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TRANSITIONS TO RENEWABLE ENERGY AND SUSTAINABLE PROSPERITY IN LEBANON:

A People-Centred Approach to Equitable Energy Supply



FOREWORD

Finding alternatives to energy production is crucial if we are to alter the trajectory of our planet and avert catastrophic climate change. This global challenge needs to be addressed through context specific solutions if we are to limit warming to the 1.5°C target set out in the Paris Agreement. The impacts of climate change are already being felt across the economy and environment in Lebanon, a country particularly vulnerable to rising sea levels and water shortages. Yet Lebanon has a mixed response; as signatories of the Paris Agreement, the country is committed to reducing greenhouse gas emissions by up to 30% by 2030 but at the same time it is searching for its first oil and gas reserves.

Public services here, already in short supply, are compounded by the influx of displaced people from the Syrian Civil War, and Lebanon now hosts the highest percentage refugee population of any country in the world. Like the Lebanese, displaced Syrians in Lebanon living in both formal and informal settings are not obtaining the required electricity to operate even basic household appliances. The inadequate energy supply has resulted in endemic power outages; the power gap is estimated at around 1GW, equalling three-hour cuts in Beirut and up to 12-hour cuts daily in other parts of the country. Consequently, households and businesses are relying on self-generation through polluting private diesel generators to fill in the gaps of the supply.

Displaced people and climate change are two of the biggest issues imposing on Lebanon's future prosperity. They are also two opportunities that, if responded to through the uptake of renewable energy options, could enable the creation of a thriving economy in Lebanon. A renewable energy transition would utilise the skills of an increasing population, the country's natural resources, and provide energy resilience. It is not just about changing energy patterns but creating value for communities by reformulating public services to improve prosperity for all residents.

New and existing models of energy delivery must recognise communities' energy needs across various contexts, taking into account socioeconomic conditions and self-defined aspirations for achieving prosperity. At the Institute for Global Prosperity, UCL and the RELIEF Centre, we are working with communities to understand what prosperity means for them, based on their understanding and opportunities for living a good life. We see opportunity in community-led decentralised energy projects across Lebanon, which are providing alternatives to pollutants and insufficient energy supply from the state. Despite facing a myriad of challenges, Lebanese entrepreneurs in particular are providing examples of how future decentralised energy solutions could look and are helping achieve the government's target of 12% renewable energy supply by 2020. But more still needs to be done.

We partnered with Chatham House for this workshop, learning from their expertise in decentralised energy supply for refugee populations in Jordan as part of the Moving Energy Initiative. The workshop, *Transitions to Renewable Energy and Sustainable Prosperity in Lebanon: A People-Centred Approach to Equitable Energy Supply* bought together Lebanese energy entrepreneurs, policy makers and donors to discuss the future of energy in Lebanon.

The wellbeing of future populations, education, health, water supply and employment opportunity are all inextricably linked to energy supply and are crucial for achieving prosperity. Our hope is that the combined expertise and discussions from this workshop are a first step towards future collaboration and action towards a renewable energy transition. As you will see in the following report, the combined crises of climate and migration in Lebanon need urgent action, and data on this area is severely lacking. To set Lebanon on a sustainably prosperous trajectory, the energy supply must be addressed by utilising the understanding and expertise of the communities themselves that are facing these crises, and those who are already benefitting from innovative, decentralised energy projects, helping set them on their own pathways to prosperity.

PROFESSOR HENRIETTA L. MOORE Founder and Director The Institute for Global Prosperity

INTRODUCTION

Energy is critical for creating a prosperous future for Lebanon. For years, Lebanon's sectarian politics have halted progress toward a more established renewable energy landscape. The wars that have plagued the country, destroying much of its infrastructure and igniting the 'brain drain', have compounded this stagnation. Lebanon also has the largest number of displaced people per capita, adding to the difficulties of an already struggling state. Energy supply, at the macrolevel, is unreliable, unable to meet the needs of the population and is deeply affecting its most vulnerable groups.

In the face of a lack of sufficient power and endemic power outages, alternative community energy projects around the country are proving an appetite for change at the local level. The millennial generation in particular are finding creative ways to solve the energy crisis; as progressive, open-minded, and environmentally, socially and technologically conscious individuals, they see opportunities to develop pathways to prosperity for Lebanon through a renewable energy transition.

