UNDA project, on "Up-scaling Energy Efficiency in the residential and tertiary sectors in the Arab Region"

National Seminar on: "Launching of the baseline mapping study on the energy use in the building sector in Jordan",
5 March 2019 –Amman - Jordan

MINISTRY OF ENERGY AND MINERAL RESOURCES
THE HASHEMITE KINGDOM OF JORDAN

Economic And Social Commission For Western Asia

UNITED NATIONS
ESCWA

Proposed UNDA baseline mapping study methodology for energy consumption in office buildings

40 YEARS

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# Main objectives of the baseline mapping study on energy use in office buildings

- **Estimation of the built stock of office buildings**
  - ✓ **Per category : Public, Private**
  - ✓ **Per climate and geographical areas**
  - ✓ **Per energy performance (where possible)**

- **Estimation of final Energy consumption**
  - ✓ **Per energy source**
  - ✓ **Per usage**
  - ✓ **Per climate zone**

- **Estimation of equipment rate**
  - ✓ **Per usage**
  - ✓ **per category**
  - ✓ **Per climate zone**

Main objectives of the baseline mapping study on energy use in office buildings

- **Focus on some specific usages**
  - ✓ **Evolution of the equipment rate (cooling, heating, etc.)**
  - ✓ **Evolution of energy performance**
  - ✓ **Evolution of energy consumption linked to usage patterns (zooming on cooling, heating and)**

- **Elaboration of EE indicators**
  - ✓ **Per total final consumption**
  - ✓ **Per energy source**
  - ✓ **Per usage**
  - ✓ **Per category (where possible)**
  - ✓ **Per climate area**

- **Enable the elaboration of future scenarios for the stock of office buildings and estimate their EE potential**

Methodology of data gathering and analysis for office buildings

- **Distribution of Building stock per climate zone**
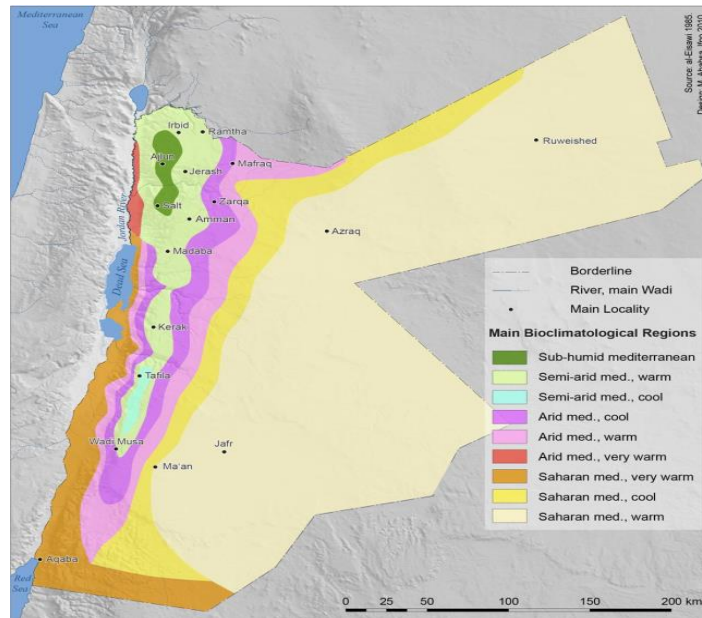
Climate characteristics of Jordan. Atlas of Jordan 2014.

- **More distribution factors**
  - ✓ Urban / rural
  - ✓ Shares of total heated areas
  - ✓ Shares of total air conditioned areas
  - ✓ Etc.

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Methodology of data gathering and analysis for office buildings

- **4 types of possible sources of information**
  - ✓ **Public sources data**
  - ✓ **Surveys**
  - ✓ **Measurement campaigns**
  - ✓ **Modeling**

Combining sources is often needed for complete and balanced indicator sets

Statistical data of building stock	Data for GIS	Energy consumption
• Ministry of Energy • Department of Statistics • JNBC, MoPWH, MoMA	• JNBC • DoS, MoMA, • Google Map…..	• Ministry of Energy • NERC • RSS, JorGBC……

Typology & Quantification Equipment / Buildings

Climate area distribution

**Characterization physical / energy**

Methodology of data gathering and analysis for office buildings

- **Available data sources from public institutions**

	National level	Regional level
Available data	▪ Final energy consumption in public, private etc. ▪ Final energy consumption per usage	▪ Final energy consumption in shopping malls per energy source ▪ Final energy consumption per usage
Sources	✓ STEG surveys ✓ Minitries, Chambers of Commerce ✓ Energy audits	✓ Data gathering from gas and electricity distributors
strengths	Reliable sources	Surveys
weaknesses	✓ Little data on characteristics of the buildings and equipments	✓ Small number of indicators ✓ No aggregation possible on supra levels
Timeliness	Access to data processed by the Ministry of energy , DoS, and other but no access to raw database	

