

UNDA project, on “Up-scaling Energy Efficiency in the residential and services sectors in the Arab Region”



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**National Seminar on: National Workshop on
“Development, Implementation and Evaluation of
Energy Efficiency Policies in the Buildings Sector
in Jordan”,**

22 July 2019 –Amman – Jordan



MINISTRY OF ENERGY AND MINERAL RESOURCES
THE HASHEMITE KINGDOM OF JORDAN

Economic And Social Commission For Western Asia



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Identification of potential EE action programmes that are applicable on a nationwide level for the existing building stock, and assessing their potential energy and economic impacts, including the prioritisation of identified actions

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2. Evaluation of the impacts of EE actions in existing buildings
3. Prioritizing energy efficiency actions based on saved CO₂ emissions (as part of a low carbon strategy)

Potential of EE actions targeting the existing building stock at the national level

The evaluation of the energy efficiency potential in the residential and tertiary sectors according to the types of building will make it possible to identify EE actions targeting the existing building stock. These measures are but not limited to:

- ✓ Thermal renovation of buildings; **Energy impact estimation by simulation.**
- ✓ Elimination of incandescent lamps from the market and diffusion LED lamps; **Energy impact estimation by calculation.**
- ✓ Dissemination of efficient appliances; **Energy impact estimation by MEPS calculation.**
- ✓ Diffusion of solar water heaters; **Prediction and calculation**
- ✓ A systemic and global approach to energy management, focusing on the automated control of building energies according to their uses (**the transformation of the consumer into a particular user, informed and mobilized, able to optimize his comfort while realizing energy savings**)
- ✓ Other measures

Potential of EE actions targeting the existing building stock at the national level

In the case of the building (residential-tertiary sector), the actions to be studied (but not limited to) are:

- changes in heating modes,
- the implementation of actions on the building (internal and external insulation, double glazing in cold areas, insulation of roofs in cold and hot areas, etc.),
- the setting up of monitoring actions (for example, lighting automation), or actions on housing facilities (LED lighting, eco-efficient appliances, etc.).

These measures will be studied individually or in the form of a bouquet. In addition, particular attention is paid to the order in which these actions are performed. For example, it is better to insulate a dwelling before changing the boiler so as not to overestimate the size of the latter.

Evaluation of the impacts of EE actions in existing buildings

Evaluation of the impacts of EE actions in existing buildings

The impacts to be evaluated are:

- **Energy impacts:** improved energy independence by reducing fossil fuel consumption and diversifying the energy mix.
- **Economic impacts:** reduction of the energy bill, reduction of public subsidies and industrial development of energy conservation technologies.
- **Environmental impacts:** reduction of greenhouse gas emissions.
- **Social impacts:** job creation and preservation of the standard of living of disadvantaged households

Evaluation of the impacts of EE actions in existing buildings

- **Residential Buildings**

- ✓ **By 2030, the EE actions would make it possible to reduce the demand in final energy of ktoe to only ktoe, a gain of about ktoe by 2030.**
- ✓ **The cumulative primary energy gain over the 2020-2030 period generated by the energy conservation actions is estimated at around ... Mtoe.**

Evaluation of the impacts of EE actions in existing buildings

- **Residential Buildings**

- ✓ **According to EE actions, GHG emissions would be around kTECO₂ by 2030 instead of kTECO₂ provided by the trend scenario. The emissions avoided at this horizon are then about kTECO₂.**
- ✓ **Over the 2020-2030 period, avoided emissions are estimated at around MTECO₂.**

Socio-economic impacts of EE actions

■ Residential Buildings

Socio-economic impacts can be assessed at several levels:

- ✓ For the consumer community, the reduction in energy bill (considering current rates) is estimated in 2030 at around MUS \$ / year. The cumulative gains over the 2020-2030 period would be of the order of MUS \$.
- ✓ For the community, the cost of implementing EE actions is estimated at about US \$million. Thus, the cost of the avoided primary energy toe is about US \$ / toe.
- ✓ The EE actions would avoid the construction of an additional cumulative capacity of electricity production of about MWe by 2030, which corresponds to deferred investments of the order of MUS \$.
- ✓ In terms of jobs, the implementation of actions would allow the creation of around additional jobs by 2030 in the sectors developed in this context.

Evaluation of the impacts on the job

- Instruments are available for two types of approaches to estimate the employment impact of energy efficiency measures in buildings:
 - a comprehensive approach related to additional investments to achieve goals, and
 - a sector-based approach based on turnover, value added and the number of jobs in the sector.
- The main difficulty encountered during this work is access to information.

We therefore propose to use the overall approach, which is to determine the number of jobs based on additional investments to be made.