At the Institute for Global Prosperity, UCL and RELIEF Centre, we understand prosperity to include quality of life, good health, and better opportunities for people and communities. Going beyond its traditional definition, we see prosperity as tying social value to economic value. There are diverse ways to flourish and no single model of development. In this way, prosperity offers us opportunities to engage with diversity and create inclusive, sustainable change in a myriad of ways, adapting to local circumstances. In the context of energy for Lebanon, which needs to be resilient, diverse and adaptable to different contexts, this is where the potential lies.

The workshop, *Transitions to Renewable Energy and Sustainable Prosperity in Lebanon: A People-Centred Approach to Equitable Energy Supply*, joined the research and thinking of the Institute for Global Prosperity, RELIEF Centre and Chatham House with pioneers from Lebanon's energy sector. Over the course of a day we discussed ideas, collaborations, and strategies that could help Lebanon move towards a more prosperous energy future. We found that through place-based and people-centred approaches, we will be able to support models of energy delivery that meet people's needs in context; their socio-economic conditions, their perspective and aspirations for achieving their self-defined prosperity.

PREFACE

This paper has been prepared by the Institute for Global Prosperity, the RELIEF Centre and Chatham House. It is based on a discussion around the challenges and solutions to transitions to renewable energy and sustainable prosperity in Lebanon held at a workshop at Chatham House in London on 29 January 2019.

The workshop brought together strategic planners, scholars, and energy practitioners to discuss the development of a research agenda around peoplecentred approaches to equitable energy supply in Lebanon. The aim was to generate discussions around alternative choices to traditional topdown structural reforms, particularly in view of the evolving crisis response and resilience approach.

This research is being undertaken as part of the Institute for Global Prosperity's work on environment and energy and the RELIEF Centre's work on Inclusive Growth and Vital Cities, in partnership with the Moving Energy Initiative (MEI) – an international partnership including Chatham House that began in 2015 to promote sustainable energy delivery in situations of forced displacement.

The Institute for Global Prosperity, Chatham House and the RELIEF Centre hope that this paper will inform future bottom-up interventions that have an impact on sustainable future prosperity for Lebanon.

All quotes are taken directly from participants of the workshop.

BACKGROUND

Addressing today's global energy challenge is an essential part of creating pathways to prosperity and securing sustainable livelihoods. Increasing rates of migration, climate change, and ageing and damaged infrastructure are adding significant pressures to already struggling economies like Lebanon. Here, plans to make a national transition to sustainable energy access will only be successful if they work for people, taking into account the manifold challenges of the current system. It is time to pool local and international expertise and resources to find and implement sustainable solutions in this area that also create economic and entrepreneurship opportunities to address environmental challenges and secure sustainable livelihoods in the process.

LEBANON'S ENERGY PROFILE

"A prosperous future for Lebanon in a time of mass migration and a changing climate is dependent on a renewable energy transition, inextricably linked to public services. This complex intersection means that a dependable energy supply would improve the wellbeing, employability, safety, health and education of residents of Lebanon leading to a better quality of life, as well as laying the ground for sustainable prosperity for all."

DILAPIDATED INFRASTRUCTURE AND DIESEL DEPENDENCE

The electricity infrastructure in Lebanon suffered significant damage during the civil war of 1975-90, and the grid has not yet been restored nearly thirty years later. This has led to endemic power outages caused by a significant gap between the power supply and demand. This gap cannot be met by the country's main electricity producer, Electricité du Liban (EDL), who hold a monopoly of energy supply in Lebanon, alone. There is an estimated 1GW power shortage in Lebanon, equalling three-hour cuts in Beirut and up to 12-hour cuts daily in other parts of the country (Dziadosz, May 2, 2018).

This has resulted in residents relying on their own methods of electricity generation through expensive, private diesel generators which are extremely damaging for both the health of populations and the environment in Lebanon.

HIGH FOSSIL FUEL IMPORT DEPENDENCE AND THE HOPES FOR DOMESTIC GAS

The electricity sector is currently responsible for over 53% of the nation's GHG emissions (UNDP, 2017). At present, the only forms of energy produced within Lebanon come from renewable sources, including solar water heaters and hydroelectric power plants (UN ESCWA, 2018). Otherwise, Lebanon relies on imported fossil fuels (fuel oil and diesel) for 98% of its total energy supply and provision (OECD/IEA, 2014). This dependence has significant environmental and political consequences, as the country's economy is vulnerable to fluctuating oil prices, exacerbated by regional unrest (UN ESCWA, 2018). Currently, the Government of Lebanon hopes to discover and exploit offshore gas deposits, chiefly for use in domestic power. Whilst domestic gas could in theory reduce import dependence and emissions, there are questions over the extent to which this should be invested in and relied upon given other competitive opportunities and the global decarbonization drive.

