

JICA's interventions in the energy sector
(co-benefit Mitigation)

Capacity Development for Energy Efficiency and Conservation (EEC) in Egypt

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1. Outline of the Technical Cooperation Project in Egypt

- Improving Energy Efficiency and Conservation (EEC) was one of the main recommendations and policies in “**Integrated Sustainable Energy Strategy (ISES) to 2035**” (2016) in Egypt.



Enhancing capacity of EEC relevant entities as organizations is essential.



- Since Apr.2021, JICA Technical Cooperation (T/C) Project, the Project for Capacity Development on EEC, **started in full scale**.
- ⇒ Completed capacity assessment / baseline survey in Sep.2021.
- Since Oct.2021, T/C activities started and will be **completed in Mar. 2023**.

Overall Goal and Purpose of the Project



- This T/C aims to strengthen institutional capacities of Government of Egypt toward further promotion of EEC.

Overall Goal	Objectively Verifiable Indicators
<p>EEC promotion system of the government of Egypt is strengthened, and the national goal for energy saving is accomplished.</p>	<p>To reduce energy by 18% compared to 2010 by 2035 (target set by ISES to 2035).</p>

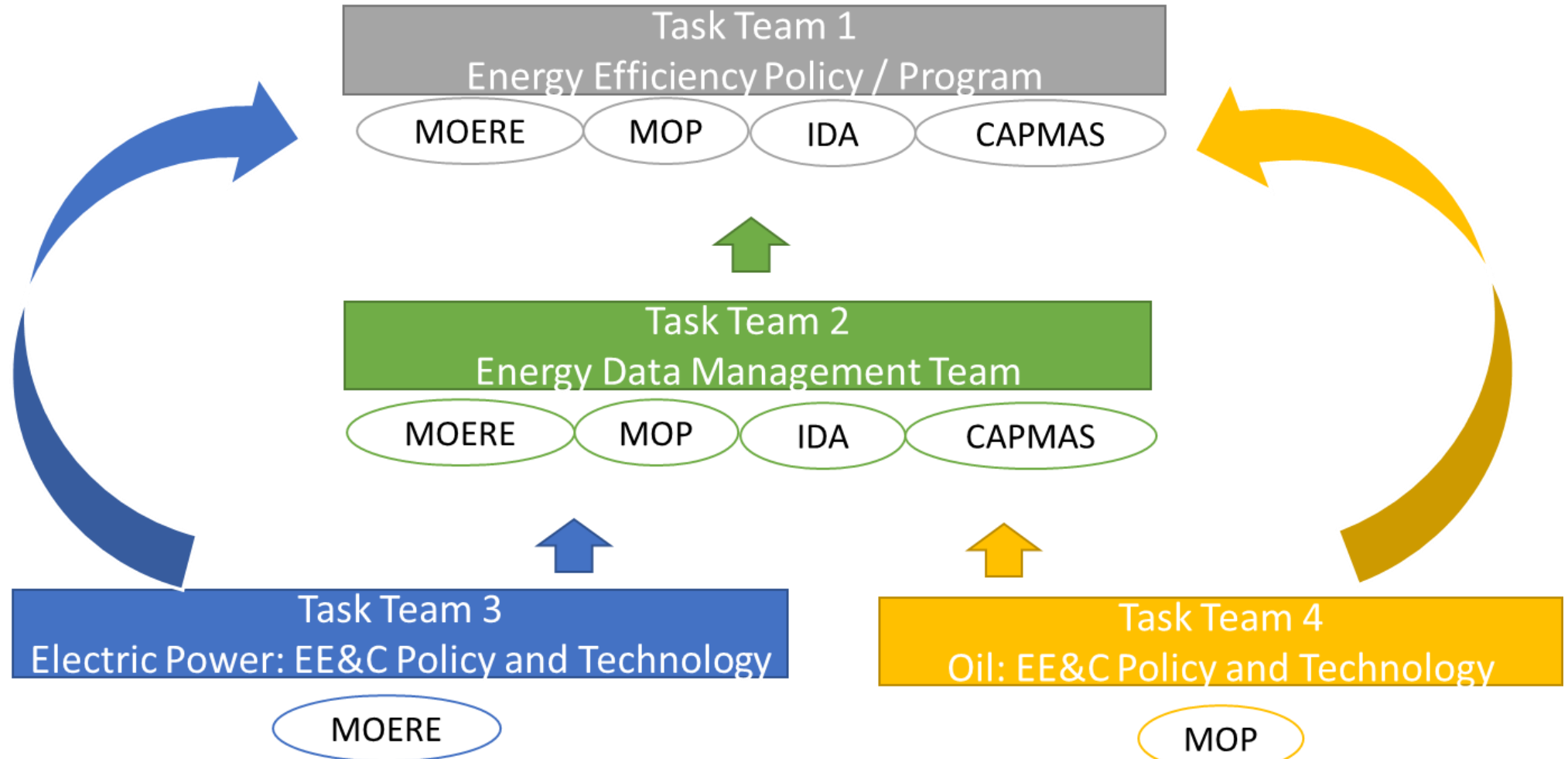
Project Purpose	Objectively Verifiable Indicators
<p>To promote EEC policies at the national level, such as NEEAP-II and the Egypt OGMP, T/C team will develop the capacity of government agencies necessary for system establishment for the formulation of EEC promotion strategies, plans, data management, and expansion of the introduction of high-efficiency equipment.</p>	<ol style="list-style-type: none"> 1. Review of implemented projects in NEEAP-II is conducted. 2. Data Management System is established.

