

A D W E C

شركة أبوظبي للماء والكهرباء

Abu Dhabi Water & Electricity Company

Abu Dhabi Power Stations Efficiency Optimization Project

By Mr. Faisal Najed

With the support of

TRACTEBEL


Introduction

- **Faisal Najed** - Advisor in Abu Dhabi Privatization Directorate, Abu Dhabi Water and Electricity Company (ADWEC)
- Abu Dhabi Power Stations Efficiency Optimization Project is an initiative of **ADWEC** supported/developed by **Tractebel**
- The project duration was 10 months and counted with a multidisciplinary team of technical and economic experts and the involvement of the whole Abu Dhabi Energy Sector (ADWEC, TRANSCO, DOE, Power Companies, ...)

Project Background

Context

Power and water generation economic model in the Middle East was developed in a time of low fuel costs

Fact

Low efficiency power & water plants

Reasons to change

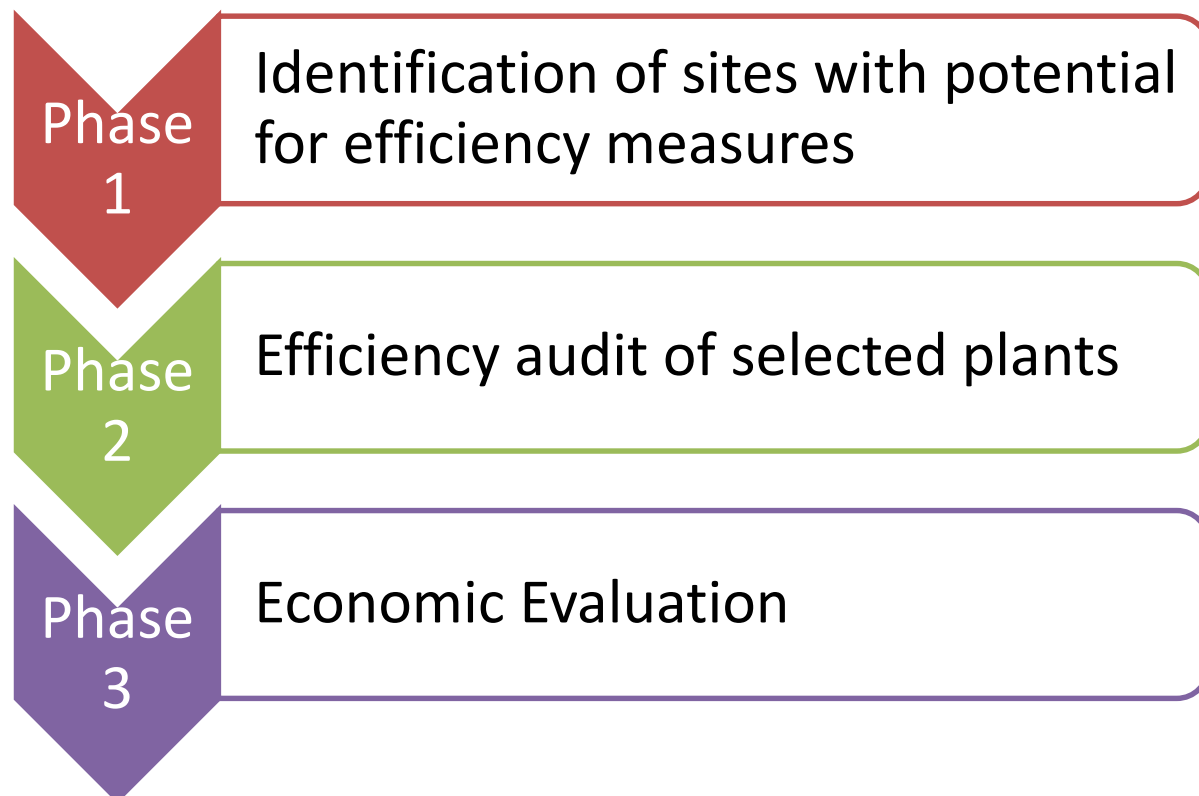
Higher fuel costs, low cost of renewable energies, forthcoming availability of nuclear power plants and mature Reverse Osmosis (RO) technology

Efficiency program

Upgrades to the existing gas turbines,
Decoupling of water production from power generation
Replacement of current thermal desalination units by RO

Project Objective

Develop a techno-economic roadmap aiming at improving the efficiency of Abu Dhabi Fleet of Power and Water Plants



Expected results:



Phase 1 – Screening

Data collection

- Site visits
- OEM proposals

Preliminary evaluation of efficiency improvements and capital costs

Preliminary Economic modelling of Abu Dhabi System and Cost-Benefit Evaluation

Shortlist most beneficial plants for further investigation in Phase 2

Phase 2 - Efficiency Audit

Representative Upgrade/Efficiency Improvement Options

Decoupling of Water Generation from Power



GT+HRSG (Duct Burner) +BPST+MED/MSF



GT+HRSG (Duct Burner – Off) +ST (Condensing) + RO Plant

Gas Turbine Upgrade

GT Air Inlet Cooling Systems

Fuel Gas Preheating

Air Inlet Filter Upgrades

Battery Energy Storage

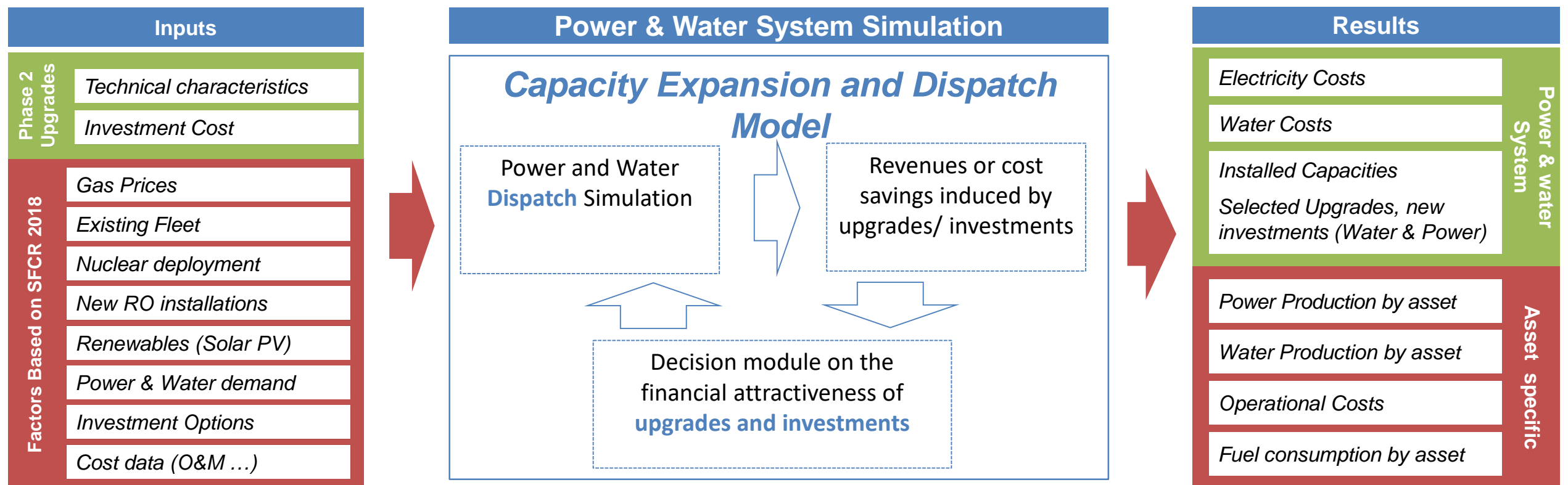
Phase 2 - Efficiency Assessment

Perhaps hide this slide, too much details

	Inputs	Activities	Outputs
Site Visit	<ul style="list-style-type: none"> Plant design and performance data Historian data extract from O&M records 	<ul style="list-style-type: none"> Assessment of site data Detailed evaluation of efficiency improvement options Meeting and discussion with O&M 	<ul style="list-style-type: none"> Potential options for efficiency improvement
Review OEM proposals	<ul style="list-style-type: none"> OEM proposals 	<ul style="list-style-type: none"> Review and assess the OEM proposals for proposed modifications for efficiency improvement 	<ul style="list-style-type: none"> Cost/benefit of OEM proposals
Thermodynamic modeling/assessment	<ul style="list-style-type: none"> Plant design and performance data Potential options for efficiency improvement 	<ul style="list-style-type: none"> Thermodynamic modeling Plant performance evaluation with efficiency improvement 	<ul style="list-style-type: none"> Performance improvement data - increase in output and efficiency and reduction in fuel consumption Determination of Capex and Opex for each of the proposed modification

Phase 3 – Economic Evaluation

Analyze the cost to benefit of the efficiency improvement solutions and determine the implementation sequence that would bring the highest benefits for the system over a horizon until 2030



*SFCR: Statement of Future Capacity Requirements

Conclusions & Benefits for the Sector

- Investments:
 - Upgrades of existing assets
 - New RO capacity in the system
 - Extension of PWPAs
- Benefits are mainly from:
 - Fuel cost reductions
 - CCGT investment deferral
 - Cost reduction due to decommissioning of MSF/MED thermal desalination

Study demonstrated that efficiency improvement initiatives will bring significant **positive Net System Cost Savings** for the sector

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