THE CURRENT STATE OF ENERGY SUPPLY & ACCESS: OPTIONS AND PROPOSED PLANS FOR ALTERNATIVE SOURCES

The workshop began with an overview of the role of energy in a nation's socio-economic development and highlighted that diversifying the energy mix has become of increasing importance for a number of Arab nations, including Lebanon. Given the rising market prices for oil and gas, coupled with the increase in energy demand from urbanising modern societies, these nations are turning to sustainable energy alternatives as part of their incremental energy supply. Yet, Lebanon depends almost entirely on fossil fuel for its domestic energy supply and is looking for its first oil and gas reserves.

GOVERNMENT POLICIES

Since 2009, the Government of Lebanon (GoL) has been taking steps to address these problems. The National Energy Efficiently Action Plan (NEEAP) was established in 2010; one of its targets is for Lebanon to access 12% of its energy from renewable sources by 2020 and 30% by 2030 through a number of initiatives and actions implemented at the national level. GoL then signed up to the UN Sustainable Development Goals in 2015, and a year later, the Lebanese Centre for Energy Conservation (LCEC) developed the National Renewable Energy Action Plan (NREAP). To prevent further deterioration of the humanitarian situation caused by the Syrian conflict, the Lebanese Crisis Response Plan 2017 -2020 was also put into place. It was noted that the implementation of this programme is challenging, given the institutional and legal frameworks in place with respect to the energy sector in Lebanon.

The 12% by 2020 commitment is both a challenge and a source of pride for Lebanon. However, the ability to measure progress towards this objective is difficult due to a lack of national data. Some benchmarks have been set by the NREAP, using 2010 as a baseline, and 2020 as a target. Reaching 30% by 2030 will be a challenge, and the LCEC has emphasised the importance of the involvement and leadership of the EDL in the development of renewable energy in Lebanon.

"In the Lebanese context, electricity is a humanitarian need, directly linked to the provision of vital services and, to a large extent, to security and social stability."

Lebanon Crisis Response Plan 2017-2020

Given that Lebanon is a net importer of oil and all its thermal power plants use fuel oil, it was discussed that the country would benefit from introducing natural gas into its energy mix, firstly though importing and later through its own potential resources. Companies are currently exploring for gas offshore, given the discovery of the Leviathan gas field in neighbouring countries. However, it was argued that using any gas found will not be possible in Lebanon without the right policy environment, and success would require significantly more political support and financial resources than is currently available. In addition, whilst delivering lower emissions than oil fuels, a dependency on gas would still aggravate pollution, making achieving the country's sustainability targets even more problematic.

One of the main challenges would be to secure the investment for the necessary infrastructure to bring the gas onshore and deploy it within the power sector without a reliable export revenue stream. Most agreed that commercial production, if a discovery is made, was unlikely before 2025. One argued:

"While many countries are divesting from fossil fuels, further exploration by Lebanon is financially and environmentally reckless. Should they continue to focus on fossil fuel development and infrastructure instead of reaping the advantages that renewable technology and circular economy systems offer, they risk being burdened with higher costs to the economy and damages from climate change."

It was argued that as energy has far reaching impacts for other sectors, we should think about how to link it with water and solid household waste, for instance. More community scale or mobile water treatment plants using solar power was suggested as one solution.

"Water is extremely expensive in Lebanon and the energy that goes towards making water available is a major issue."

OPPORTUNITIES FOR COLLABORATION

It was suggested that, moving forward, a combination of both regional and international collaborations will need to continue and grow in order to address the energy needs of Lebanon.

Opportunities to capitalise on foreign aid could be sought in order to build essential infrastructure for sustainable energy, and more work needs to be done to open up the private sector to renewable energy. However, the overarching legal and regulatory systems need to be in place in order to do this.

The Lebanese parliament issued in 2002 the law 462 comprising the appointment of an electricity regulatory authority which would grant licenses for power production, and enabling the Council of Ministers to perform this task for a period of two years. However, the law was not implemented, and another law, 288, was issued in 2014 extending the authority of the Council of Ministers for two years. In 2015, the parliament passed the law 54, extending that period until 2018. As the law expired Lebanon currently lacks a regulatory authority, and no entity has the authority to grant licenses.

