TORs for competitive tendering

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Technical Cooperation with	Project no.:
India	14.2114.8-001.00

Title of the Assignment: Mini-grid study

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List of abbreviations

BMZ	Federal Ministry for Economic Cooperation and Development
CEO	Chief Executive Officer
CLEAN	CLEAN Energy Access Network
DRE	Distributed Renewable Energy
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH
IGEN - Access	Indo German Energy Programme - Access to Energy in Rural Areas (IGEN-Access)
MNRE	Ministry of New and Renewable Energy
NABARD	National Bank for Agriculture and Rural Development
RE	Renewable Energy
S3IDF	Small Scale Sustainable Development Fund
SDG	Sustainable Development Goal
SE4ALL	Sustainable Energy for All
SME	Small and Medium Enterprises
SNA	State Nodal Agencies
SoPs	Standard Operating Procedures
SSCGJ	Skill Council for Green Jobs
TDS	Tax Deducted at Source
USAID	United State Agency for International Development
WP	Work Packages

1. Introduction

This document defines the terms of reference (TORs) for a study on mini-grids under the IGEN-ACCESS project of GIZ. Chapter 2 provides the background of the IGEN-ACCESS project while chapter 3 defines the terms of reference for a competitive tendering. Firms of consultants which would like to bid need to meet all requirments laid out in this document.

2. Project description

A.1 Analysis of problems and potentials (in relation to the technical cooperation measure)

India has emerged as one of the fastest growing economies in the world with an impressive growth rate of 7.9% for the year 2015-16 exceeding expectations and earlier predictions of 7.6%. The current government of India prides itself on being progressive, and claims that India's current economic and social development is the result of systematic policy driven proactive governance.

The government has initiated policies and programmes dedicated towards poor, marginalized strata of the society. Some of the activities initiated by the government for social and economic development are Swatch Bharat Mission (Clean India Mission) for improved quality of life, minimum pension for workers, social security for the common people, universalizing the banking system, rejuvenating the Ganga river, providing 24X7 power to all, connecting India through roads and rail, building affordable housing for the poor, or developing smart cities.

Yet a quarter of India's population lack access to basic electricity. The current government has pledged 24/7 power to all by 2019 and to electrify all unelectrified villages by 2019. Even though electrification through grid expansion is the main focus, the Government of India has also incorporated renewable energy into its strategy with ambitious targets of 175 GW by 2022 to reduce fossil fuel dependence and increase environmental and social benefits.

India's grid infrastructure is ageing and inefficient, the power sector is debt ridden and despite investing billions of rupees in the sector, nearly 225 million people (40million households) lack access to electricity. India is facing an energy gap of enormous magnitude with a growing dependence on fossil fuels. The soaring energy demand is putting a great burden on this finite reserve. The electrification strategy through expansion of central grid has been outpaced by the population growth and industrialization, leaving the significant part of the country without reliable power supply.

Large scale centralized grids take a long time to transform, they are expensive, not flexible and inefficient. Decentralized Renewable Energy (DRE) or Off-grids are an appropriate option to resolve some of the issues mentioned above. Unlike the current Indian central grid, DRE's are smart, efficient and a futuristic option. The DRE systems are far more flexible and efficient as supply and demand are in close proximity. They eliminate the inefficiencies associated with long distance transmission. They can work in isolation or compliment the central grid. DRE can be quickly deployed and they carry the environmental and social advantage of reducing emissions, improving air quality, spurring education, providing access to modern communication and facilitating productive uses for economic benefit.

The cost of renewable energy generation and storage components have plunged and are expected to keep dropping. The solar photovoltaic (PV) prices have reduced by 80% since 2008. The growing renewable energy market along with the realization of affordability has resulted in rise in investment in the sector. An interesting trend has been the concentration in moving away from centralized RE grid. The energy sector which has been dominated by large

utilities is becoming more decentralized. For example in Germany, almost 46% of all renewable energy is now in the hands of households and farmers, and only 12% of renewable assets are owned directly by utilities[1,2]."

Off-grid renewable energy offers an opportunity for new entrepreneurs to invest in the energy market with creative business models which are tailor-made to the needs of the consumers they serve. Off-grid solar has seen a remarkable growth in recent time. According to the World Bank, there are close to 40 companies[3] in the Indian market focusing on solar lanterns and solar home systems. Besides these, there are other smaller entities involved in the solar products at household level. While Rural Energy Enterprises (REEs) have stepped up to address the supply side gap, the sector is still relatively nascent in comparison to the magnitude of the problem. The sector is struggling with challenges like financing, value beyond product design, supply chain, business models, after sales service, distribution networks and customer relationship.

At the world stage there is significant pressure on developing countries like India to move towards cleaner and sustainable growth. India has committed to move towards a climate friendly pathway in the Intended Nationally Determined Contribution (INDC) submitted to the UN in 2015. India's important energy related INDC pledges include:

- Reduce emission intensity by 33% -35% by 2030 from 2005 levels;
- Source 40% of its electricity from non-fossil fuel sources by 2030;

The Government of India faces the challenge of sustaining economic and industrial growth alongside providing affordable and reliable power to its people, while at the same time reducing the countries carbon footprint.

This unmet energy demand and global consensus to move towards clean energy presents a huge business opportunity. Off-grid renewable energy solutions like decentralized renewable energy (DRE) systems and solar home systems (SHS) have a huge potential and an important role to play in providing access to energy to the rural population of India.

A.2 Description of the technical cooperation measure

The Indo-German Energy Programme – Access to Energy in Rural Areas (IGEN-Access) is a bilateral cooperation project carried out by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) and the Indian Ministry of New and Renewable Energy (MNRE).

