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**Fall**

**Report on the workshop of Innovation for Sustainable Energy in the Arab World**

**Energy Efficiency and Mobility**

DIAPOL-CE Project

**14-15 February 2023**

**Implemented by:**

**Responsible project:**

**Regional Project “DIAPOL-CE”: Innovation for Sustainable Energy in the Arab WorldEnergy Efficiency and Mobility”**

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# Background

With the global energy crisis, energy efficiency is coming back as a subject of primary importance, where today, energy efficiency is playing a primordial role improving the energy security of the Arab countries.

On the other hand, the last years brought new challenges to the sector that will sure require innovative solutions that addresses energy efficiency in the different sector in a non-traditional way.

In fact, energy efficiency measures have always been linked to the need of investment in retrofitting old equipment and replacing them with newer ones that more efficient or in upgrading the existing infrastructure by adding insulation i.e. However, the digital revolution offers new opportunities for energy efficiency with advances in artificial intelligence and the drop of prices of sensors making data more accessible and presenting low hanging solutions for energy efficiency.

This event proposes to discuss the future of energy efficiency in different sectors in the light of the most innovative solutions and the latest trends.

# Objectives

The event had three objectives:

Firstly, to host a session for the EE platform on Digitization and Energy Efficiency. Secondly, addressing EE in the building sector in the light of the development of smart and automated buildings, looking at the impact of the building digitization in different sectors going from the most innovative approaches of EE within the industrial and transport sectors, to finally shedding the light on the importance of behavioral change through innovative communication tools such as social media or through gamification.

Finally, to discuss the future of current and future of E-Mobility individual and public sectors in the light of the most innovative solutions and the latest trends.

# Agenda

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| --- | --- |
| **Day 1: 14/02/2023** | |
| **Innovation for Sustainable Energy in the Arab World Energy Efficiency and Mobility** | |
| **Time** | **Activity** |
| 10:00 – 10:15 | Registration of participants |
| **Session 1: Welcome and opening remarks** | |
| 10:15 – 10:40 | • Mrs. Jamila Mattar, Director, Energy department, LAS  • Mr. Jauad El Kharraz. Executive director, RCREEE  • Mrs. Anita Richter, Project Leader, "DIAPOL-CE Policy dialogue and knowledge management on low emissions development strategies" – GIZ, (online) |
| **Session 2(Hybrid):** **Energy Efficiency platform in the Arab region: Digitization and Energy Efficiency Moderated by: Dr. Joseph Al-Assad, LAS** | |
| 10:40 – 11:40 | • BIM and data analysis methods in service of EE in buildings, Mrs. Margot Grim-Schlink, e7 energy innovation & engineering (online)  • Impact of the digital era on the potential of energy efficiency in the different sectors by Mrs.Vita Rozite, IEA (online)  • Open discussion with participants |
| 11:40-12:00 | Coffee Break |
| **Session 3: Innovation and E. Mobility**  **Moderated by: Dr. Maged Mahmoud, Technical director, RCREEE** | |
| 12:00 – 13:00 | • Highlights of the E-Mobility Guideline, Dr. Mohamed Abdelhameed, Energy Expert.  • Innovation and E-mobility, Mrs. Yosra Asaker, Senior energy specialist, World bank  • Open discussion with participants |
| 13:00–14:00 | Lunch Break |

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| **Day 2: 15/02/2023** | |
| **Innovation for Sustainable Energy in the Arab World**  **Energy Efficiency and Mobility** | |
| **Session 4:** **Innovation in service of energy transition**  **Moderated by: Dr. Mohammed Al-Khayat, Chairman NREA, Egypt** | |
| 10:30 – 11:40 | • Energy efficiency: key trends and innovations, Mr. Nouri Alkishriwi- Energy expert  • Innovation for an energy efficient building sector- Building Energy Performance Tool, Mr. Riadh Bhar, Guidehouse.  • Innovative sustainable cooling solutions - new capital district cooling plant, Eng. Haytham Atta, Contracts & Commercial Manager (ACUD)-Egypt.  • Open discussion with participants |
| 11:40 – 12:00 | Coffee Break |
| **Session5: Highlights on the regulatory framework for E. mobility in the Arab region** | |
| 12:00 – 12:50 | • Instructions of the charging electric vehicles in Jordan, Mr. Abdel Rahman Alqatawna, head of contracts and agreements department, EMRC- Jordan.  • Regulatory framework for electric vehicle charging activities in Egypt, Mr. Sherif Mohamed Zoheir, head of central department for electricity market, Egypt-era. |
| 12:50 – 13:00 | Conclusion and closing comments |

