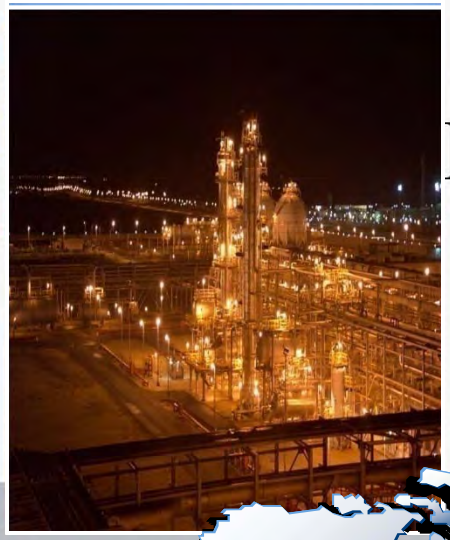
Enppi

Engineering for the Petroleum and Process Industries



International Engineering & EPC Main Contractor

PRESENTATION AGENDA:

ENPPI PROJECT ENGINEERING

I. HERITAGE.

II. TODAY.

III. FUTURE.

Established in 1978 under the Egyptian Investment Law to provide engineering, procurement, construction, and project management services for the petroleum and process industries in Egypt, Middle East and North Africa.

35 Years of Experience

International Business
11 Countries
MENA Region
South America

Engineering
EPC Main Contractor
Egypt / International

Resources:
2300 Staff
2.5Million
Technical Man-hour Yearly

Paid Capital:
US$ MM 220

Enppi

Value Chain Roles

Main Contractor
Engineering, Procurement, Construction
& Project Management





Engineering

Procurement

Construction Management

E&I Installation

Overall Project Management

Enppi

EXPERIENCE

Enppi

Enppi Since 1978

2000 - Present

Gaining reputation as a world class EPC contractor

MENA region – South America

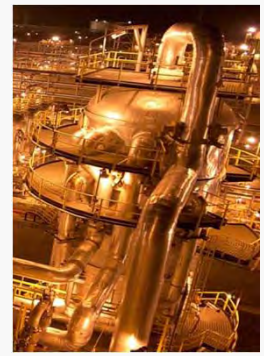
Mid 90's

International Business

UAE, Syria

Mid 80's

1st LSTK Responsibilities Refinery Project – Egypt



1978

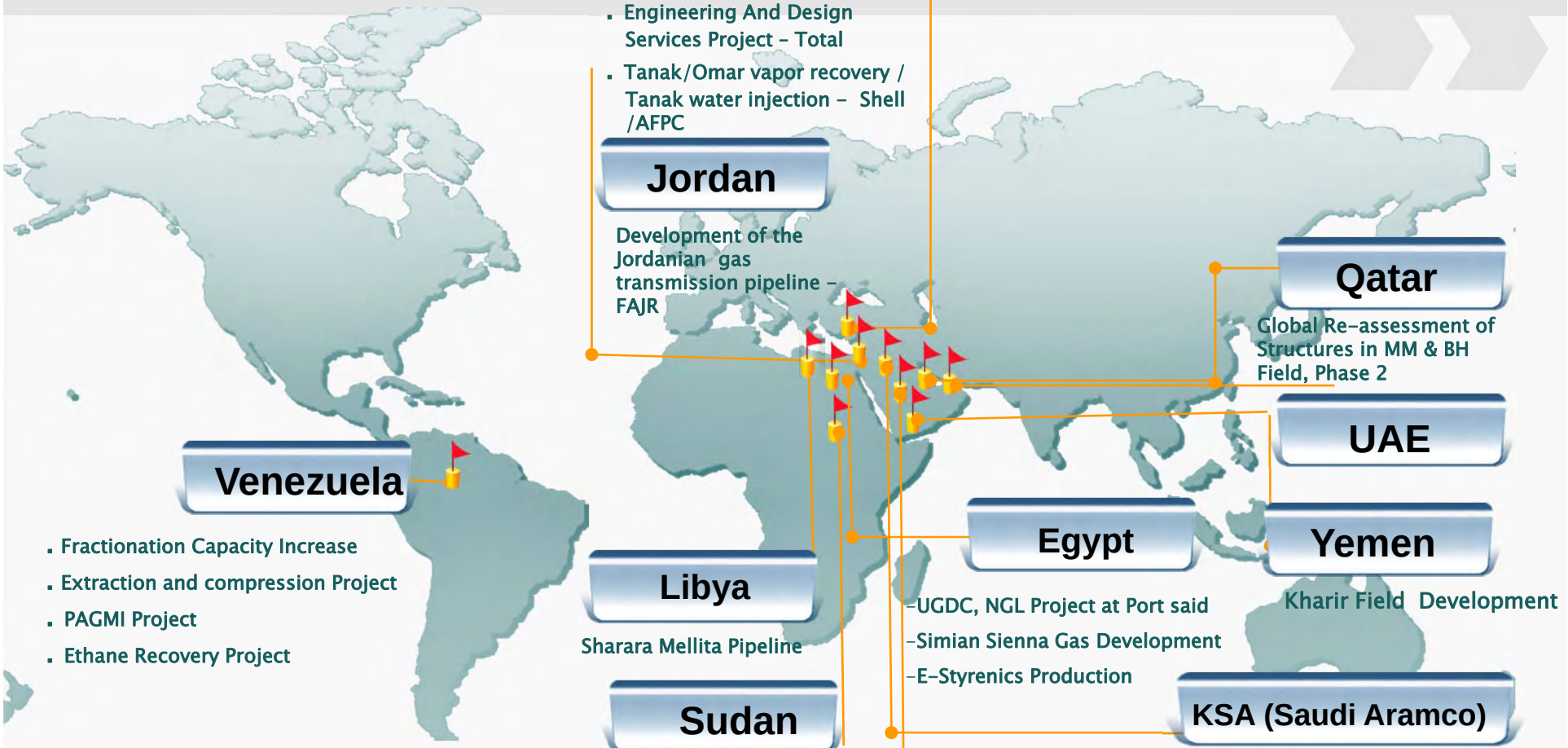
Consultant & Multidiscipline Engineering Services - Egypt

Enppi

Thinking Globally

Offshore Experience **Pipelines Experience**

Oil Field Experience



Syria

- Engineering And Design Services Project – Total
- Tanak/Omar vapor recovery / Tanak water injection – Shell /AFPC

Jordan

Development of the Jordanian gas transmission pipeline – FAJR

Qatar

Global Re-assessment of Structures in MM & BH Field, Phase 2

UAE

Venezuela

- Fractionation Capacity Increase
- Extraction and compression Project
- PAGMI Project
- Ethane Recovery Project

Egypt

-UGDC, NGL Project at Port said

-Simian Sienna Gas Development

-E-Styrenics Production

Yemen

Kharir Field Development

Libya

Sharara Mellita Pipeline

Sudan

Neem Export Pipeline

KSA (Saudi Aramco)

.Yanbu Gas Plant Expansion . Yanbu Export Refinery Project

.Safaniya Water Disposal System Upgrade

KSA/Kuwait (KJO)

.Al-khafji Field Development Plan Phase-I

.Expansion of Hout Crude Onshore Production Facility

Enppi

TODAY

Engineering development

Reasons for engineering development

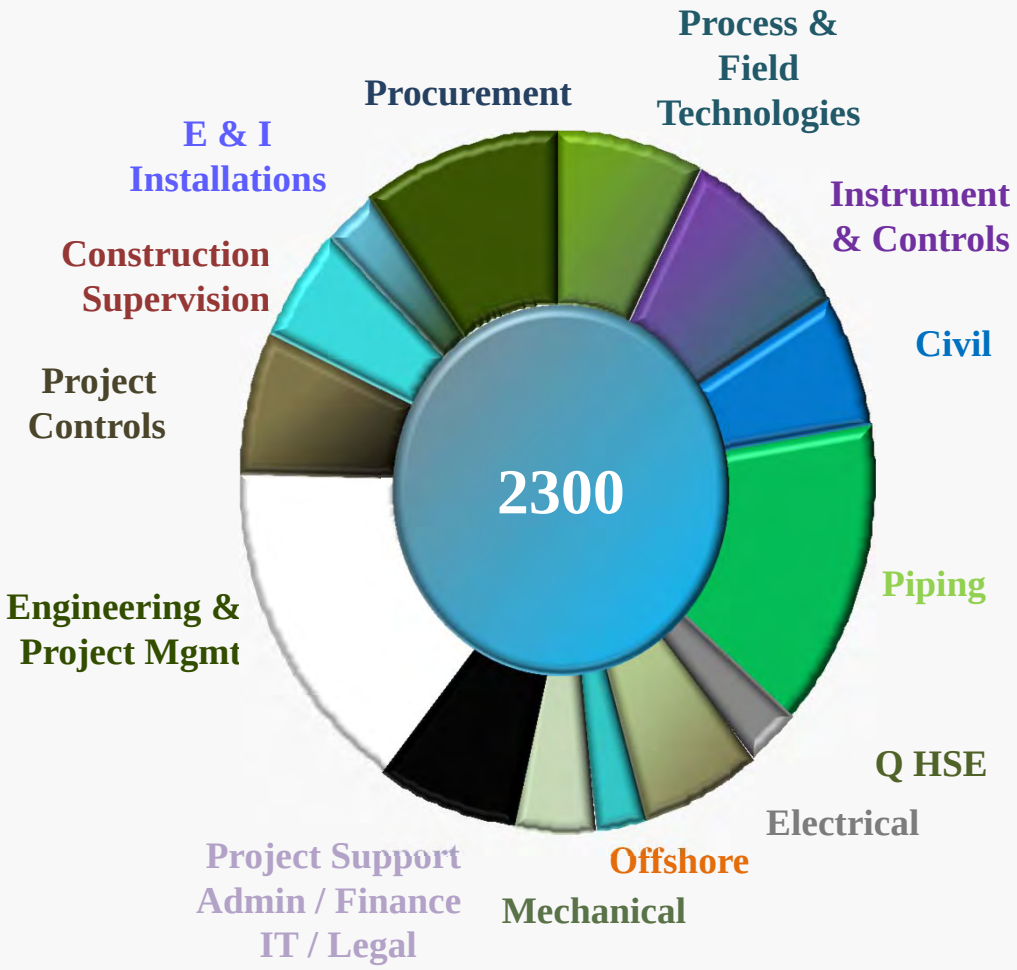
- Very hard competition for EPC projects.
- Increase ENPPI capabilities for MEGA projects execution.
- Cope with market requirement.
- Introduce new scope of work (fertilizer, subsurface projects ,petrochemicals , renewable projects , mining,…….)

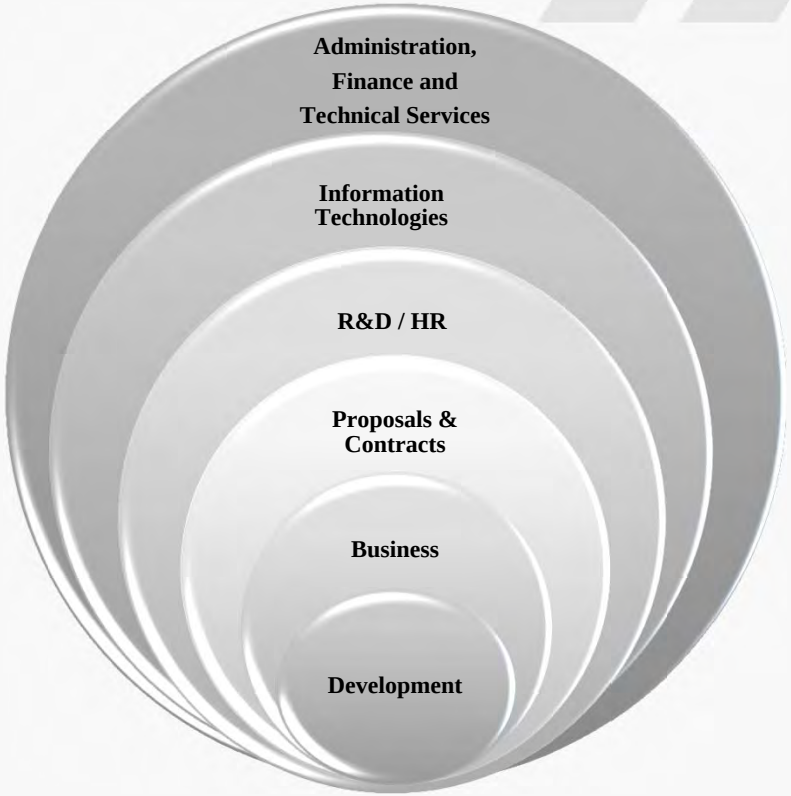
Project Engineering Arms:

- Manpower Resources (training).
- Facilities (software,…etc).
- Engineering management (reporting).
- Workflow and Inter-discipline interface Improvement.

