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**BRIEFING PAPER** APRIL 2023

## SIX BUILDING BLOCKS TO INTEGRATE SMALL-SCALE ENERGY SOLUTIONS INTO DEVELOPMENT PLANNING COMPARING THE APPROACHES OF KENYA, NEPAL AND NIGERIA

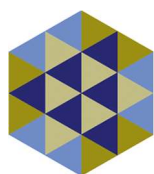
**ABDULMUTALIB YUSSUFF, ANNISA SEKARINGTIAS**

Small and decentralised energy solutions, for example, distributed renewables and small-scale storage, are crucial to delivering a quick, affordable, and equitable energy transition. They are well suited to expand energy access and reach underserved communities. However, their small size can also present barriers to funding and scaling up. Integrating small-scale energy solutions into national development planning can help to overcome some of these barriers.

This briefing is a part of our series of analyses into small-scale energy solutions. Our analysis compares how three leaders in deploying small-scale energy solutions – Kenya, Nepal and Nigeria – have achieved progress.

We have identified six essential building blocks for governments:

1. Democratisation of the process, including local participation.
2. Integration of small-scale clean energy with national development.
3. Holistic mapping of the intersections with different ministries/agencies.
4. National diagnostics on viability, including local value chains and sources of finance.
5. Effective policy mobilised with adequate institutional capacity.
6. Promotion of international cooperation.



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A well-integrated energy and national development plan<sup>1</sup> seizes opportunities at three layers of implementation: local, national, and international.

Locally, it needs to start with understanding communities' needs, and how the energy delivered can stimulate economic activities at the local level.

At the national level, governments need to explicitly identify links between small-scale energy planning and the broader national development goals. Additionally, they need to clarify responsibilities across different government bodies, resolving any overlaps. Better division of responsibilities, and crowdsourcing of knowledge, will then allow proper diagnostics of the viability of different small-scale technologies and any gaps that need addressing. For example, whether opportunities to build local value chains exist, or the kind of support that is needed from international partners. This then needs to be formalised into adequate institutional capacity, ideally a specific ministry or agency with a clear mandate to deliver the ambitions, setting relevant and feasible targets.

Ultimately, showing this national capability and planning will increase confidence in international settings. This allows governments access to wider capital pools, for instance via international financial institutions, or knowledge and technology transfer with more advanced countries. Overall, this will provide room and resources for governments to do more – providing a positive feedback loop to accelerate both energy transitions and development.

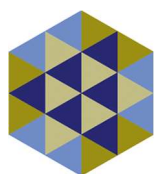
## Why small-scale energy solutions and national development need to be planned together

Small-scale, decentralised energy solutions<sup>2</sup> – such as distributed renewables (solar PV systems/mini-grids), batteries, and energy efficient appliances (heat pumps, air conditioning, clean cooking appliances) – have unique advantages for

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<sup>1</sup> By national development plan, we refer to a strategic long- and/or medium-term plan by the government to improve quality of life and guide the implementation of programmes and policies that promote rapid multi-sectoral growth and development.

<sup>2</sup> We use “small-scale energy solutions” to describe those that have smaller unit sizes (MW/unit) and investment costs (\$/unit) (similar to what is referred to as “granular technologies” in Wilson et al. (2020)). They are decentralised, modular, and tend to shift customers' roles to be more active in energy systems. There is room for both large-scale and small-scale energy solutions. For example, industry and manufacturing still predominantly need large-scale power generation. Integrating small-scale solutions into existing systems poses an important technical challenge in accelerating the pace of the energy transition.



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both the energy transition and development. The granularity of these solutions allows quicker deployment and increased efficiency. This is because they

- > have lower unit costs, and so demand less access to capital, especially when supported by economies of scale and risk mitigation mechanisms
- > have lower technological complexity, easing deployment and allowing quicker adoption
- > offer larger potential efficiency gains, particularly for individuals and households<sup>3</sup>
- > diffuse more quickly into markets, providing faster technological learning benefits and improving faster<sup>4</sup>
- > improve the resilience of existing grids, for instance, by continuing to operate during a main grid outage.