A.2.1 Objectives and indicators

The objective of IGEN-Access is to improve the sector environment for rural energy enterprises, and strengthen the ability of enterprises to deliver renewable energy solutions to rural communities.

The areas of activities for IGEN-Access are:

Innovation and Entrepreneurship

[1] http://www.irena.org/rethinking/rethinking_fullreport_web.pdf
[2] In addition to these, 14% are with project developers, 13% are with investment banks, 14% with industry and 1% with others
[3] World Bank, 2016. Off-Grid Solar Market Trends Report 2016

This entails working with Rural Energy Enterprises or their networks to enhance their delivery of energy access solutions to rural households. This measure is delivered through training, access to mature and proven technologies, enhancing market intelligence, upgrading logistics and value chains, and business model development. IGEN-Access will facilitate the participation of women as enterprise owners, in particular.

Public support programmes / schemes

The intervention focuses on developing capacities of government agencies to deliver energy related services and supporting relevant institutions in developing and implementing public sector programmes and providing support in effective implementation of energy access solutions.

Access to Finance

This activity entails development of financial products such as loans and lease instruments for rural energy enterprises and consumers. Creating awareness among key stakeholders, particularly from private and public financial institutions is a major measure too.

The programme indicators are:

Outcome Indicators

OC1: 75% of rural enterprises supported by IGEN-Access directly or indirectly confirm that the business conditions (e.g. business models, training programmes, financing, public support programmes, market intelligence) have improved significantly during the programme period.

OC2: 20 rural energy enterprises- six of which are managed by women-which have been trained by programme partners have developed business plans to address 25,000 Households.

OC3: Two financial instrument tailored to the requirements of rural energy enterprises or households has been introduced on a national or state level to allow 10,000 Households access to energy.

OC4: Four national or state level programmes/ regulations (e.g. standards/guidelines) to support access to energy for which development was assisted by IGEN-Access are adopted.

Output Indicators

(OP)A.1: 40 further rural enterprises (of which 12 are managed by women) received technical training and / or business development services from organisations which were supported by the programme.

(OP)A.2: A renewable energy sector network (e.g. CLEAN) offers three services (e.g. trainings, clean cooking forum, access to finance, standards) to sustainably strengthen the sector.

(OP)B.1: Two new business models to use renewable energy for improving access to energy are piloted by energy enterprises (e.g. hybrid model, solar cold storage, solar water pumps).

(OP)C.1: Proposals for four financing instruments tailored to the requirements of rural energy enterprises or households have been presented to financial institutions (e.g. banks, cooperatives, enterprises).

(OP)C.2: Representatives of five different organisations providing financial services (e.g. banks, cooperatives, enterprises) who participated in trainings and awareness events on rural energy finance confirm their increased willingness to fund rural energy enterprises or consumer of energy products.

(OP) D.1: Proposals for the design / implementation of financial and technical guidelines for four national (e.g. on cook stoves) or state level energy access programmes/regulations/standards are available.

(OP)D.2: One action plan for clean cooking energy in India was adopted by the inter-ministerial roundtable.

(OP)E.1: Market intelligences (e.g. market barriers, user requirements) of 3 products or services (e.g. solar water pumps, solar cold storages, energy efficient cook stoves) are prepared and available for enterprises of the sector.

The deliverables achieved by the activity under this tender will be evaluated using (OP) A.2 and (OP) A.1.

A.2.2 Target group(s) and other stakeholders

IGEN-Access will work through enterprises, private sector institutions, corporates, the Central Government, State Nodal Agencies, training institutions, financial institutions and NGOs to improve energy access for and benefit:

- The rural population without access to energy
- Poorest strata of society
- Women

A.2.3 Executing agencies and partner structure

The IGEN-Access programme's implementation agreement is signed between Ministry of New and Renewable Energy (MNRE) and the German Federal Ministry for Economic Cooperation and Development (BMZ). On behalf of BMZ, GIZ is implementing the IGEN-Access programme.

According to the bilateral agreement between the two governments, BMZ will establish and finance the IGEN-Access programme, and based on the implementation agreement between MNRE and GIZ, MNRE will provide corresponding inputs such as:

- Personnel
- Infrastructure
- Logistical support
- Professional support (technical)
- Financial support
- Access to stakeholders
- Facilitate access to financial resources

IGEN-Access is to focus on Uttarakhand, Uttar Pradesh, Bihar, West Bengal and North Eastern Region. The State Nodal Agencies (SNA) of these states are also implementation partners. Other partners are public and private financial institutions, renewable energy enterprises, training providers, Non-Government Organisations and a range of other Government Departments associated with rural development.

A.2.4 Design of the technical cooperation measure

A.2.4.1 Methodological approach and use of instruments

The IGEN-Access programme has been built using the management model “Capacity Works”, developed for GIZ. IGEN-Access programme approach has taken into consideration the five success factors necessary for a fruitful cooperation which are strategy, cooperation, steering structure, processes and learning and innovation.

The programme was developed by GIZ to support the change processes desired by the partner country (India) with respect to access to energy. The programme objectives and results were agreed with MNRE. The strategic plan identifies a range options for capacity development.

The programme used the results model tool to map the agreed objectives. It also provides a better overview of the systemic context in which the IGEN–Access is working. The results model also highlights the project boundaries and the key results (outputs and outcome) and how they are embedded in the overall context.

A stakeholder map was used to provide insights for effectively crafting relations with specific actors for achieving project outputs and outcome.

The decision making process is being managed by a steering committee comprised of decision-makers from the MNRE and senior representatives of GIZ. The steering committee meetings are conducted as part of the overall energy coordination meeting which take place every second/third month. On working level MNRE is updated on programme activities and any other developments concerning the project on a monthly basis. This meeting is also used to seek support and inputs from MNRE.