# Event progress

## Session 1 - Opening and welcoming session

Firstly, the workshop started by welcoming speech by Eng. Jamila Mattar, Director of Energy Department at League pf Arab State (LAS), addressing the long relationship with Regional Center for Renewable Energy and Energy Efficiency (RCREEE) as a strategic partner and the technical arm for LAS as well as continuous development of GIZ in Energy sector. Eng. Jamila mentioned the importance of Energy Efficiency (EE) investment projects, as well as the future of EE in different sectors in the light of the most innovative solution and the latest trends, EE in building sectors and building digitization and industrial and transport sector.

Secondly, Dr. Jauad El-Kharaz, Executive Director of RCREEE illustrated that EE platform in the Arab Countries is a result of the fruitful efforts of GIZ in cooperation of the League of Arab state and RCREEE where all entities are aiming to reinforce the regional collaboration of serving EE which will be adapted to current Renewable Energy (RE) topics on the development of EE and enabling framework and market coefficient. Dr. Jauad also mentioned that EE innovation and Mobility in the Arab world aims to address the digitalization and also de-carbonizing the transport sector in the Arab countries and to discuss the guidelines of Electric Vehicle (EV) and Charging stations. Moreover, highlighted to continue supporting LAS to in order to provide the technical assistance to member states, Where the support includes:

* Conducting Technical report on Renewable Energy and EE
* Preparation a guidelines
* Collecting Data
* Organizing Events such as today event, ARFREE and AEED.

Dr. Jauad concluded by emphasizing to keep Looking forward to continuing hosting reginal cooperation and supporting the member states in Renewable Energy and Energy Efficiency.

Thirdly, Mrs. Anita Richter, Project Leader, "DIAPOL-CE Policy dialogue and knowledge management on low emissions development strategies" – GIZ, started her speech by welcoming from GIZ on behalf of the German government and the esteemed attendees on person and online. Mrs. Anita addressed the strategic relationship which is longer than 15 years towards sustainable energy systems in regional and global projects with LAS represented by Eng. Jamila Mattar and RCREEE through collaborating on the introduction of Arab sustainable strategy and the national action plans for RE and EE.

Mrs. Anita also addressed the GIZ support in MENA region through mentioning a successful relationship in Tunisia in supporting the implementation of EE strategy through different sectors as well as in Jordan in supporting the EE action plan. Moreover, Mrs. Anita concluded her speech by underlining the continuous support to the development through innovating polices and finding instrument for EE in industry and the feasibility to implement them in the countries of the region. As well as to facilitate knowledge exchange between experts between the region, instance what have been done in EE platform which was in collaboration with GIZ, LAS and RCREEE.

## Session 2

This session was moderated by Dr. Joseph Al Assad, LAS advisor. This session was about the Energy Efficiency platform in the Arab region: Digitization and Energy Efficiency.

Mrs. Margot Grim-Schlink was the first speaker, who is a shareholder and head of consulting and planning for sustainable buildings and neighbourhoods at e7 energy innovation and Engineering. She gave a presentation about “BIM and data analysis methods in service of EE in buildings” who presented her session online. Mrs. Margot starts her presentation with some of the Energy Efficiency and sustainability Buildings in different designs across various countries. Also, she explained the steps for energy optimization through digitalization, where the steps are as follows:

* Collecting the Data and analyse it.
* Reduce energy demand.
* Use building information modelling (BIM)
* Set a clear goal for the digitalization measures.
* Determine who will be responsible for data operations.
* Elaborate a data concept as much as necessary, as little as possible.
* Ensure the predicted building mechanical systems performance.
* Conduct ongoing energy monitoring.
* Artificial Intelligence (AI)

Mrs. Margot also illustrates a BIM 3D tool that shows shading and optimizes the building shadow and ventilation as well as the mechanical system. Furthermore, she highlighted that the monitoring comes after during the system operation where technical monitoring like:

* Digital twin of the building automation functions.
* Exact comparison of measured performance against TARGET performance
* Detailed description of the system functions is necessary.