MANPOWER RESOURCES

Current Manpower Resources





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Current Manpower Development

A) ENPPI Academy

- Established for upgrading new graduates capabilities to keep pace with the ongoing changes in technological developments, the increasing workload and employees turnover.

- Duration for new graduates: 6-8 months theoretical and practical training in labs and at sites.

- Duration for experienced engineers: 1-2 months in-house orientation and theoretical technical training.

Sample – Enppi Academy

Module to the Oil & Gas Industries - (for new comers)

- Fundamentals of Oil & Gas Industries
- Main Equipment in the Oil & Gas Industry
- Engineering Documentation
- Introduction to Project Management & Controls
- Introduction to Oil & Gas HSE
- Training at Site

Information Technology

Enppi Headquarters

- Inclusive task force area
  - **18300 Sq. Mt.**
  - **12300 Sq. Mt. Lease**
- Auditorium (Capacity 250)
- Training Center / Enppi Academy
- Reprographic Center
- Cafeteria

Facilities

- Computer Network
- CAD Network
  - **(PDS License)**
  - **(PDMS License)**
- Integrated Communication System
- HSE / Detection & Alarm / Security Systems

SOFTWARE

Piping
PDS
PDMS
AUTOCAD
CAESAR II

Pipeline Design
TLNET
TGNET
PIPEPHASE
OFFPIPE

Mechanical
Cadna Noise

Civil
SACS
SAP 2000
FRAME WORK +
3D STUDIO
STAAD PRO

Heat Exchangers
HEXTRAN
HTRI

Towers
FRI

Fire Fighting
IN-PLANT

Electrical
MICROSTATION
EDSA
Electrical Trans. & Dist.
Lighting Calculations
Cable Sizing & Lists

Instrumentation
In Tools
Control / Relief Valve Sizing

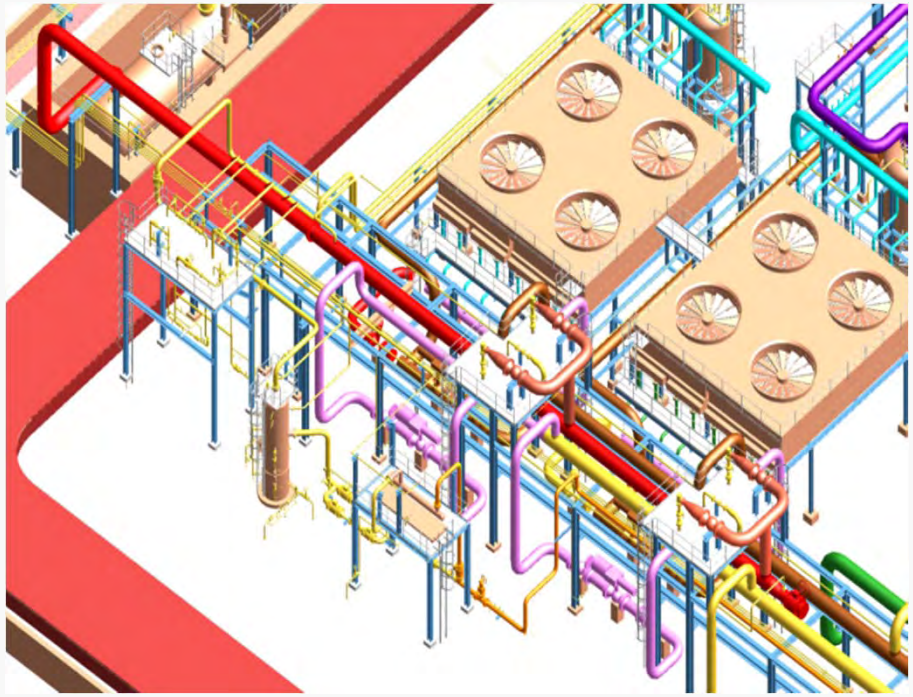
Enppi

3D Modeling

Electronic Model (PDS & PDMS)

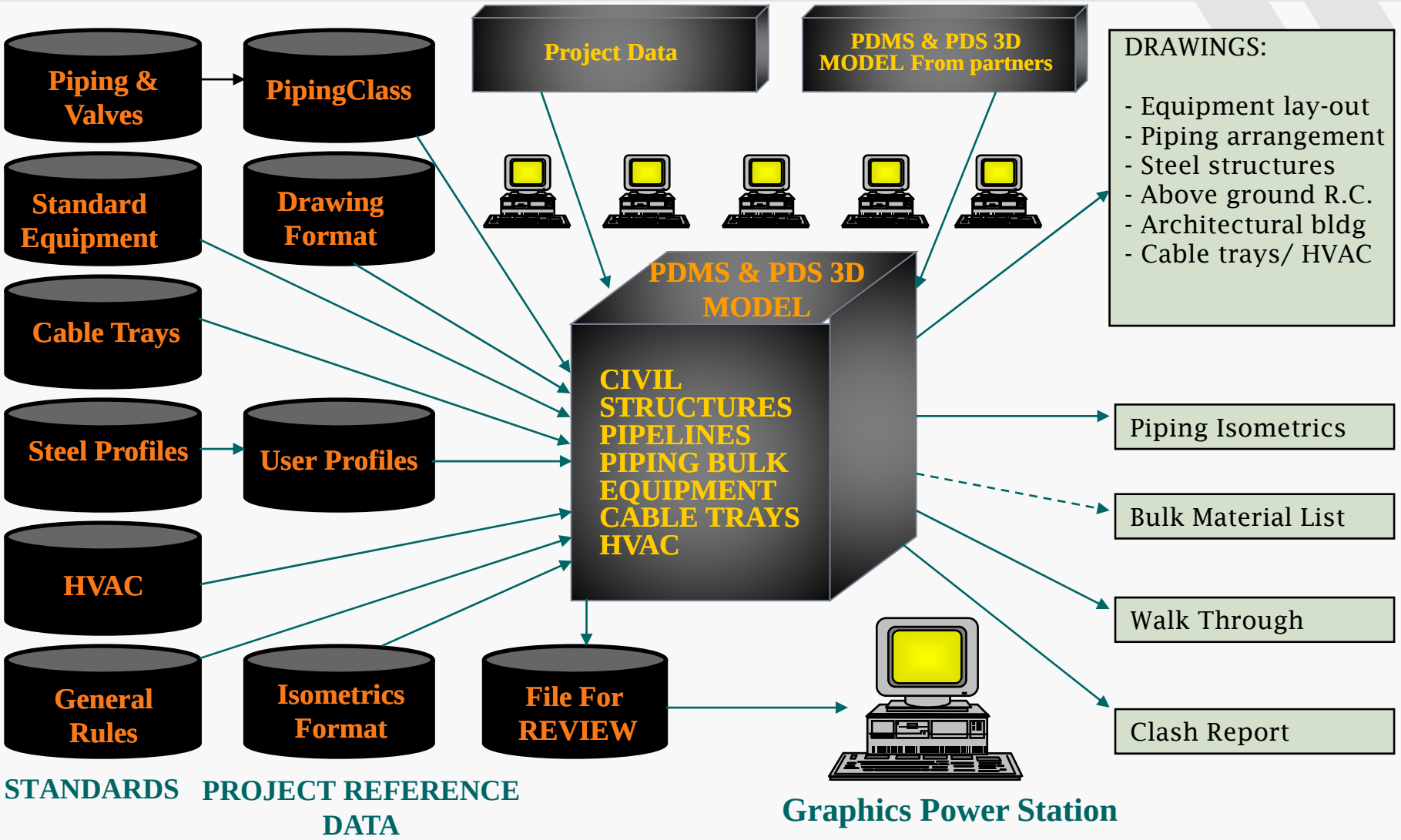
A 3D graphic model of site features including civil, electrical, instrument, piping and equipments in actual shapes and exact location.

This model provides isometric drawings; piping MTO, general arrangement drawings, orientation drawings, interference checks; Model walk throught and equipment clashes.



Enppi

PDS & PDMS 3D Modeling(current)



Enppi

Engineering Integration(ongoing)

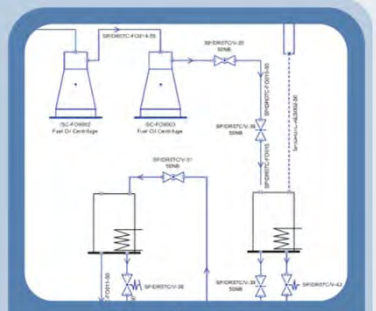
ENGINEERING MULTI-DISCIPLINE INTEGRATION PLATFORM

Enppi

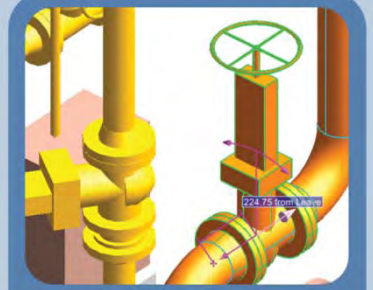
Engineer, Design and Reporting (Ongoing)

Plant Products

- Diagrams
- P&ID
- Engineering
- Instrumentation
- Electrical
- Schematic 3D Integrator



Engineer



Design

- Global
- Review
- Review Share
- Clash Manager

Manage

- PDMS
- Multi-Discipline Supports
- Cable Design
- Mechanical Equipment Interface
- Laser Model Interface
- Pipe Stress Interface
- Concrete Design
- Plant control Room
- ISOMETRICS

Enppi

Engineering Integration(ongoing)

- **ENGINEERING MULTI-DISCIPLINE INTEGRATION SOFTWARE:**

  - **Enables changes to be implemented more quickly, and controlled and communicated more effectively :**

    reduced impact of change on cost, schedule, quality and risk.

  - **Enables a wider range of data inconsistencies to be detected during design:** increased design quality and reduced risk of costly, late design changes and associated rework.

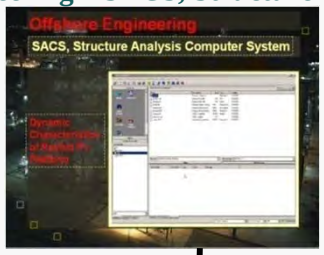
  - **Allows multi-discipline engineering teams to work together more effectively:**

    increased design efficiency, quality and multi-location, global working.

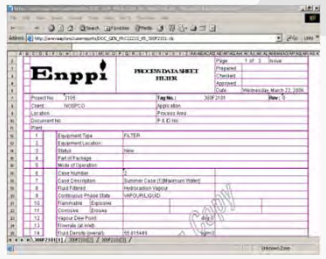
  - More effective management, control and exploitation of data.