The IGEN-Access programme approach focuses on processes of cooperation systems for delivering services that are relevant to the sector and directly contribute to the outcomes and outputs of the programme. This is being achieved by defining clear objectives and initiating activities that directly contribute to these objectives. The programme has also incorporated learning processes through capacity development activities at individual, organizational, network and societal level. The programme has a clearly defined communication process in place. These main output processes and learning processes are complemented by support processes and a steering process. The support process include result based monitoring, knowledge management, strategy development and updating, project progress reporting, and internal steering.

Learning and innovation is an integral part of the IGEN-Access programme. To start with, the programme has analysed its predecessor programme, IGEN RE, and incorporated the lessons learned in designing the programme. Every year a strategy workshop is conducted to analyse the programme and employ necessary course correction. Capacity development activities are undertaken at different levels.

Also the Binding Minimum Quality Standards of the GIZ are used to assess the status of the IGEN-Access programme annually. The assessment focuses on eight key aspects using a five level scale. These aspects are: Results Model, Stakeholder Analysis, Steering Structure/Steering Meetings, CD Strategy, Operational Plan, Results Based Monitoring, Implementation Agreement and Cross-cutting issues.

A.2.4.2 Interaction with other development cooperation programmes in the partner country

IGEN-Access is constantly in the process of identifying synergies related to energy enterprise development with other development cooperation programmes within GIZ as well as with other development agencies or partners. In the event any such synergies are identified IGEN-Access will establish communication with the respective organisations to collaborate for a mutually beneficial outcome.

A.2.5 Results and risks

A.2.5.1 Macroeconomic, socio-economic, socio-cultural, political and ecological assessment

In the offer of the IGEN-Access programme, policy markers are defined. They express the level of expectation with regard to the contribution of the project to BMZ's development-policy goals.

The marker system of the BMZ is based on DAC System and uses three levels:

Level 2= Principal Objective; Level 1= Significant Objective and Level 0= not targeted to the objective.

Principal objective means that the programme intends to achieve results directly in this area. Significant objective means that this marker is not decisive for the developmental intervention but anchored in the concept of the project. Both types of the objective should be considered in the conceptualization of the project.

The IGEN-Access programme has two marker with level 2 (LE 2) in the area of Rural Development and Food Security and Climate change mitigation and level 1 in the areas of Socio-Economic Effects, Participative Development and Good Governance, Gender and Protection of Environment and Natural Resources. These are the cross cutting issues (Programme Vorschlag Teil B TZ Modul = Programme offer Part B TC Module, page: 12-13).

a. Rural Development and Food Security (LE - 2)

Rural Development and/or Food Security is a major objective (project objective considering the programme objective) of the intervention and is crucial for its implementation. The improvement of energy access in rural areas contributes to improved agricultural production (solar pumps) as well as to more food processing (e.g. drying and cooling facilities) and more efficient cooking and improved health conditions of women.

b. Socio-Economic Effects (AO – MSA)

The project indirectly addresses the economic potentials in rural areas and contributes to poverty reduction at sectoral level (e.g. through the development of local value chains, productive uses of energy).

c. Participative Development and Good Governance (PD/GG – 1)

The project will indirectly contribute to improvements in the political frameworks and their implementation and thus pays high attention to participation of all actors in the political as well as private sector. Continuous dialogue with selected actors (financial institutions, private entrepreneurs, start-ups, etc.) will be applied in developing such political frameworks/guidelines.

d. Gender (GG – 1)

New business models will pay attention that women get access to training and other capacity development interventions and the implementation of pilot projects will be gender sensitive and effects of the pilot projects will be gender sensitively monitored.

e. Protection of environment and natural resources (UR – 1)

The project advices the government and private institutions to use more clean and renewable energy technologies/sources (e.g. sun, wind, water, biomass) and this will reduce negative effects on the environment (e.g. reduce pollution of air, soil and water through diesel generators for irrigation etc.).

f. Climate Change (KLM – 2)

Significant contribution through pilot projects and replication of viable business models to increased use of renewable energy which contributes to the reduction of GHG emissions (e.g. energy efficient biomass cook stoves, solar water pumps).

These cross cutting issues have to be considered in formulation and specification of the strategic options as well as in developing activities and work packages.

A. 2.5.2 Assessment of the risks

The risk profile of the programme is medium. Some of the risks identified are:

a) The training and educational institutions may not take new topics for supporting entrepreneurs in their portfolio. The entrepreneurs may not make use of the new training offers.
b) Financial institutions may not develop tailor made products attractive for private enterprises.

The project is also expected to strengthen the network with key actors and ministries focused on poverty reduction (Ministry of Rural Development, Ministry of Power) and ensure that the financial instruments to be developed are oriented towards the needs of the stakeholders. General agreement between different ministries and/or stakeholders is challenging.

3. Terms of Reference

According to the INTERNATIONAL ENERGY AGENCY (2017, p. 3) an estimated 225 million people (around 40 million households) in India do not have access to electricity at all. Moreover, many households which are already connected to an electricity grid are suffering from unreliable and low quality (voltage, service time) of electricity provision. Especially in remote and rural areas, villages are often provided electricity through so-called “mini-grids” which use either solar energy, hydro power or biomass (biofuel or biogas) to generate electricity which is then supplied to households and Productive use of Energy (PuE) applications (e.g. mills, weavers).