At the same time, small-scale solutions directly benefit people's lives. They provide more equitable access to technologies, and more access to local developers and communities.<sup>5</sup> They generate more jobs,<sup>6</sup> support resilient agri-food systems,<sup>7</sup> and deliver better access to healthcare, clean water, and education<sup>8</sup> in many emerging markets and developing economies (EMDE).

However, the focus on energy supply, particularly traditional large-scale fossil fuel solutions, means smaller and more demand-side solutions are often overlooked. In the ongoing debate about what path is best for development, some voices are still rooted in the idea that climate action, energy transition and development are at odds.<sup>9</sup> In reality, to address climate change and to fulfil sustainable development goals (SDGs), investment and deployment of small-scale energy solutions must ramp up fast, and now.

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<sup>3</sup> Wilson et al., 2020, [Granular technologies to accelerate decarbonization](#)

<sup>4</sup> IPCC, 2022, [Climate Change 2022: Mitigation of Climate Change - Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change](#)

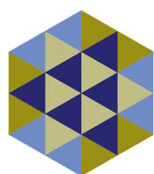
<sup>5</sup> Wilson et al., 2020, [Granular technologies to accelerate decarbonization](#)

<sup>6</sup> Power for All, 2022, [Powering Jobs Census 2022](#); Wilson et al., 2020, [Granular technologies to accelerate decarbonization](#); The Rockefeller Foundation, 2021, [Transforming a Billion Lives: The Job Creation Potential from a Green Power Transition in the Energy Poor World](#)

<sup>7</sup> Efficiency for Access, [Agriculture and Energy Efficiency](#); Ingram et al., 2022, [Improving Rural Livelihoods, Energy Access, and Resilience Where It's Needed Most: The Case for Solar Mini-Grid Irrigation in Ethiopia](#)

<sup>8</sup> AMDA, 2022, [Benchmarking Africa's Minigrids Report](#)

<sup>9</sup> WSJ, 2023, [Can Developing Economies Have High Growth Without Using Coal? A Debate](#)



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In our previous briefing,<sup>10</sup> we detailed the development benefits of small-scale energy solutions, as well as the investment gap and how a systemic approach from multilateral development banks (MDBs) is crucial to address it. National governments also need to take a holistic view and plan the energy transition and development agenda hand in hand. By taking into account the full benefits of small-scale energy solutions and integrating them into national development plans, we argue that governments can unlock both development and energy transition targets.

To identify the building blocks of a model strategy, we look at Kenya, Nepal, and Nigeria, and their different approaches to integrating small-scale energy into their national development plans.

### Summary of case study methodology: Nigeria, Kenya and Nepal

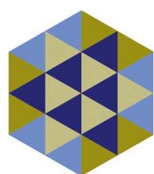
We selected these three countries because they

- > represent three distinct and important regions in terms of energy access and transition (East Africa, West Africa, and South Asia)
- > have relatively similar gross domestic product (GDP) per capita
- > have shown increasing interest in using small-scale energy solutions to support their economic and social development.

We analysed countries' national development plans and post-COVID green recovery strategies (see Annex: Table 3) and drew insights from a convening with stakeholders in Nigeria in November 2022. More detail on the underlying documentation we used is contained in the Annex.

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<sup>10</sup> E3G, 2022, [How multilateral development banks can boost small-scale energy solutions](#)



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## The six building blocks to effective mainstreaming of small-scale energy and development goals

Our comparative analysis identifies six key features of well-integrated small-scale energy planning and highlights successful practises.

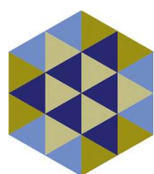
### The building blocks for well-integrated small-scale energy and national development planning



Figure 1: Our analysis of Nigeria, Kenya and Nepal identified six features of successful integration of small-scale energy planning with national development. Governments can seize opportunities at local, national and international level.

### 1. Local participation

Involving the local community in both the design and the implementation of the national development plan is an essential part of making sure small-scale energy supports a more equitable modern energy service, in turn supporting national development. This can be done via various models: a full-fledged community-led cooperative model; a private-led model; a tripartite between community, utility and small-scale developer; or a combination of these. Nepal has achieved an electrification rate above the global average largely through a community-led model. The model has also been a driver in the country achieving significant success in socio-economic development, evidenced by the strengthened local governance and increased livelihood of rural communities.