Integrated Engineering Multi-disciplines

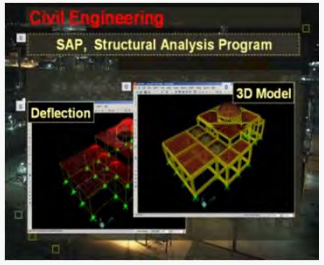
Offshore Engineering – SACS, Structure Analysis Computer System



Architectural Engineering – 3Ds Max

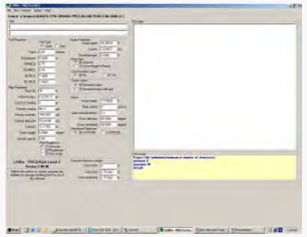


Process Technology – VPE – Data sheet & Intelligent P&ID's as final deliverables



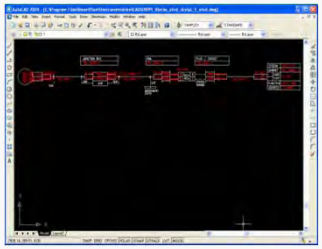
Civil Engineering- SAP, Structural Analysis Program

Integrated Engineering Multi-Disciplines

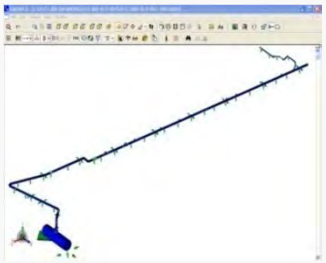


Pipeline – Input On-Bottom Stability (AGA PRCI)

Electrical – ETAP – Power System Analysis and Design



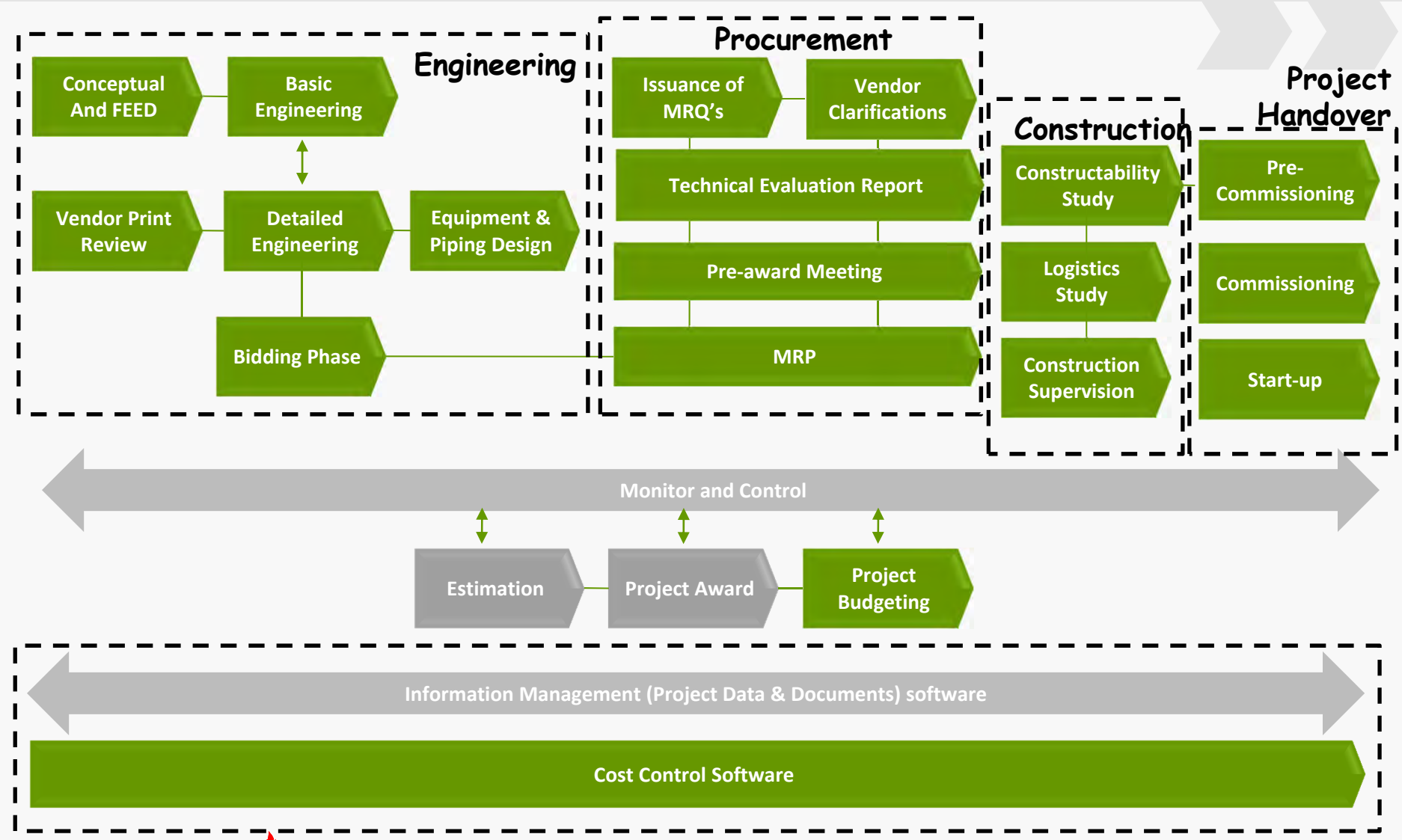
Instrumentation – IN tools- Instrumentation system data bases



Piping – CAESAR II – Stress Analysis

Enppi

EPC Process Overview



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ENGINEERING REPORTING

- **E.P.C. REPORTING SOFTWARE:**

End year 2012-2013

- Enables engineering management to focus on the real status of the project.
- Report missing / conflict data in different engineering deliverables.
- Improve the quality for the overall project deliverables.

Mid year2013-2014

- Integrate the engineering, procurement and construction status

FUTURE

New Fields

Enppi

Current Available Capabilities

A- SOLIDS HANDLING Section in Enppi has been established in the year 2007 to cover engineering services for **Petrochemical, chemical and Mining Industries,** including:

- **Petrochemical industries**: Polystyrene, polyethylene and polypropylene.
- **Fertilizers industries**: Urea and Phosphate plants.
- **Sulfur recovery**: handling and storage in gas processing plants.
- **Mining Industries**, including handling & ore preparation and storage .

B- In addition to the available experience and capabilities of other disciplines, such as instrument control, Loss Prevention, Civil, material engineering and Electrical.

E-Styrenics Polystyrene Plant
Solids Handling Scope:

Solids Handling activities covered the following areas:

1- Rubber Dissolving Area.

2- Internal & External Lubricant Addition.

3- Pelletizing.

4- Pneumatic Conveying and Silos.

5- Weighing, Bagging & Packaging.

6- Dust Control.

E-Styrenics Polystyrene Plant

Rubber Bale Conveyor feeding the Rubber Chopper machine

- Capacity: 92 bales/h
- Bale weight: 34 Kg

E-Styrenics Polystyrene Plant

Pelletizer line in the HIPS production area

E-Styrenics Polystyrene Plant

Pneumatic Conveyor line
In the HIPS Plant:
- Capacity: 9750 Kg/h

E-Styrenics Polystyrene Plant

Top View of the pelletizer building and silos including Pneumatic Conveyors

E-Styrenics P.S Plant

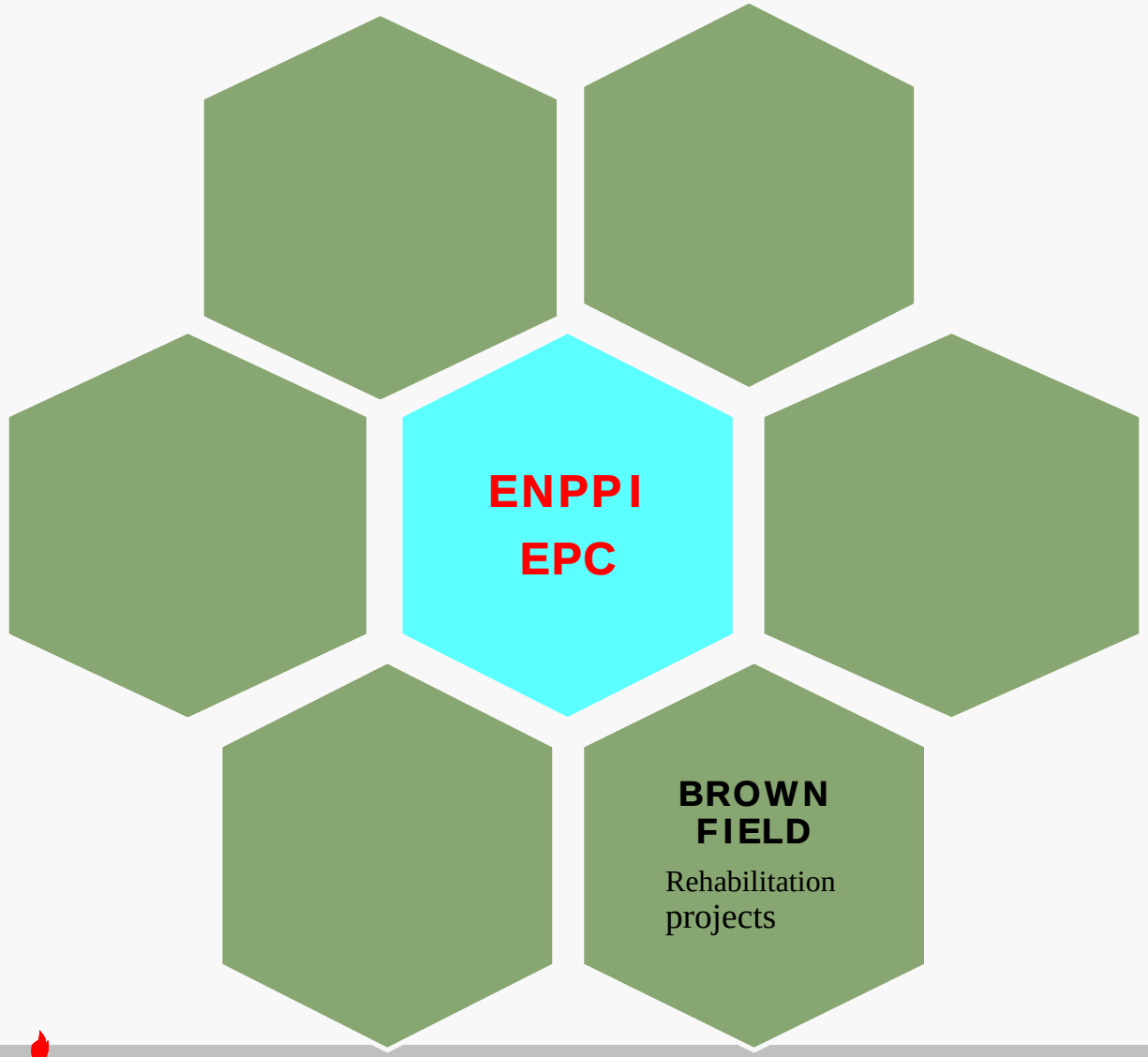
Weighing, bagging and Packaging area, including 3 lines 2 lines in operation, the 3rd is a stand-by:

- HIPS line
- SWING line
- Stand-by line

Capacity of each line 600 bags/h

Bag Weight 25 Kg

New Fields



Enppi

Enppi

Gupco Rehabilitation Project SINCE 2005

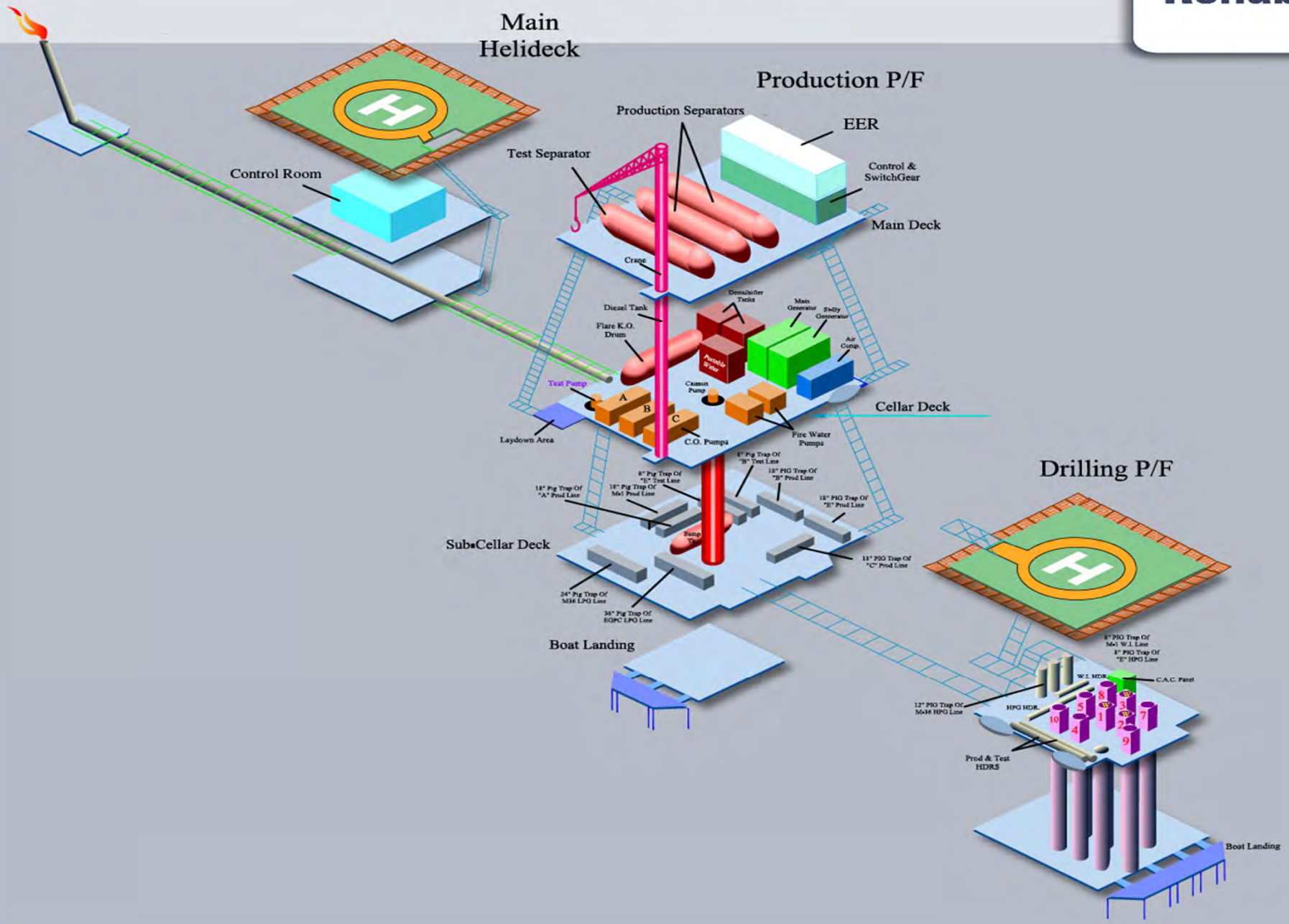
Rehab

Sample of Rehabilitation Performed Activities

Badri / July Turnaround

- Vessel replacement and repair
- Process piping repair and replacement
- Piping support replacements
- ESD and blow down valve replacement
- Instrument air system replacement
- Closed drain system repair
- Deluge system repair
- Centralized control room, DCS and ESDS installation
- Fire and Gas detections system installation
- Necessary fabric, boat landing, handrail, helipad repair to accomplish TAR

