Annex 1

Scope of Work - LOT 1:
Nigeria Integrated Energy and
COVID-19 Vaccine Distribution Plans

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Contents

1. Context

In 2019, the Federal Government of Nigeria (FGN), through the Rural Electrification Agency (REA), developed a geospatial model to determine the least-cost way of achieving universal electrification by 2024. The model's outcomes were intended to support REA's off-grid strategy and the 2016 Rural Electrification Strategy and Implementation Plan (RESIP), providing a roadmap for how the different elements of the country's rural electrification strategy would come together, and which parts of Nigeria would be electrified using which approaches.

The model brought together a combination of publicly available data sources, including the 2015 High Resolution Settlement Layer (Facebook and Columbia University), the 2014 NMIS electrified schools and primary health centres dataset (UN MDGs), and the night-time light emissions dataset (Facebook). Based on the 2019 geospatial modelling, it was found that Nigeria's electrification rate was approximately 49%. The analysis also revealed that the least-cost way of achieving universal electrification by 2024 would result in 60% of new connections from solar home systems (SHS), 29% from grid extension and 11% of new connections from mini-grids.

The Nigerian geospatial model goes a long way towards being an exemplar of an Integrated Energy Plan, but has four key limitations that SEforALL, in collaboration with the Government of Nigeria, now seeks to address: (1) some of its data and analysis is outdated and incomplete; (2) it is not yet a fully open-access tool that is being used by a range of public and private sector actors; and (3) it does not incorporate clean cooking; and (4) it was developed prior to the COVID-19 pandemic and therefore does not take into account the cooling and energy considerations for a future COVID-19 vaccine roll out plan, especially as it relates to maintaining strong and sustainable cold chains.

By addressing these four limitations, SEforALL and the Government of Nigeria seek to make Nigeria's energy access plan an example of what a national Integrated Energy Plan should be. The development of an updated Integrated Energy Plan is timely from the perspective of the Nigerian government. In light of the severe challenges created by the COVID-19 crisis, in June 2020 the FGN established the Nigeria Economic Sustainability Plan, which envisions 26 priority interventions as part of Nigeria's recovery plan. Two of these interventions would be directly supported by an updated Nigerian Integrated Energy Plan:

- The Solar Power Strategy envisions deploying 5 million solar home systems and mini-grid connections by 2023. A key requirement of this initiative will be to identify locations for solar installations and identify prospective beneficiaries.
- The National LPG Expansion Implementation Plan will promote LPG consumption in Nigeria as a cleaner alternative to traditional cooking fuels such as kerosene, charcoal and wood.

An updated Nigerian Integrated Energy Plan incorporating electrification and clean cooking will play a vital role in assisting the FGN in determining the tactical implementation approach for both the above-mentioned interventions. At the same time, a model for the national cold chain for vaccines will provide critical decision-making support for the FGN in determining the appropriate approach to roll out the COVID-19 vaccine to the most vulnerable populations in Nigeria.

2. Objectives

The overall objective of this assignment is twofold: First, to develop an updated and enhanced national Integrated Energy Plan for Nigeria, building on the work that has already been done in Nigeria. Second, building on updated geospatial datasets and analysis, to build a model to help the FGN understand the tradeoffs associated with different approaches for distributing the COVID-19 vaccine. Specifically, SEforALL seeks an organization or a consortium of organizations to:

1. Deliver the new Integrated Energy Plan by:

    a) Updating the geospatial electrification analysis carried out in 2019 with the latest available data, while at the same time adding new available datasets, where possible. With this updated and new data, the Organization/Consortium shall determine the optimal approach to, and costs associated with, achieving universal electrification in Nigeria.
    b) Incorporating clean cooking into the model to facilitate an integrated view between electrification and clean cooking solutions. By including cooking, the model should serve as central and common framework around which different stakeholders can explore linkages, evaluate trade-offs, compare consequences and coordinate different clean cooking strategies. It is also meant to facilitate enhanced technology/fuel specific decision-making, especially for LPG and electric cooking (e.g. identifying attractive markets or distribution strategies).
    c) Ensuring the new Integrated Energy Plan (electrification and cooking) and its underlying tools and data are well understood by key stakeholders in the public and the private sectors and can inform policy and organizational decision-making. The Organization/Consortium shall also build the capacity of key government stakeholders around the technical aspects of the tools and their future maintenance and use.
    d) Ensuring that Integrated Energy Plan is publicly accessible and usable by external stakeholders through an online, interactive spatial platform. In particular, one of the main aims of an accessible platform is to ensure that private sector actors and investors have access to the Integrated Energy Plan, and that the tools (i.e. the geospatial models) are structured in a way as to be as useful as possible to these actors.