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## Recommendations

1. Include more local communities, civil society, and small and medium-sized enterprises to democratise the planning process.
2. Identify how small-scale energy planning can stimulate local economic activities, by encouraging productive use of energy.

## 2. Integration with development plans

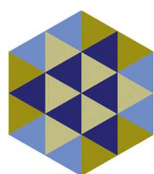
Delivering electricity is necessary, but not sufficient to achieve development goals. It is critical to specify what service level and support are needed for the newly gained access to electricity to stimulate economic growth. In Nigeria's national development plan, the linkages are there but abstract. Meanwhile, Nepal's plan provides a target for minimum energy consumption per capita and details on how small-scale energy solutions can empower education and healthcare, and generate jobs. Kenya's plan also includes targets for job creation and socio-economic development, though with less detail than Nepal's.

## Recommendations

1. Integrate small-scale energy planning into the broader economic and social development agenda to ensure their sustainability. The contribution of small-scale energy to national development and climate needs to be specific, explicitly stated in the development plan, and with identification of its accompanying support.
2. Integrate clean energy, including viable small-scale energy solutions, into infrastructure projects – rather than limiting focus to traditional centralised projects.

## 3. Effective coordination across ministries and agencies

As energy and development are cross-cutting, there needs to be a strong coordinating body or a clear mapping of the different ministries involved, and their specific roles. For example, in Nigeria, the Rural Electrification Agency (REA) is responsible for the implementation of small-scale distributed energy solutions for rural electrification. The Federal Ministry of Finance provides fiscal incentives needed to support small-scale market scale-up, the Standards Organisation coordinates solar and balance of system standards, while the Federal Ministry of



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Power, the parent ministry of REA, coordinates government policies on the power and electricity sector. Kenya and Nepal have a similar coordination structure.

### Recommendations

1. Conduct holistic mapping of the intersection with different ministries.
2. Clarify mandates for different bodies and institutionalise the way they align and co-design policies.

### 4. Economic viability of small-scale energy solutions

A full diagnostic of the economic viability of different small-scale energy solutions helps governments prepare to integrate them into national development plans. For instance, this could highlight opportunities to build local value chains and diversify sources of finance. Nepal's national plans contain a detailed analysis of the viability of small-scale energy solutions for deployment at national and sub-national levels, which explains the challenges, opportunities, and existing barriers and how to tackle them. This level of detail is finely articulated, compared to Nigeria's and Kenya's national development plans.

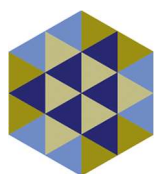
On financing, the use of local currency in debt financing in Kenya and Nigeria is on the rise. During 2020–21, about 28% of debt was denominated in local currencies, compared with just 11% in the pre-pandemic years. The low-cost local currency financing is proposed to be extended to off-grid renewable energy development.<sup>11</sup>

Another financing barrier is small project size. To address this, Nigeria is piloting a demand aggregation programme. The programme draws on the list of companies already approved by the Rural Electrification Agency (REA) in the national electrification programme, and leverages the role of investors, private companies, and philanthropy. It pools demand from developers, provides aggregated purchasing of equipment for distributed solar, and coordinates the logistics processes. This is intended to lower the overall costs for both developers and customers, and ultimately achieve economies of scale in the sector by bringing the pricing to a point comparable to utility-scale projects.<sup>12</sup>

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<sup>11</sup> IRENA and CPI, 2023, [Global Landscape of Renewable Energy Finance](#)

<sup>12</sup> Global Alliance for People and Planet, 2023, [Lowering Costs for Renewable Energy Developers \(DART\)](#)



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## Recommendations

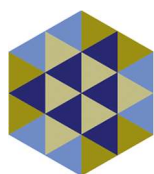
1. Conduct a national diagnostic on the viability of small-scale energy deployment, including opportunities for local value chains and identifying sources of finance.
2. Seek partnerships for technology transfer and domestication of technology, including critical skill building for local workers.
3. Increase local currency use in debt financing to mitigate risks from foreign currency exposure.
4. Seek partnerships to aggregate smaller projects to make them more viable, and explore opportunities for linking to carbon finance initiatives.
5. Use standardised tendering and procurement to support the effective coordination and implementation of small-scale energy components in national development plans.