Badri Construction



Gupco Rehabilitation

Badri 2008

Before and After

Photographs

Enppi

Rehab

New ESR ROOM

PRODUCTION SEPARATOR

Enppi

Rehab

NEW PIPE WORK

NEW LADDERS

Enppi

Rehab

NEW AIR COMPRESSOR

NEW GAS GENERATOR

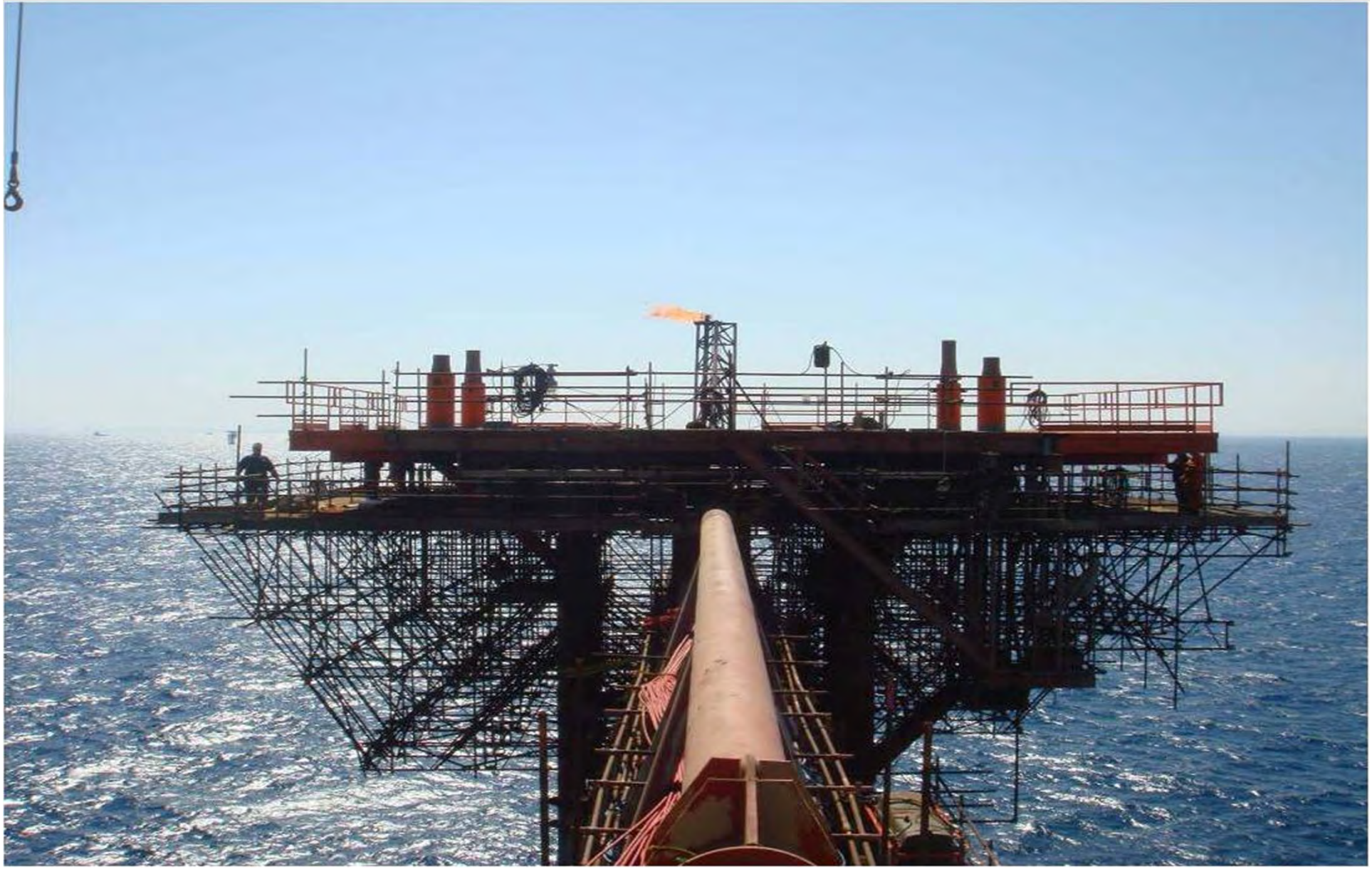
Enppi

Rehab

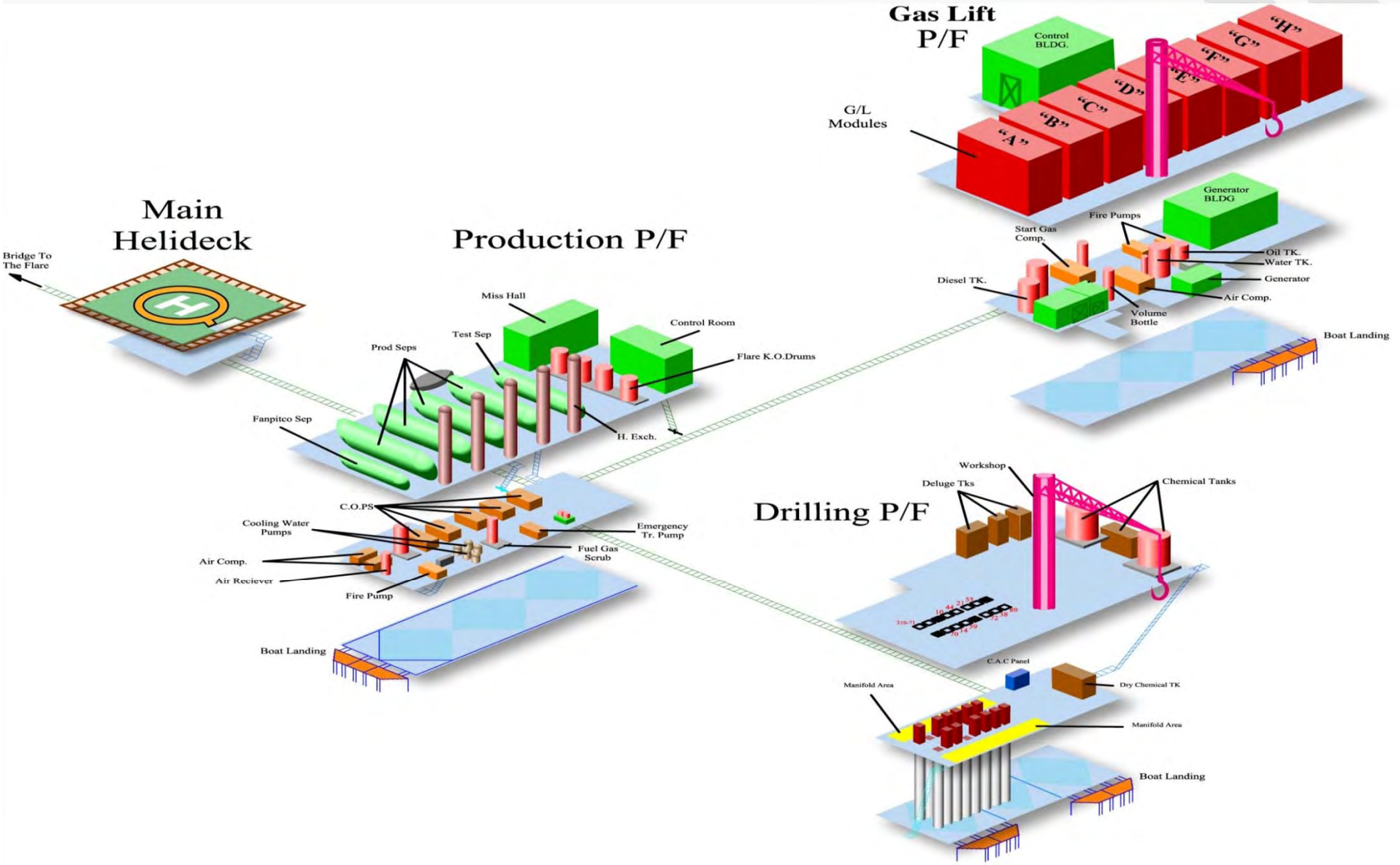
NEW FLARE TIP

Enppi

Rehab



J10 PLATFORM



New Flare Installation on J10 PLATFORM

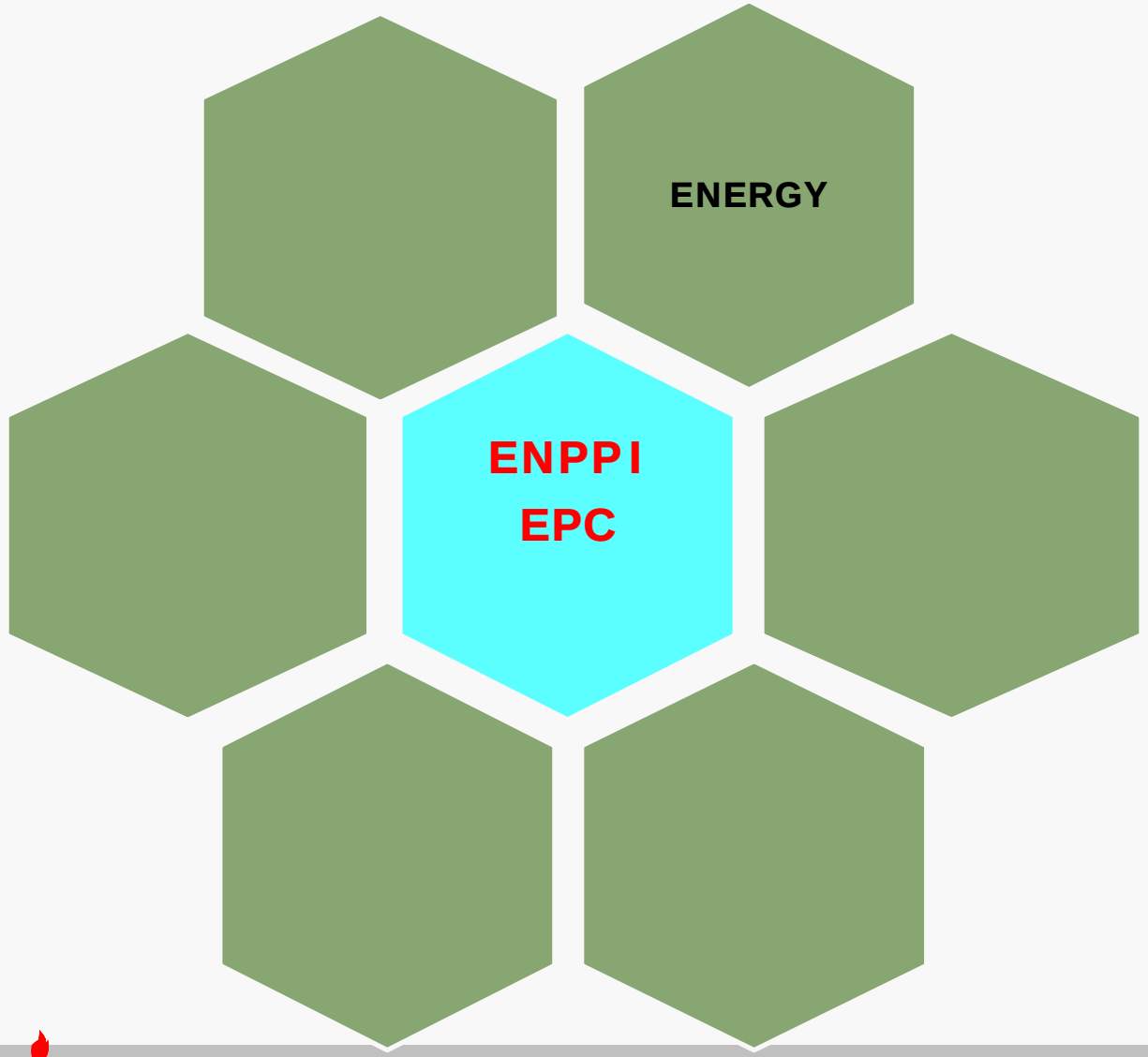
Extension Deck EL-Maadeya

ESR Deck being Lifted

Enppi Engineering Plans for Future Rehabilitation Projects

- Establish New Rehabilitation Division.
- Develop and Issue Design Guides and Engineering Instruction.
- Conduct International training Sessions.
- Renewal of current risk basis certification
- Consultation of Expats as needed.
- Enhance current available Rehabilitation software recourses.

New Fields

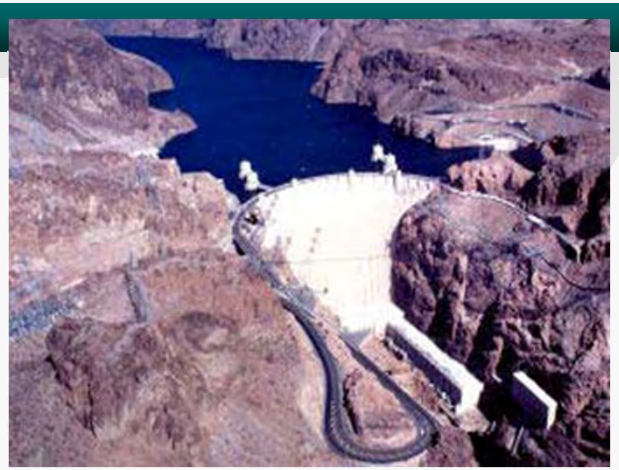


Enppi

New Fields : Energy Generation Fields

Fossil Fuel Power Plant

Nuclear Power Plant



Hydroelectric Power Plant

Geothermal Power Plant

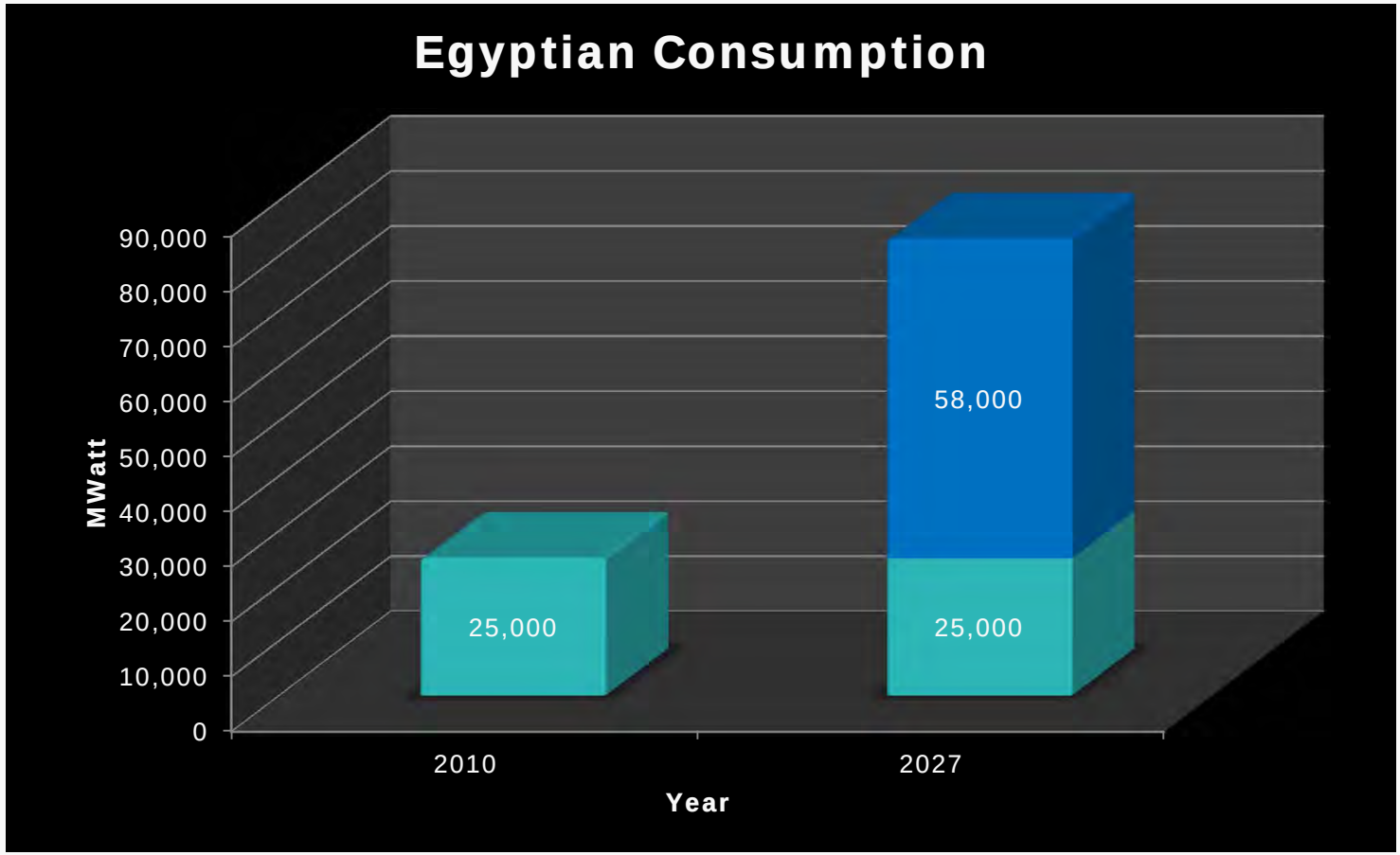
Solar Thermal Power Plant

Wind Power Towers

Enppi

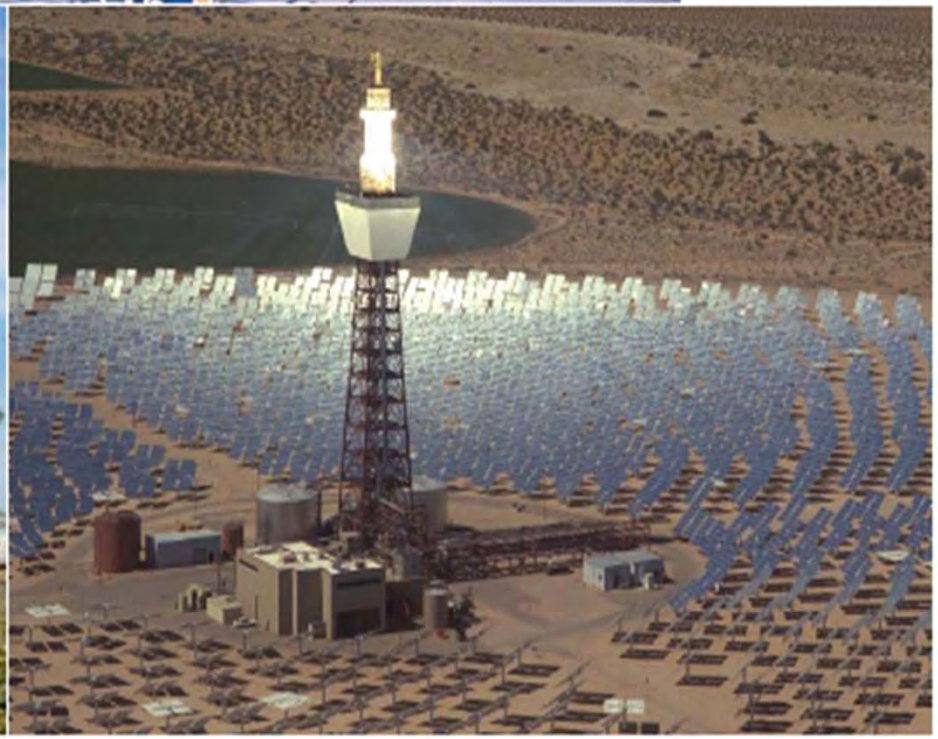
New Fields : Energy Forecast For Egyptian Power Demand