2. Develop a geospatial model to help the FGN evaluate the trade-offs of different approaches for rolling out a national COVID-19 vaccine, considering the constraints and opportunities around cold chain storage and transportation and their associated costs. This will help to ensure that sufficient planning and budgeting is put in place in advance, to help prepare for the actual arrival of the vaccine.

For the Nigerian government, the benefits of this project are apparent: In addition to the delivery of a valuable tool and approach in the Integrated Energy Plan, the output of this project will also be a updating the findings from the 2019 least-cost geospatial analysis. The findings that will be improved will include: (1) the optimal / least-cost technology mix for universal electrification; and (2) the associated costs for achieving universal electrification, including any affordability gaps. In addition to these two dimensions, there will be a new series of analysis and findings on: (3) clean cooking, particularly around the opportunity, feasibility and implications for expanding LPG and electric cooking; and (4) the costs associated with delivering LPG and electric cooking at different scales. The geospatial datasets from the Integrated Energy model will then form the basis for determining the cooling and energy needs and costs

associated with establishing and maintaining cold chain infrastructure for the delivery of a future COVID-19 vaccine.

For the private sector, the benefits will be focused on a significant reduction in some of their development costs. By providing high quality data and information, the private sector can make decisions in a data rich environment, which will lead to higher probability of success. In addition, Nigeria pursuing the development of an Integrated Energy Plan demonstrates a commitment to achieving universal energy access, which also helps excite the private sector more.

Finally, for SEforALL, in addition to helping both the Nigerian government and the private sector, the overarching benefit will be to have 'model' Integrated Energy and COVID-19 Vaccine Distribution Plans that can be replicated and built on to help other countries.

3. Scope of Work

To deliver on the above stated objectives, the selected Organization/Consortium will undertake the following tasks:

Task 1: Review similar and complimentary efforts being carried out by other stakeholders in Nigeria to identify synergies and opportunities to leverage new data, tools, etc

The Organization/Consortium shall first carry out a comprehensive review of other recently completed, ongoing and future activities/projects relevant to this assignment (e.g. GIZ, WRI, RLI, USAID, World Bank). The review should identify where there may be synergies with these efforts, including opportunities to leverage new data/information, tools, relationships, etc. Upon completion of this review, the Organization/Consortium shall, in consultation with SEforALL and the Government of Nigeria, pursue these opportunities and synergies with the goal of leveraging them for the benefit of this assignment.

Task 2: Update the geospatial, integrated electrification plan developed in 2019

The Organization/Consortium shall develop a roadmap for investment and project implementation that: (1) meets Nigeria's electrification targets at the least possible cost and considers any political, social, development or environmental priorities; and (2) estimates the costs of supply. The updated integrated electrification plan should provide, among other things, the associated cost of the investments to be made every year, as well as the costs of managing, operating and maintaining them. The plan should also contain estimates of demand to be served.

Task 2.1: Development of analysis criteria and parameters

The Organization/Consortium shall propose the key parameters that will inform/guide the geospatial, electrification analysis that follows and elaborate how each parameter will be defined and measured. Such parameters include but are not limited to: (1) service quality standards for grid networks and individual systems; (2) target access levels; and (3) temporal issues such as pace of roll-out and stop-gap solutions. The Organization/Consortium shall review and discuss with relevant counterparts as well as concerned ministries and utilities.

Task 2.2: Data gathering

The Organization/Consortium shall collect, compile, clean and aggregate all available data layers relevant for this exercise, with a particular focus on: (1) refreshing inputs with the most current datasets available; and (2) collecting additional data layers.