According to BHUSHAN/KUMARAKANDATH (2016, p. 48) there are 2.359 mini-grids in India in 2016. However, many mini-grids, which are known to IGEN-ACCESS have not been considered by BHUSHAN/KUMARAKANDATH (such as hydro power mini-grids in Uttarakhand). Thus, it can be assumed that the number of existing mini grids in India is much higher. The Ministry of New and Renewable Energy (MNRE) “targets to achieve deployment of at least 10,000 RE based micro and mini-grid projects across the country with a minimum installed RE capacity of 500 MW in next 5 years (taking average size as 50 kW)” (MNRE, 2016, p. 5)4. In a recent announcement, the PRESS INFORMATION BUREAU (PIB) of the government of India states that it will facilitate the electricity supply to the still unelectrified households with INR 16,320 crore (ca. EUR 2,3 million). It is intended that “the States and Union Territories are required to complete the works of household electrification by the 31st of December 2018” (PIB, 2017). This prepones the household electrification target from 2022 to 2018.

<u>Challenges within the RE Off-Grid Sector</u>

The Union and State governments further support the sector with the development and implementation of policies and public support programmes. Also in states which have mini-grid policies in place, state governments have failed to attract large-scale private sector investment in the mini-grid sector. The threat of the arrival of the (government supported) main grid still exists for private investors in the mini grid segment. This would make the mini-grid redundant and therefore makes an investment in mini-grids highly volatile.

It has also been observed that KfW’s 20 million Euro line of credit to the Indian Renewable Energy Development Agency (IREDA) faces challenges in attracting enough private players active in mini grid space.

Based on the experience of IGEN-ACCESS measure many mini-grids are unfortunately either underused or not functional anymore (especially community operated min-grids). For example, out of 24 mini grids for the productive/commercial use of energy and household electrification which run on biodiesel extracted from Jatropha in several districts in the state of Chhatisgarh only 6 are still being operational as was investigated in a study of the IGEN-ACCESS measure. The 6 operational gensets however, were mostly using diesel instead of biodiesel. The study also highlighted that of the initially 90 productive use applications only 31 were left. A 120 KW PV park on the island of Sagar/Sundarban which was financed by MNRE has been idle since the island was connected to the grid.

In the 1990ties many mini hydropower stations were set up in remote hilly regions of Uttarakhand with the financial support of the government. A study by GIZ revealed that many

[4] See Draft National Policy on RE based Mini/Micro grids which was sent by MNRE to stakeholders for information and feedback on 01.06.2016, MNRE (2016): 30/05/2012/NSM, Ministry of New and Renewable Energy, SPV Division on Draft National Policy on RE based Mini/Micro grids, New Delhi/India

of them are either dysfunctional or under-utilized due to several reasons such as technical issues (broken penstocks) or management issues (unprofessional maintenance, poor revenue collection).

Knowledge Gap

Numerous publications on the off-grid sector in India are available. A subset of them focuses on mini-grids. They focus on the analysis of the policy landscape, highlight the challenges for mini-grids (see for example BHUSHAN/KUMARAKANDATH, 2016)5, they look into the financial viability of mini-grids compared to other incumbent energy services (see for example CAMELLO. et al., 2015)6. They address the policy, regulatory, and market infrastructure needed for two sets of electricity providers – ESCOs and the national grid – to co-exist and collaborate to accelerate energy access (LUONG, s.t.). The studies investigate how price fall of components and technological advances, such as mobile payment options and storage technology could lead to a broad transformation of the sector (PWC, 2016). Or they investigate models to finance and operate mini-grids (government models such as village energy committee model, private operator model, or state specific models such as models used in West Bengal or Chattisgarh). As private enterprises only recently entered the mini-grid business arena an inadequate data availability is yet a major challenge to assess mini-grids operated by private players (GNESD, 2014). A recent study financed by KfW highlights potential financial assistance needs of different off-grid technologies which also covered mini-grids (Hahn, 2017).

The above-mentioned studies are mainly based on extensive literature research, qualitative research (mostly interviews with a few and often the same stakeholders) and case studies to supplement and support the statements made in the reports. A comprehensive quantitative study based on empirical data about mini-grids, especially on dormant and non-functional grids has not been performed yet. Some of the statements made in the studies, such as on the financial viability need to be verified in GIZ's view, too.

In the national and international debate the productive/commercial/agricultural use of energy is often mentioned as one of the key factors for the success and sustainability of mini-grids. None of the researched studies did comprehensively attend this issue for Indian mini-grids.

To close this existing knowledge gap a study to investigate the profitability, productivity and financing of mini grids is therefore required.

I. General Terms of Reference for the firm of consultants

The study will constitute the first large scale basic research of the mini-grid sector in India and will especially provide insights in community and privately operated mini-grids (challenges, approaches, financing, profitability, etc.). For this study mini-grids are assumed to provide electricity to multiple households and commercial/productive/agricultural applications. The electricity is generated by any renewable energy (e.g. hydro, wind, solar, biomass)

The firm of consultants will apply three major research methodologies: literature research, qualitative research and quantitative research. Literature research will provide the theoretical

[5] BHUSHAN Chandra, KUMARAKANDATH Aruna (2016): Mini-grids: Electricity for all, Centre for Science and Environment, New Delhi

[6] CAMELLO Stephen D., REICHELSTEIN Stefan J., SAHAO Ashumann, SCHMIDT Tobias S. (2015): Enabling mini-grid development in rural India. Working paper, s.l.

background and will allow the perusal of existing data.Through the quantitative research the systematic, objective and standardised measurement of real and empiric facts will be achieved. Qualitative research techniques shall be used to obtain subjective data which allows to interpret the captured quantitative data and to discover additional phenomena. Data, investigator, and methodology triangulation techniques shall be used to enhance the confidence in the outcome of a research project.

The objective of the study is as follows:

Empirical data on mini-grid solutions in India is analysed.

The indicators to measure the achievement of the objective are as follows:

1. A detailed analysis of mini-grids in India based on empirical data - in particular with respect to the commercial, productive and agricultural usage of mini grids - is available by June 2018.
2. First descriptions of individual or combined German TC/FC support for mini grids are available.
3. First discussions on the potential TC/FC measures with the relevant stakeholders (such as MNRE, CLEAN Network, private operators, village representatives, farmers, etc.) are documented.

