence-based planning. However, some potential challenges and limitations are worth highlighting, so that they can be identified at the outset in case the methodology needs adapting slightly to suit different contexts.

- **Data gaps – lack of data and accessing available cross-sectoral data can be resource and time intensive.**

Like any planning approach, availability of reliable and robust data is a critical aspect of the analysis for the EDM approach. The process can be delayed if insufficient data is available and can require more resources if additional surveys are needed to gather more reliable primary data.

The Kitui CEP required working across multiple sectors and found different ministries and departments have sources of data that have been collected for their own sectoral planning and budgeting. This data was useful to understand various aspects of energy planning – demand, functionality of existing energy systems, non-energy interventions to support energy intervention impacts etc. However, the data is often not shared beyond respective ministries. The EDM six-step process helped access some of this useful data that otherwise would not have been available, as follows: identifying and disaggregating target users; building their understanding and buy-in; and encouraging investment in resources (the national and local coordination points and technical committee process).

The process was delayed, depending on availability of ministerial counterparts, official processes to release data, holiday seasons, and even resulted in having to do additional surveys if the quality was not sufficient. For instance, following delays in getting demand-side data on health centres and dispensaries, the planning team conducted its own surveys and interviews. The iterative nature of the approach also meant that additional data was sometimes needed to strengthen the proposed solution further. Delays are to some extent inevitable when undertaking local level planning and recognising these challenges up front can help in resourcing and finding alternatives without undermining the aims of the process.

- **Capacity challenges – a range of skills are needed which may require additional financing to build local capacities and fill knowledge gaps**

As discussed above, the EDM planning approach requires a full range of skills and resources.

Strengthening of local partner capacity on the approach and on other skills such as data analysis and collection; coordination of activities; and workshop facilitation was essential throughout. At times this required additional resources, and planning upfront could help mitigate these challenges. For the Kitui CEP it was useful to bring in additional expertise when developing cash flow and business models, developing least-cost electrification modelling and data visualisation aspects. The need for sufficient resource allocations and process delays were important lessons from the Kitui CEP development process.

- **Cross-sectoral engagement – breaking through inherent siloed working practices of various sectoral stakeholders requires strong coordination.**

Different sectoral departments have different targets and mandates – and often do not align towards one goal. This leads to sector stakeholders delivering interventions in silos with minimal collaboration. The technical committee was recognised by many local stakeholders as an important initiative for bringing together multi-sectoral stakeholders. However, to achieve that the planning team worked hard to engage with the different ministries to build their understanding, and get their interest and input. An initial stakeholder mapping and stakeholder engagement plan (step 2) was a critical starting point for this. However, changes in key staff and different priorities meant continuous engagement processes were needed, particularly from local partners, to communicate findings and tease out factors that interest respective sector-specific development plans.

- **Awareness raising – buy-in is needed at all levels at an early stage to push planning forward and achieve implementation.**

There was strong interest in this work right from the outset, particularly about what the end results would be and who would get what when implementing the solutions. It was critical to raise awareness with stakeholders throughout the process, including why activities were taking place. The sampling process which engaged communities was particularly controversial – following unfounded rumours that those locations would be the first to receive solutions. The project team helped mitigate this by ensuring that the sample locations were distributed across each of the sub-counties and selected through transparent criteria. Also, during workshops it was important to frequently summarise its purpose during the proceedings. The choice of priority investments risks being influenced by political preferences. However, having a strong evidence base which identifies the pros, cons, and numbers of people who will benefit from each investment has helped discussions at the technical committee level.



## 4

## Looking forward

The work condensed into this working paper shows how an inclusive and integrated planning approach such as EDM can build the scalability and sustainability of energy services – taking the process through from planning by local governments and into implementation.

Through the EDM planning process, the Kitui CEP is proving that it is ready to implement solutions to deliver energy which can guide investments from the government and others to achieve the county's development goals. The technical committee led by the county's energy department and the Ministry of Environment and Natural Resources has the opportunity to feed CEP solutions into county policies and ensure the CEP is firmly anchored in county development plans. Looking beyond the CEP, the next step for Kitui County is to identify their priority investments and develop implementation plans accordingly. Stage 2 of the EDM, outlined earlier in this paper, provides an overview of activities that can move this forward.

A key lesson from the work in Kitui is that there is interest from various non-energy sectors such as health, water and agriculture in understanding and embedding energy services effectively within their work to maximise impacts and achieve sustainability. What is often lacking is a systematic planning process and a platform at the local level that guide various stakeholders to make these linkages effectively. Therefore, it was important for the planning team to invest significant effort in building stakeholders' awareness and buy-in throughout the planning process.

An important milestone of this work took place in 2019, when the team co-convened a regional inclusive and integrated planning workshop with Kenya's Ministry of Energy. This brought together government, civil society and private sector participants from Kenya, Ethiopia, Tanzania and Uganda. The participants found encouraging consensus on the need to move away from the 'business as usual', top-down planning approaches commonly used in the energy sector. These approaches

have often resulted in failure or under-performance and incurring social and financial costs. The use of inclusive and cross-sector planning approaches like EDM were seen as beneficial for improving uptake and impacts.

IIED and partners are now planning to scale the EDM planning approach to support counties across Kenya to develop their respective CEPs. This work will include strengthening local and national capacity for undertaking inclusive and integrated planning, and creating an environment for multi-sectoral dialogues where energy will be seen as an enabler for achieving development goals. We are also exploring opportunities for embedding the approach in other countries and invite interested energy planners and practitioners to take part.

**LIST OF ABBREVIATIONS**

CAFOD	Catholic Agency for Overseas Development
CEP	County Energy Plan
CIDP	County Integrated Development Plan
CSO	Civil society organisation
EDM	Energy Delivery Model
IIED	International Institute for Environment and Development
M&E	Monitoring and evaluation
MOU	Memorandum of understanding
MSME	Micro, small and medium enterprise
NGO	nongovernmental organisation
SHS	Solar home systems
WRI	World Resources Institute



Access to reliable, affordable, sustainable and safe energy is recognised as an enabler of many development objectives. Yet energy infrastructure is often planned as standalone investment, from a purely economic and technological standpoint and in a top-down way that does not take into account the needs of end users. To realise the full benefits of energy as an enabler of different development objectives across sectors, more inclusive and integrated approaches are needed. This working paper presents an innovative technical approach for inclusive and integrated energy planning for local governments by applying the Energy Delivery Model (EDM) planning approach developed by IIED and CAFOD

IIED is a policy and action research organisation. We promote sustainable development to improve livelihoods and protect the environments on which these livelihoods are built. We specialise in linking local priorities to global challenges. IIED is based in London and works in Africa, Asia, Latin America, the Middle East and the Pacific, with some of the world's most vulnerable people. We work with them to strengthen their voice in the decision-making arenas that affect them — from village councils to international conventions.



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