Methodology of data gathering and analysis for office buildings

- **Example of approach used in France**
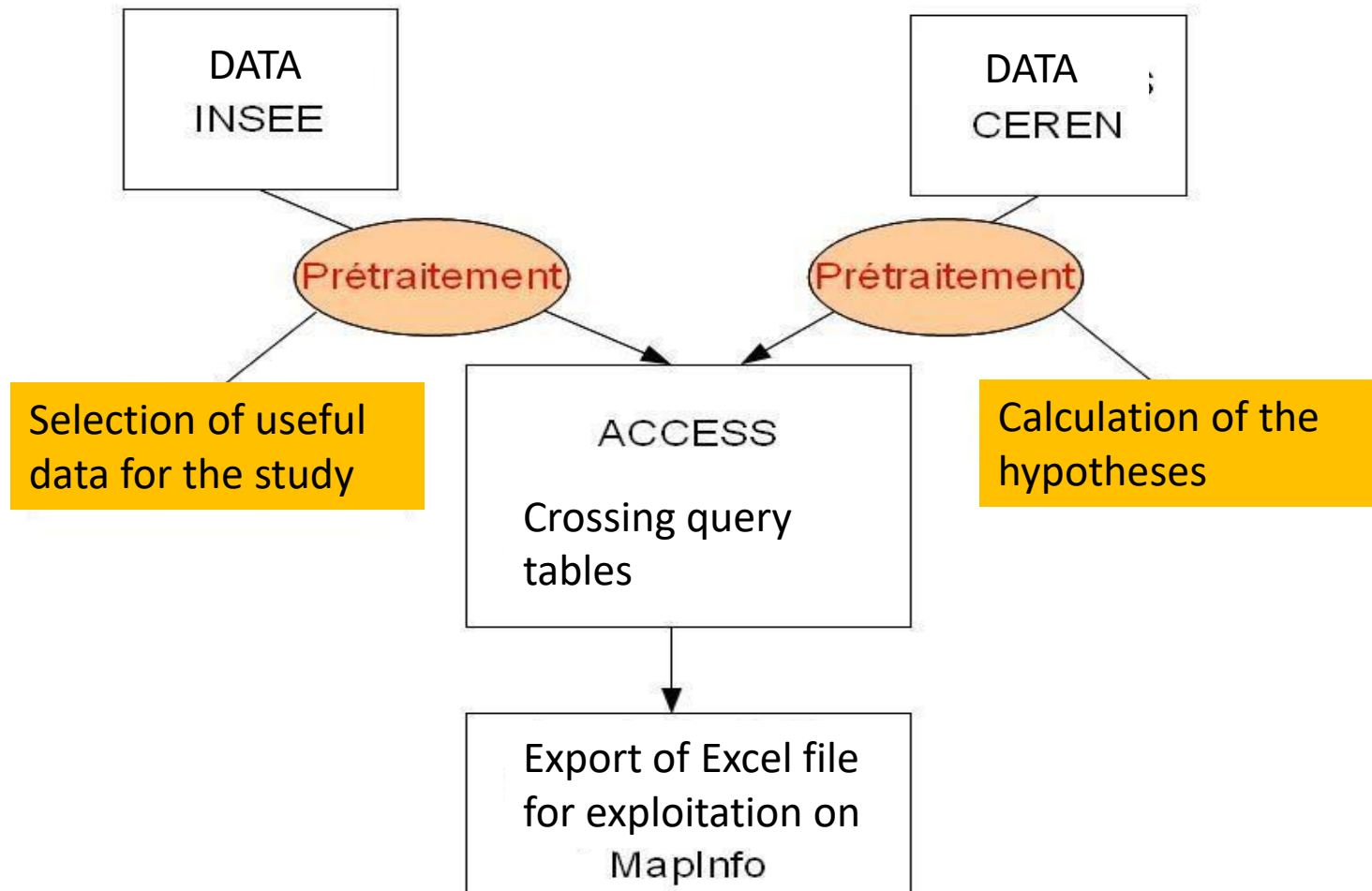
Energy Consumption and their respective ratios for office buildings

Offices	Area covered m^2	Intensity consumption kWh/m^2	Overall Consumption in GWh/year	Overall Consumption in toe/an
Public sector				
Private sector				
TOTAL				

Distribution of the stock of office buildings across the geographical and climate Zones

Total office buildings	Total area in m2	Total electricity consump. in KWh	Total electricity consump. in toe	Total gas consump. in toe	Total primary energy consump. In toe	Total primary energy intensity in koe / m² /Year
Zone 1						
Zone 2						
….						
TOTAL						

Methodology of data gathering and analysis for office buildings

- **Highlight on the methodological aspects taken into account**
  - ✓ The right approach is needed from all actors for all to endorse the results.
  - ✓ The appraisal of information gathered through available sources (Ministry of Energy, DoS, others ministries, Chamber of Commerce, Electricity utilities, NERC, RSS, JorGBC, etc.) and identifying the additional data needed
  - ✓ The methods to estimate the additional data needed (combination of top-down and bottom-up approaches)
    - ➤ Bottom-up : the use of micro data (energy consumption of a representative sample of shopping malls per category per climate zone) to reduce uncertainty
    - ➤ Top-down : Macro data (Country or region) using distribution factors (administrations, climate zones, categories., etc.)
  - ✓ Comparison of modeling results with metered data (gas/electricity consumption for a representative sample of shopping malls)
  - ✓ Data consistency checks with regional and national level statistics.

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Main questions and points for discussion

- **What are the important energy usages to focus on ? (heating, cooling, lighting, others?)**
- **How can we estimate the penetration rate of high-performance equipment and its evolution ?**
- **How can we estimate the high thermal quality buildings rate and its evolution?**
- **What are the alternative sources of information to turn to for complementary data? (Other than Ministry of Energy, different ministries, DoS, Chamber of Commerce, Electricity utilities, NERC, RSS, JorGBC, etc.).**
- **How to strengthen efforts of existing data producers : Ministry of Energy, DoS, Chamber of Commerce, Electricity utilities, NERC, RSS, JorGBC, etc.?**
- **How to establish an energy monitoring tool for the office building sector, in order to measure the impact of energy management in the country?**
- **Other points for discussion….**

THANK YOU FOR YOUR ATTENTION

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