Egypt need to Triple Power Capacity by 2027



Enppi

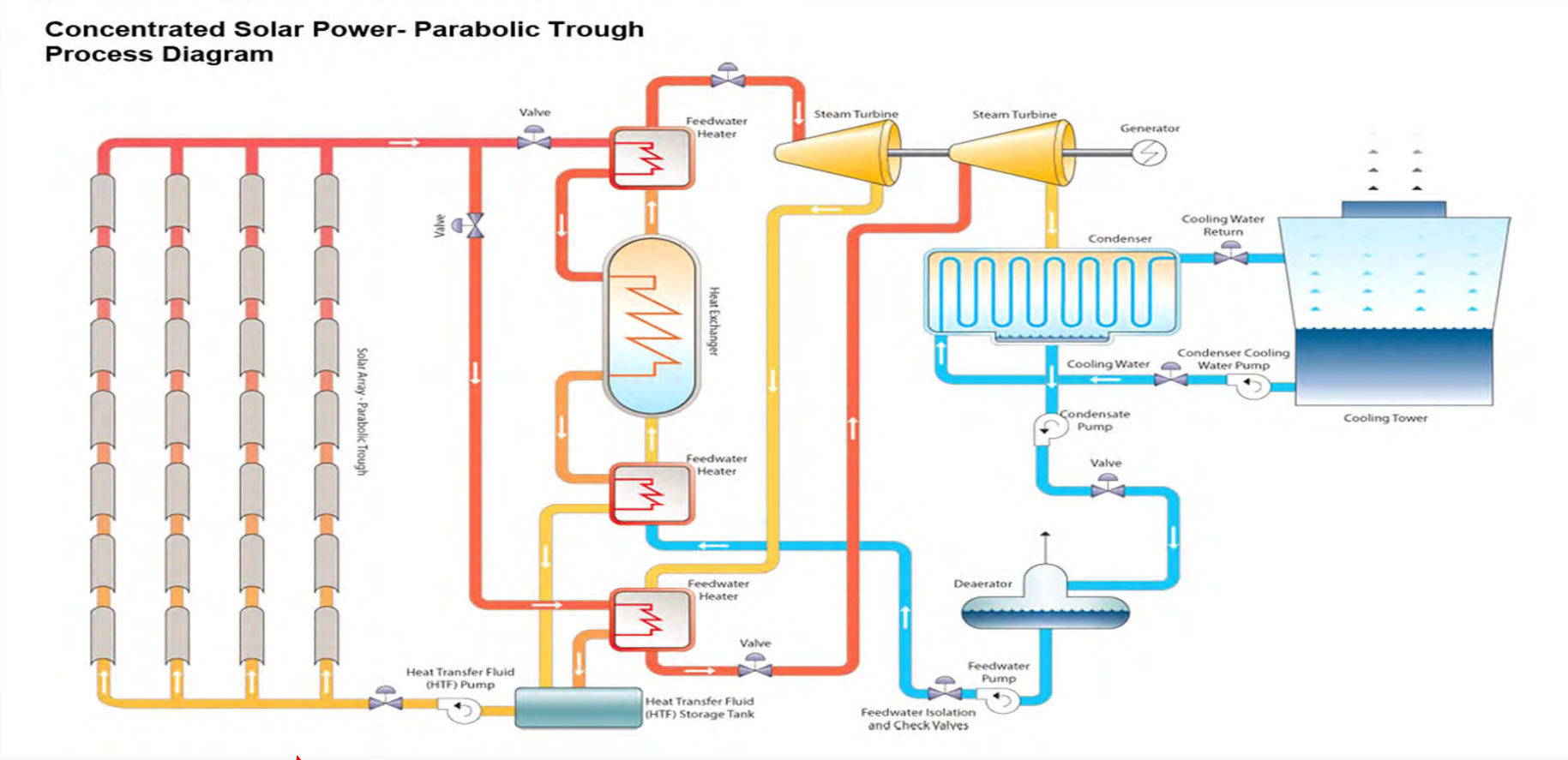
New Fields : Renewable Energy - Solar



Enppi

Current Available Capabilities

Particularly, Solar power generation plants are considered achievable for Enppi, since their design knowhow draws various parallels to the Oil and Gas industry



New Fields : Renewable Energy - Solar

Mirrors concentrate light on a boiler. This facility is in Spain.

Solar electricity *-photovoltaic* power

- Sunlight can produce electricity directly. This is called *photovoltaic* power.
- Solar cells contain specially treated thin silicon wafers. Light is absorbed in the cells, freeing electrons and producing an electrical current.
- Arrays of solar cells can produce electricity at a home or school.
- Larger arrays are being built by utility companies to reduce the need for fossil fuels.

New Fields : Renewable Energy - Wind

Current Capabilities:

Enppi Engineering can influence Wind Power Projects through different engineering disciplines as electrical, civil, Mechanical, etc.

- Wind has been used as an energy sources for over 2000 years.
- Rotor blades rotate around a horizontal hub.
- The hub connects via a gear box to the generator.

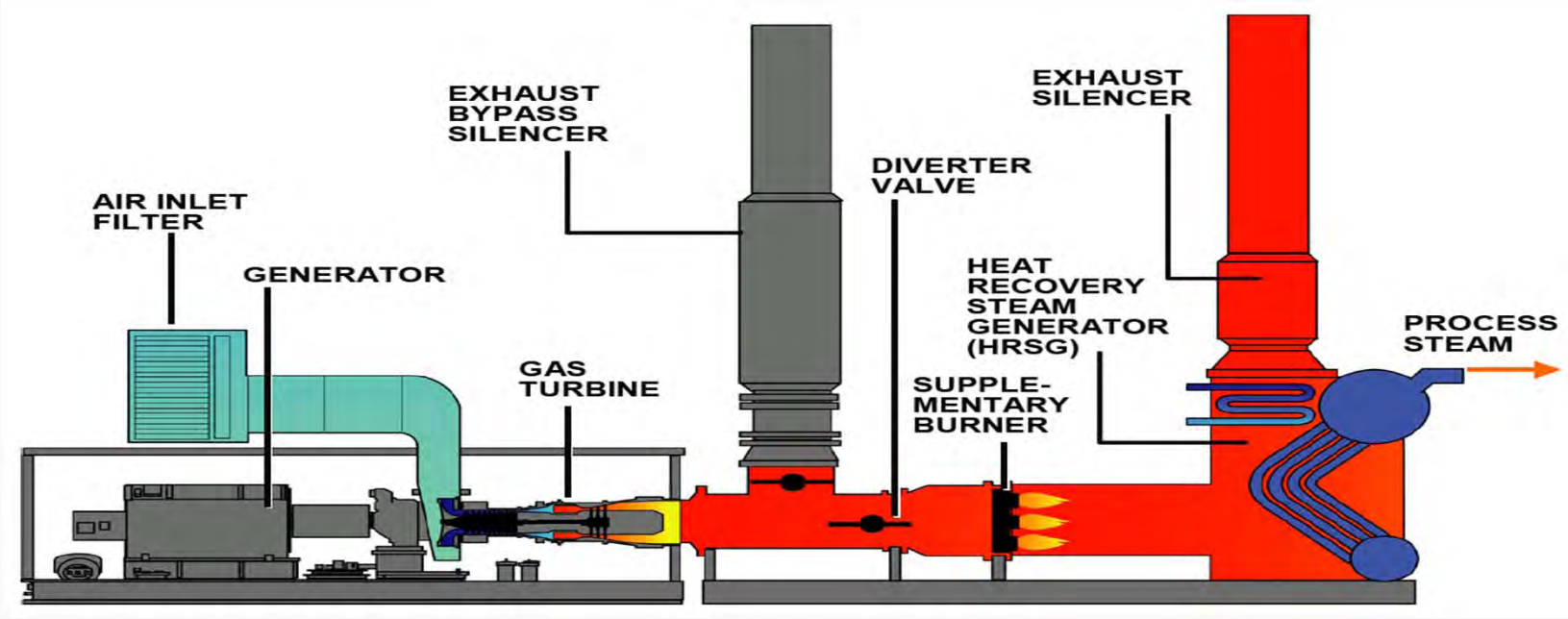
New Fields

Combined Cycle Plants

New Fields: Combined Cycle / Gas Turbine Cogeneration Layout

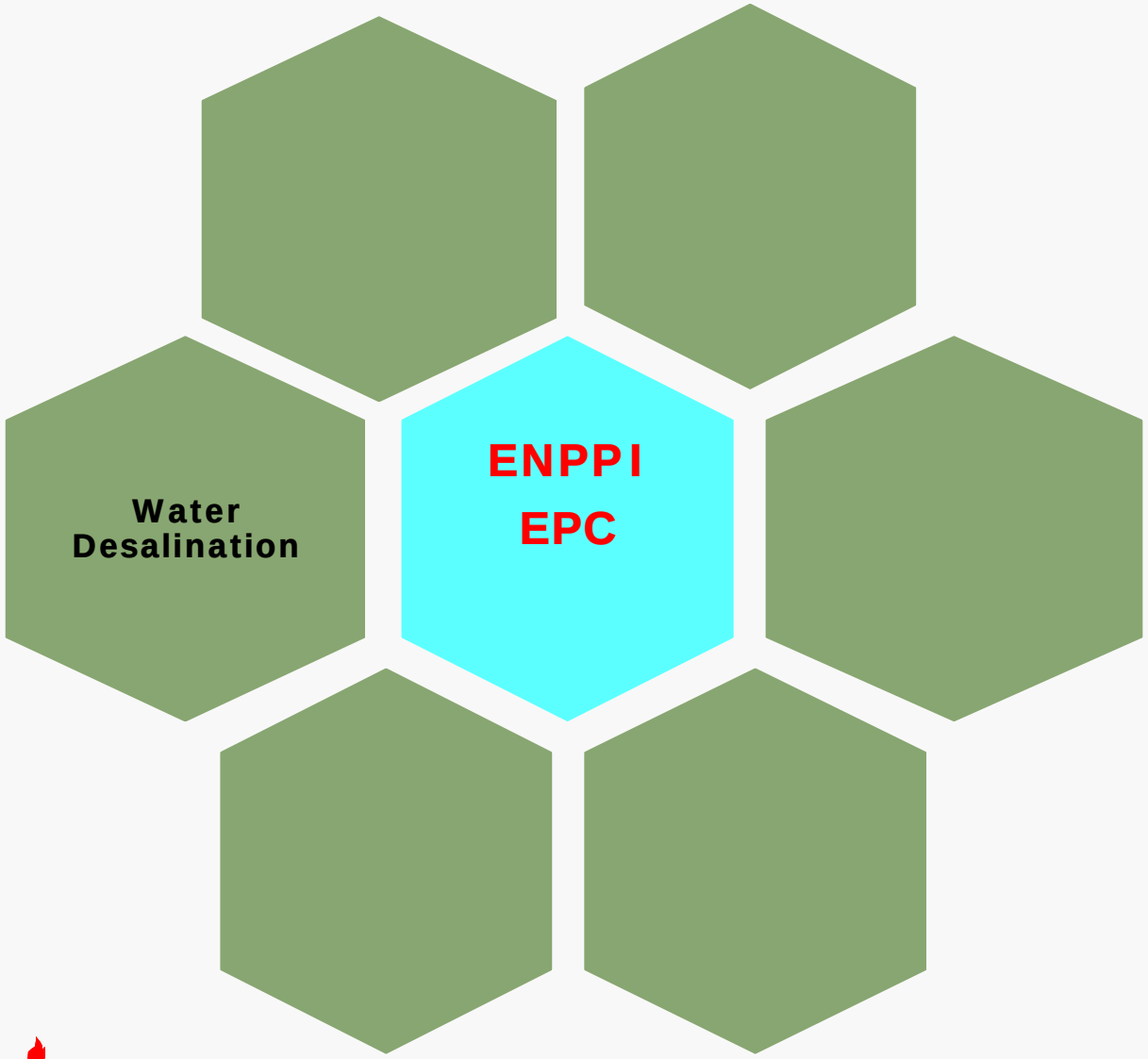
Current Capabilities:

Enppi Engineering already performed combined cycle in Oil and Gas Projects through different engineering disciplines such as, UGDC, GASCO and PDVSA Projects



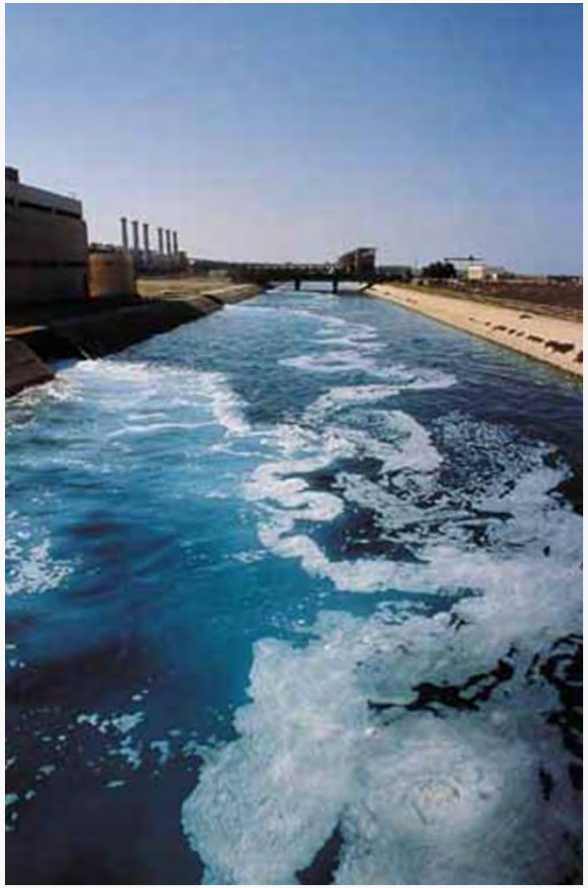
Enppi

New Fields



Enppi

New Fields: Solar Powered Desalination



Desalination

The separation and removal of ions, salts and other dissolved solids from water.

- Heat Based
- Membrane Based

Water Desalination

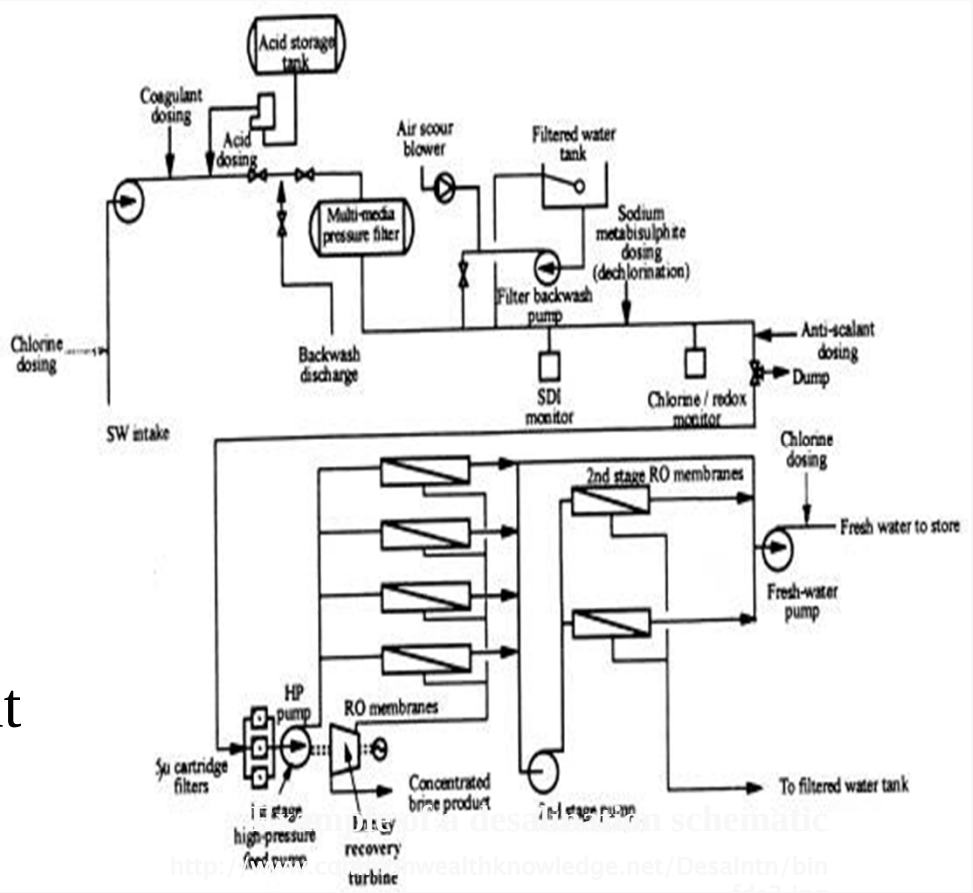
- Water desalination projects particularly in Egypt and the Gulf area, as KSA plan to invest 20 billion SR in water projects in the next 15 years. On the other hand our local water desalination market is expected to be a massive one due to the expected development in the western desert and Sinai..

Enppi

Water Desalination

Conceptual unit design and construction

- Schematic
- Product design



Current Capabilities:

Enppi Engineering capable to perform detailed engineering activities of desalination Projects through different engineering disciplines. (Piping, Vessels, Heat Exchangers, electrical Instrumentations, Civil, etc)

WASTE TO ENERGY

What is Waste-to-Energy?

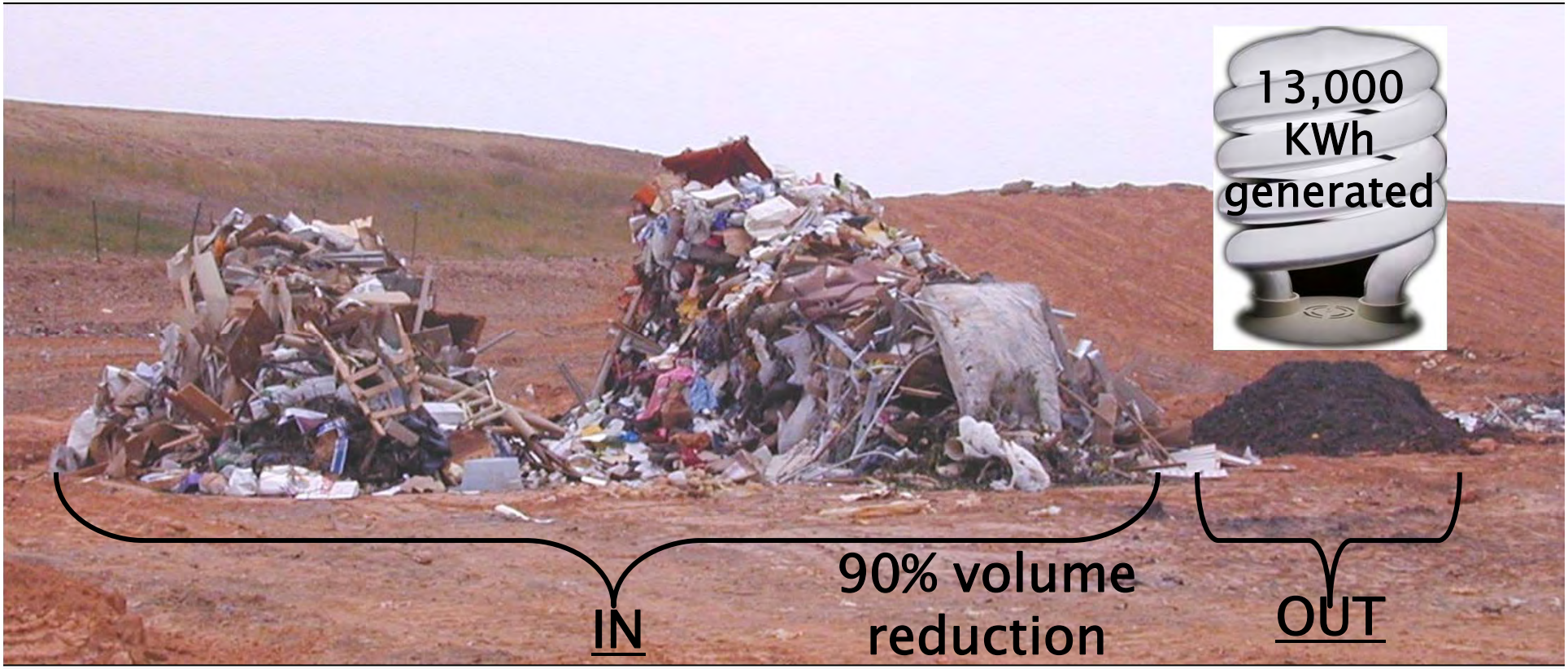
Waste-to-Energy is a specially designed energy generation facility that uses household waste as fuel and helps solve some of society's big challenges

Municipal Solid Waste
1 ton

- Power: up to 750 kWh
- Metal: 50 lbs
- Ash: 10% of original volume

Waste-to-Energy Facility

Reducing the Volume of Waste & Saving Space in the Landfill while Generating Clean, Renewable Energy



100 cubic yards
of waste

10 cubic yards
of (inert) ash

Waste-to-Energy

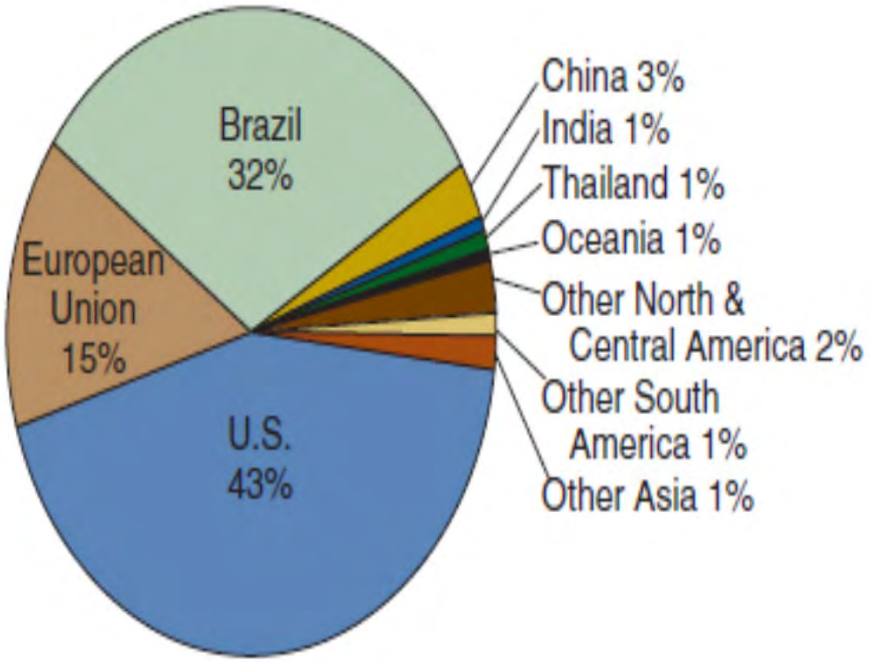
Biofuel projects

As the new world trend is to use alternative fuels rather than gasoline and diesel, especially with low NOx and CO emissions and higher calorific value, the Biofuel world market became a massive one nowadays.

