

SUMMARY – Third Meeting of the Moving Energy Initiative’s Energy & Water Working Group in Jordan

King Hussein Club, Amman

On 28 June, 2018, the WANA Institute, Chatham House, EDAMA, and the Norwegian Refugee Council (NRC) brought together over 40 experts at the King Hussein Club in Amman to discuss the lessons learned and progress made on two Moving Energy Initiative projects in Jordan: the Green Affordable Homes project and the solarization of al-Mafraq Hospital’s water heating system. With 80 per cent of Syrian refugees in Jordan living outside of camps, mainly in rented accommodation amongst the host population, the Moving Energy Initiative’s energy focus is on the governorates with high refugee populations, in line with the Jordan Response Plan for the Syria Crisis’s stated energy priorities. The workshop invited participants to brainstorm on practical ways forward for scale-up to support the energy priorities of the JRP and enable sustainable financing.

The Green Affordable Homes project has retrofitted 48 low-income homes for efficiency and contributed in building 3 new green affordable homes in areas affected by the refugee crisis. It demonstrates how energy access and comfort can be improved at a low cost and contributes to the aims of the Jordan Response Plan and community cohesion. Through the project, a new Up-cycling Initiative has been launched for the first time in Jordan promoting creative-functional reuse, where shading devices were created out of the old window frames (the ones replaced through the project with double glazed ones) and straw, together by both locals and Syrian refugees.

The solarization of the water heating system at al-Mafraq public hospital which is under immense pressure from the additional patient intake since 2012 (around 40 per cent of emergency patients are Syrian, both coming from the urban population and those referred to the hospital from Zaatari camp).

These projects are practical learning projects to improve understanding of how humanitarian aid can contribute to energy sustainability that is of benefit to both host community and refugees. Presentations by implementers were followed by discussion and updates on other energy and water sustainability projects in the country, including in the refugee camps.

Participants were then divided into two groups to brainstorm how efficient green affordable housing, and sustainable energy for hospitals could be scaled up in Jordan, drawing on the experience of the MEI and other similar projects in Jordan and elsewhere. This report sums up the considerations, practical information, and conclusions from those break-outs.

Key Take-aways from the Presentations

Solarization at al-Mafraq General Hospital

This project was awarded a Low Carbon Project grant by the Moving Energy Initiative in 2017. The proposal from Jordanian company Millennium Energy Industries in partnership with the King

Hussein Foundation, targets an energy access improvement and energy cost-savings for a hospital that serves both Jordanians and Syrians in al-Mafraq, close to the Syrian border. Each month, this hospital has around 350 to 400 in-patients and 500 out-patients, and serves around 8,000 emergency patients. In spite of acute rises in patient numbers since 2012, the hospital has no additional budget for hot water, which is often switched off during the summer months, leading patients to heat water on gas stoves in their rooms when necessary.

Each year, diesel costs the hospital over JOD152,000 (USD214,386) — the hospital pays no supplier fee — and electricity bills, which are paid by the Ministry of Health, amount to around JOD276,000 (USD389,280).

The project costs UK£185,000 and has 4 components:

1. Solar thermal system to support heating of DHWS and space heating for the main building and utilities at Mafraq Hospital;
2. Replacement of the broken hot water boiler;
3. Supply, installation, and connection of a Solar PV system for supplementary electricity, with a capacity of 16kW Peak;
4. Operational maintenance for a period of 4 years.

The solar thermal system is expected to generate savings of approximately 260,000 kWh (thermal)/year or the equivalent of 30,000 litres of diesel and a CO² saving of 76 ton/year. The expected solar PV system savings are 27,500 kWh/year and a CO² saving of 18.2 ton/year. This should save around JOD16,800 (USD23,600) in diesel costs each year, which can then be spent on urgent medical priorities by the hospital's management. The electricity savings would help reduce the burden on the MoH.

The project also has a study component for which the King Hussein Foundation conducted a baseline study and is monitoring the results to inform future projects. MEI was able to add in a training component – providing on-site training for five Syrian refugee students at the al-Mafraq Centre for Renewable Energy (Government of Jordan & GIZ).