4 Counterparts of Egyptian Government

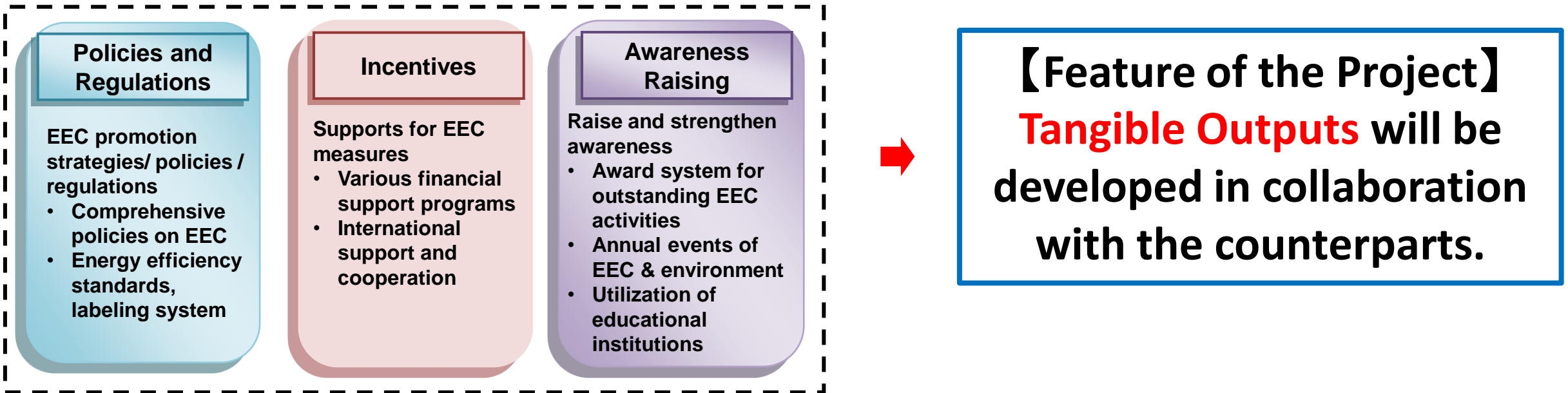
<p>Ministry of Electricity and Renewable Energy (MOERE)</p>	<ul style="list-style-type: none"> • Formulated “National Energy Efficiency Action Plan-II” (NEEAP-II). • Promoting EEC in the electricity sector.
<p>Ministry of Petroleum and Mineral Resources (MOP)</p>	<ul style="list-style-type: none"> • Formulated “Oil and Gas sector Modernization Program (OGMP)”. • Promoting EEC in the oil and gas sector.
<p>Industrial Development Authority (IDA)</p>	<ul style="list-style-type: none"> • Authority that falls under the Ministry of Trade and Industry (MTI). • Promoting EEC in the industrial sector.
<p>Central Agency for Public Mobilization and Statistics (CAPMAS)</p>	<ul style="list-style-type: none"> • Managing various Egyptian statistics including energy related data.

Project Structure

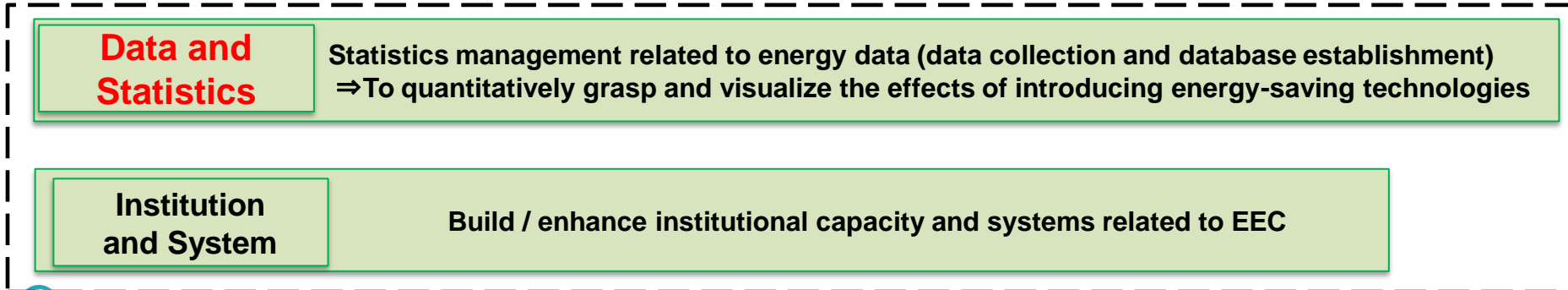
- Established Task Teams by each sector/field.