Refresh inputs with the most current datasets available: This will involve reviewing each of the datasets used in the 2019 analysis and determining if updated data is publicly available. Key data sources that were used initially that may require updating include:

- **Population data.** The original analysis makes use of the High-Resolution Settlement Layer (Columbia University's Earth Institute) to determine the population distribution and density in Nigeria. The data used was from 2016, but the dataset was refreshed in April 2019.
- **Electrified locations and electricity infrastructure.** The 2019 analysis utilized the locations of electrified schools and primary health centers from Nigeria's Millennium Development Goals Management Information System (NMIS). This information is from 2014, and should be refreshed based on more updated surveys, if available. For example, several organizations (e.g. WRI and the World Bank) plan on mapping and auditing health facilities in Nigeria, the results of which should be included in this update, if possible. The 2019 analysis also relies on NASA's night-time light emissions data to determine electrified regions. The analysis currently uses monthly composite data from 2012 to 2016, and this would need to be updated with the most current information.
- **Demographic data.** Estimates of population growth rates and household size data should be rolled forward in the model to the current year using the latest available data sources.
- **Household demand.** In the 2019 analysis, household demand was determined by mapping energy consumption tiers to different settlements. To determine which tier each settlement falls under, appliance prices needed to be gathered at local markets. Given that most appliances are imported, the prices will have changed since 2019 given changes in inflation rates and foreign exchange rates over the past year. Additionally, rural and urban income distribution data (EIU Canback) will need to be updated to 2020 by the selected Organization/Consortium as part of the assignment. This work will require visiting markets (to the extent this is possible given COVID restrictions) or could involve surveying market vendors for pricing of key appliances.
- **Technology costs.** A key input to the 2019 analysis is a detailed breakdown of costs – both CapEx and OpEx – for the different technology options:
    - **Grid:** Cost of cabling/km, transformer cost, reticulation costs, metering costs, generation costs
    - **Solar Home Systems:** Average cost of SHS systems across a range of suppliers
    - **Mini-grids:** Cost of batteries ($/kWh), panels ($/kW), cabling, inverter costs, O&M, etc.

  All of these cost elements are based on 2018/19 and may need to be updated through developer and vendor interviews. Each assumption should be tested and updated so it reflects as close to current reality, as possible. Costs should also be adjusted to take into account projected future cost reductions/changes and the impact of economies of scale and varying penetration rates (of particular technologies) on unit costs.

Collect additional data layers: Since the original geospatial analysis was developed, new data is now potentially available that could enhance the analysis. The Organization/Consortium will work with SEforALL and the Government of Nigeria to understand what new data is now available (both internationally, and locally within Nigeria) and how to access it. While some data may be readily available to SEforALL or the government, some of the data may not be publicly available, and therefore may need

to be purchased and this contingency should be incorporated into the workplan and budget. Examples of variables and datasets that could provide potentially useful new data layers include:

- **Ability-to-pay:** Consumer credit-worthiness information could potentially be used as an indicator for ability-to-pay. To the extent that this data contains settlement-level indicators of creditworthiness, this information could be layered on to the household demand data to produce a more accurate estimate of which settlements belong to which consumption Tiers. The data could also be used to potentially determine the affordability gap of achieving different tiers of access. In addition to consumer creditworthiness, data on cost of finance could be used to assess consumers ability to pay for e.g. connection fees or household and productive use appliances.
- **Energy for productive use:** Information about agricultural value chains and other productive uses (e.g. Commercial & Industrial) can add critical information around current and anticipated future energy demand beyond household energy consumption; this is particularly important for mini-grids.
- **Forecasting demand and consumption patterns:** Detailed settlement-level information on consumption patterns could be useful for determining possible penetration of SHS and adoption of clean cooking solutions. This data would also be useful as an add on to the household demand layer to map settlements to consumption tiers. Furthermore, efforts should be made to better characterize demand heterogeneity and forecast latent and future demand, using on-the-ground surveys, where necessary and feasible.
- **Built environment:** The selected Organization/Consortium should consider adding a data layer covering road coverage and road quality across Nigeria, as well as on mobile phone coverage, location of telecom towers, proximity to financial institutions, and the location of substations and transformers. These will assist SHS / mini-grid companies in determining logistics costs of accessing and monitoring different sites, and will be relevant for LPG transportation modeling, as well.

Once the data is obtained or made accessible, the Organization/Consortium should determine how best to incorporate the data layers into the model. For instance, some data sources may be used to supplement existing data layers for more accurate estimates of certain parameters (i.e. household demand), while other data sources may potentially replace existing data layers in the model.