Key challenges were:

1. Government approvals. Approvals were needed from the following authorities and it took 6 months to gain them:
 - a. Ministry of Planning
 - b. Ministry of Energy (JREEF)
 - c. Prime Ministry Office
 - d. Ministry of Health
 - e. Final beneficiary /Mafraq Hospital
2. Approval and connection to the electrical distribution company took longer than expected
 - a. There were outstanding bills due to the electricity company and not paid by the Ministry of Health. This prevented the project from receiving approval for the construction of the PV system. [update since workshop]

- b. Documents requesting the PV system connection to the grid were submitted in the first week of August 2018, but by mid-September, the PV system was not yet connected by the electricity company and not yet operational.
3. The following list of site challenges occurred. They are usual for projects of this kind, although challenges ‘c’ and ‘d’ were particular to this project, especially the need to upgrade the boiler (covered by the project) and later on the status of the piping (discovered too late to be covered by the project):
 - a. Cooperation & interest from final beneficiary O&M staff
 - b. Space availability
 - c. Knowledge of grant agreement terms by final beneficiary
 - d. Status of existing infrastructure
 - e. Records of energy consumptions and demand

Green Affordable Homes

The Jordan Response Plan for the Syria Crisis 2018-2020 notes that increased demand for cheap housing has left almost 2 million Jordanians and Syrians without access to affordable housing (over one fifth of the country’s population) and 1.3 million living in substandard housing (JRP 2018). Unfortunately, new housing is being built without consideration of health standards or energy and water efficiency. Therefore, it rarely meets the country’s building code standards, and will result in a huge loss of value for money for the government in future as well as increasing energy poverty.

This project run by JGBC and Habitat 4 Humanity Jordan takes a long-term integrated look at Jordan’s sustainable energy goals, and the critical need for energy and water efficient housing in particular.

This project had four components:

1. Awareness and capacity-building for communities and local builders. This included 6 workshops attended by more than 120 local community members (men and women) in al-Dulail, Ajloun, Ghor Al Safi, Ajloun, Deir Alla and al-Masharea’.
2. Retrofitting 48 existing homes, including rain water harvesting, solar water heating, double glazing, and LEDs.
3. Building 3 new green energy and water efficient homes. This included orientation, rain water harvesting, separation of grey water and black water, thermal insulation of walls and roofs, double glazing, solar water heater, LEDs, and water aerators.
4. Updating the green rating tool developed by the Jordan GBC based on the experience with low-income housing.

The project has retrofitted 48 low-income family homes for efficiency in al-Dulail, Deir Alla, al-Masharea’, and Ajloun, and has built 3 new water and energy efficient affordable homes in Ajloun and Salt. The project provided the subsidy for green materials, but the home-owners paid the rest through a revolving loan system. It also aimed to build local capacities for the sustainability of the green concept, and to create more social cohesion between locals and refugees.

The JGBC is writing up a report detailing the practical elements, costs, and benefits of the project compared with baseline conditions.

Challenges included:

- The building permit process: firstly, the process of convincing HH to go legal; secondly, the process to get the local engineer to understand the specifics of ‘Green Building’; and thirdly, the drawings approval.
- Communication with, close supervision of, and technical support to implementers (builders and volunteers).
- Costs. Due to the current market conditions, prices of green materials are relatively high for low-income communities.
- Structural issues. The project could not target the lowest income families as the project did not provide for the structural upgrades their homes would have needed to apply the retrofits.
- Land prices. The project could not target the lowest income families as the prices of land were too expensive for many families who need homes. Therefore, it targeted low-income families who already had a plot to build on.

In terms of future scale-up, the huge potential to improve people’s comfort levels and well-being were emphasised. It was strongly recommended to implement a neighbourhood pilot project. This could work through a cooperation in which:

- the government or institute of housing provides lands;
- loans to families are provide by HfHJ;
- design and technical support is given by the Jordan GBC;
- and funding supports the costs and activities.

Alongside this, it was suggested that several entities cooperate through a multi-stakeholder comprehensive approach to overcome the land price issue in the long term.

Discussion

1. Sustainable Energy Investments for Hospitals

Delays in approvals proved to be a challenge: “We face delays in approvals, especially regarding the power distribution companies,” said one participant with many others nodding in agreement. Licensed by the Ministry of Energy and Mineral Resources, the distribution companies grant the licenses for renewable energy projects and set the conditions to give approvals. Donor funding is usually time-limited and therefore if approvals are delayed, it can lose valuable project time or even mean that projects are not completed. Things might be speeded up if there were exceptions for certain types of projects, e.g. those that meet JRP priorities.