It was highlighted that to establish a sustainable and modern energy supply, it is unlikely that the focus will be on just one source of energy.

Lastly, given the significant past and present events in Lebanon, from civil war to mass displacement, it was highlighted that an approach towards energy focusing on resilience in the face of stress has arisen - yet the country now needs to look beyond resilience and crisis management and towards growth and prosperity.

ENERGY EQUITY, JUSTICE AND THE PROVISION OF MODERN ENERGY SERVICES TO VULNERABLE POPULATIONS

This session focused on the transitions to renewable energy for vulnerable communities living in urban areas.

LOCAL CHALLENGES & INEQUALITIES OF ACCESS

This discussion highlighted that energy provision on a national scale in Lebanon is uneven and reflects a multitude of socio-cultural divisions and inequity within Lebanese society. It was noted that it may not be possible to develop a renewable energy structure that is able to consistently provide electricity across the country; disparities in economic geography across Lebanon, combined with a shifting socio-political environment, make t his challenging.

"Many Palestinian informal settlements in Lebanon receive far less energy than other areas of the country. For example, Shatila [a refugee camp] is connected to the Mount Lebanon network, which is reliable in some places, but has far less access to energy than neighbouring areas."

Lebanon's entrenched "diesel dependency" was discussed in detail. There is a broad, complex and at times exploitative web of stakeholders who own and depend upon diesel generators; from the government and mafia to local communities. Despite this, they are widely used. One participant made the point that there is a tendency for communities to feel safer relying on multiple sources of energy rather than one in case of power failure. As a result, communities have sought out their own alternatives, generated at the local level. This opened up the discussion to consider how personalised forms of energy and diesel generators might introduce opportunities for a new, more decentralised energy mix in Lebanon, and which stakeholders would need to be involved in this. Could private generators be

included in a shift to renewable energy? Or were they part of the problem that needed to be pushed out? Participants held conflicting views on this issue.

In the face of a complex and often highly localised and personalised energy mix, it will be challenging not only to create a consistent and regulated mode of electricity supply for communities, but to also convince citizens that it will be reliable and worth choosing.

"Some communities add salt to electricity meters to be able to mediate their electricity readings. Little is done, or can be done, by the government to regulate this."

In addition, participants voiced the concern that communities might not understand the implications of transitioning to renewable energy and how it would affect them, and whether it would be able to meet their expectations. It is not yet clear whether renewable interventions in Lebanon will result in a reduction in energy bills, as use of electricity may go up. It should be coupled with efficiency interventions and improving energy literacy within Lebanese communities, as this would help empower communities to understand the benefits and challenges of the energy system they rely on already, as well as how this impacts upon energy provision within the country as whole.

This would enable Lebanese citizens to see how their existing energy provision could be made more efficient, as well as opening them up to ideas around alternative power sources. In addition, it would help to create a culture where, if individuals are in part responsible for managing their own energy provision, they are encouraged to maintain and develop the parts they play in it. It was suggested that municipal authorities would be well placed to take a bigger role in renewable community energy initiatives.

"We could use online courses or MOOCs to promote energy literacy at the municipal level."

INNOVATION AND HARNESSING PARTNERSHIPS

There is already a lot of innovation taking place in Lebanon's entrepreneurial sector around energy provision and generators, as well as a range of ideas on what more could be done - possible in large part because of entrepreneurs' extensive knowledge of electricity. Yet, it was noted that entrepreneurs are restricted by practical and basic limitations, including the tools and resources they have at their disposal, in addition to geographical and socio-political limitations like land ownership. Thus, while pioneering, ideas for new energy systems can be unrealistic, or not easily replicated or distributed. It was suggested that a mapping system identifying the effectiveness of local authorities would help aid our understanding of why innovations are possible in some areas of Lebanon and not others.

"Distributed energy is what is working in Lebanon. We have a structural problem with the on-grid system, and this avoids the problem by staying outside of those structures. While the government sorts itself out in terms of storage and regulation – distributed power is the way forward."

There are already initiatives that are making the most of mobile support networks. For instance, the EU UNDO-CEDRO 4 project (V24) for renewable energy through implementation in Kabrikha, in the South of Lebanon, allows a community-scale renewable energy power plant to plug into the separate local grid owned and operated by the municipality when utility power is off, and allows that same power to plug into the utility network when national power is available.