Necessary 3 Aspects for EEC Promotion



Foundation of EEC promotion





2. Technical Cooperation Activities in Electricity Sector

Preparation of annual EEC report

- **Annual EEC report** is under preparation and **to be released at COP27** including following key contents.

Key Contents of EEC Annual Report, MOERE (tentative)

Key Contents
• Strategies and policy framework
• Key performance indicators (National energy balance, Energy Intensity, etc.)
• EE framework and measures
• Climate change (GHG reporting, grid emission factor, etc.)
• Awareness raising, training and capacity building
• Future projects

Capacity Development through Energy Audits (E/A)

- Enhancing **capabilities to implement EEC promotion policies in building sector** through E/A trainings (theory and practice).
 - **Lecture based trainings**
 - **Lecture based trainings** contribute to MOERE officers to receive **certificates from LEED** (the Leadership in Energy and Environmental Design).
 - **On-site trainings**
 - In on-site trainings, actual **power consumption by office devices (Air Conditioner, lighting, etc.)** is measured using data logger and the obtained data is **analysed** for EEC improvements in building sector.

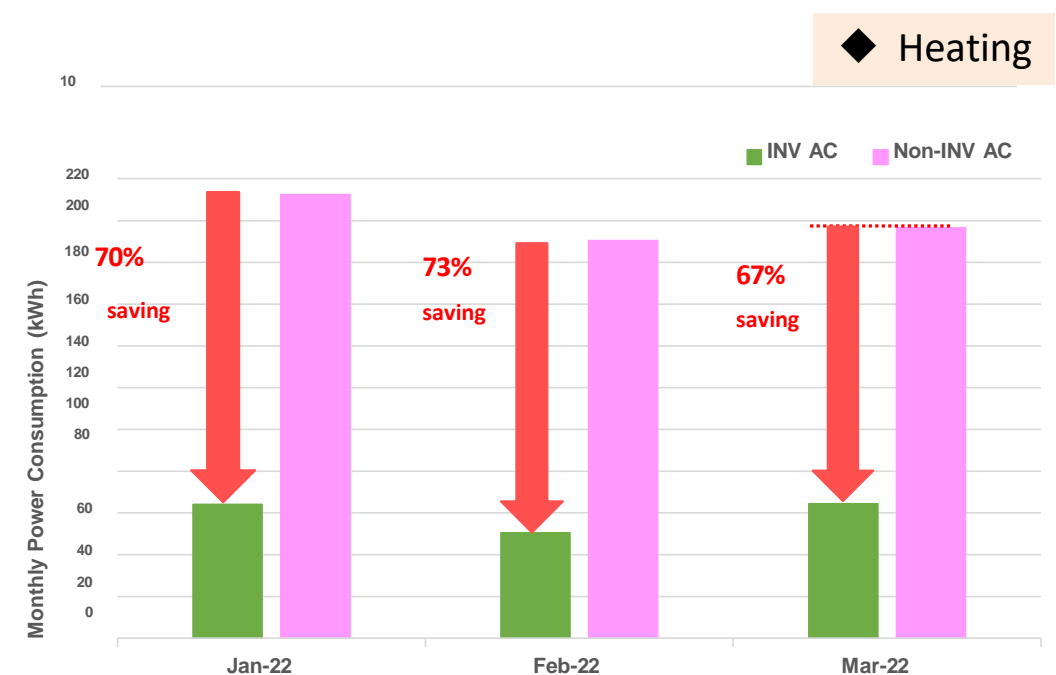
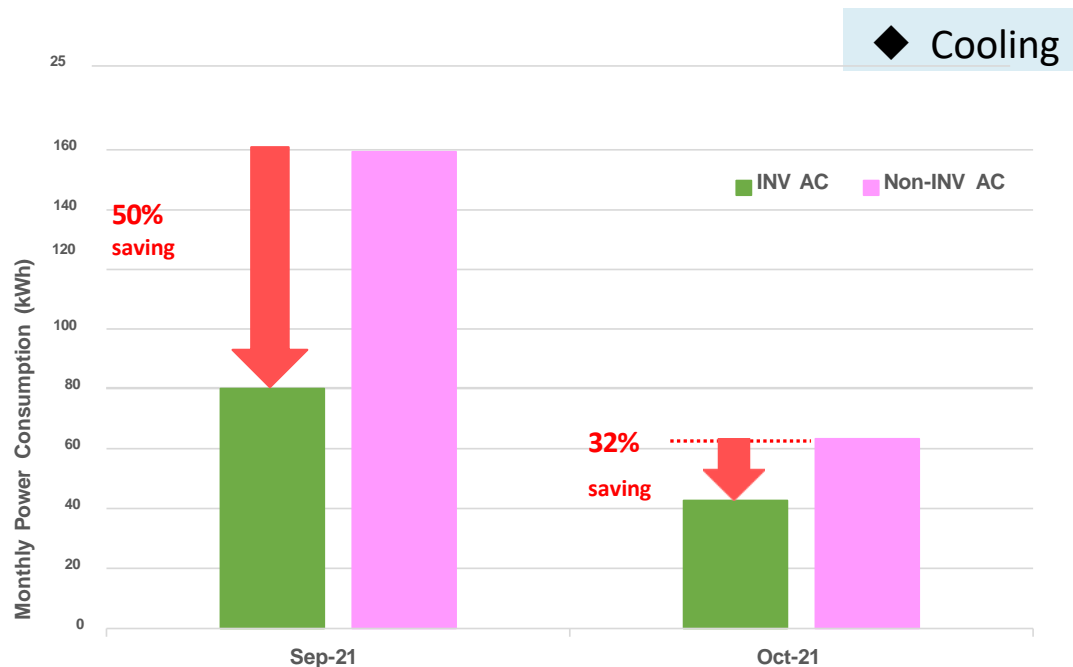