At present, the incentives are not aligned towards renewable energy and energy saving. “MEMR and NEPCO feel we have too much solar already,” said one participant. Electricity demand did not grow quite as fast as expected and there is now too much conventional power capacity in addition to solar energy. Because NEPCO has to take the power onto the grid and use it, it means

that at certain times of the day they have to pay a fee to the conventional (thermal) power plants to stop generating. NEPCO will not see the benefit of power saving in the short term but in the long term it will save the government money.

As some conventional power plants need to be decommissioned in 2025 and as storage becomes cheaper, more capacity will be freed up. It was mentioned that Tesla Jordan was working on large batteries that would help meet storage needs. However, when interconnection (grid connection) approval is lacking, it is significantly easier to work on projects that do not need interconnection approval and reduce net consumption. This includes:

- buildings efficiency measures;
- passive thermal applications, such as solar water heating and solar cooling;
- and off-grid PV, which directly feeds power needs without grid connection.

It was pointed out that hot water is in great demand and that solar energy for this purpose does not need any grid impact studies. Taking the al-Mafraq experience into account, a focus on solar energy for hot water for all hospitals could begin within a few months, and generate major savings for the government. **The key is finding the right funding mechanism.**

The experience of AFD in the West Bank (Palestine) was raised. In 2013, AFD and the French Facility for Global Environment (FFEM) funded the creation of a revolving fund for energy efficiency for public buildings. AFD worked with the Ministry of Energy, Ministry of Health, and Ministry of Finance to develop the fund to hold solar savings and finance other projects. This was done for the duration of the payback period (4 years), after which the facilities at the hospitals fully belonged to the Ministry of Health.

2. Green Affordable Housing

It was pointed out that energy saving measures and building envelopes for housing should be treated differently from public buildings. Different donors fund the shelter aims of the JRP and housing in Jordan, and the impact must be targeted towards more social objectives, individual health and comfort level improvement. Questions include how government and construction parties can develop an approach for housing which is different to what is already in place and build understanding of the benefits and demand for efficient/green housing.

When NRC included solar water heaters in their shelter component, they supplied solar water heaters (SWHs) in return for a new lease agreement with refugee tenants. Most of the problems between landlords and refugee tenants centre around accumulated debt with bills and rent, so SWHs supported both. The SWH system was transferred to the landlord after one year, on the condition that the landlord lowers the rent agreement for refugee tenants.

It was mentioned that buying LPG (even with subsidised prices) is a large cost for poorer families (including Syrian families), especially in the winter months. Better insulated housing would help reduce the need for LPG.

Existing mechanisms in Jordan may offer ways for donors to reach the housing market. JREEEF has agreements with certain banks in Jordan to provide loans for SWHs and solar water systems whereby JREEEF covers the interest. For SWHs purchased through a community based organization, JREEEF can support 50 per cent of the cost (the JGBC Green Affordable Homes project also benefitted from this in retrofitting and new builds and JREEEF benefited from reaching CBOs in new areas). JREEEF is currently working on the design of financing for high efficiency home appliances, with support from AFD and other grants. JREEEF cannot deal directly with end users, so always works with CBOs, distribution companies, and banks. This mechanism has been successfully applied and scaled up.

3. Energy and Livelihoods in the Refugee Camps

Electricity for businesses in refugee camps

In Zaatari, the UNHCR was said to be saving about USD5 million a year as a result of the KfW-funded solar plant. This money can go directly to the health budget or be spent on other priorities. UNHCR is not trying to work with distribution companies to enable legal connections for businesses. In Azraq, all businesses have access to electricity, while they currently use diesel in Zaatari. UNHCR is carrying out a study on how this impacts livelihoods, including asking businesses how much they currently pay for a generator and how much they would be willing to pay. Distribution companies could have additional customers, given that there is an innovation that enables refugees to pay for reliable access within the legal framework.

Improved temperature conditions for refugee shelters using local, sustainable materials with zero waste

In Zaatari, the caravans attract and store the heat: “If it is 20 degrees Celsius outside, it will be 40 inside the caravans in Zaatari,” said one participant. Oxfam has deployed a completely different method of building in Zaatari: a school building, opened in June 2018, was constructed using the superadobe technique. “Refugee camps are made to be temporary. The superadobe will go back to earth – there is no waste material.” Heating and cooling are improved because the building is warmer in summer and cooler in winter compared to average concrete buildings. Oxfam is now asking if this technique would be scalable for household shelters in Zaatari camp. A pilot project between Oxfam and UNHCR is currently being discussed with donors.