The analysis will consist of the following content:

1. A detailed analysis of Indian literature on mini-grids and mini-grid operating models is available which includes a comparison of the Indian situation and operating models with international best practices.
2. Data on all micro and mini-grid operators in India (such as business model, financial and operational data) are compiled in a table.
3. A comprehensive quantitative and qualitative analysis of the mini-grid landscape in India is available (including operational status of mini-grids, operating models used, productive/commercial/agricultural use of energy, financing, profitability).
4. An analysis of productive/commercial/agricultural use of energy applications is available (including income generation, employment generation, sustainability issues such as financial viability)

The firm of consultans is expected to conduct the study in close cooperation with IGEN-ACCESS. The firm of consultancy shall provide a pool of experts to conduct the study. The firm of consultants is in charge of providing advisory services, mission logistics, and quality assurance with timely reporting to GIZ – IGEN Access (as detailed out later).

The structure of all reports under this tender needs prior approval by IGEN-ACCESS. All documents will be composed in English and will have to be perused by a native English speaker. IGEN-ACCESS reserves the right to immediately return documents if grammar, punctuation, or spelling errors are found.

In particular, the the following issues needs to be addressed and investigated:

1. Impact of governance structure on mini-grids
2. Impact of Productive use of Energy (PuE) on mini-grids

3. Impact of technology (e.g. DC versus AC, PV [local, imported], hydro, biogas) on mini-grids
4. Impact of costs (capital, running costs) on mini-grids
5. Impact of subsidy on mini-grids
6. Impact of geography and climate zone on mini-grids
7. Impact of business model and fee structure on mini-grids
8. Impact of availability of main grid on mini-grids
9. Impact of mini-grid size (e.g. village size, pico, micro, mini, small)
10. Impact of involvement of local community in design and implementation of mini-grid
11. Impact of funding agency [donor, government, NGO, private] on mini-grid
12. Impact of political framework (e.g. policies available)
13. Impact of planning, implementation, commissioning approach on mini-grid

Based on the research the firm of consultants is supposed to work out the success criteria of mini-grids.

The firm of consultant is to define measurable criteria to research above mentioned issues. E.g. productive use of energy: sector (textile, metal, agriculture), ownership (private, NGO), political framework: mini-grid policy, content of policy.

All results of the quantitative research shall be further investigated and explained through qualitative research methodologies. The qualitative research should also be used to discover, explore and describe new phenomena. The firm of consultants is also to document all mini-grid relevant observations during the field trips, interviews, etc.

For every mini-grid surveyed a process chart should be developed highlighting and describing the steps taken to plan, implement and commission the mini-grid (e.g. how was the quality control conducted, form of contract, commissioning procedure,O&M).

The firm of consultant will also capture and compile technical data of every mini-grid surveyed

Furthermore, the firm of consultants is to take high-resolution pictures (>1 MB) of every mini-grid surveyed. The pictures should depict challenges and problems observed by or pointed out to the researcher. The firm of consultants is to provide the pictures to IGEN-ACCESS and transfers the rights on the pictures to GIZ (especially the usage of the pictures in any publication by GIZ, BMZ, and MNRE).

It is understood that a mini-grid is a complex system and its success is depending on many criteria. The firm of consultants is to take into consideration this complexity and map it out.

In the technical proposal, the firm of consultants is to indicate any software (e.g. statistical software, data capturing software) used during the research. Especially, the firm of consultants is to use a digital survey software including all relevant survey infrastructure ranging from electronic questionnaire creation, capturing (online and offline), analysis, data validation, survey monitoring, user management, data visualization to data export. All captured data is automatically and promptly to be uploaded (incl. GPS data of survey sites) into a survey system with access rights to GIZ staff.

We expect the bidders to answer the following questions as part of their proposal.

1. What would be your approach and methodology for conducting the study.
2. What data would you capture to address the above mentioned issues. Please provide reasons. How would you make sure the data are available and correct?

3. What are the perceived risks associated with the different tasks under this work package? How does the bidder propose to mitigate these risks? How does the firm of consultants ensures the quality of deliverables (for all processes, indicators and project steps).
4. What type of data analysis methodology/techniques or data visualization techniques will be used by the bidder? Please elaborate the roles and responsibilities of different team members for implementation of your proposal.

In the following tables, further requirements, indicators and activities are defined. Please note that all documents, such as tables, lists, etc. (see also means of verification) needs approval by IGEN-ACCESS.
During the course of the project a planning mission of GIZ will be in India to design a follow up programme to IGEN-ACCESS. The firm of consultants might be requested to be interviewed by the planning mission.

Indicator	Output	Activities	Key Indicators	Means of verification
A detailed analysis of mini-grids in India based on empirical data - in particular with respect to the commercial, productive and agricultural usage of mini grids - is available by June 2018.	Desktop study has been conducted	Develop categories for literature review on mini-grids (e.g. timeframe, topics [challenges, business models, technologies], etc.)	Categories are defined	List of categories
		Compile available literature on Indian mini-grids based on categories	Relevant literature compiled	Reference list and bibliography
		Compile international best-practises and experiences on mini-grids based on categories		
		Conduct evaluative literature review (analyse available literature, synthesize and interpret data, etc.).	Relevant data have been extracted and interpreted, gaps of research have been identified (scoping review), quality of data has been assessed	Data sheets, minutes of meeting, tables, presentations,
		Compare results of research on national literature with international experiences and best practises		
		Propose list of interviewees to evaluate results of analysis	Interviewees compiled	List of interviewees
		Interview relevant stakeholders to evaluate results of literature study	Taped and transcriped interviews are available	Interview reports (incl. transcriptions)
		Present results to IGEN-ACCESS	Presentation held	Minutes of meeting, presentation material
		Develop final report on literature research (incooperating feedback from presentation)	Final document submitted	Final report on literature research