## 5. Institutional capacity and political direction

Strong institutional capability, backed with adequate political support, plays a significant role in all three countries. In Nigeria, the Rural Electrification Agency and Electricity Regulatory Commission show how politically stable institutions and effective leadership (with high-level political backing from the presidency and the legislature) can transform the small-scale energy landscape. The institutions have been actively advocating, in collaboration with lawmakers, for bill amendment that helps de-risk the sector and makes it attractive for financing.

In Kenya, the integration between the country's development vision, institutions, and programmes, helps accelerate the deployment of small-scale energy. Kenya's Rural Electrification and Renewable Energy Company (REREC) uses subsidised distributed renewable energy solutions to electrify rural areas, while aligning its goals with Kenya Vision 2030. Simultaneously, REREC coordinates all procurement and tendering processes related to small-scale energy solutions, making the projects easier to manage for both developers and financiers. This is a similar approach to Nigeria, where the Rural Electrification Agency (REA) manages government procurement, financing, and subsidies for small-scale energy solutions through the Rural Electrification Fund. A dedicated Energy Transition Office (such as the one in Nigeria) can coordinate across cross-





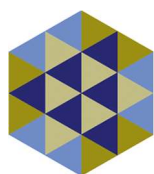
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departmental functions, for example, between the ministries of energy, development, and finance.

To illustrate this building block further, we map out some of our recommendations on the relevant government ministries and agencies in Table 1.

*Table 1: Snapshot of recommendations mapped onto the relevant government ministries / agencies – non-exhaustive list*

Recommendation	Government ministries / agencies responsible for leading					
	National planning	Finance	Science / technology & innovation	Investment	Energy / rural electrification	Labour
Ensure and foster democratisation of the process, including local participation	X				X	
Conduct holistic mapping of the intersection with different ministries	X					
Identify clear link between small-scale energy and national development goals	X				X	
Assessment of local value chains			X	X		X
Diversify sources of financing		X				
Ensure institutional political backing	X				X	
Implement transparent measurement and aggregation					X	
Engage international financial institutions		X				



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## Recommendations

1. Ensure there is adequate institutional capacity to implement policy.
2. Set clear measurable targets and indicators, backed up with policy tools such as regulations, legislation, and finance instruments.

## 6. International cooperation

Governments can leverage bilateral, multilateral, and public–private partnerships to support the implementation of these plans. Our previous study<sup>13</sup> looking at multilateral development banks (MDBs) identifies the need for MDBs and governments to set out a common pact for unlocking the massive development benefits from small-scale energy solutions. Here, governments must play a more effective and vigorous role in realising the benefits of small-scale energy solutions. Kenya and Nepal successfully do this by identifying strategies for connecting with international partners, such as the Green Climate Fund, through the national designated authorities, such as the Ministry of Environment. They also connect with multi-donor trust funds on areas where donor support can be channelled to national development plans, such as the implementation of enabling frameworks and priority projects identified in the plan. This allows for more support and clarity from the higher level of government and international actors.

## Recommendations

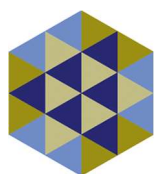
Request regional and multilateral development banks to enhance support for integrated climate and development planning and for small-scale energy solutions.

Adopting these building blocks, we assess the three case study countries in Table 2 below. While all three countries have made strides in implementing small-scale energy solutions, Nepal emerges as a clear leader in terms of integrating small-scale energy planning into their national development.

Detailed benchmarks for what each assessment means are available in the Annex (Table 4).