Pilot Project (1) : AC Demonstration Test

➤ This pilot project aims to compare **actual power consumption** of **inverter-controlled AC** and **non-inverter-controlled AC** under living conditions.

*AC: Air Conditioner

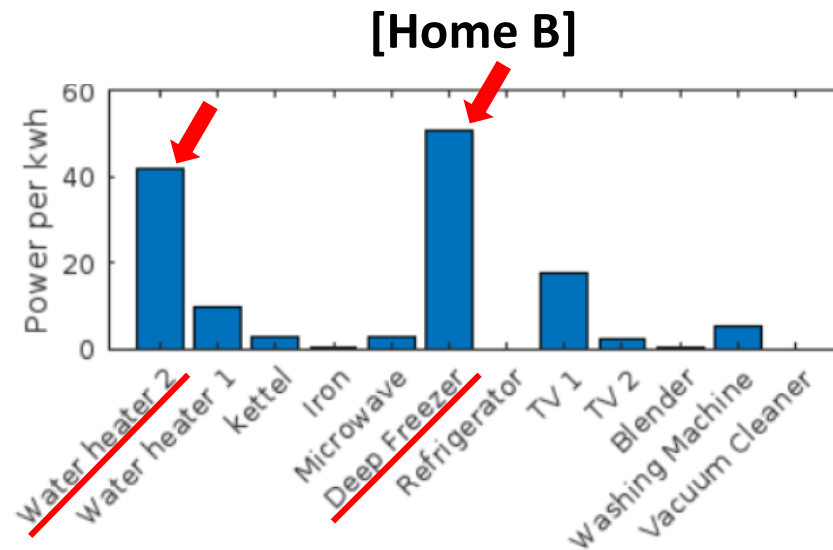
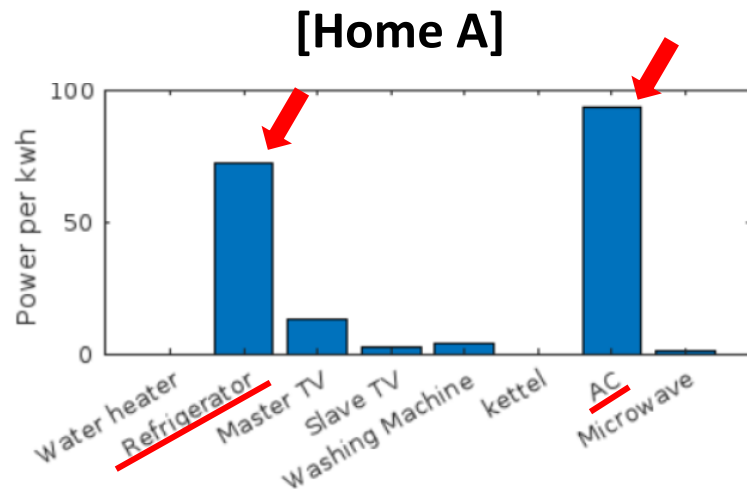
- Data collection is still on-going to obtain one-year data and the test results have already proved the **inverter AC significantly reduces power consumption**.