	Population size of mini-grids (no. of mini-grids) in India has been established	Develop matrix (table) for compilation of existing and future (in planning phase) mini-grids in India	Table with criteria is available	Table
		Collect state-wise data from different sources (government, civil society, private sector) through telephonic interviews and literature research	Report on data collection prepared	Data collection report
		Check quality of data and compile data in table (also reduce redundancies)		
		Present table to IGEN-ACCESS	Presentation to IGEN-ACCESS has been conducted	Presentation material, minutes of meeting
		Prepare geographic presentation of mini-grids	Map of mini-grids has been developed	India map of mini-grids
		Prepare final version of table	Final table has been presented	Mini-grid table
	Quantitative research has been prepared	Propose mini-grid categories / classes (e.g. government structure [e.g. community driven, private sector managed], technology [e.g. PV, hydro, hybrid, biogas], system [off-grid, on-grid], objectives [e.g. demonstration, lighting, productive use of energy], etc.). Please base work on categories developed during literature research.	Categories have been presented and discussed with IGEN-ACCESS	List of categories
		Propose sample size for every class. The size of the sample	Sample sizes have been calculated	Sample sizes

		size will be calculated based on confidence level of 95% with a margin of error (confidence interval) of 10%.		
		Review main research issues (see above) and propose modifications. Define research questions.	Revised research questions	Research questions (including reasons)
		Based on main research objectives propose and formulate hypotheses (null, alternative)	Hypotheses have been defined	Definition and description of hypotheses
		Based on available information (known/unknown mean,standard deviation, kind of data) propose statistical methods (e.g. significance tests). For significance tests, consider alpha value of 0.05.	Adequate and justified hypotheses tests have been proposed	Description of proposed significance tests
		Develop draft survey form (questionnaire to capture data, point scale design, language [English/Hindi], control/trap questions, etc.)	Draft survey form has been developed and proposed. Note: the survey form should be designed in a way that the issues mentioned above can be addressed.	Survey form(s)
		Decide on sample size for testing draft survey form and test survey form	Test accomplished, propose modifications on survey form	Test report, minutes of meetings
		Develop final survey form	Survey form developed	Final Survey form(s)
	Qualitative research has been prepared	Propose qualitative research methodologies (e.g. focus	Qualitative research methodologies outlined,	Description of research methodologies

		group, indepth interviews, observations)	justified and proposed to IGEN-ACCESS	
		Work out interview guidelines	Interview guidelines prepared and discussed with IGEN-ACCESS	Interview guidelines
		Propose interviewees / groups for group discussion (geographic distribution, sectoral distribution, etc.)	List of interviewees / groups justified and presented to IGEN-ACCESS	Lst of interviewees / groups
		Test tools and analyse results with respect to tools	Test reports (incl. proposed modifications) prepared	Test report, minutes of meetings
		Revise tools and adapt research approach	Revised tools and approaches	Final versions of tools and approaches
	Enumerators have been trained	Based on research conditions (e.g sample size, budget) calculate and propose number of enumerators and interviewers. Remark: IGEN-ACCESS has based an initial assessment of costs on 200 sites.	Number of interviewer/enumerators proposed and justified	Minutes of meeting
		Select and propose enumerators and interviewer (based on geography, language, culture, etc.)	List of enumerators/interviewers prepared	CVs of enumerators/interviewers and other supporting documents, list of enumerators/interviewers
		Train enumerators and interviewer on tools and approaches (e.g. guidelines, survey form)	All proposed enumerators/interviewers have been trained	Enumerators/interviewers understand survey forms/interview

				guidelines and research methodology Enumerators/interviewers are able to answer questions of interviewees
	Quantitative and qualitative research has been conducted (latest raw data results end of April 2018)	Capture data in all sites (defined in sample size) by end of April, 2018	All data captured and inputed in database	Filled out data capturing forms Tables with data Field trip notes Notes of observations
		Interview all selected interviewees and conduct focus group discussions by end of April, 2018	All interviewees transcriped Information gathered during focus group discussions outlined	Transcribed interviews Field trip notes (e.g. observations) Minutes of meetings
		Develop a short note on first findings (results of a first rough analysis of qualitative and quantitative data) by May 4, 2018	Short note have been submitted to IGEN-ACCESS	Short document of 2-5 pages
		Analyse quantitative data	All statistical computations carried out and results descriped	Computations (print outs)
		Analyse qualitative data	All interviews/focus group discussions analysed and knowledge gathered descripted (also through observations)	Write ups of analysis
		Combine results from qualitative and quantitative research (e.g to explain quantitative results)	Results are presented to IGEN-ACCESS	Presentation material, minutes of meetings

		Develop success criteria for mini-grids	Success criteria are presented to and approved by IGEN-ACCESS	
		Develop and present study report	Draft study report has been developed and submitted to IGEN-ACCESS	Report Minutes of meeting
		Revise study report based on feedback and develop final document	Final report has been submitted	Final report
Description of individual or combined German TC/FC support for mini grids is available.	Discussed description of individual or combined German TC/FC support for mini-grids is available	Gather information from GIZ, KfW and respective or potential partner ministries in India	All necessary stakeholders have been interviewed	Minutes of meeting Transcription of interviews
		Based on information (e.g. support demand, opportunities, study information, strategies of organisations, relevance, realistic to come true) develop at least three options (incl. justifications) for individual or combined German TC/FC support initiatives	At least 3 options have been developed and submitted to IGEN-ACCESS	Option descriptions
		Discuss initiatives with KfW and GIZ	Present options to KfW and GIZ	Presentation Minutes of meeting
		Revise initiatives based on feedback	First discussions on the potential TC/FC measures with the relevant stakeholders (such as MNRE, CLEAN Network, private operators, village representatives, farmers, etc.) are documented.	Minutes of meetings, final document