The Organization/Consortium's proposal should indicate how the Organization/Consortium plans to address technical issues such as: collection of the unavailable data, appropriateness of readily available and applicable data, with respect to validity, accuracy, quality and level of resolution of data.

Task 2.4: Update the electrification analysis carried out in 2019

The Organization/Consortium shall establish a geospatial least-cost electrification planning model that integrates on-grid and off-grid technology choices in a systematic and comprehensive manner. The model shall identify areas for grid densification, grid extension as well as off-grid access delivery modalities to serve as an effective basis for national-level planning with the aim to achieve universal access to electricity.

The model shall detail the location and clustering of demand load centers at a settlement or more detailed level and determine the most cost-effective technological approach to electrify each load center. The analysis shall consider least-cost supply and demand considerations, affordability, technical and economic

viability, environmental and social protection, and the integration of renewable resources, all within a national context. The tool should be user-friendly and facilitate updating of the key input parameters.

With the updated and new data, the Organization/Consortium shall use the model to refresh the geospatial analysis carried out in 2019 and identify the optimal electrification technology mix and pathway for achieving universal access to electricity. The Organization/ Consortium shall evaluate and compare least-cost electrification options for unelectrified loads via central grid (grid extension, densification or intensification), mini-grids (expansion of existing mini-grids or development of new ones) and solar home systems connections. The analysis shall determine technology unit costs for these technologies (fixed and variable costs at different scales and time horizons). The Organization/Consortium shall provide analysis for areas proposed to be connected by off-grid technologies and determine, which will be better served using mini-grids or individual SHSs. The Organization/Consortium shall determine the associated total costs for achieving universal electrification, including any affordability gaps.

Task 2.5: Sensitivity analysis

The Organization/Consortium shall undertake a sensitivity analysis to examine the robustness of the model's key outputs to changes in key input assumptions and policy parameters. This analysis should examine the sensitivity of selected high-level outputs of the options analysis to different technology and supply costs, standards for service, reliability and resilience, timing of roll-out and other policy variables.

The Organization/Consortium shall also discuss preliminary results with the Government of Nigeria and SEforALL for discussion and revision and incorporate feedback into the sensitivity analysis and final electrification options analysis.

Task 3: Integrate clean cooking into the model

The integrated energy plan developed in 2019 only contemplated universal electrification. The plan should be extended to include visualizations and analyses of: (1) the opportunity, feasibility and implications for expanding LPG for cooking, including, for example, prioritizing high potential markets for LPG penetration, and identification of potential LPG distribution locations, and (2) the impact of varying degrees of electric cookstove adoption on electrical demand/consumption, electricity unit costs, transmission and distribution capacity/infrastructure and other relevant system variables.

This initial focus on LPG and electric cooking reflects the Government of Nigeria's priorities with regards to expanding access to modern cooking solutions. While LPG and electric cookstoves will be the primary focus of this work, the Organization/Consortium will also endeavor to obtain additional datasets (i.e. biogas, biomass) that encompass the broader Nigerian cooking landscape, to the extent these are available, such that these data layers could be incorporated into the model at a future time, as data and resources allow.

To carry out this analysis the Organization/Consortium is expected to carry out the following sub-tasks:

Task 3.1: Development of analysis criteria and parameters (scenarios and targets)

The Organization/Consortium shall define, in collaboration with the Government of Sierra Leone and other relevant stakeholders, different scenarios for access to LPG and electric cooking. The scenarios

should be normative based on targets set by the stakeholders involved and use national and/or international standards/tiers for what constitutes “improved”, “clean” and “efficient” cooking access.

Task 3.2: Data collection and processing

The Organization/Consortium shall undertake a review of what geospatial and non-geospatial data is available as it relates to cooking and evaluate the need for primary data collection in consultation with SEforALL and the Government of Nigeria. The Organization/Consortium shall then use the data to establish a baseline of clean cooking access for Nigeria for inclusion in the model. In addition to the datasets captured in the electrification model (e.g. on demographics), the following variables and types of datasets should be explored:

- Datasets that identify populations without clean cooking
    - Access to cooking fuels and technologies: Proportion of population with access and sustained use of clean cooking technologies/fuels
    - Women-led households: Estimated proportion of households in which an adult female is the sole or main income producer and decision-maker
- Datasets that characterize and calculate demand
    - Institutional cooking: Location of schools, universities, health centers and other major institutions that have cooking needs
    - Consumer preference: Consumer needs and preferences for different cooking solutions, by cooking service
- Datasets that help determine clean cooking potential and technologies
    - Forest cover: Extent of forest cover and mapping of protected areas
    - Annual deforestation rate: Annual rate of land removal of a forest or stand of trees into farms, ranches, urban use or other non-forest uses
    - Other biomass sources (non-forest such as e.g. livestock, waste, sugar cane): Current and potential agricultural activity as an indicator of agricultural residues
    - Electric cookstove (ECS) infrastructure: ECS distribution infrastructure and retail points
    - LPG and other biofuel infrastructure: Surface transportation networks, pipeline networks and location of refill points
- Datasets that inform scenario analyses
    - Co-benefits: health, climate and gender equity (including job creation livelihood)
    - Time spent on gathering of biomass fuels and other things such as water

Task 3.3: Development of geospatial clean cooking model

Based on the defined functions and features, the Organization/Consortium shall establish/develop a geospatial model/module for clean cooking for Nigeria that can be integrated, where necessary, with the model developed for electrification.

The model should be developed taking into consideration that SEforALL may, depending on the success and utility of this assignment, replicate this effort with other countries in the future. As such, the Organization/Consortium should develop a ‘generalized’ model that can be easily customized for different country circumstances, needs and priorities.

Task 3.4: Analysis

The Organization/Consortium should examine the lifetime cost of ownership of different clean cooking solutions (i.e. LPG, electric stovetop), as well as the costs associated with deploying different clean cooking solutions (e.g. required infrastructure or supply chains). This would include understanding the cost of the cooking apparatus, replacement timeframes and the cost of energy input (i.e. LPG vs. electricity vs. other fuels). Understanding these elements would require surveying the cost of relevant appliances at local markets in Nigeria and understanding the typical energy consumption profile of the different appliances. Cost modeling should also take into account opportunity costs associated with current fuel consumption (e.g. time spent collecting firewood or the environmental risk of accelerating deforestation).

The Organization/Consortium should then model the target scenarios using the geospatial data and cost-benefit analysis. For this analysis, the Organization/Consortium should consider factors such as proximity to existing LPG depots and distribution points, whether the settlement is a high enough consumption tier to support an electric stove top, etc. The Organization/Consortium should work closely with the Nigerian Ministry of Petroleum Resources to gain access to the necessary custodians of clean cooking information (i.e. where are the distribution warehouses and retail points of sale for LPG, etc.).

Task 4: Building on the updated and new geospatial data layers and analysis from the Integrated Energy model, the Organization/Consortium will develop a model to help the FGN understand and quantify the tradeoffs of a nation-wide, roll-out of a potential COVID-19 vaccine, considering the constraints and opportunities around cold chain storage and transportation and their associated costs

The module should focus on analyzing the cooling requirements necessary to deliver different potential configurations of the COVID-19 vaccine across the cold chain and points-of-care and provide visibility into the tradeoff between maximizing distribution of the vaccine to the vulnerable populations who need it, and the attendant costs of the mix of energy and non-energy cooling solutions necessary to deliver the vaccine. These different COVID-19 vaccine 'scenarios' should be determined in close collaboration with and input from those organizations responsible for, or involved in, broader COVID-19 responses (e.g. NCDC, FMoH, WHO, GAVI). Throughout this analysis, the Organization/Consortium shall consider opportunities to reduce energy demand – through energy efficiency - for cooling across the cold chain.

To do this, the Organization/Consortium will:

- Determine preparedness for vaccine delivery on the basis of the quality and reliability of existing cold storage and cold chain infrastructure.
- Identify the additional cooling needs for temperature-controlled cold chains from importation to warehousing, transport, and point-of-care across vaccine delivery scenarios that adjust for required volumes, cooling requirements, and frequency of delivery.
- Determine the tradeoffs (social, economic and environmental) inherent in the mix of energy and non-energy related cooling solutions necessary to guarantee temperature control for a COVID-19 vaccine from importation to point-of-care across delivery scenarios, including different scenarios on: quantity of vaccines required, frequency of administration, and the temperature windows for vaccine. Identify the contribution of additional energy and non-energy related cooling solutions to a long-term logistics framework for the delivery of regular vaccines, medicine, and blood products; this can include the redeployment of existing (excess) cooling capacity from the agricultural sector.