Pilot Project (2) : Smart Home Test

- This pilot project aims to collect **actual power consumption by home appliances** using smart sensors developed by E-JUST at 5 homes.
 - AC, refrigerator / freezer and water heater are the major power consuming appliances, and data collection will continue throughout this summer and to be analysed.

Examples of measured power consumption data in Jul.2022



Smart Sensor



3. Technical Cooperation Activities in Petroleum Sector

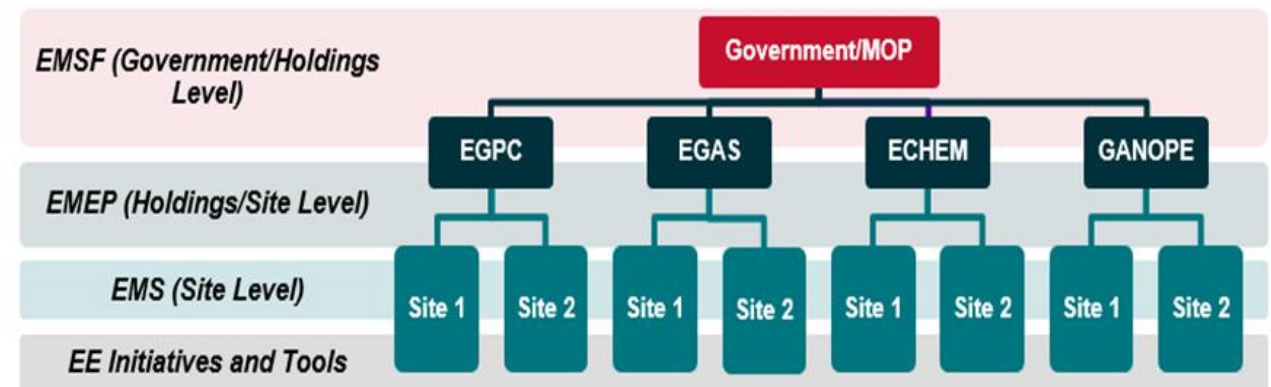
Development of the EMSF Roadmap (1)

- To close the gap identified as part of “As is Analysis”, the preliminary **EMSF (Energy Management System Framework) roadmap** was developed.
 - The roadmap covers the five key EMSF elements (**Organisation and governance, regulations, finance, information and capacity building**) throughout the petroleum sector as well as each level.

5 Key Elements of EMSF



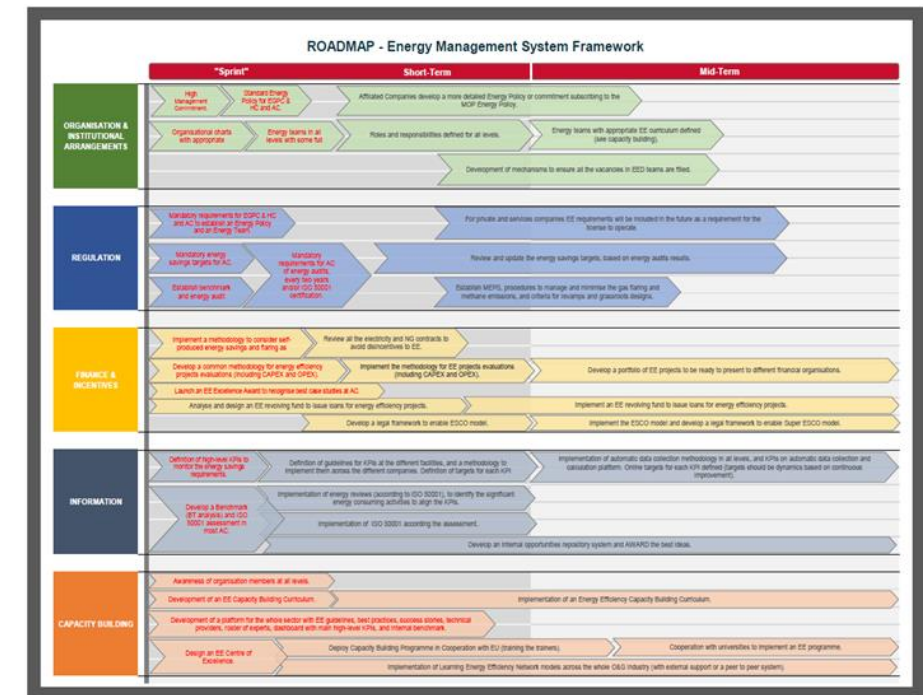
Overall Structure of Petroleum Sector (proposed)



Development of the EMSF Roadmap (2)

- Major **“SPRINT” phase** elements in the roadmap
 - Define and apply petroleum sector-wide **energy policies**.
 - **ISO 50001 (EnMS, Energy Management System)** for affiliates in petroleum sector (mandate).
 - All affiliated companies will be required to **set energy-saving targets** to be achieved, reported, and presented.
 - Developing and implementing an **ESCO model** within the petroleum sector.
 - Establishment of a **Center of Excellence (CoE)**, where **EEC services and trainings** are to be provided.