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<sup>13</sup> E3G, 2022, [How multilateral development banks can boost small-scale energy solutions](#)



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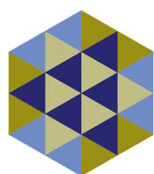
Table 2: Assessment of Nigeria, Kenya, and Nepal's approaches to integrating small-scale energy in national development plans

Building block	Description	Nigeria <sup>14</sup>	Kenya <sup>15</sup>	Nepal <sup>16</sup>
Democratisation of the process, including local participation	Participation from local to national level of governance, and civil society organisations.	Medium	High	High
Integration of small-scale clean energy with national development	Identification of how small-scale clean energy can support development, including increasing energy access and the productive-use benefits that they can generate.	Low	Medium	High
Holistic mapping of the intersections with different ministries	The existence of a coordinating body or a mapping of the required participation of different ministries/agencies	Medium	High	Medium
National diagnostic on the economic viability, including local value chains and sources of finance	Featuring analysis of small-scale energy including potential, challenges, opportunities, strategies and working policies, and expected results.	Medium	Medium	High
Effective policy mobilised with adequate institutional capacity	Measured by accelerated deployment of small-scale energy since political commitment is translated into action, backed by political will and driven by politically stable institutions.	High	High	High
Promotion of international cooperation	Promotion of international cooperation to increase finance and technology transfer.	Medium	High	High

<sup>14</sup> Federal Government of Nigeria, 2020, **Nigeria Economic Sustainability Plan (NESP)**; Federal Government of Nigeria, 2017, **Economic Recovery and Growth Plan (ERGP)**; Ministry of Finance, 2021, **Medium-term National Development Plan (MTNDP)**; Ministry of Finance, 2020, **National Integrated Infrastructure Master Plan (NIIMP)**

<sup>15</sup> Ministry of State for Planning, National Development and Vision 2030, 2018, **Kenya Vision 2030** <https://vision2030.go.ke/>

<sup>16</sup> Government of Nepal, National Planning Commission, 2020, **The Fifteenth Plan**



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Specific country assessments and tailored approaches are needed. There are common success factors and barriers from the case studies that can be relevant to EMDE more generally. We find that governments can effectively integrate small-scale energy solutions into national development plans while considering the six building blocks we have identified.

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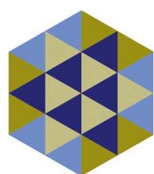
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## ANNEX

Table 3: The national development plans assessed in this paper

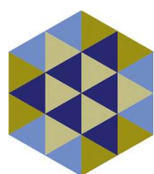
National Development Plans	Description
Nigeria	
Nigeria Economic Sustainability Plan (NESP) <sup>17</sup>	A short-term stimulus package as part of the pandemic recovery strategy. The plan includes the development of a value chain for solar home system (SHS), citing its potential to boost job creation and strengthen the local market. The Central Bank of Nigeria facilitates the programme, which provides a unique opportunity and strong influence to stimulate and diversify the economy. The central bank also provides some guarantees that help mobilise the banking sector towards green financing.
Economic Recovery and Growth Plan (ERGP) <sup>18</sup>	A medium-term economic plan that links the need for food and energy security by diversifying energy supply, including clean energy sources. However, the case for clean energy is not granularly articulated in terms of the types of clean energy and the kind of support provided, compared to the NESP which was meant to be a one-year transit plan to an upcoming successor plan to the ERGP.
Medium-term National Development Plan (MTNDP) <sup>19</sup>	The plan aims to drive economic growth and development through increasing the awareness of climate issues and diversification of energy supply to include small-scale renewable energy sources.
National Integrated Infrastructure Master Plan (NIIMP) <sup>20</sup>	A \$2.3 trillion blueprint for infrastructure development. It aims to improve the sustainability and resilience of public infrastructure to the rising impacts of climate change through low-carbon transport, and boost Nigeria's preparedness against floods and other natural disasters. Specifically, it aims to increase the share of alternative energy including small-scale energy solutions to 35% by 2043.

<sup>17</sup> Government of Nigeria, 2020, **Nigeria Economic Sustainability Plan (NESP)**

<sup>18</sup> Federal Government of Nigeria, 2017, **Economic Recovery and Growth Plan (ERGP)**

<sup>19</sup> Ministry of Finance, 2021, **Medium-term National Development Plan (MTNDP)**

<sup>20</sup> Ministry of Finance, 2020, **National Integrated Infrastructure Master Plan (NIIMP)**