Energy impact of the scenarios

- **Tourism Sector Buildings (for Example)**
 - ✓ **By 2030, the EE actions would make it possible to pass the demand in final energy of ktoe to only ktoe, a gain of about ktep by 2030.**
 - ✓ **The cumulative primary energy gain over the 2020-2030 period generated by the EE actions is estimated at around ... Mtoe**

To be carried out by category of buildings following the example of the residential: Health, Hotel, Commerce, Education, Offices, other tertiary

Prioritizing energy efficiency actions based on saved CO2 emissions (as part of a low carbon strategy)

As part of a low-carbon strategy, the prioritization of energy efficiency actions aims to show the most relevant actions in terms of investment and potential savings of CO2 emissions.

In the context of constrained investments, this prioritization becomes necessary because it alone makes it possible to propose elements of public policy that are compatible with economic resources and with the objectives of reducing CO2 emissions in order to reach the objectives at least cost. It is then proposed to choose to analyze the actions according to two factors:

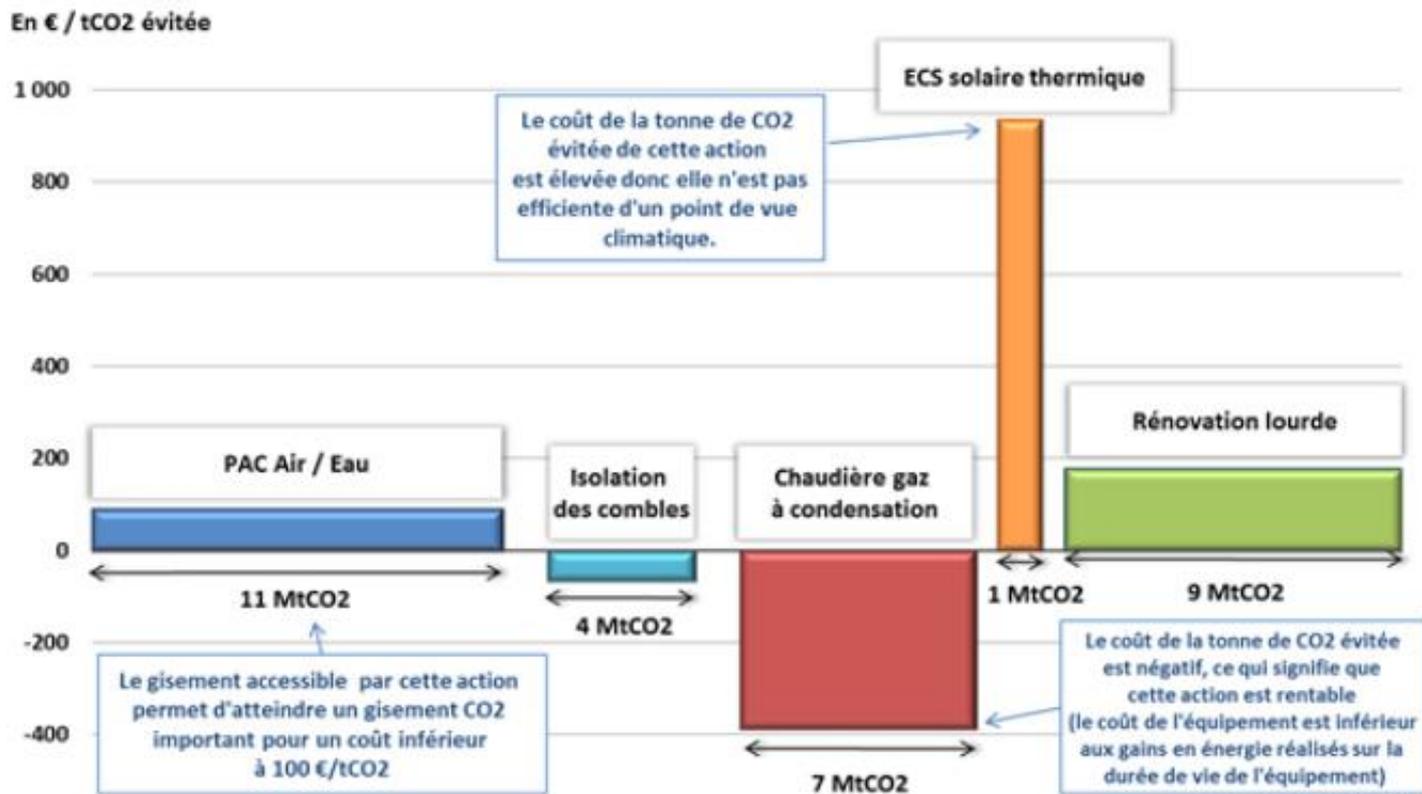
- the quantities of CO2 that they can avoid;**
- their average cost, expressed in US \$ / tCO2 avoided, which is their full cost compared to the quantities of CO2 that they can avoid.**

The combination of these two factors makes it possible to determine the most effective actions to prioritize in a low carbon strategy (those that provide the most significant CO2 reduction potential per US \$ spent).

