Renewable Energy Market Assessment

in Nineveh Governorate, Iraq

July 2020

TABLE OF CONTENTS

1 INTRODUCTION

According to the National Aeronautics and Space Administration (NASA) of the United States, "Scientific evidence for warming of the climate system is unequivocal." The current warming trend of the climate has a 95 percent probability directly linking human activity as its primary cause, most notably in the form of polluting greenhouse gasses. Climate change, and its numerous effects on human health and the health of the planet, has become one of the world's largest existential threats of our lifetime. Humanitarian aid programmes and government agencies have increasingly become cognisant of climate change as a security threat, especially in vulnerable contexts such poverty-stricken, conflict-stricken, or reconstructing areas.

In Iraq, People in Need (PIN) is working to support livelihoods as people struggle to rebuild their lives upon a fragile social, economic, and political foundation after years of conflict. In doing so, PIN's work is forward-focused; sensitive to the added layer of difficulties climate change will have on society, and looking to incorporate a larger aspect of sustainability in our activities in the region. From education to work placements to infrastructure rehabilitation, viable opportunities for beneficiaries should have a sense of longevity and sustainability – renewable energy could be a cross-cutting factor in achieving this goal.

For the purpose of better informing the design of future interventions, assisting people in the most needed, sustainable way possible, this assessment surveys a target population in the Nineveh governorates of northern Iraq on current energy needs and how renewable energy could potentially fill in any gaps.

What is renewable energy?

Renewable energy is energy produced from sources that do not deplete or can be replenished within a human's lifetime. The most common examples include wind, solar, geothermal, biomass, and hydropower.

What is global warming?

Human activity is overloading our atmosphere with carbon dioxide and other global warming emissions. These gases act like a blanket, trapping heat. The result is a web of significant and harmful impacts, from stronger, more frequent storms, to drought, sea-level rise, and extinction. For example, in the United States, about 29% of global warming emissions come from the electricity sector. Most of those emissions come from fossil fuels like coal and natural gas.

What is CO2e?

Carbon dioxide (CO2) is the most prevalent greenhouse gas, but other air pollutants—such as methane—also cause global warming. Different energy sources produce different amounts of these pollutants. To make comparisons easier, we use a carbon dioxide equivalent, or CO2e—the amount of carbon dioxide required to produce an equivalent amount of warming.
In contrast, most renewable energy sources produce little to no global warming emissions. Even when including "life cycle" emissions of clean energy (i.e., the emissions from each stage of a technology's life—manufacturing, installation, operation, decommissioning), the global warming emissions associated with renewable energy are minimal.

Impact on public health

The air and water pollution emitted by coal and natural gas plants are linked with breathing problems, neurological damage, heart attacks, cancer, premature death, and a host of other serious problems. The pollution affects everyone: one Harvard University study estimated the life cycle costs and public health effects of coal to be an estimated $74.6 billion every year. That's equivalent to 4.36 cents per kilowatt-hour of electricity produced—about one-third of the average electricity rate for a typical US home.

2 METHODOLOGY

Using a survey administered via smartphone, with data recorded via Kobo Toolbox, PIN conducted data collection from the 22nd to 24th of June 2020.

Surveys were collected from randomly selected households, the percentage of female household interviewees was 10% and male 90%.

80 surveys were conducted, the interviewees were from Nineveh governorate in the following areas:

Govenorate	District	Sub-District	Area	# Households surveyed
Nineveh	Hamdaniya	Bartella	Bartella center	20
			Shaqooli village	12
	Mosul	Bashiqa	Bashiqa center	12
			Omar Qapchi village	12
	Telkaif	Telkaif	Batnaya village	2
			Sada Wa Bawiza village	10
			Telkaif center	12
Grand Total				80

Additionally, a survey was performed with the following groups of local government offices, farmers, and supplier of power systems:

Group	Number surveyed
Water Distribution Office	3
Irrigation Office	3
Health Office	3
Farmers	14
Power Systems Suppliers	4

Data collection, analysis and reporting were subsequently carried out by the PIN MEAL independent unit.

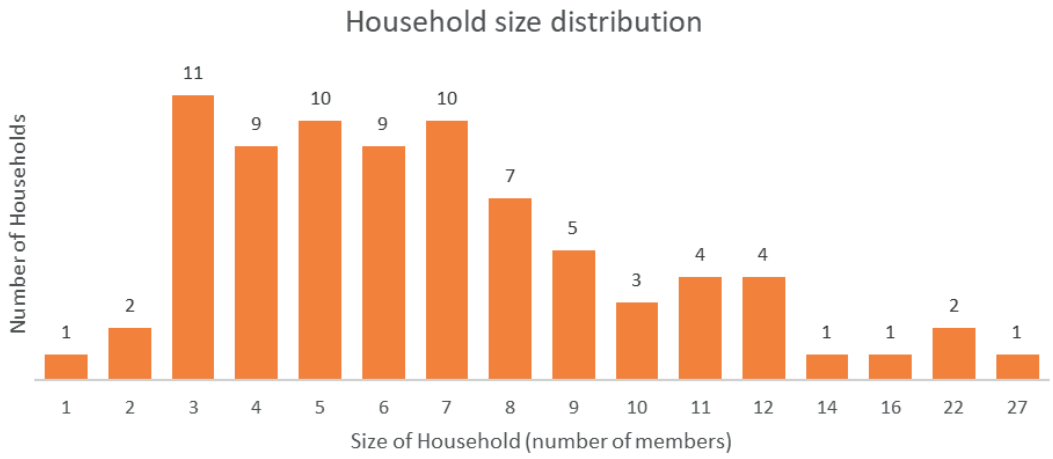
The assessment was performed to know people's sources of energy and electricity, in daily use and cooking, and how much the public is informed about the usage of renewable energy.