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National Development Plans	Description
Kenya	
Kenya Vision 2030 <sup>21</sup>	The country's first long-term development plan aims to transform Kenya into an industrialised, middle-income economy in a clean and secure environment. The Vision is designed to be a highly participatory plan that includes governments from the local level up to national level, as well as participation from civil society, and international and local communities.
The 3rd Medium-term Plan 2018-2022 <sup>22</sup>	The plan emphasises the roles of small-scale energy and the challenges and opportunities for their deployment at national and sub-national levels. It highlights the opportunities to build local capacity for manufacturing, maintenance, and installation and the subsequent job creation benefits from it.
Kenya Energy Act <sup>23</sup>	While the Act covers both fossil fuels and renewable energy, in this study, the focus area of the briefing is on support for small-scale and distributed renewables. The Act provides for and empowers the national and sub-national governments to play roles in energy planning and strengthening the implementation of renewable energy including small-scale energy technologies.
Nepal	
The Fifteenth Plan <sup>24</sup>	Developed by the Nepalese National Planning Commission and the second Nepal's Nationally Determined Contribution (NDC). It highlights the benefits of distributed energy and its alignment with development and climate action. It also addresses the required support mechanisms to increase their uptake and improve consumption efficiency.
National Energy Strategy of Nepal <sup>25</sup>	The strategy was designed to meet five specific national goals including improved energy access and energy security with renewables; reduced reliance on fossil fuel imports; efficient use of energy. The strategy also prioritises small-scale renewables as a mainstreamed development approach with incentives to scale the solutions' adoption.

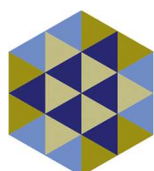
<sup>21</sup> Ministry of State for Planning, National Development and Vision 2030, 2018, [Kenya Vision 2030](#)

<sup>22</sup> Ministry of State for Planning, National Development and Vision 2030, 2018, [The 3rd Medium-term Plan 2018-2022](#)

<sup>23</sup> The Energy and Petroleum Regulatory Authority, 2019, [Kenya Energy Act, 2019](#)

<sup>24</sup> Government of Nepal, National Planning Commission, 2020, [The Fifteenth Plan](#)

<sup>25</sup> Government of Nepal, Water and Energy Commission Secretariat, 2013, [National Energy Strategy of Nepal](#)



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*Table 4: Benchmarks for assessing quality of the building blocks to integrate small-scale energy and development plans as seen in Table 2*

Building block	High	Medium	Low
<b>Democratisation of the process, including local participation</b>	Focus on all the multiple levels of government – federal, state, and local government and their small-scale energy needs.	Focus on the federal and one other level of government (state level).	Focus on the federal level only with consideration of the needs of sub-national government (siloed).
<b>Integration of small-scale clean energy with national development</b>	Reference to specific types of small-scale energy solution and their impacts on the Sustainable Development Goals (SDGs).	Reference to small-scale energy solutions without the specific SDGs they help to deliver.	A blanket reference to small-scale energy solutions without specifying their types and the SDGs they help to deliver.
<b>Holistic mapping of the intersections with different ministries</b>	Specification of responsible ministries and agencies for all sectoral interventions in the national development plans.	Specification of responsible ministries and agencies for some of the sectoral interventions.	No specification of responsible ministries and agencies.
<b>National diagnostics on viability, including local value chains and sources of finance</b>	Detailed analysis of the viability of small-scale energy solutions for deployment at national and sub-national levels.	Analysis of the viability of small-scale energy solutions but lacking information on their feasibility in the domestic context.	Reference to small-scale energy solutions in the body of the plan, but lacking the barriers and opportunities to their implementation.
<b>Effective policy mobilised with adequate institutional capacity</b>	All policies or targets related to small-scale energy solutions are translated into instruments and metrics for actualisation with adequate institutional capacity and leadership.	Some of the policies or targets are translated into instruments, but limited metrics and institutional capacity to implement.	Some of the policies or targets are translated into instruments, but the metrics, institutional capacity, and leadership are lacking.
<b>Promotion of international cooperation</b>	Mobilisation of international stakeholders' participation in the preparation of all sectoral interventions in the national development plan.	Mobilisation of international stakeholders' participation in the preparation of some of the sectoral interventions in the national development plan.	No participation of international stakeholders or partners in the national development planning process.