- Determine the total cooling and energy needs for different delivery scenarios, including different scenarios on: quantity of COVID-19 vaccines required, frequency of administration, the temperature windows for vaccine, and the co-benefits for existing immunization programs.
- Determine the total cooling cost (CapEx and OpEx) associated with different delivery scenarios of a potential COVID-19 vaccine.
- Determine where and how the different delivery scenarios of a potential COVID-19 vaccine could be leveraged to strengthen Nigeria's existing medical cold chain for other vaccines, medicine and blood products while avoiding stranded assets.

To inform this analysis, the Organization/Consortium is expected to find and use a variety of datasets, including, for example:

- Nigeria's geospatial model for least-cost electrification, which includes: (i) population density by community; (ii) current status of electrification per community; (iii) least cost technology for bringing new connections to each community.
- The location of health facilities across Nigeria. USAID's Logistics Management Information System (LMIS), for example, contains the geographic coordinate system data (i.e., latitude and longitude) for more than 30,000 health clinics across Nigeria. In addition, GAVI through its Cold Chain Equipment Optimizations Platform typically has information on the cold storage capabilities of health facilities (type and size of fridge), and their electrification status.
- Road quality. The UK Nigeria Infrastructure Advisory Facility (UKNIAF) program has developed a detailed dataset on road quality across more than 3,000 km of road in Nigeria. This allows a deep understanding of speed and cost of transportation along these roads.
- Vaccine spoilage data for Nigeria, including the causes of spoilage where available.
- The volume and reliability of existing cold chain and cold chain equipment. Understanding the existing cold chain capacity and reliability is crucial to informing the need based on different delivery scenarios.
- Temperature data across cold chain routes to determine points of risk for temperature control of vaccines.
- Populations at risk. Certain data providers, such as Fraym, are using demographic data and health statistics to identify at-risk populations. This data can be useful in identifying where the vaccine should be deployed first.

Multiple government ministries/agencies (including, for example, the Nigeria Centre for Disease Control) and development partners will likely have an interest in the module and execute its results in terms of strengthening cold-chain network. As such, the Organization/Consortium is expected to begin this exercise by consulting a wide range of relevant stakeholders to identify their specific needs, requirements and functionality and to ensure that the module is aligned with broader efforts and strategies for rolling out a COVID-19 vaccine.

Task 5: Ensure the Integrated Energy model (electrification and cooking) is accessible and usable for the public and private sector

In order for the model (electrification and cooking) to provide the most value, the Organization/Consortium needs to ensure that it is structured in such a way that it is both accessible and usable by several parties, particularly private sector companies looking to expand energy access. Significant work needs to focus on the user experience (UX) and the user interface (UI). There are several key design features that need to be considered:

- Users should be able to visualize all relevant and available data layers used as inputs to the analysis (e.g. grid infrastructure existing and planned, population distribution or structures dataset, location of public facilities and major demand centers, resource potential throughout the country, road network, etc.).
- At a minimum, private sector players will need to be able to run model runs using existing datasets in the model (but selecting their own assumptions and parameters), and download results out of the model.
- Several output report templates need to be defined that would be useful for private sector players. At a minimum, these output reports would include: (1) list of communities with associated parameters, such as GPS coordinators, income per capita, cheapest electrification source, etc. and (2) data formats that enable visualization of results.
- The model should use open source data in its logic. Some of these data sets might be updated by their owners/contributors with some frequency. Each of the input datasets will need to be evaluated to determine if future updates to the data will be critical to the model's accuracy, if the data is expected to be updated regularly, and if so, how best to enable the model to consume those future versions of the data. This will require rules to be crafted that guide how open source updates would happen and would be governed.
- These and other features, including for example the need for nested authorities and access levels, will be determined in conjunction with SEforALL and through a series of consultations with external parties.