Prioritizing energy efficiency actions based on saved CO2 emissions (as part of a low carbon strategy)

Exemple de la France

Gains liés aux actions sur une maison individuelle chauffée au fioul

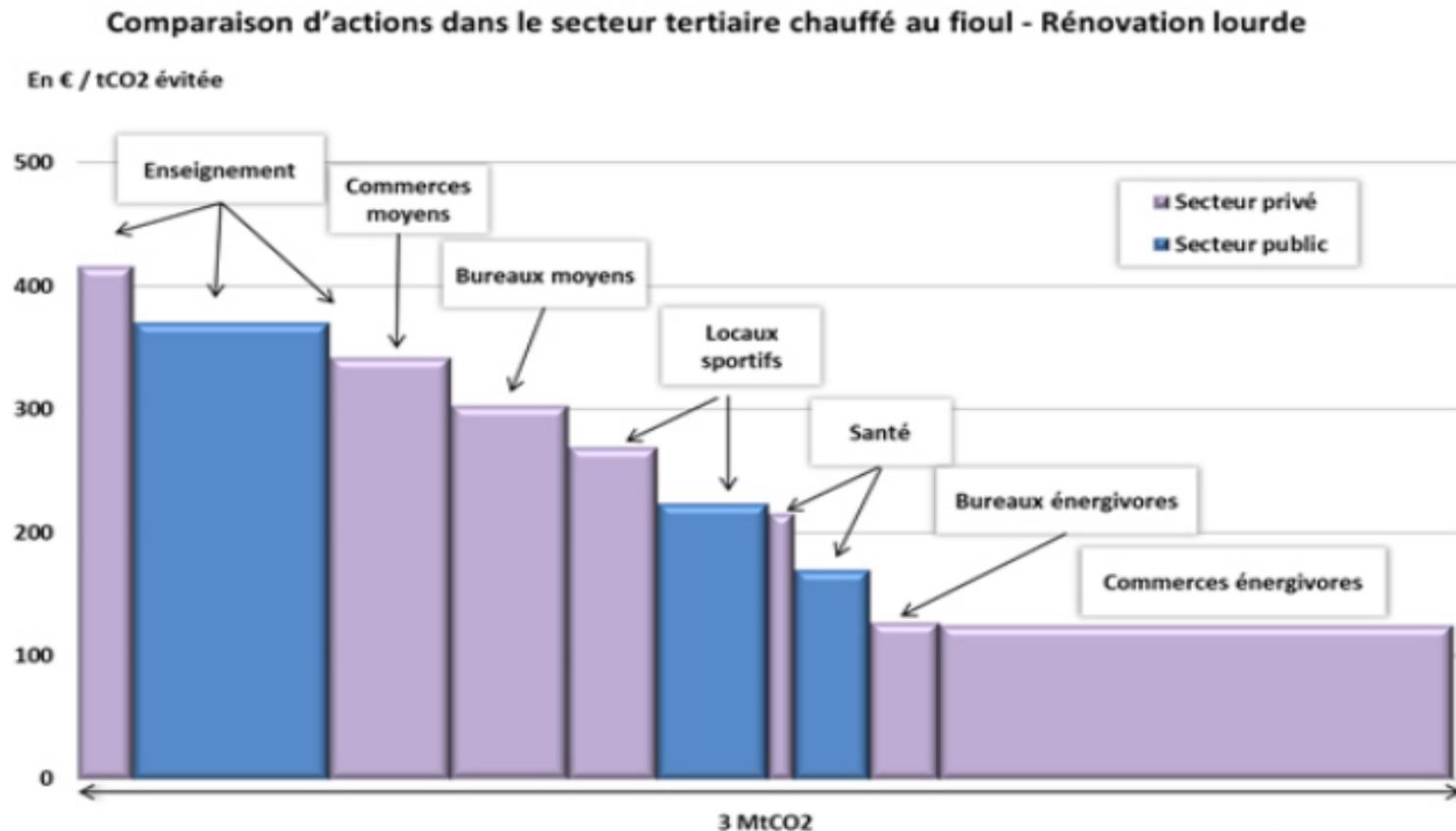


Source : Calculs UFE

It should be noted that the costs per tCO2 avoided are proportional to the cost of the toe avoided.

Prioritizing energy efficiency actions based on saved CO2 emissions (as part of a low carbon strategy)

Example from France



It should be noted that the costs per tCO2 avoided are proportional to the cost of the toe avoided.

Thermal renovation of buildings and EE actions

- Thermal renovation of buildings includes:
 - insulation of the building envelope (roof, walls and windows double glazing),
 - installation of efficient heating and cooling equipment.
- The change of electrical appliances (fridge, washing machine ..) by more efficient equipment.

It is expected that the financing of these measures in existing buildings at the level of ... MUS \$ over 20 years.

We consider here that renovation work is a priori done by craftsmen masons, roofers, plaster and insulation trades, carpenters, electricians ... These jobs are local. The manufacture of equipment (insulating materials, glass, wood, windows ...) could be imported.

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THANK YOU FOR YOUR ATTENTION

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