EMSF Roadmap Developed



207262-EOY-RMP-000-0001 - RoadMap - Post Workshop Version - Revision 1

Pilot Refinery Energy Review (1)

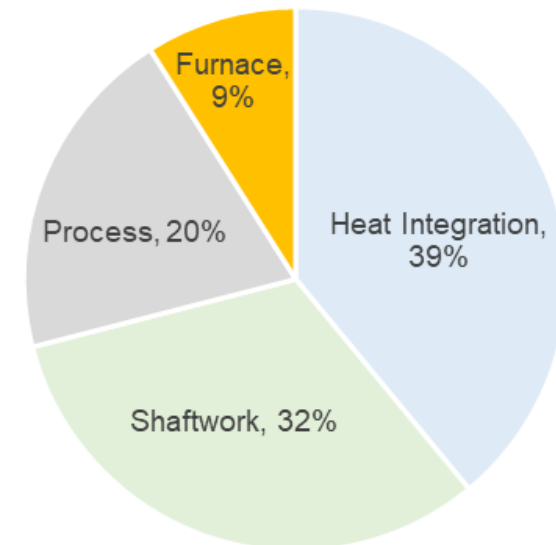
➤ “Quick Wins” and investment opportunities

- A total of 72 EEC opportunities were identified.
- The total potential savings is estimated 171 mil EGP/yr, which consists of a combination of **quick-wins and investment opportunities**.

Opportunity Categorisation with Associated Potential Savings

Category	Description	Statistics	Estimated Savings (mil EGP/yr)
A	Quick Wins	9	12.2
B	Low Investment	2	1.4
C	Medium Investment	8	35.3
D	High Investment	1	122.4
X	Rejected	52	~
TOTAL		72	~ 171

Inefficiency Gap Areas in a Pilot Refinery



Pilot Refinery Energy Review (2)

➤ Training courses outline of energy review

- General Methodology of **Opportunity Evaluation**
- Worked Examples
 - Furnace
 - Shaftwork
 - Heat Integration
 - Process / Design
- Achieving optimum energy efficiency
- Development of a utility system model
- Thermal integration analysis using pinch technology
- Identification and evaluation of energy projects
- Hands-on **trainings using the Software**