3. FINDINGS

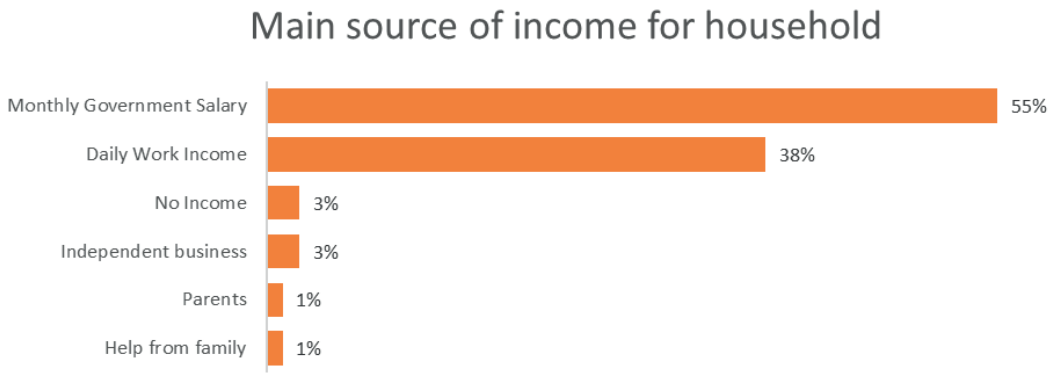
In this section, the first part of the findings of the assessed market**s**t will be presented and elaborated.

3.1. Households

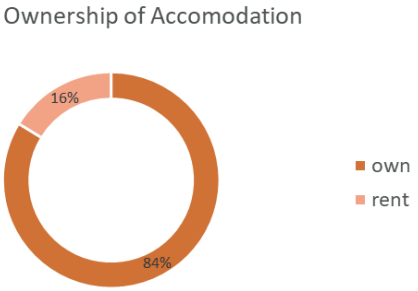
Household Size: Around 75% of the surveyed families had a household size of 3 to 9 members, in an average 6 per HH. The surveyed 80 households had the following size distribution:



Income: around 69% of surveyed families said they have a stable source of income, while 31% said they depend on unstable, day by day, sources of income.
Regarding the type of income, 55% of families stated having a government income (employment or retirement salary), 38% stated having a daily work income, and other sources of income can be seen in the following figure:



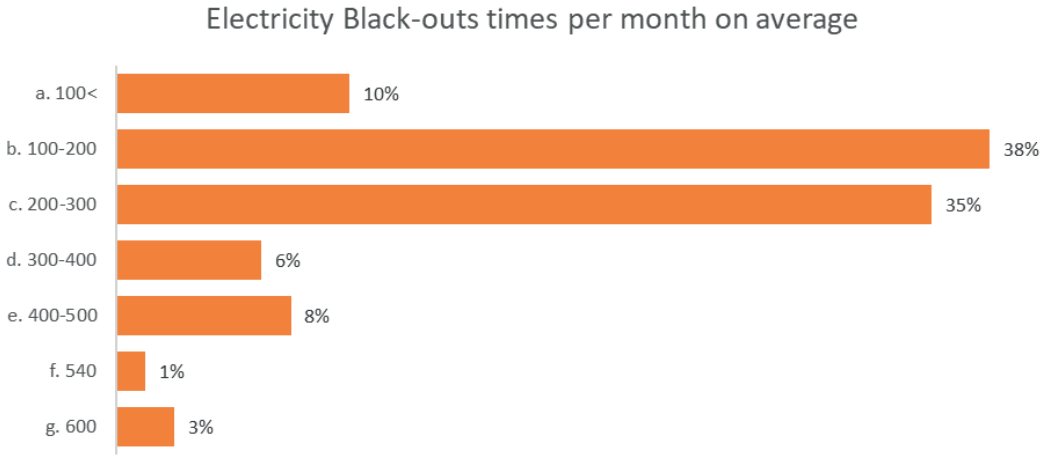
Accommodation: 84% of the surveyed households said they own their place of residence, while 16% live in rented ones.



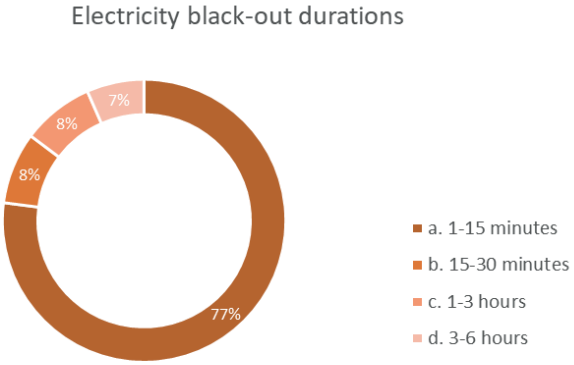
3.1.1. Household Electricity

Electricity: around 96% of the surveyed households said they are not satisfied with the current supply of electricity in their place, while 3% stated their satisfaction.