			Revised options have been submitted	
Print layouts for documents (study report, German TC/FC initiatives) have been approved		Layout documents (study report, support initiatives) based on GIZ regulations and provide draft layouts to IGEN-ACCESS	Draft layouts of all documents are developed	Layout of documents Minutes of meetings
		Revise layouts and provide final layouts of all documents	Final layouts of all documents developed	Final layouts

Monitoring and evaluation

Monitoring and evaluation is an integral part of all GIZ projects. Monitoring provides information on the results that the project activities achieve, thereby allowing to evaluate the strengths and weaknesses of the activities implemented.

The IGEN-Access programme uses a Results-Based Monitoring (RBM) system to continuously review the progress in achieving the objectives of the programme and to take corrective actions where necessary.

For this tender, a project monitoring sheet (PMS) will be developed in consultation with IGEN Access. The format for the PMS and guidance on developing and maintaining it will be provided by GIZ. The consultancy/firm has to update the PMS on a monthly basis and submit to GIZ. The PMS will help provide inputs to the RBM system. Thus, the firm of consultants is to provide evidence how it is going to measure the progress of the project and provide/update the respective data. The firm of consultants is expected to respond to changes flexibly, especially if the project is in danger of straying from the defined results corridor

RBM and PMS are key steering tools in this project.

II. Detailed specifications

General

The consultancy/firm needs to demonstrate following ability through adequate references and documents.

- Provide evidence of permissions to operate in India for international staff seconded or any other proposed collaboration in India
- Provide evidence of at least 10 years of offering and completing similar services in comparable organizations in India (e.g. preparing and conducting surveyes, statistical analysis, research projects of similar nature)
- The average turn over for the firm of consultants in last three financial years should be at least € 450000.
- Demonstrate ability to work in a highly collaborative environment with teams that are subject to time and skill constraints
- Demonstrate ability to manage contracts of this magnitude with reference to financial and administrative functions.
- Provide evidence of knowledge and experience of contexts around decentralized energy sector, especially mini-grids and underserved communities in India
- Prior demonstration on selection and management of key staff members as described below for proposed tasks in various roles of leaderships, advisors, managers etc.
- Evidence of working with a network of national and international research institutes

Flexible remuneration item

This position is supposed to allow for flexible reaction to changing situations and new requirements, if necessary for reaching the objective of the project. EUR 15,000 is to be included for this. Use of this remuneration item has to be approved by the responsible person on GIZ side.

Quality assurance and other requirements

To ensure the quality of the outputs the firm of consultants has to meet the following requirements:

1. Reports or documents pertaining to the project and prepared by the firm of consultants need to be thoroughly verified prior to submission. Sub-quality deliverables would not be accepted; Please note: all documents should be developed either by the researchers or the team leader (see terms of reference for the experts)
2. It is expected that all documents will undergo a final proof read by the team leader
3. All interviews incl. focus group discussions will be recorded and documented, that is transcribed in English;
4. The firm of consultants ensures that IGEN-ACCESS staff is briefed continuously on the progress of the project and informed immediately on any changes whatsoever (e.g. delays);
5. The selected team members need to have sensitivity regarding gender issues and have a sound understanding about India and the Indian culture
6. The firm of consultants has to cross check the work of enumerators and interviewers (random check)
7. All meetings will be documented by the firm of consultants. The minutes of meetings need to be approved by IGEN-ACCESS. The consultant is to proposed a format for steering meeting and minutes.
8. The firm of consultants is not allowed to replace project staff without prior approval by IGEN-ACCESS.
9. All deadlines specified in the terms need to be met

Please note: GIZ may consider to prematurely end the project if the quality requirements are not met.

Timeline

The project period is 6 months and starts iny February/March 2018. The bidders should design their technical and financial bids considering the given timeline.

Deliverables

During the project period, the firm of consultants is expected to provide the following deliverables

1. Updates (conference call or in special cases one to one meeting) on a fortnightly basis on project progress.
2. Inception report with schedule of deliverables as defined in the terms above to be delivered within the first two weeks of the project.
3. Project monitoring sheet (form provided by IGEN-ACCESS) within the first two weeks of the project
4. All reports and documents as defined in the terms above

Programme Steering Structure

The firm of consultant will report to a Technical Expert (to be nominated) from the GIZ - IGEN-Access programme. The firm of consultant is to designate a team lead.

A steering meeting will take place once a month at the GIZ premises in Safdarjung Enclave/Delhi. The steering meetings will be attended by the core personell of the project team (team lead, all researchers). Depending on situation IGEN-ACCESS reserves the right to demand from the consultant that additional personell will attend the meetings (e.g. enumerators, interviewers).

Structure of the proposal

The proposal should contain a very brief company profile followed by a detailed approach and methodology to execute the project. The proposal should also contain the project timeline highlighting milestones and deliverables. Please elaborate the roles and responsibilities of the different team members in the proposal. Qualifications of the organization (information on similar projects) and team qualifications (CVs) should be provided in the annex.

Geographic Locations

The firm of consultants will need to be allowed to operate in India and any international staff seconded will need to have necessary permissions to work in India. Experts should be ready to travel within India, especially to rural areas in India.

