



King Abdullah City of Atomic & Renewable Energy

Request for Information

Microgrid Feasibility Assessment Project

(TL-2018-05-05)

25 September, 2017

INTRODUCTION AND BACKGROUND

King Abdullah City of Atomic & Renewable Energy (KACARE) is seeking expressions of interest, technical inputs and project development ideas from organizations that may be interested in participating in a future Request for Proposals (RFP). The resulting RFP will relate to demonstration projects on the use of microgrids for integrated energy generation, energy storage and thermal solutions.

KACARE will convene an industry-focused workshop on this topic in mid-November and anticipates releasing the RFP in January 2018. KACARE will support successful RFP projects through its cost-sharing program.

Potential locations for microgrids may include: isolated or remote communities; retail premises, off-grid communities or business premises; campuses, such as hospitals or education institutes; and groups of commercial or industrial premises. For the purpose of this RFI, community microgrids are defined as multi-user microgrids that are supported by a local community, business users, utilities, and building or site owners.

PROJECT OVERVIEW

KACARE seeks to accelerate the development of community microgrids, with integrated Renewable Energy power sources, throughout Saudi Arabia. The motivations for this project include increasing the resilience of electricity supply, lowering future energy costs, and reducing carbon emissions caused by the dependence on diesel generation.

Isolated areas in Saudi Arabia (e.g. villages, mountainous or desert areas, and islands) have high electricity generation costs, due to the special challenges posed by their remoteness, difficult access, harsh climate and low population density. Electricity for lighting, heating & cooling, and desalination in those areas is generally delivered by:

- The national electricity and water grids, which are expensive (or not economically viable) to extend to those areas, and difficult and costly to maintain.
- Diesel-fueled power plants which have high costs of energy production and give rise to significant secondary costs (installation, operation & maintenance, service logistics and fuel transport), and increased CO2 emissions.

Many remote areas would benefit from installing renewable energy generation capacity but integrated solutions are needed to ensure that the investment in isolated energy systems is resilient and reduces the dependence on fossil fuels. Therefore microgrid solutions should take account of intermittency of power generation, energy storage, district cooling, and small-scale water desalination and distribution.

In addition, microgrid solutions are also applicable even in the major urban areas of Saudi Arabia. Due to the fast-growing demand for electricity, substations supplying new developments are often sized inadequately to support the peak loads, so the site developers must take some energy management measures to supplement generation or shift demand, or both, to stay within the limits of the power supplied by the grid. Examples of these strategies can be found in housing developments, shopping

malls, and industrial parks throughout the Kingdom. Microgrid solutions for these use cases will benefit developers and building/facility owners as well as the national electricity company by providing well-managed, localized energy generation and demand response to the national grid interface.

RFI REQUIREMENTS

Eligible Projects

KACARE is seeking input from leading firms in the microgrid sector into the design of an RFP for future projects which:

- Are located in the Kingdom of Saudi Arabia and will provide exemplars of Saudi Arabia's commitment to clean energy
- Are community, multi-user microgrids or single-owner, or campus-style microgrids
- Are residential or business users
- Encompass public or private critical facilities including but not limited to schools, hospitals, airports, and commercial or industrial premises.
- Demonstrate the integration of technologies such as combined heat & power, renewable energy, electric or thermal storage, demand management and other relevant technologies
- Will attract the support of the relevant Utility companies
- Are capable of attracting third-party investment
- Support the electricity distribution system by: addressing capacity concerns; providing a black start capability, facilitating renewables integration or providing other services that are meaningful to local utilities
- Can be delivered by the responding organization alone, or as a member of a consortium

Proposed projects may be of any size and configuration while meeting the broad definition of microgrids. Projects must demonstrate technically significant and innovative energy system integration. The benefits of the proposed microgrid implementation must be clearly identified and the integration of renewable energy sources in the system design is a fundamental requirement.

In a future microgrid implementation, projects and solution providers should be capable of:

- Partnering with Saudi organizations and stakeholders and engaging local suppliers across the value chain in the delivery and maintenance of the microgrid
- Forming a project consortium that includes Saudi academic institutions
- Implementing a technology localization program in Saudi Arabia
- Demonstrating the added value of integrated energy generation, demand response, and storage solutions in terms of economics, technical capability and environmental benefits
- Demonstrating a successful operation for a cumulated duration of at least two years

Additional Objectives:

- Demonstrating the advantages of innovative core technologies (hardware or software) and including but not limited to monitoring, control, diagnostics, lifetime estimation and Balance-of-Plant components
- Demonstrating cost-efficient solutions to the community and to end-users
- Overcoming service and maintenance challenges through a combination of automation, and effective use of local labor
- Online monitoring of operating conditions, load demands and system output. Providing data on usage, efficiency, reliability and the overall efficiency of the system during the testing period
- Optimizing power electronics to guarantee a robust integration of renewable energy sources with the microgrid

Participating in the RFI

Respondents may include microgrid project developers, technology vendors, control system and software vendors, financial institutions or lending partners, research institutions, nonprofits and other relevant organizations. Respondents may be potential lead bidders or supporting team members in a future project. KACARE is particularly interested in receiving information from consortiums.