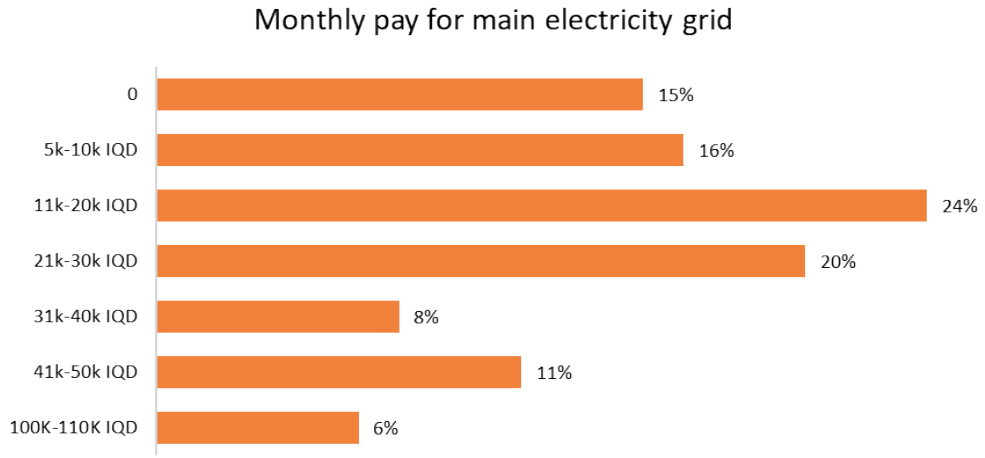
The main sources of this dissatisfaction are the numerous electricity outages daily and the limited power capacity of local generators. About 73% of households report a 100-300 electricity black-outs per month on average. More details in the following figure.



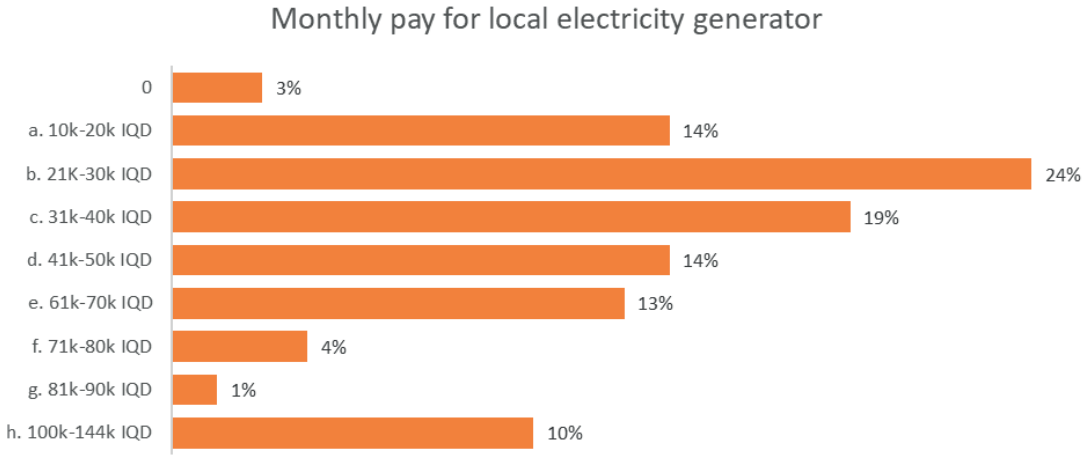
77% of these blackouts last between 1 to 15 minutes, 8% last 15 to 30 minutes, while 15% last for hours.



Cost of Electricity: around 60% of the households pay from 5,000 to 30,000 Iraqi Dinars per month for the main grid electricity, 15% said they pay nothing as they are not officially registered as a customer to the main grid.



Around 57% of households pay from 21,000 to 50,000 Iraqi Dinars per month for the local generators' electricity, 10% said they pay between 100,000 to 144,000 Iraqi Dinars per month, while 3% said they don't have electricity from local generators.