In order to do this, the following activities will be undertaken:

- **Determine data disclosure limitations and considerations**: The Organization/Consortium should begin by evaluating what limitations or considerations there are to making data publicly available. This includes, for example, identifying at what level of granularity each dataset can be made public (e.g. local government areas vs settlements).
- **Interviews with stakeholders to determine user needs**: The Organization/Consortium should carry out a series of interviews with stakeholders, including SHS and mini-grid companies, as well as clean cooking providers, banks and other financial services providers, and government agencies to determine what features will be most important for them in an online, accessible tool.
- **Evaluation of potential features to offer**: With a full list of potential uses, the cost benefit trade-off of providing specific features, vs. not providing them should be understood. The Organization/Consortium should work with SEforALL to evaluate the advantages and disadvantages of different features and determine the list of elements that will be included.
- **Engage with online service provider**: The Organization/Consortium should, as an integral part of the proposal, develop, or preferably make use of an existing, visualization tool / user interface for the Integrated Energy Plan, and build and embed the features into the tool that can then be installed on a dedicated or cloud server and made available through a publicly accessible website, determined by SEforALL and the Government of Nigeria. The Organization/Consortium may utilize an external service provide for this activity, if necessary. The visualization tool / user interface should be developed so that it can be deployed for different country settings with only minimal additional development.

Task 6: Document, disseminate and transfer data/results

The Organization/Consortium shall prepare a draft final report, documenting in appropriate detail the methodological framework and key assumptions, results of the analysis and recommendations for each of the following: (1) the updated geospatial, electrification plan; (2) the clean cooking analysis; and (3) the cold-chain / COVID analysis. Taking into account comments and feedback received from SEforALL and FGN, the Organization/Consortium shall revise the draft reports and finalize them for delivery. Finally, the Organization/Consortium shall produce, for SEforALL, a separate summary report that highlights lessons learned and best practices, to ensure learnings are carried forward.

In coordination with the government of Nigeria and with support from SEforALL, the Organization/Consortium shall organize several dissemination workshops, where the results and analysis are to be presented. A minimum of four workshops are envisioned: two for the Nigerian Government (one on electrification and cooking and one on COVID-19), one for the off-grid industry and one for the clean cooking sector. The workshops shall take place in-person (with the option of virtual attendance) unless this is deemed unsafe/infeasible due to COVID-19 / travel restrictions, in which case the workshops shall be virtual.

Prior to finalizing the reports and hosting the dissemination workshops, the Organization/Consortium shall 'stress test' its analysis and findings through a series of consultations with relevant stakeholders. These consultations should cover the electrification, cooking and cooling/COVID-19 elements of this assignment.

The Organization/Consortium shall also transfer to the Government of Nigeria the complete and comprehensive set of data used/developed during this assignment. The Organization/Consortium must ensure that these key datasets are shared along with metadata and collection methods. Where appropriate, reference will be made to licensing agreements for specific datasets. The information will be shared in an accessible format agreed upon by the Organization/Consortium, SEforALL, and the Government of Nigeria.

Task 7: Build the capacity of key stakeholders

The Organization/Consortium shall conduct, at a minimum, two (2) trainings during the assignment, aimed at professional staff, to familiarize them with the GIS data layers, the overall capabilities of the models (electrification/cooking and cooling/COVID) and online user interface, the methodology and analysis framework for updating the geospatial analysis in the future and key variables for sensitivity analysis. The Organization/Consortium shall ensure that participants are fully trained to independently operate and extend the model in the future for analytical and decision-making purposes. Activities should include but are not limited to workshops, webinars and a set of online training documents (e.g. how-to guides and tutorials). The Organization/Consortium shall work with SEforALL and the Government of Nigeria to identify which staff and organizations will receive training. The workshops shall take place in-person (with the option of virtual attendance) unless this is deemed unsafe/infeasible due to COVID-19 / travel restrictions, in which case the workshops shall be virtual. The Organization/Consortium will also support SEforALL and the Government of Nigeria in identifying the appropriate institutional and organizational arrangements to manage and maintain the model and its associated datasets and databases.

4. Gender Mainstreaming

The selected Organization/Consortium should make a concerted effort to mainstream gender considerations throughout the design and implementation of this assignment. This includes, for example, identifying or creating appropriate datasets and updating models with gender-disaggregated data on particular populations lacking access to electricity or clean cooking, customer preferences and demand for different cooking appliances, or differentiated outcomes of technology employed for productive uses. The selected Organization/Consortium shall also work to ensure all trainings and stakeholder engagements are gender balanced.