Staff requirements

The firm of consultants is expected to provide a pool of experts (national/international). The pool of experts should encompass:

1. Project Management specialist/Team Lead
2. Statistican
3. Researcher and Analyst (quantitative research)
4. Researcher and Analyst (qualitative research)
5. Energy Expert (especially rural energy access and mini-grids)
6. Enumerators and Interviewers
7. Document Layouter
8. Professional Writer (English native speaker)

Human days for national and international consultant

No.	Personnel	No. of days	No. of months
1	Team Leader (International/National)	56	1.9
2	Statistician	10	0.3
3	Researcher (quantitative)	84	2.8
4	Researcher (qualitative)	84	2.8
5	Energy Expert	10	0.3
6	Enumerator/Interviewers	600	20.0
7	Document Layouter	10	0.3
8	Professional writer	10	0.3

III. Terms of Reference for the experts

To achieve the specified objectives, GIZ expects the firm of consultants to assign international/national experts dedicating a total of 28.7 human months (see above) to the project. The identified resources are:

1. Team Leader (international), Operations

Reports to – GIZ (assigned GIZ expert and GIZ IGEN-ACCESS lead)

Core Responsibility	Core Competencies & Requirements
• First point person of contact for the project • Ensure transparency and quality standards • Proof reading of documents • Acts as back stopper for the project on any human resource gap during course of project period • Checks on the fund utilisation and financial planning in consultation with the officer responsible for the commission at GIZ • Coordinates with government departments and other likeminded stakeholders building positive relationship • Develops a detailed action plan for the team members based on the agreed deliverables for the project • Responsible for reports and other reporting compliances as per ToR	• Master's degree in energy or related field and at least ten years of operational experience • Minimum of 10 years of work experience in programme management • Possess personal qualities of integrity, credibility, and commitment to execute mandate • Flexible and able to multitask; can work within an ambiguous, fast-moving environment, while also driving toward clarity and solutions; demonstrated resourcefulness in setting priorities and guiding investment in people and systems • Willingness to travel to rural locations • Knowledge of spoken Hindi in addition to English • Prior work experience in India is desirable

2. Statistican

Reports to – Team Leader

Core Responsibility	Core Competencies & Requirements

• Ensure that data caputuring and analysis meets all standards of good statistical research • Propose statistical research methodologies • Develop hypothesis • Support researcher in developing documents	• Should have higher education degree (minimum Masters) in statistics • Knowledge of statistical analysis software • Should have knowledge of local Indian language and fluency in English (speaking and writing) • Strong communication and inter personal skills including presentation skills • Minimum of 5 years of work experience in related fields

3. Researcher (qualitative/quantitative research)

Reports to – Team Leader

Core Responsibility	Core Competencies & Requirements
• Preparing overall research • Ensure that data capturing and analysis meets all standards of good statistical research • Propose statistical research methodologies • Develop hypothesis • Manage enumerators / interviewers • Cross check enumerators / interviewers • Develop all documents (reports, tables, lists, minutes of meetings, etc.) • Preparing and conducting focus group discussions • Conducting interviews with main stakeholders • Literature research	• Should have higher education degree (minimum Masters) in energy, statistics • Knowledge of statistical analysis software • Experience in managing team of enumerators/interviewees • Should have knowledge of local Indian language and fluency in English (speaking and writing) • Strong communication and inter personal skills including presentation skills • Minimum of 10 years of work experience in related fields (quantitative/qualitative research) • Proven experience in conducting focus group discussions

4. Energy expert

Reports to – Team Leader

Core Responsibility	Core Competencies & Requirements

• Support team in energy related/mini-grid related questions (especially providing background information for the development of questionnaires, surveys, etc.) • Develop hypothesis • Support researcher in developing documents	• Should have higher education degree (minimum Masters) in energy related subjects • Experience in mini-grid sector in India (planning and managing mini-grids) • Should have knowledge of local Indian language and fluency in English (speaking and writing) • Strong communication and inter personal skills including presentation skills • Minimum of 10 years of work experience in related fields (quantitative/qualitative research)

5. Enumerators/Interviewers

Reports to – Team Leader or Researcher

Core Responsibility	Core Competencies & Requirements
• Conducting interviews with households, village level entrepreneurs using energy, and farmers • Capturing of data • Entering data in database • Transcribe interviews (in English)	• 5 years experience in capturing data and/or conducting interviews • Should have knowledge of local Indian language and fluency in English (speaking and writing) • Strong communication and inter personal skills

6. Document Layouter

Reports to – Team Leader or Researcher

Core Responsibility	Core Competencies & Requirement
• Layout of documents	• Should have higher education degree (minimum Bachelor) in design/layout related subjects (e.g. graphic designer) • 5 years experience in laying out studies/reports/etc. • Fluency in English (speaking and writing)

7. Professional writer

Reports to – Team Leader or Researcher

Core Responsibility	Core Competencies & Requirement
• Proof reading of documents (style, grammar, etc.)	• Should have higher education degree (minimum Master) in English/Journalism/related fields • 5 years experience in proof reading/journalism • English native speaker

The firm of consultants may choose to subcontract the no. 5, 6, and/or 7 in case the required competencies are not available within the organisation.

IV. Specification of inputs

- Concrete tasks and assignment periods in the different thematic areas specified by GIZ through TOR. Before the concrete assignment, the consultancy/firm will develop an implementation proposal / work plan (assigned experts with CV, foreseen tasks, length of assignment (number of human-days in the country of residence) for discussion with the GIZ project manager and for final written approval by GIZ.
- The proposal shall clearly describe how the competencies of the individual experts complement each other to ensure that all required qualification are covered.
- The proposed experts have to be available from the start date of the contract.
- Reporting is expected as per terms above. Special reports can furthermore be required upon request by GIZ. The assessment of impacts of implemented activities shall be a key feature of all reports provided to GIZ.
- All written outputs of the assignment are to be submitted to GIZ as Microsoft Word and pdf documents. Before any project-related information is to be published or contacts with the media are to be established, these must be coordinated with GIZ.