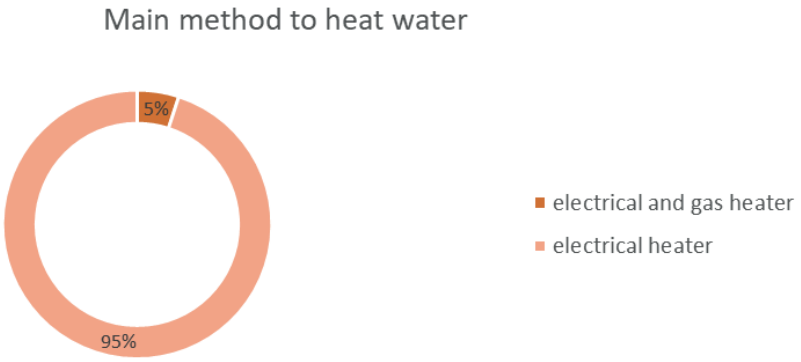


3.1.2. Energy Sources and Renewable Energy

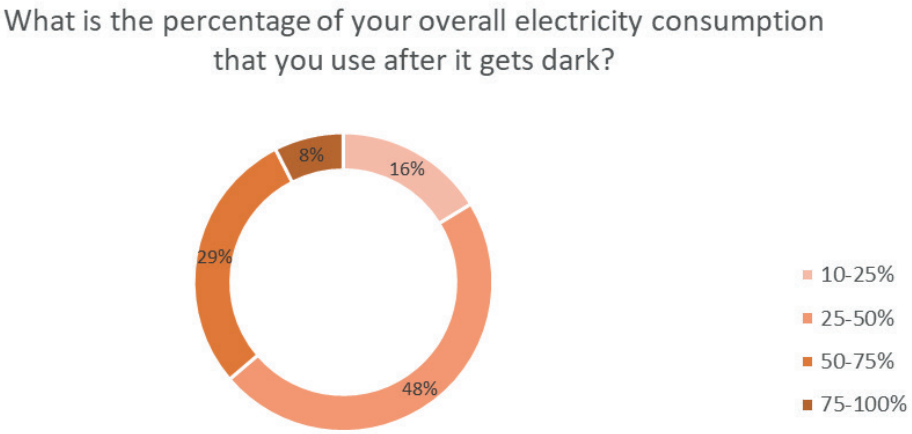
Energy Source of Electricity: When households were asked about the source of electricity in Iraq, 51% of surveyed households said they do not know, while 49% said they know about the sources of electricity. For those who know the sources, 47% said it is from fossil fuel and hydroelectric sources, 29% said its from fossil fuel, and 24% said it's from hydroelectric sources.

Negative Impacts: we asked surveyed households if they are aware of any negative impacts of energy sources of electricity and 68% said they do know; 50% of those said air and noise pollution are the negative impacts, and 50% stated air pollution.

Electricity Consumption: 95% of surveyed households said they use electrical heaters as the main heating method for water in their places, and 5% said they use gas heaters in addition to electrical heaters.



At night, the majority of household reduce their electricity consumption where 48% said they consume 25-50% of daytime rates when it gets dark, 29% said they consume 50-75% of daytime rates.

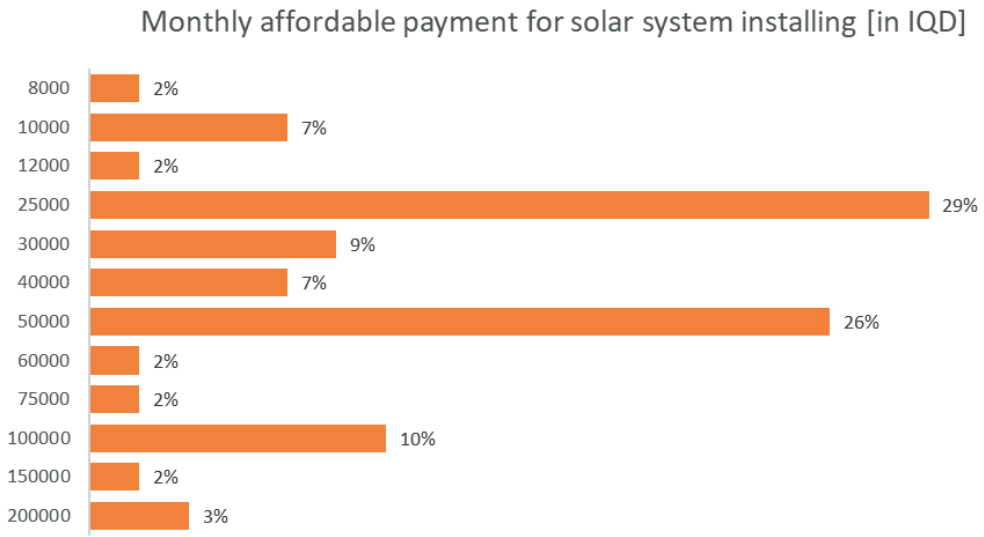


Renewable Energy: when we asked households if they have heard of any renewable energy sources, 35% said they do not know these sources and 65% said they do know. Our enumerator team was equipped with proper training and introduced renewable energy sources to those who lack the knowledge.

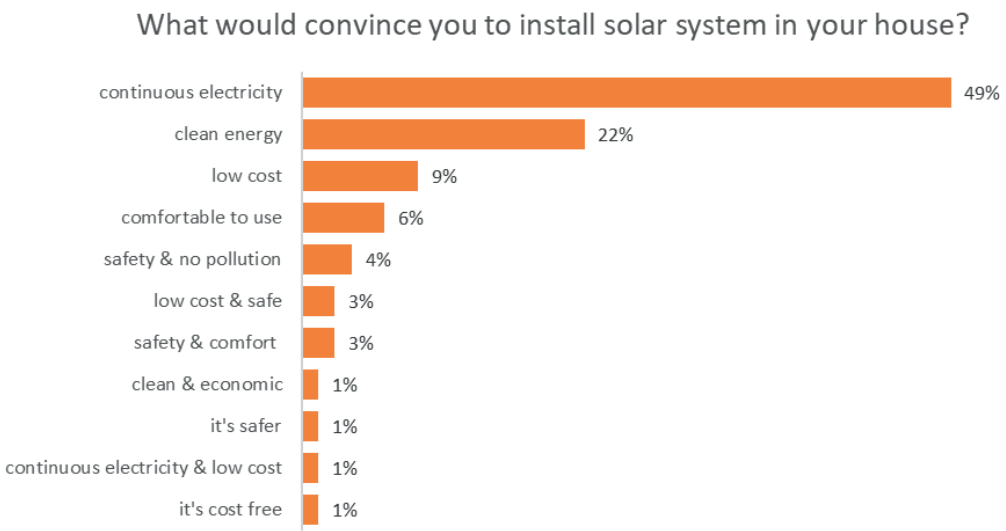
93% of households with knowledge about renewable energy stated Solar energy as the only source they know, and 7% listed solar, hydroelectric, and wind energy sources.