1. Mrs. Margot emphasized the importance of collecting data in different stages from the design phase, building modelling, and during ongoing monitoring which makes it easier to understand the inner workings of a building, where a deeper analysis is necessary and how can energy saving be optimized.

The second online speaker was Mrs. Vita Rozite, Energy Policy Analyst at International Energy Agency (IEA). Mrs. Vita had a presentation titled “Impact of the digital era on the energy efficiency in the different sectors”. She indicated the challenges faced during 2022 through supply chain challenges and increasing the cost of equipment where these aspects are continuing to progress in EE. However, Ms. Vida emphasized that EE Global primary energy intensity is improve by 2% in energy intensity in 2022. As a result, digitalization can:

* Open opportunities for system-wide efficiency
* Help make energy efficiency faster, cheaper and at larger scale
* Enhance analytics and visualisation for decision making, where digital tools can help targeting energy efficiency measures
* Scale up, reduce implementation costs, deliver greater impact
* Enable energy efficiency of equipment, systems, plants, supply chains but can also radically transform manufacturing processes
* Improve efficiency of transport systems and facilitate a shift towards low-emission options

Additionally, Ms. Vida also illustrated on what would it need to reach Net Zero Emissions by 2050 Scenario (NZE) milestones which are :

• Yearly wind and solar PV capacity additions >1 000 GW by 2030;

• 5 million heat pumps installations/month in NZE by 2030;

• 100 million buildings with residential PV by 2030;

• All new buildings zero‐carbon‐ready by 2030;

• 150 Mt low‐carbon hydrogen by 2030, 850 GW electrolyzers.

Ms. Vida also concluded her presentation with the challenges and what can be done during working in digitalization as indicated in Table 1 below.

Table 1 Challenges and what can be done in digitalization.

|  |  |  |
| --- | --- | --- |
| No | Challenges | What can be done/Solutions |
| 1 | Data Challenges | * Data-sharing platforms * Harmonization standards * Data protection frameworks, and transparent communication |
| 2 | Insufficient  co-ordination | * Develop communities of practice * Create knowledge-sharing platforms * Create crosscutting networks * Create special-purpose vehicles |
| 3 | Lack of capacity | * Create initiatives to attract capacity and skills * Develop opportunities for knowledge exchange * Develop training and upskilling programmes |
| 4 | Access to finance | * Stimulate public-private partnerships * Support the creation of new instruments e.g. green bonds * Redirect funding and develop dedicated financing vehicles * Introduce training to develop bankable projects * Support the creation of revenue-generating business models |
| 5 | Digitalization risks | * Develop cyber security frameworks and guidelines * Create options for circularity * Build capacity and create inclusive policies and projects |

## Session 3

This session was Moderated by: Dr. Maged Mahmoud, Technical director, RCREEE. This session was about Innovation and E- Mobility. Dr. Maged started by addressing the electric transport sector which demonstrates 30% from the global final energy demand according to the latest statistics in 2021. Where this percentage indeed will contribute to greenhouse gas emissions. It is also recommended to be shown in the Nationally determined contribution (NDCc). Dr. Maged also addressed the importance of infrastructure for EV charging stations, as a result, the guidelines for connecting the EV charging stations to the grid were considered a main target where these guidelines are at the latest stages to be published by RCREEE.

The first speaker was Dr. Mohamed Abdelhameed, Energy Expert for 15 years in Energy, green finance ad buildings with national and international organizations, His presentation was titled “Highlights of the decarbonizing the transport sector in the Arab region, Guideline for charging stations.” presented with his team (Eng. Mohamed Fayez, and Eng. Amr Salah).

Dr.Abdelhamid started his presentation by mentioning how E-Mobility innovations and developments are from a technological perspective. However, there are still some challenges that minimize the spreading of E Mobility where the context of transport sectors of the 17 Arab countries was presented to show the demand and the sustainable contribution to the economic developments of each country, it is also noted that the transport sector is one of the biggest contributors to the global inventory of greenhouse gases emissions.

