Renewable Energy Research Summary Report
November 2021

Overview

As energy needs continue to increase in the country with only two percent coming from hydroelectricity plants (Annual Ministry Report, 2018) , fossil fuel-based sources are not able to meet the demand and continue to add pressure to the climate in Iraq[1]. In addition to the long-term environmental effect, the existing infrastructure of the electricity sector in Iraq can only meet 50% of the market needs of electricity (Iraqi electricity sector Overview). A private electric generator has become the primary power source for most Iraqi families (approximately every household is paying 100 USD or more per month for the private generators). While in rural areas, it becomes more expensive for farmers as they need to buy their own generators and the resources to run them. Furthermore, the cost of electricity is considered one of the main factors in the increasing costs of production across all the economic sectors in Iraq.

Iraq Response Innovation Lab (IRIL) launched a study to explore potentials of renewable energy sources in Iraq especially in the light of their experience with using solar energy for the incubated agribusiness projects in 2021 and the challenges that accompanied that.

In summary, our research demonstrated several opportunities for the development in the field of renewable energy in Iraq:

- The most feasible renewable energy sources in Iraq are solar and biogas.
- There is opportunity to launch a community focused management model that will allow those in rural Iraq to play a part in developing and benefiting from renewable energy.
- There is opportunity to directly impact the lives at the individual level, support small businesses to be part of creating sustainable change for communities, and at a more macro-level build our advocacy expertise in this area.

The research highlighted the promising opportunities in this field as well as its challenges. Summarized briefly, the challenges are:

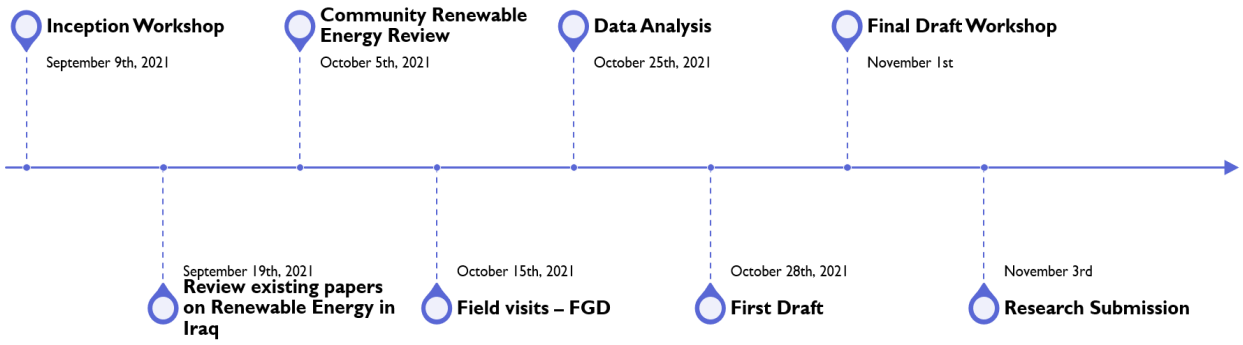
- Lack of governmental support and regulations, where the Iraqi government has not put adequate policies and rules to encourage the implementation of renewable energy, where most of the effort has been done by the private sector.
- Lack of awareness, as people do not trust that the renewable energy solution is a secure source of energy that can replace the conventional ones, as well as general ignorance about the negative impact of fossil fuel on the environment.
- Lack of quality and expertise, in which the quality of the products does not meet the appropriate technical standards that suit Iraq's harsh environment.
- The high initial cost of switching to renewable energy. This is due to the lack of funding mechanisms for energy produced by renewable energy solutions as opposed to the energy produced by fossil fuel, which has received good amounts of funding. The lack of market competitors also plays a part in raising the prices.
- Lack of coordination among parties between the following parties: manufacturers and companies, authorities, researchers, and standard organizations. The loss of communication among them scatters efforts made by any of them and has a bad influence on the renewable energy production process.

[1] Nation, United. 2020. United Nation Iraq. September 30. Accessed September 05, 2021. Ref Link

Despite these challenges, we believe that there is high opportunity in the sector of renewable energy, and a successful pilot is needed to challenge the current status quo and to create a ripple effect that would renewable energy to be a reasonable alternative to fossil fuel-produced energy.

Process & Timeline:

The research was launched in September and throughout the two months, key informants were interviewed, data was collected from renewable energy experts and businesses globally, and the viability of different types of renewable energy sources were examined to produce actionable project ideas that can be applied within the context of Iraq.



Timeline

Main Findings:

The data collected showed us that the best sources of renewable energy to pursue are:

- Solar energy
- Biogas from biomass

Wind Power and hydroelectric power were not considered to be a priority due to the high investment required for them and their volatility. Wind Energy has an optimum speed that allows it to be most productive, and this speed is available in one stretch of land and within specific timeframes that do not cover the whole year. As for hydroelectric power, with the looming shadow of drought on the horizon, building assets and plans around water do not seem sustainable.