Requested Information

Please limit the RFI response to a maximum of five pages and address each of the following headings:

1. Essential Information
 - a. Organization name
 - b. Primary point of contact
 - c. Contact information (e-mail, phone and address)
 - d. Company website
2. Describe your business, product or service and your company's key capabilities
 - a. For example: Utility, project developer, systems integrator, generation, control/EMS/SCADA, storage and management, switching/protection, modeling/simulation, financier.
 - b. If you have more than one product or service, please indicate this
3. Experience in delivering projects (other than microgrids) in Saudi Arabia and/or MENA region
4. Describe your current experience with microgrids, including feasibility studies, design and implementation
 - a. Location(s)
 - b. Scope and type: (for example single-user versus multi-user)
 - c. Mix of fossil-fueled and renewable energy generation sources
 - d. Experience with integrating storage
 - e. Experience with integrating space cooling (district cooling)
 - f. Engagement with utilities

5. Describe your role in previous microgrid projects and the role you would ideally take on a future project in Saudi Arabia
6. Describe any potential microgrid projects that you have identified in Saudi Arabia and the stage of development. If none, describe how you would identify potential projects and partners.
7. Indicative cost of any proposed projects (this is not binding and is for information only)
8. Describe other entities or specific organizations that you will work with on this RFI
9. Describe any policy or funding enablers that might help accelerate the adoption of microgrids in Saudi Arabia
10. Suggestions, comments or questions about other resources that would be helpful to you

Collaboration

Given the potential range of technologies involved in microgrid projects, KACARE envisages that bidders at the RFP stage will form consortia which include technology developers, EPC, suppliers for Balance-of-Plant components, and research-performing organizations or academic institutes. International collaboration will be encouraged and the transfer of technology, IP and know-how to Saudi companies will be an essential part of a future RFP.

RFI Timeline

The RFI is intended as a precursor to an RFP. Upon receiving and analyzing the responses KACARE will develop the RFP which will be issued to selected organizations.

The tentative schedule is as follows:

Activity	Date
Release the RFI	25 September, 2017
Responses due	29 October, 2017
Engagement with responders and response analysis completed	20 November, 2017 (to be confirmed)
RFP release	4 January, 2018

The dates above are estimates and may be subject to change.

How to Respond to this RFI

Please submit an electronic file of your RFI response by 15:00 Saudi Arabia time on 29 October, 2017 to the RFI Coordinator listed below:

Subject: Microgrid RFI (TL-2018-05-05)

To: Abdulaziz Al Shehri (abdulaziz.shehri@energy.gov.sa)

Written questions: All questions relating to this RFP should be submitted to the above e-mail address no later than 29 October, 2017.

No Obligation

This RFI does not (a) commit KACARE to issue a Request for Proposal or (b) to award any funds or pay any costs incurred in preparing a response, or (c) to procure or contract any services or products. KACARE will at its sole discretion, determine what, if any, next steps may be taken. KACARE reserves the right to cancel or modify this RFI in part or in its entirety at any time.

Notice of Public Disclosure

As a public entity, KACARE is subject to Saudi law and therefore any documentary material, data or other information received by KACARE from a respondent is a public record subject to disclosure. In responding to this RFI, please do not include any sensitive information, or any information or materials that are not requested.

Cost-Sharing Projects

Many KACARE RFPs are cost-sharing projects. This is the mechanism by which the cost and risk of innovative projects are shared between KACARE and the bidder or consortium. Generally up to 50% of the project's costs may be borne by K·A·CARE, and up to a maximum financial amount. The total budget of a project will therefore be the amount contributed by KACARE plus the amount contributed by the bidder or consortium.

About KACARE

National Context

The development and deployment of Renewable Energy in Saudi Arabia is a national priority in order to reduce the domestic dependence on dwindling oil reserves.

KACARE Objectives

Under Saudi Arabia's the National Transformation Program (NTP) KACARE has been designated the lead agency to encourage Saudi companies to:

- Acquire expertise in high-potential renewable energy technologies
- Localize and commercialize renewable energy technologies for the Saudi market
- Enable the wider deployment of renewable energy technologies, products and services nationally and in the region.