When applied at the national level:

- 1,000,000 tons of **rice straw** which will not be burnt in the fields.
- 1,000,000 tons of municipal waste that will be beneficially diverted from landfill.
- Saving approximately 1,000,000 tons of natural gas and reducing Egypt's CO2 emissions by approximately 1,600,000 tons.

About 90 percent of global biofuel production is concentrated in U.S., Brazil, and Europe, 2007



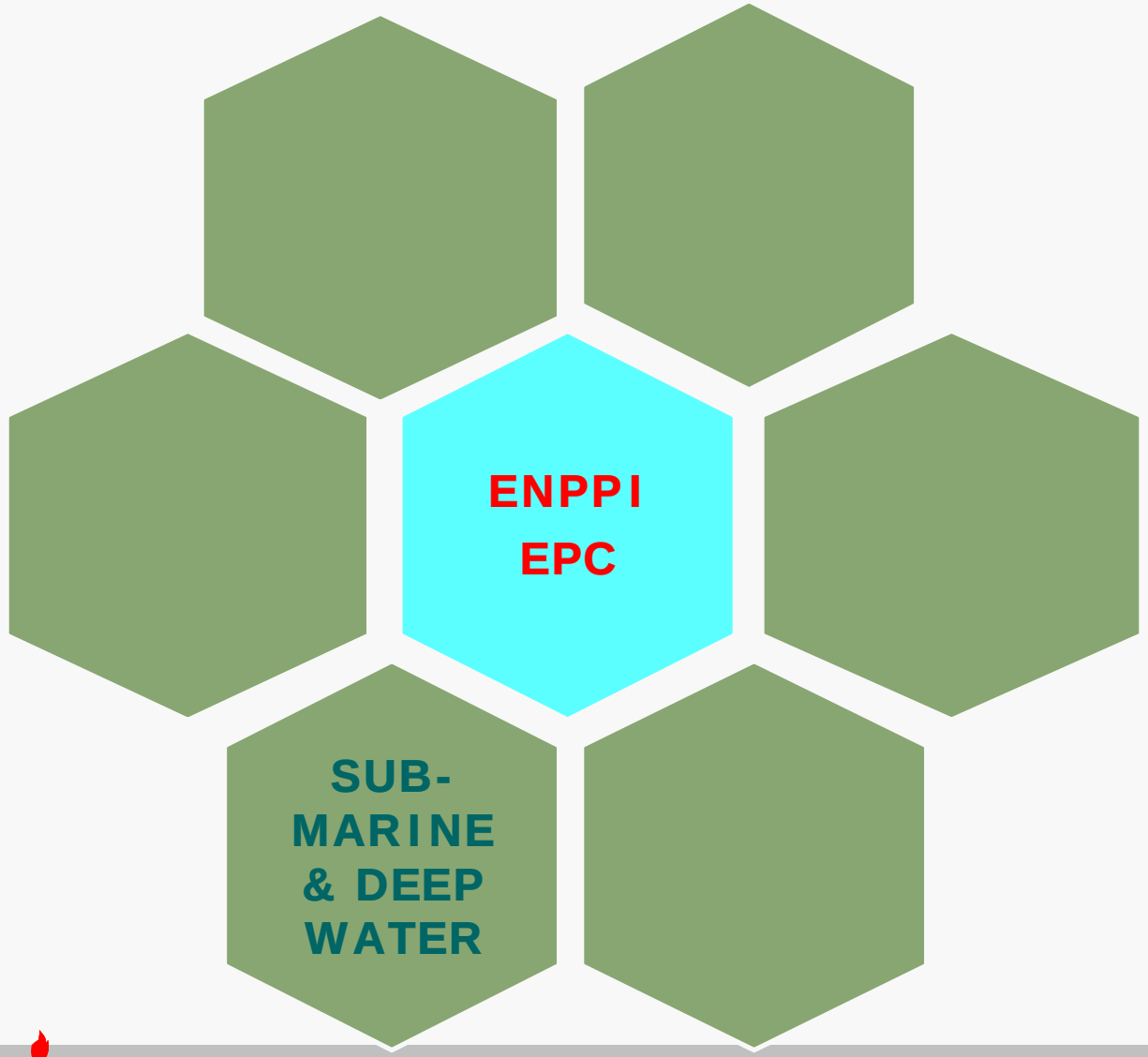
Source: FO Licht, includes only ethanol for fuel.

Enppi

Waste-to-Energy

- Establish New Department.
- Establish Partnership with competent Licensors in this field
- Develop and Issue Design Guides and Engineering Instruction.
- Conduct International training Sessions.
- Consultation of Expats as needed.

New Fields

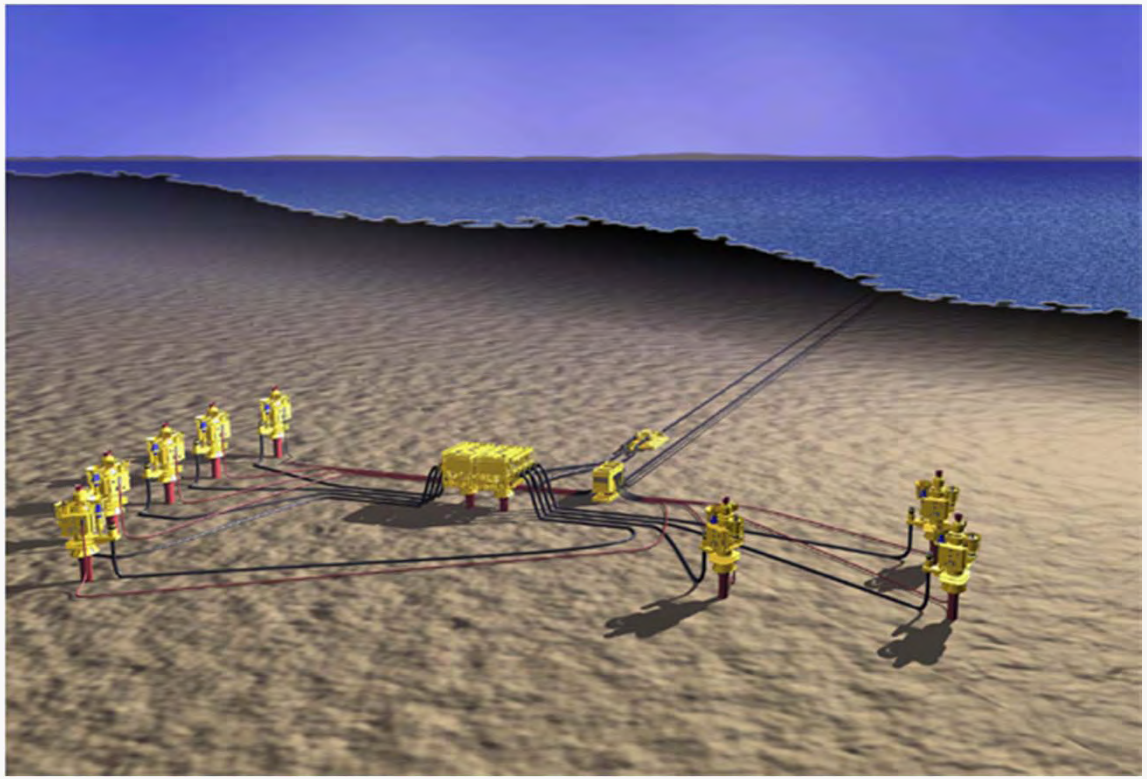


Enppi

SUB-MARINE & DEEP WATER

PREVIOUS PROJECT:

WEST DELTA DEEP MARINE CONCESSION SCARAB / SAFFRON DEVELOPMENT PROJECT

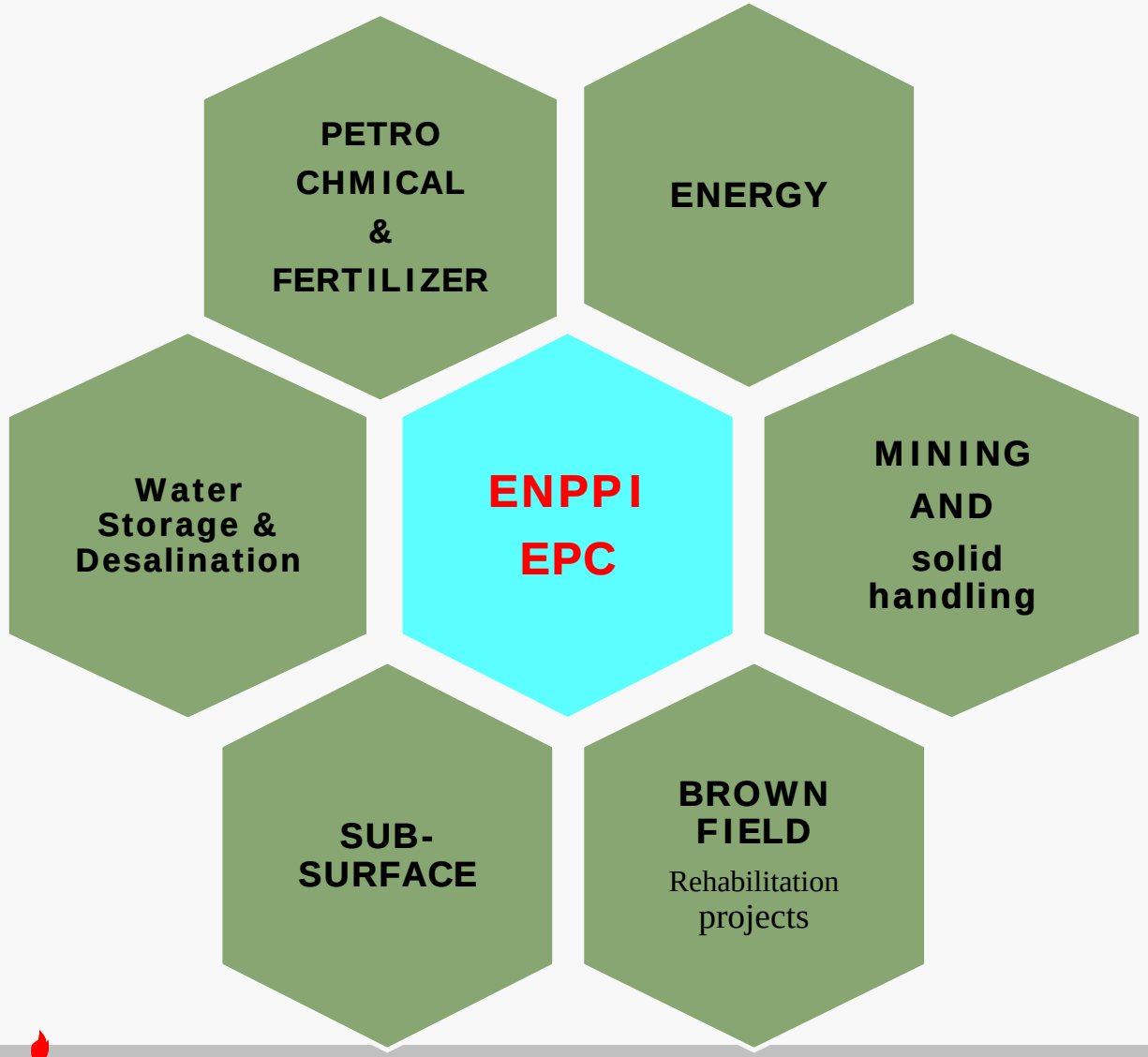


SUB-MARINE & DEEP WATER

Action Plan:

- Develop the current capabilities of Deep Water Team.
- Establish Partnership with specialize contractors in this field
- Develop and Issue Design Guides and Engineering Instruction.
- Conduct International training Sessions.
- Consultation of Expats as needed.

New Fields



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Thank You For Your Attention

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Engineering for the Petroleum and Process Industries