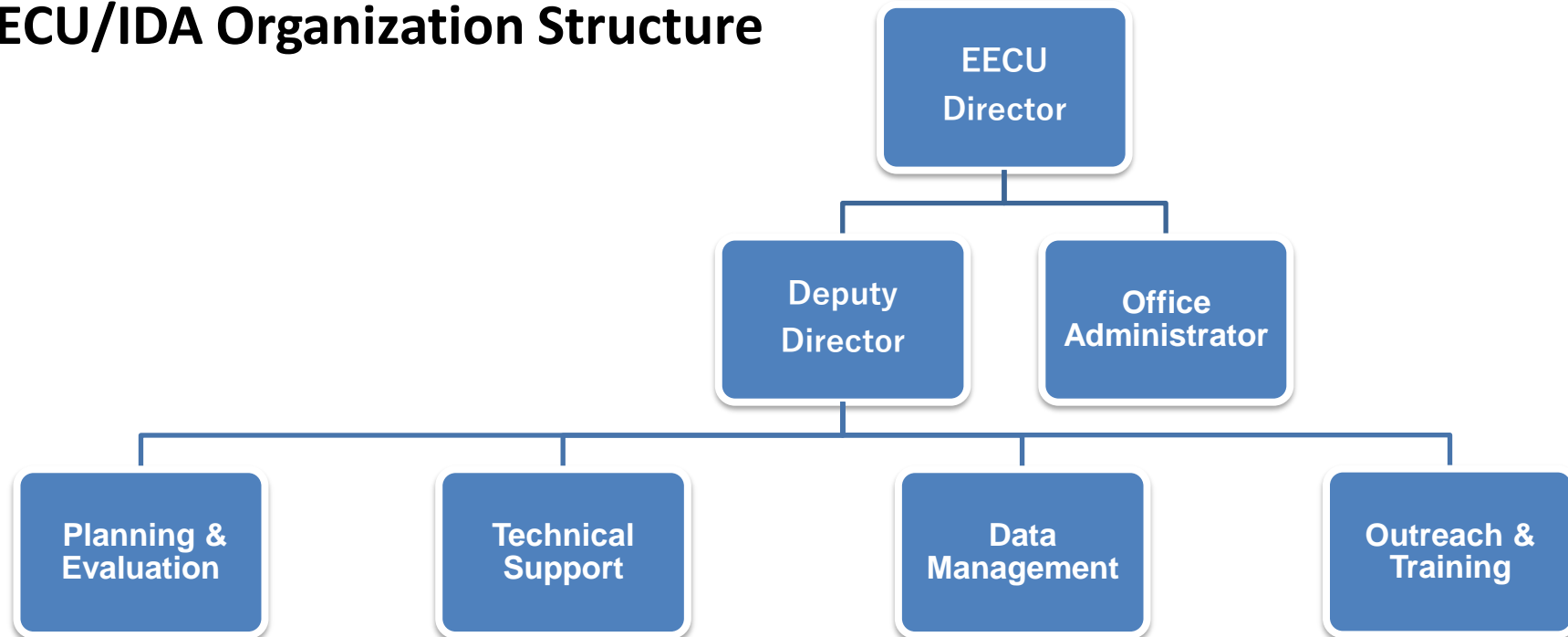


4. Technical Cooperation Activities in Industrial Sector

Establishment of EECU/IDA

- **Establishment of EECU (Energy Efficiency and Conservation Unit)**
 - Energy Efficiency and Conservation Unit (EECU/IDA) was officially launched on 1st January 2022 with objectives and mandate of EECU.

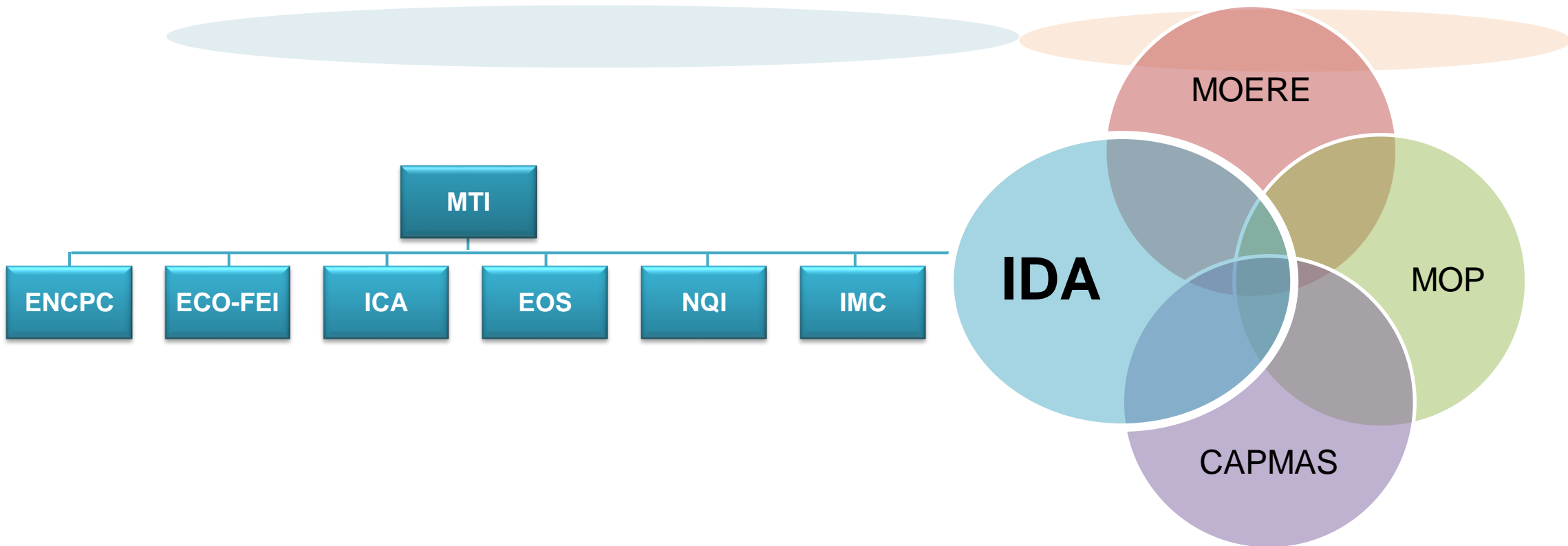
EECU/IDA Organization Structure



Overview of EECU/IDA Activities

Industrial sector activities

Cross sector activities



Integrated Activities in the Industrial Sector

➤ Integrated activities with relevant entities in the industrial sector

- Integrated discussion / meeting in the industrial sector with participation from **MTI affiliated entities (MTI, IDA, IMC, ECO-FEI, ENCPC, NQI, EOS).**



○ Energy audits trainings

- Outline of training
 - ✓ Concepts of EEC in the industry sector
 - ✓ Electricity tariff (2021) and the necessary measures to reduce the energy bill
 - ✓ Applicable technologies and solutions to overcome the implementation barriers
 - ✓ Incentive financing tools
 - ✓ Site visit & Group work
 - ✓ Energy audits case study



Cross Sector Activities

➤ Cross sector activities with EEC related counterparts

- Meetings with **MOERE** to discuss **energy manager system establishment**.
- Meeting with **MOP** to share information on the approaches in the petroleum sector. (e.g. **EMSF, EnMS**)



➤ Workshops for private sector

- 1st awareness raising workshop for factories is under preparation.
- Sharing EEC information (e.g. technologies, governmental funds, private funds).
- EEC check list for factories.