Of the surveyed households, 96% of them said they would be interested in having a renewable energy installation / photovoltaic panels / solar collectors.

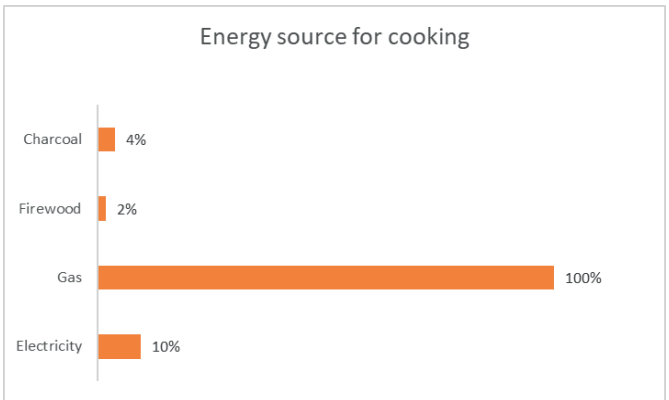
They were asked to give a rough amount of affordable monthly payment for solar system installing, the results were as follows:



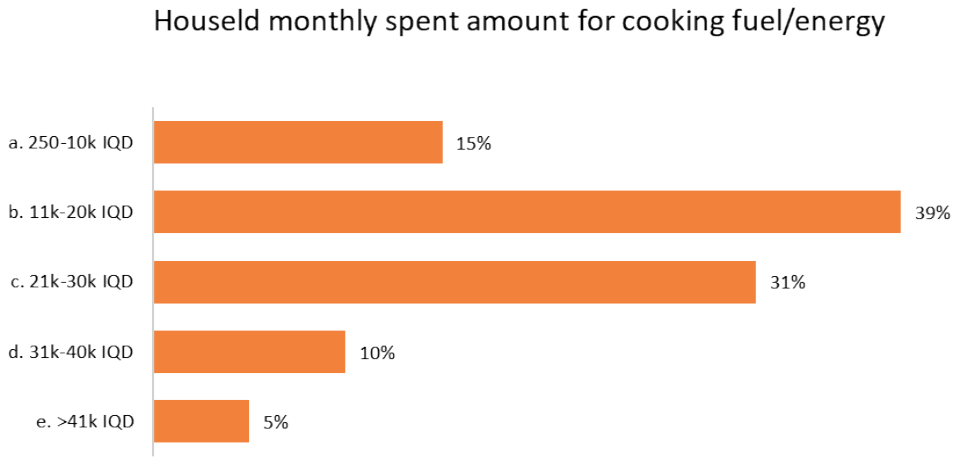
Around half of the surveyed households said they would be convinced to install a solar system in their house if it is guaranteed they have continuous electricity combined with the main grid, while only 9% said if the solar system is a low cost, they would install it.



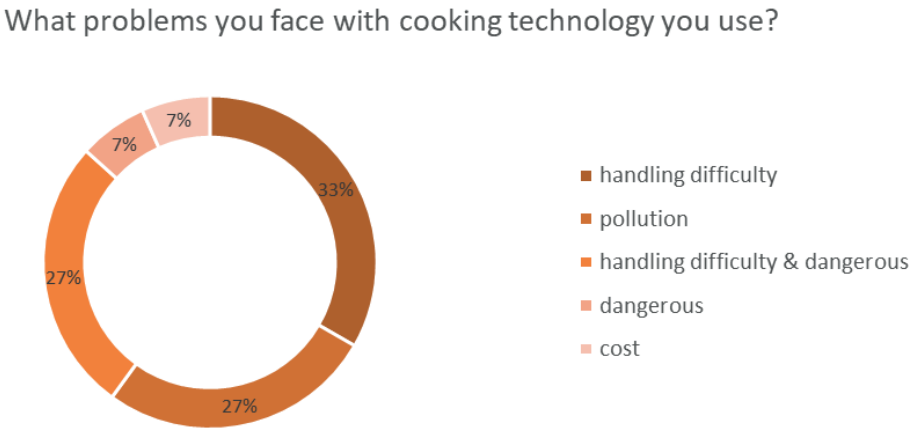
Cooking: 100% of households said they use gas as their main method of cooking, 10% said they use electricity.



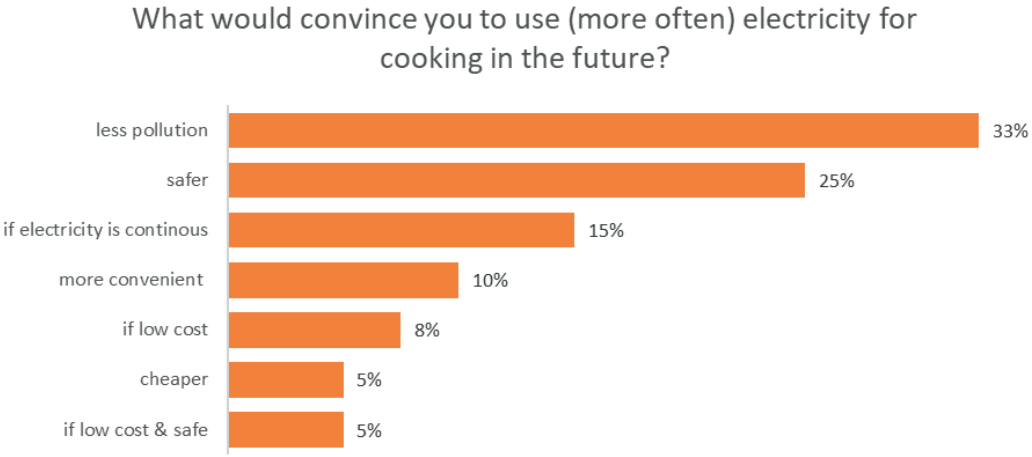
Around 70% of households spend 11,000 to 30,000 IQD per month for cooking fuel/energy, and others spend different amounts as follows:



58% of household expressed comfort in using their current cooking technology and fuel, 42% said they are not. Those not comfortable stated issues they face with current cooking technology they as shown below:

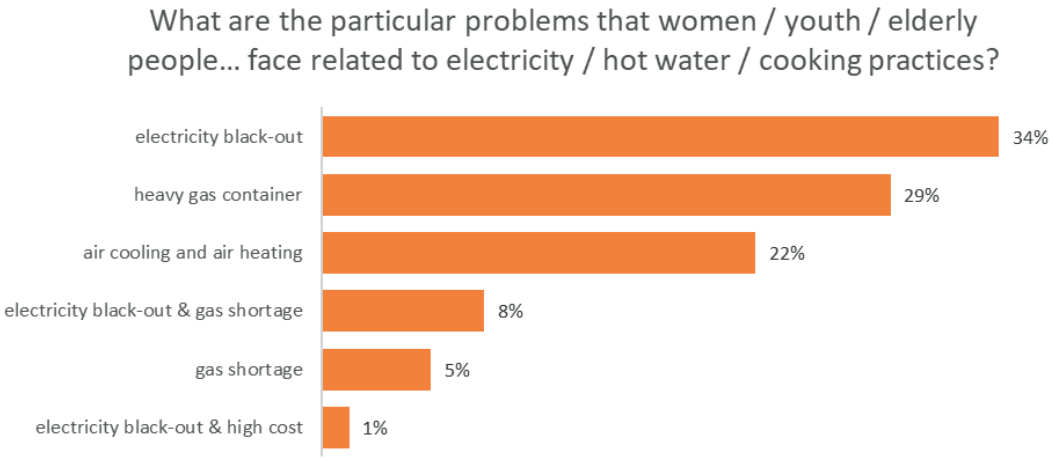


33% of households said they would electricity more often for cooking if it offers less pollution, 25% said they would use it if it is safer, and 15% said they would use it more often if electricity was continuous.



When asked if they would like to use renewable energy (photovoltaic) also for cooking, 89% said they would.

We asked about what are the particular problems that women/youth / elderly people face related to electricity / hot water/cooking practices, and 34% stated electricity black-outs as the main problem they face, 29% said inconvenience of handling the heavy gas containers is the main problem they face.



When households were asked if there are any particular obstacles that they face when purchasing devices base on renewable energy, 84% stated the high cost of such devices as the main obstacle, and 18% stated it is not available in the market.

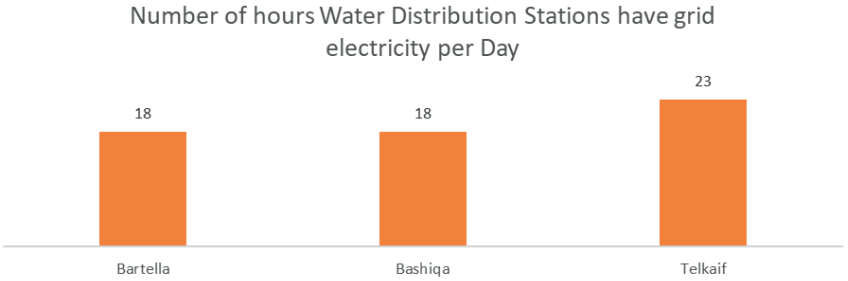
3.2. Local Government Offices

Department heads of several local government offices were interviewed and surveyed to assess the availability of electricity and the impacts of insufficient availability of it. An assessment of solar systems in these offices was performed with inquiries about the possible use of solar energy in the operating the facilities that these offices are running.

3.2.1. Water Distribution Offices

When asked about how do they evaluate the availability of electricity in their office, Bashiqa and Telkaif said it's **good**, while Bartella evaluated it as acceptable.

Each office in these areas had the following grip power hours available per day:



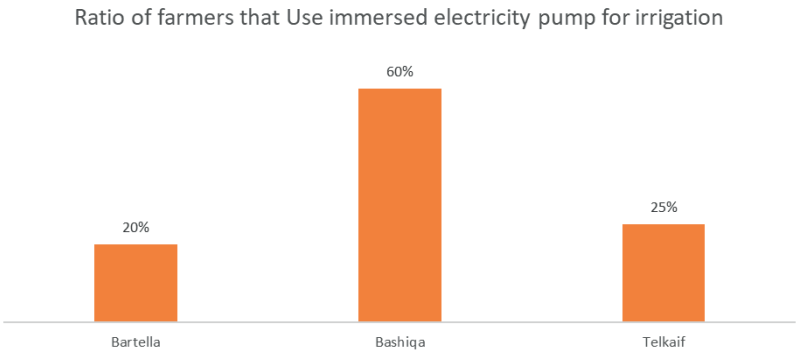
Bashiqa and Telkaif water distribution stations distribute in time slots manner to the areas it covers, i.e. divide time to deliver water to each area separately. While in Bartella the stations distribute to all areas at the same time. All the three offices said they have generators at the stations. Telkaif's office said they pay around 10 million IQD per month for the fuel of their generators.