Solar Energy on the other hand is the obvious renewable energy source in Iraq. According to research conducted in 2010 Iraq has a net of solar radiation that extends from south to north with higher radiation rates in southern and middle cities. [2]Cities in the west (Anbar) have 8 months of sunshine duration which makes it the most promising place to draw all photovoltaic and solar concentrated power. This was tested in our barley sprouting unit “Al Rabye Al Daiem” which is currently established in Anbar through the agribusiness incubator. Even though the initial investment was relatively high reaching 12K USD it helped the unit save up to 450 USD per month. This significantly reduced the operational cost and drove down the production cost from 0.6 USD/kg to 0.007 USD/kg making it extremely cost-efficient in the long run.

Biomass being an unexplored yet highly promising source of energy in the country can also be utilized to produce the renewable energy biogas. Through the interaction between microorganisms and organic wastes such as manure, sewage, agricultural by-products, and discarded food biogas can be produced and utilized through engines. This alternative energy resource can be utilized specifically in rural areas with high concentrations of cattle. With relatively cheap materials and easy assembly, biomass can be considered one of the biggest potential energy sources that are yet to be

[2] Abdul-Wahid SN, Hassan AM. 2010. "Calculation and application of net solar radiation in Iraq." *J Al-Qasisiyah Pure Sci* 1-30.

explored in the country. Rural areas are also facing a challenge of lack of services and governmental support, and this causes many core issues in those communities, like lack of water and electricity.

In addition to the nature of Renewable Energy resources, we also explored how innovation can take part in the management aspect of energy production in Iraq. With energy production mostly being monopolized by the government that most of the population renders slow and irresponsive especially in the face of growing demand and shortage, an alternative method of management is also necessary to explore. This introduces the concept of Community Renewable Energy in which it is member of the community play the main role in initiating, developing, operating, and benefiting from renewable energy development. It can be varied in terms of technology, sizes, structure, governance, and funding options. This type of management has various examples within Europe, and the UK. With awareness, proper planning, coordination, and motivation community management can find its way in Iraq. As more climate-aware populations exist in specific urban areas and various NGO actors operating in rural areas, a trigger can be made to pilot this model of management for the first time in Iraq.

Opportunities and Way Forward:

In the light of the data presented, innovative pilots should be focused on Solar Energy and Biogas in Iraq through community management of these resources. We are seeking to utilize community management as it as an innovative approach to operate. In addition to that community management further reinforces the role of the community and in building the capacity of its members without relying on the governments or other external actors. This is facilitated two approaches:

1. **Micro interventions that focus on specific communities and individuals. This could be achieved through the following approaches:**

1.1. Creation and launching of a biogas station (biodigester system) through a community-based management approach. The station will be hosted in a specific neighborhood and its residence will receive the needed capacity building to operate and maintain the station under the supervision of a local NGO.

- Stationed in rural areas (within either Kirkuk/ Salahaldeen/ Anbar based on the livestock size in those areas)
- Depending on the population of the selected community, the number of units will be six units, providing a source of energy to 15 households, and six small scale projects (each unit will be associated with income-generating activates such as dairy production, organic fertilizer production, food processing, and other agriculture-related activities)

The estimated budget for this intervention will be 200K USD (including the income-generating activities)
At the end of the pilot project period, IRIL will develop a lesson learned based on the following questions:

- Can the biogas stations be locally produced according to the sufficient quality of the global standard
- Will the community be able to use this solution to cover their energy needs
- What is the best-fit business model that can ensure the sustainability of the production (type of enterprise, operational model, and ownership modality)
- How the farmers can integrate income generating activities with this solution (organic fertilizer production, dairy products, food processing, and other activities)
- How Oxfam can benefit from this experience to improve the quality of livelihoods programing (e.g., expand this experience to different communities, enhance the quality of the applied durable solutions approach, and others)

1.2 Launching a Renewable Energy Incubation with a focus around Solar Energy.

- The themes of the incubation will focus on innovative approaches that will develop solar energy solutions (Training, ICT Solutions, Supply chain interventions)
- The incubator's purpose will be to support youth in establishing and launching their innovative micro business within the Renewable Energy Sector

- Depending on the complexity of the approach, a seed funding of 20K- 30K USD will be provided per innovation.
- Due to the technical complexity of the sector of Renewable energy and based on previous agribusiness experience, seed funding support will be given in five projects only
- The estimated total budget for this intervention will be 250K USD

Based on the previous agribusiness experience, we anticipate the launch of 5 established businesses that would provide innovative solutions around Solar Energy use. This can range from localizing some parts of the supply chain, to utilizing solar power to power specific tools, to many other possibilities.

1.3 Launching a parallel campaign around innovation in Renewable Energy to raise awareness about the potentials of Renewable energy and to coordinate with experts in the field.

2. **Macro interventions to include more coordinated work with government, universities, research facilities, and other stakeholders such as:**
    - Increasing government engagement in the field of renewable energy
    - Building the capacity of quality assurance for energy
    - Establishing the “Iraq Association of RE” to regulate the work of companies in the field of Renewable Energy to build reliability
    - Developing the technical capacity to engineers in cooperation with public universities in Iraq
    - Increasing awareness among people of different ages and backgrounds

As Iraq Response Innovation Lab, we believe in the bottom-up approach and we believe that while macro-level interventions are important, it is micro-level, people-led interventions that drive change in the country.