EEC Check List

(Note) I: Can be implemented by operations, H: Investment required^①

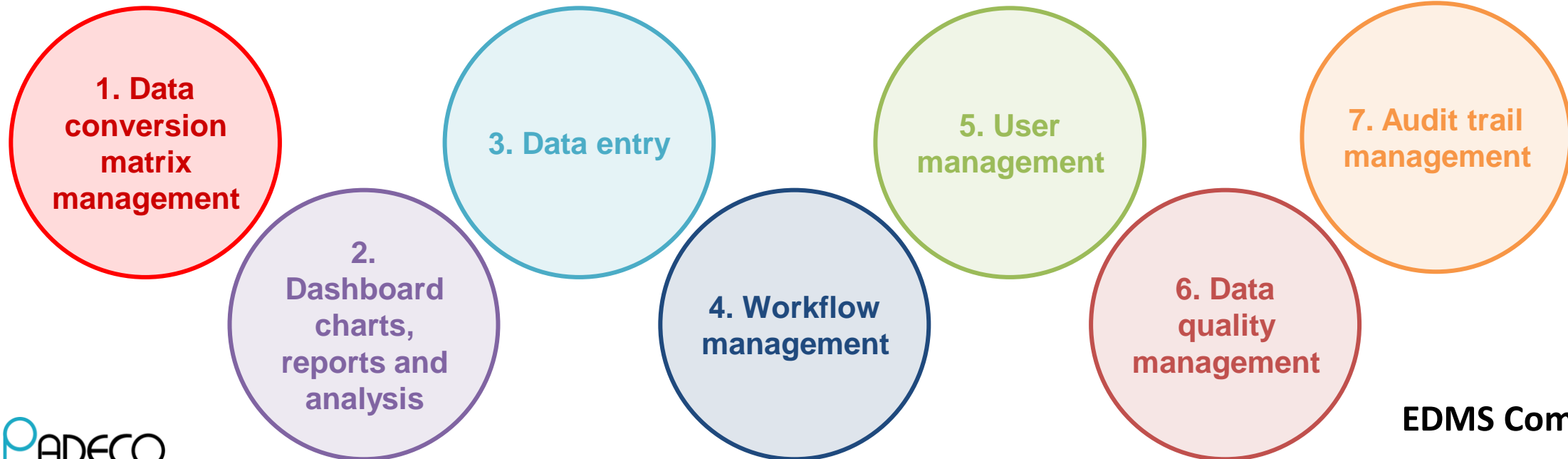
Category ^②		I ^③	H ^④	Check List ^⑤
[1] General management matters ^⑥	1.Energy Conservation Promotion System ^⑦	<input type="radio"/>	<input type="radio"/>	Do you have an organization that continuously conducts energy management (energy conservation activities)? ^⑧
		<input type="radio"/>	<input type="radio"/>	Does your management participate in the PDCA cycle for energy conservation? ^⑨
		<input type="radio"/>	<input type="radio"/>	Have you set energy efficiency and conservation targets and secured an investment budget? ^⑩
		<input type="radio"/>	<input type="radio"/>	Have you established annual plans and medium-to long-term plans for energy efficiency and conservation measures? ^⑪
		<input type="radio"/>	<input type="radio"/>	Do you have management standards for major facilities (air conditioning, ventilation, production facilities, lighting, etc.)? ^⑫
		<input type="radio"/>	<input type="radio"/>	Do you post energy conservation status (annual/monthly targets and results, etc.)? ^⑬



5. Technical Cooperation Activities in Data Management Field

Development of Energy Data Management System

- **Development of prototype **Energy Data Management System (EDMS, Software)** to be shared by CAPMAS, MOERE, MOP and IDA**
 - In order to collect the statistical data necessary to create a national energy balance table, relevant entities upload prescribed data by operating a browser.



EDMS Components

The Project Homepage Prepared



- The Project homepage has been uploaded and to be updated continuously.

<http://egypt-energysaving.com/>

Why Do We Need Energy Savings At Home?

Fossil fuels such as petroleum, coal, and natural gas were transformed from plants and animals hundreds of millions of years ago and are limited in quantity. Each of us can use resources more effectively by eliminating wasteful use. And reducing the use of fossil fuels also contributes in reducing greenhouse gases that are produced by burning fossil fuels and resulting in global warming. In particular, saving electricity at home plays a major role in reducing CO2 emissions, as it is one of the major electricity consumption sector.



Thank you very much for your kind attention!