All three offices do suffer from electricity black-outs and that effects their water pumps operation causing water distribution cut-offs of their covered areas.

All three offices said they are interested in Solar Energy. Telkaif's office said they have knowledge about installing Solar Panels, Bashiqa and Bartella said they do not have. We asked them if they can participate in the payment of solar systems that PIN would install in some of their distribution stations, Bartella and Telkaif said they cannot, while Bashiqa said they can participate.

3.2.2 Irrigation Offices

We asked the irrigation offices of the three areas about the percentage of farmers in their areas using immersed pumps for irrigation, ratios are as follows:



Bartella irrigation office said farmers need electricity for lighting in addition to pumps, and Telkaif said farmers in their area may need electricity for the lighting and ventilation in egg hatcheries. When asked about the idea of using solar power immersed irrigation pumps, Bashiqa and Bartella offices said it's a good idea to use them, while Telkaif office said the solar system with batteries is expensive.

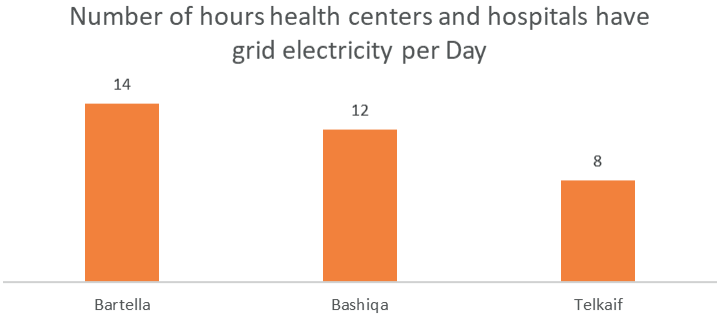
Bashiqa and Bartella offices said if the organization install Solar panels to some of the farmers, then those farmers will participate in the payment of the system cost. While Telkaif said farmers there will not be able to participate in the payments.
We asked the three irrigation offices about what is the ratio of farmers that need electricity for irrigation, their answers were as follows:

Community area/ City / Town / Village	Ratio of farmers that need electricity for irrigation
Bashiqa	50-75%
Bartella	10-25%
Telkaif	10-25%

3.2.3. Health Offices

We asked the offices to evaluate the performance of electricity in terms of availability in their area, Bashiqa and Bartella offices said it's average performance, while Telkaif office said the electricity in health centres that are in Telkaif's centre is good, but the health centres in villages have bad electricity availability.

The three health centres said the have the following hours per day of grid electricity:



All three offices said health centres and hospitals in their areas have generators.

Bartella and Bashiqa said they do not pay for fuel because the government provides it for free for the health sector. While in Telkaif office said they pay around 10 million IQD per month for fuel. The three offices said electricity black-outs do affect their health centres and hospitals where they need to operate for example patient scanning devices and vaccine storage units. They all showed an interest in Solar energy, and they do not know about installing solar panels.

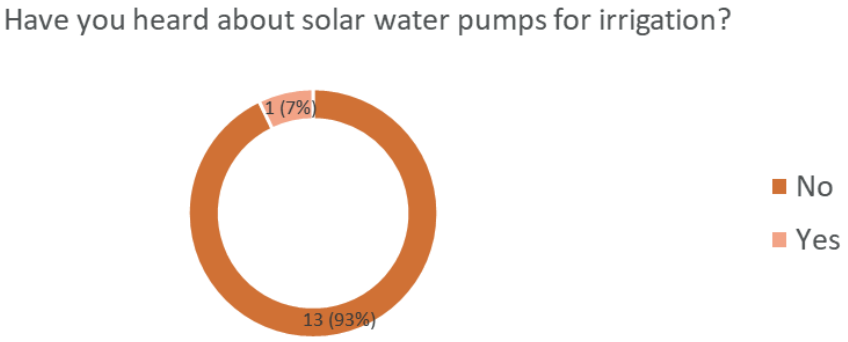
The three offices said they are not able to participate in the payments of the solar system if the organization installs them to some of their health centre and hospitals.

Bashiqa office added that they do need solar panels to get clean and free electricity, but there is no support from the government in this regard. Telkaif's office said they are very convinced in having solar systems especially after seeing how the system works in the school next to their office (the school's solar system installed by PIN).