4. Financing Opportunities for Energy Interventions to Support the JRP

The partly EU-funded **Catalyst Middle East and North Africa Clean Energy Fund** in Jordan has USD57 million available to invest in regional clean energy projects. It is looking to invest in projects like the hospital solarization one if there is a plan that would bring it to scale. For example, **if the ministry can pay for solarization of water heating systems on multiple large hospitals over for example 5 years, using the money that would have been spent on diesel bills, they will then benefit from 13 to 15 years of almost zero diesel consumption.** On Catalyst’s part, this would not mean grants or loans, but equity investments with a commercial objective. The generated savings should pay for the project. It was pointed out that with **every passing month, diesel is being wasted, leaving less money to meet people’s health needs.**

Jordan's National Green Growth Plan is trying to support national financing entities to support green projects. One of the main pillars is to increase accessibility to international financing or funding, public funds, privately owned funds, and state-owned banks, and support these entities to cooperate and enable blended grant/finance opportunities). **The Green Climate Finance (GCF) Readiness Programme** prepares national entities. Jordan's Ministry of Environment is one of the national accredited entities to apply for GCF funding. The plan is to build a pipeline of projects that include the private sector as much as possible. The private sector should be coming up with or selecting projects, then approach the nationally accredited agency to ask for financing. This process was launched on 27 August, 2018. **Scaling up green affordable homes was identified as one project that the GCF programme would like to support.** Proposals should be aligned with the national green growth plan and strategy.

Breakout Group Recommendations

1. Hospitals

The group devised a potential financing model for **scaling up solar water heating applications (and potentially other efficiency measures) for hospitals.** A public-private partnership PPP model would require aid only for the initial stage, creating the capacity for sustainable financing of EE and RE in future.

The donor would fund a technical advisory service for the **Ministry of Health.**

The technical advisor would work with the MoH to:

- prepare an assessment of needs across all hospitals affected by the refugee crisis or all major hospitals;
- examine the legal and capacity options for the MoH to pay for EE/RE applications through the amounts normally spent on diesel (and possibly also electricity);
- prepare the Request for Proposals (RFP) and tenders on a performance contract basis.

JREEEF could offer a payment guarantee to **the private sector companies with the winning bids.**

After 4 years, the hospital or MoH would own the equipment. The contract could allow for a number of years of maintenance and repair servicing, and transfer of maintenance skills to hospital or Ministry employees.

It was not known if the law can provide permissions such as an agreement between the MoH and private companies. Would the Ministry be able to pay the companies directly? It may need official permission to be able to do this, but the donor could help to facilitate the system.

Suggestion: Bundling projects to bring down costs

Others suggested that such projects might be bundled at utility scale level – including more than one government entity – in order to benefit from economies of scale. A huge plan for 10 ministries or a wheeling project for all public buildings were suggested. Others said that investment in the

infrastructure would prove more sustainable. One participant mentioned that if the tender included all hospitals, this could bring the costs down significantly.

It was suggested that JREEEF may have the capacity to tender for several projects as part of one bundle.

2. Green Affordable Housing

The breakout group emphasised efficiency for housing and talked about several layers that could help enhance the benefit of work already done and enable scale-up.

Making the most of the work already done by:

1. Developing a monitoring and evaluation framework
2. Continuing to build capacity of builders
3. Raising awareness amongst communities about energy efficiency
4. Conducting cost-benefit analysis studies for green homes

Further work could:

1. Standardise the recent experience in Jordan into guidelines for the sector
2. Create a data bank where multiple bodies working in this area could deposit information, case-studies, and details on the potential for different types of buildings and the costs of materials

Practical scale-up could benefit from:

1. A mutual initiative run by different NGOs
2. Reducing the costs of land and efficient construction materials through scaling projects, perhaps working with HUDC and others that have already bought plots for this purpose
3. Upscaling the project to also benefit urban apartment buildings

Policy changes that would support scale-up include:

1. Revising national policies on land pricing (e.g. through taxation) to bring down the cost of land for low-income families
2. Updating country building codes