Dr.Abdelhamid also mentioned that to speed up the sustained development in E mobility, there are three key parameters that need to be taken into consideration which are: 1). Policy interventions (national targets), 2). market uptake of EVs, and 3). Charging infrastructure. He also addressed the best practices of China and the USA by showing the growth and market share accessibility where China has more sustainable growth due to applying only one standard to all chargers and increasing the public charging stations. He also mentioned that the optimum scenario is that each charging station equals 10 EVs, whereas in China the charging stations were more than the EVs which made it more accessible. On the other side the USA applies 3 standards and mainly depends on the individual charging stations.

Dr.Abdelhamid addressed the methodology to support the spreading of E mobility in MENA region where some recommendations were illustrated as follows:

* Supporting regulators and network operators to define the requirements necessary for the safe connection and operation of EVs/EVSE.
* Issuing customized General requirements and specifications for grid-connection, communication, safety, licensing and permits with a focus on the unidirectional charging technology.
* Guidelines and standards suitable and tailored for the regional context.

Continuing the same presentation by “Eng.Mohamed Fayez, Egypt-era”, he showed that the guidelines are tackling two points (Individual & Public) charging stations. Where the requirements are different in terms of communication and safety. Herein, for individual charging stations, Eng. Fayez addressed that the classification of charging is in 4 modes, Where Mode 2 will be sufficient. Also, the charging points shall be sized to be at least 125% of the maximum demand. Furthermore, he mentioned the grid connection requirements which include: operating voltage range, operating frequency range, power factor limits, power quality requirements, protection requirements in Over-current, over-temperature, earthing, lightning, and leakage current.

Additionally, for the public charging stations, Mode 3 will be sufficient for public charging points, where charging stations should be:

* Access to 24/7 support service
* At least two languages mainly Arabic and English.
* The charging plug shall be at a height of 75 to 120 cm from the ground.
* Configuration of charging station should be used by only specialized person
* An emergency button shall be attached to each charging point along with proper signage.

Continuing the same presentation,”Eng. Amr, transport sector” addressed the transport prospective zoning guidelines, He mentioned that 60% of the charging process is occurred at home, and 30% is at workplace. Also, the type of charging (DC/AC) stations depends on the locations for instance: AC charger to be at home, DC chargers to be at Motorways / en-route as it charges faster, and a mixed DC&AC chargers to be at Public areas.

Eng. Amr, mentioned the transport prospective space allocations recommendations where:

* Up to 10% of all parking spaces or at least 6 spaces should be ready for EVs
* EV spaces would be dedicated for EV only to encourage using it.
* EV spaces may be located at the preferred points (for instance, the nearest entry and exit points for users).

The second presentation was on” Innovation and E-Mobility” presented by Mrs. Yosra Askar who is a senior energy expert at World Bank. Energy, Transport, and Industry. she mentioned that the transport sector is the main sector generating emissions, as it represents 30% of energy consumption. Accordingly, targeting this sector will have an impact on reducing emissions. Mrs. Yousra addressed the E Mobility timeline development from 2017 to 2022 in Egypt, highlighting that Compressed Natural Gas (CNG) is a strong competitor to E Mobility.

She mentioned that according to statistics, the total current E mobility is 1040 (536 unites of Battery Electric Vehicle and 504 Plug-in Hybrid) in Egypt, originating from USA,EU and Asia. She emphasized on some points on the Clarity and predictability of the business environment to gain investors and consumers trust, e.g:

* Transparency on the development of tariffs.
* Stability of licensing and operating regulations
* Considering the economic models of investors when assessing any regulatory / tariff change Balancing the interests of different stakeholders

## Session 4

This session was moderated by Dr. Mohamed El-Khayat, Chairman of the New and Renewable Energy Authority (NREA). This session was about Innovation in service of the energy transition.