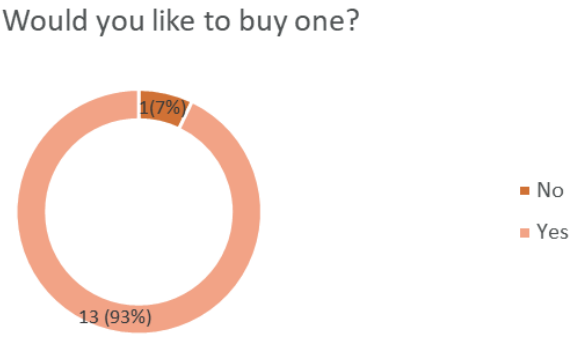
3.3. Farmers

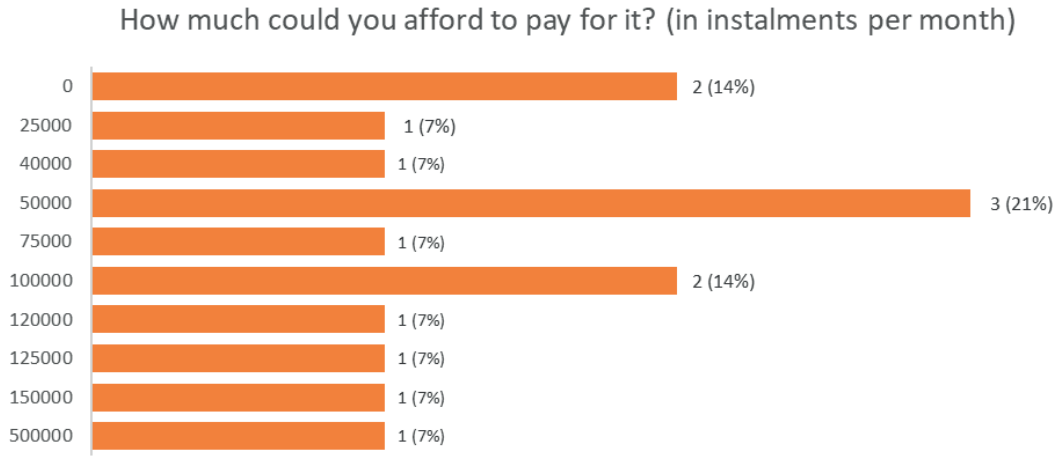
All they 14 surveyed farmers said they are interested in renewable energy, and all of them said solar energy is what interests them as it is amply available.

14 farmers said they would use solar panels to power immersed irrigation pumps, some farmers want to use it for other purposes such as: build an olive oil plant power by solar power, power his house, lighting at night, calves fattening halls, cutting machines, and sprayers.
When asked about solar water pumps, most of them say they have not heard of them.



The one farmer who knows about those pumps said they do perform well and useful.
We asked the farmers if they would like to buy one of these solar pumps and how much could they afford for monthly payments, 93% said yes, with an average monthly amount 115,000 IQD



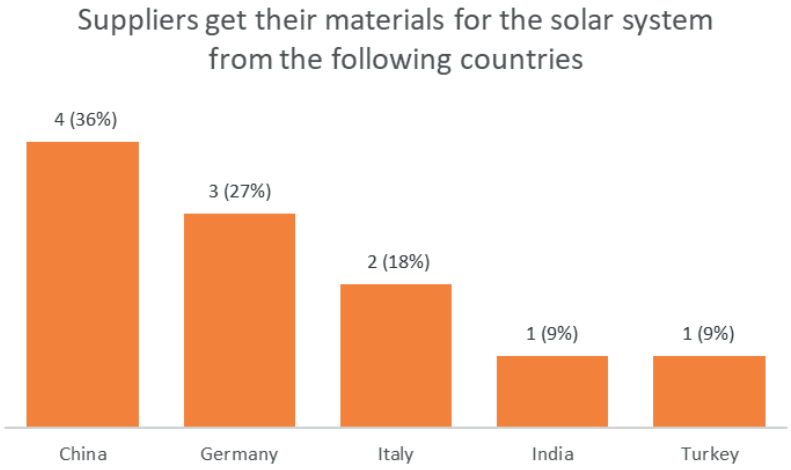


3.4. Power System Suppliers

We surveyed 4 power system suppliers, 2 are based in Erbil and 2 based in Mosul. All of them are have been involved in the renewable energy business. The two suppliers in Erbil have worked on solar systems, and the ones in Mosul worked with solar systems and some experimental or research wind renewable energy and tidal energy.

We asked these suppliers of the problems they face in renewable energy, most of them said there are no particular issues. One supplier mentioned there are many obstacles in getting permissions to install tidal or hydroelectrical systems on river areas.

The suppliers were asked where do they get their materials for solar systems, all 4 of them included China, 3 said Germany, other countries are Italy, India, and Turkey.



We asked the suppliers what is preventing them from growing their business, and the mentioned that the tariffs for importing renewable energy materials are high, and should be cancelled like many countries did, cancelling these tariffs will decrease the cost of these systems and make more people able to afford to install solar energy system.

We asked the suppliers what do you think about the system of customers paying in monthly instalments, 2 suppliers said we will not consider a business with such system, while the other 2 suppliers said they would consider this system of the government or some banks can guarantee the monthly payments.

4. CONCLUSION

The international community affirms that the use of renewable energies (solar) reduces global warming and environmental pollution in line with fossil fuels. Most scientific studies indicate that in 2050, the world will completely dispense with fossil fuels and depend on solar energy. With each solar powered ampere saving 25 tons of greenhouse gas emissions per year, the move toward renewable, solar energy is widely accepted as a crucial adaptation we must make as a society to combat the effects of climate change.

The findings from this assessment indicate that there is an enormous need in these governorates in northern Iraq for sustainable energy – not only for the purpose of slowing down climate change but for people to have consistent access to electricity. It is clear that a vast majority of ordinary households surveyed struggle performing daily tasks due to constant black-outs. Moreover, a majority of households indicated their awareness of renewable energy and their willingness to adopt it if it meant a stable electricity source.

The findings from this assessment also shed a light on the cross-cutting sectors in society that are affected by inconsistent access to electricity, including the water and health sectors.

It is clear that there is an energy need in these target areas of northern Iraq, and with our knowledge of the threat of climate change and our forward-looking implementation of sustainable, needs-based projects, People in Need can reasonably advocate for the implementation of sustainable interventions in the renewable energy field in the Nineveh governorate.

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