This project has the potential to allow communityled initiatives to fill the gap in power generation; however, it is essential to first empower communities and equip them with the skills and knowledge they need to create solutions.

"Giving power to the people is what gets power to the people."

It was emphasised that local communities have a major role to play and have the ability to fill in the gap in enhancing sustainability, equity, justice and reliability of energy in Lebanon. Thus, developing effective partnerships at a local level, and harnessing and empowering local communities, is key. People-powered initiatives and community-led activities are, and will continue, making the difference in the electricity sector in Lebanon and in any other country with a similar political structure, financial standing and bureaucratic profile.

Whilst the costs of individual solar systems were prohibitive for householders, the case was made for community scale renewable power which would bring capital costs down by half and may be able to be paid back at lower rates that current diesel bills. The potential for distributed projects to eventually be grid connected and help to augment Lebanon's national system with excess power was also tabled.

It was agreed that there is traction for digitising the energy market in Lebanon, whether it is in terms of payment or dissemination methods. Virtual netmetering, for example, could be a very effective way of disseminating and replicating energy created by generators across the country. It was also noted that we could be making more of the potential of mobile renewable energy sources that could be moved around in response to help communities affected by displacement.

INTEGRATING RENEWABLE ENERGY TECHNOLOGY: LESSONS LEARNED FROM GOOD PRACTICE EXEMPLARS OF DECENTRALISED GENERATION MICROSCALE RENEWABLE ENERGY IN THE MENA REGION

The discussion focused on the learnings of other countries addressing transitions to renewable energy within the MENA region, focussing particularly on Jordan. One participant, who has worked extensively across countries here, observed that although there is a lot to be learnt from neighbouring countries in this area, dialogue can fail between them because of a tendency towards inward reflection. Establishing working support groups that encourage knowledge sharing and effective partnerships could help externalise learnings and knowledge from previous projects.

It was highlighted that, like Lebanon, Jordan relies on imports for around 95% of its fuel needs and has also witnessed a sharp rise in power demand due to the refugee communities, some 80 per cent of which are based outside camps. Jordan is relying heavily on humanitarian and development aid to achieve both its sustainable energy access goals and its urban development goals, which is limiting for a number of reasons; the funding for many humanitarian aid projects is often time-limited, making many projects financially unsustainable. In addition, the time it takes to approve building in Jordan often delays progress further.

The Moving Energy Initiative's work on hospital solarisation shed light on the potential for a shift to sustainable government financed diesel displacement if the ministries overseeing public buildings were willing to collaborate and receive technical support to be able to procure from the private sector. Savings could potentially be channelled to improve health and education facilities, helping to better serve both local and refugee populations. The need to think holistically and take into account the benefits to health and community cohesion of energy projects was highlighted by the example of the work incorporating solar with renewable building techniques in the Green Affordable Homes project in Jordan, which also upskilled local construction workers, incorporated refugees and reduced householder stress.

"Energy access in countries affected by conflict can be strongly influenced by political change. Hospitals in the Gaza Strip, for example, can be severely affected by changes to energy provision in Israel. Gaza relies on Israel for energy, and Israel can apply pressure to Gaza by cutting this off. As a result, many hospitals in Gaza now depend upon distributed energy supplies."

FINANCING THE RENEWABLE ENERGY TRANSITION & FINDING BUSINESS ALTERNATIVES & COMMUNITY RENEWABLES TO ACCELERATE A RENEWABLE ENERGY TRANSITION & EQUITABLE ENERGY SUPPLY

This session focused on the financial opportunities and barriers for renewable energy projects in Lebanon, and the importance of the financial sector in mobilising a renewable energy transition in the country. Opportunities are changing, as economic impacts and financial returns are more widely understood and realised. It was noted that increasing private investment in renewable energy and energy efficiency projects stimulated by renewable finance mechanisms could provide cross-cutting opportunities for the economy and for the creation of sustainable livelihoods. Increasing this interest could be beneficial for communities as well as private investors.

The importance of considering both centralised and decentralised energy markets was a key focus of the discussion. It was suggested that in order to fund all aspects of an informal market, it needs to be legalised. Existing attempts to legalise the informal energy market in Lebanon were highlighted. The question as to how best to leverage the existing informal market, until it is legalised, was raised. The feasibility and problematic nature of integrating illegal generators into the existing energy sector was also discussed.