The first speaker was Dr. Nouri Alkishriwi, who is an energy expert at the energy and EE at UNDP-Libya, He gave a presentation titled “Energy efficiency: key trends and innovations”. Dr. Nouri started his presentation by addressing the concept of EE as it is considered the first fuel, then he explained the key energy challenges which increase energy consumption, limited availability, and global warming. Dr. Nouri also summarized the steps of EE which are:

* Measure (Energy Meters & Power quality Meters)
* Fix the basics (Low consumption devices, Insulation material, Power quality and Power reliability)
* Automating (Building management systems, Lighting control systems, Motor control systems, Home control systems, and Variable drive systems
* Monitor and Improve (Energy management software & Remote monitoring systems)

Dr. Nouri also addressed the benefits of Energy Management systems and the top 10 energy storage trends, as well as highlighted the importance of Minimum Energy Performance Standards (MEPS) for electrical appliances equipped with inverters. He concluded his presentation by addressing the energy efficiency strategy in Libya by targeting to reach a total energy saving of more than 16.9 TWh by 2035.

The Second speaker was Mr. Riadh Bhar, Who is a project manager of Build-Me project, also works at Guidehouse; his presentation was titled” Innovation for an energy efficient building sector- Building Energy Performance Tool”. He started his presentation through addressing the energy consumption in Buildings by introducing BUILD\_ME project which is funded by International Climate Initiative (IKI) applied for three countries (Egypt, Jordan, and Lebanon)

also showed the main objectives of the third BUILD\_ME phase which are:

* Technical Framework
* Financial Framework
* Dissemination and Capacity Building
* Political and Regulatory Framework

The third speaker was Eng. Haytham Atta, who is a contracts &commercial manager at Administrative Capital For Urban Development (ACUD), His presentation was titled “Innovative sustainable cooling solutions - new capital district cooling plant”. Eng. Atta started by addressing the cooling station at ACUD which has a total capacity of 64,000 tons as it serves more than 1.8 million square meters. Eng. Atta illustrated an overview for the ACUD services and its extension plan in the next district cooling station to the second phase. He also showed the transport pathways including (Light Rail Transit, Monorai, and High-speed rail) all over ACUD.

## Session 5

This session was moderated by Dr. Nouri Alkishriwi. This session was about Highlights on the regulatory framework for E. mobility in the Arab region.

This first speaker was Mr. Abdel Rahman Alqatawna who is the head of the contracts and agreements department, EMRC- Jordan. His presentation was titled “Instructions of the charging electric vehicles in Jordan”.Mr. Alqatawna addressed Jordan’s strategy for the 2020-2030 and its goals in EVs, also the licensing process for individual and public charging stations; he indicated that in 2021, Jordan authorities approved the standards and specifications of charging stations, where the total numbers of EVs in 2022 reach to 45,000.

The second speaker was Mr. Sherif Mohamed Zoheir who is the head of central department for the electricity market, EgyptERA. his presentation was titled “Regulatory framework for electric vehicle charging activities in Egypt”. He started by addressing the importance of conducting meetings, events, and public consultations with experts, consultants, market players, governmental authorities, and the private sector before issuing a new regulations. Mr. Sherif addressed the importance of promoting the private sector to invest in the EVs stations. He also concluded on the EVs tariff prices for low voltage (LV) and Medium Voltage (MV).

## Recommendations and Highlights

After very interactive moderated discussions between the participants, there are several recommendations:

* In KSA:
* Highlighting the importance of issuing standards and Infrastructure for Charging stations
* Asking What are the effects of extending the electric vehicles to residential buildings consumption?
* They applied Seasonal Energy Efficiency Ratio (SEER) in the usage of refrigeration where it reflects a very cost effective solution.
* In Bahrain:
* Co2 Capturing is estimated to be 4 ton of CO2/EV
* Highlighting the importance of regulations in EVs with different ministries
* The cost of each EV charger was more than 120,000 USD its expensive, However it has a short time of charging the EV which is better than the long day of charging the EVs
* There will be a reduction of the cost of charging up to 70% from the conventional fuel
* indicating in Green Building Code Policies, there will an availability of car parking areas that includes charging stations
* For the Renewable Energy (RE) Projects Tenders, the requested bidders to consider a charger for EV for each RE project

General Highlights:

* For individual charging stations, It is preferred to have two meters one for regular consumption and one for the charging stations
* The payment of charging the EVs could be based on time not based on per kWh:

(for instance in UAE, 1 United Arab Emirates Dirham /minute)

* The increasing number of EVs will result an issue to the grid functioning on the long term
* Installing a control room for EVs to monitor and control them remotely