MOBILISING A RENEWABLE ENERGY TRANSITION: CROSS-SECTORAL FINANCING

While initiatives exist to promote a renewable energy transition in Lebanon in-country, finding and financing sustainable business alternatives to existing energy supplies continue to be challenging. It was suggested that leveraging Lebanon's existing grid will help support the development of its renewables market, but this will not be possible without incentivising developers. Understanding their interests is therefore essential; this extends beyond energy specifically and also includes other industries like construction, as new buildings will need to be designed to include and encourage the use of renewable energy, for example. Financing a transportation network could also help provide a wider infrastructure that would enable renewable energy mechanisms to flourish.

INVESTMENT

There was a discussion around the role of the banking sector and their involvement with renewable energy projects, with a focus on regulations around funding for publicly and privately-owned projects. The question of incentives for banks and individuals to invest was also raised, whether it be in the form of equity or return on investment.

Examples of co-owned, small-scale, local-led renewable energy initiatives that engage the community in their business models in Lebanon already exist. It was suggested that providing credit lines through a network of commercial banks that give liquidity to local projects on the ground could help create alternative methods through which renewable energy systems could work. The more pathways and chains of investment created, the more influence funding is likely to have on the energy sector.

To move forward, it was noted that additional investment would be needed in order to encourage the capacity of the renewable energy network. However, economists in Lebanon are struggling to attract this. Making the case for Foreign Direct Investment, for instance, is difficult; although Lebanon is a free market economy, it is highly impacted by low governance, lack of transparency, procurement, low credit ratings, the influence and restrictions of local governments, and high levels of debt. As a result, there is a high risk to investment and of default.

BARRIERS TO ALTERNATIVE ENERGY

It was noted that corruption is still an issue across many areas of life in Lebanon - including the energy sector. There is a lack of transparency around decision-making processes in the country; this dislocation, coupled with movements into intangible economies, has increased levels of theft in Lebanon, including individuals stealing energy as well as those who simply do not pay their energy bills, for a range of reasons.

"Although not always permissible, the reasons behind why some are inclined to steal energy are complex. For example, some in Lebanon have applied for electricity meters and will not receive them for over a year. During this time, they are forced to steal electricity as a replacement. If we plan to increase energy generation, we need to ensure we do this in a way that will not simply result in further illegality."

The discussion highlighted that a large proportion of the Lebanese population is not interested in paying for energy. The question of who could be brought on to help aid understanding of the best ways of incentivising citizens towards using renewable energy was raised, as was the question of how we engage with citizens in regard to what makes a difference to their pocket.

HYBRID MODELS OF OWNERSHIP

The idea of alternative models of ownership was raised, involving moving from a shareholder model to a local ownership model. It was suggested that this could help redefine energy citizenship whilst encouraging more people to engage with the question of energy access and payment. It was noted that community energy is already a common ownership model in Lebanon, for example, through buildings collectively buying generators that they share, indicating that there is traction for this change.

A PEOPLE-CENTRED PROSPEROUS FUTURE: POLICY, RESEARCH AND INTERVENTION IDEAS FOR GREATER RENEWABLE EQUITABLE ENERGY SUPPLY AND TRANSITION IN THE CONTEXT OF MASS DISPLACEMENT

This session focused on generating new ideas on how to provide an equitable energy supply in the face of displacement crises.

The discussion brought attention to the issues of climate change and migration. It was highlighted that the influences of climate change on general social instability are intimately and inextricably linked, and these instabilities can play a part in leading to mass exodus - the consequences and management of which is complex. Separating these influences and trying to quantify them is difficult, and made all the more challenging by the chronic lack of data around energy use and demand in Lebanon, particularly for those in rural areas as well as the urban poor living in rapidly urbanising areas and in informal settlements.

It was highlighted that the scale and increasingly protracted nature of displacement crises today requires new, sustainable approaches that go beyond the once dominant model of humanitarian relief. Collaboration across a range of sectors is key to this in order to help produce both more reliable and descriptive data about the relationship between climate change, energy and mass displacement, and to lead to effective management methods.

Questions around how best to include of the voices of vulnerable groups in regard to discussions on energy sources were raised, and it was suggested that we need to have a better understanding of everyday energy usage in Lebanon. It was also noted that improving understanding of how issues are interconnected is key, such as how land use and population growth, for instance, affect each other. The discussion also highlighted the importance of paying attention to the fact that the energy crisis is also not strictly technical; expertise from other areas such as behavioural economics is necessary, for example, to know how best to incentivise people beyond financial considerations.