ENERGY EFFICIENCY IMPROVEMENT AT LA RÁBIDA REFINERY (LRR)

EVOLUTION AND KEYS TO SUCCESS

European Refinery Technology Conference (ERTC)

17th-18th November 2020

CONTENT

- Overview
- Energy Management Philosophy
  - ISO 50.001
  - TRMs
- Development Scheme
  - ROP/CROP
- Continuous improvement and comparison with peers
  - KEY PROJECTS
  - SOLOMON EII
- Results

OUR VALUES AND GOALS

ENERGY EFFICIENCY IS ALIGNED WITH OUR VALUES

WHY IS ENERGY EFFICIENCY IMPORTANT?

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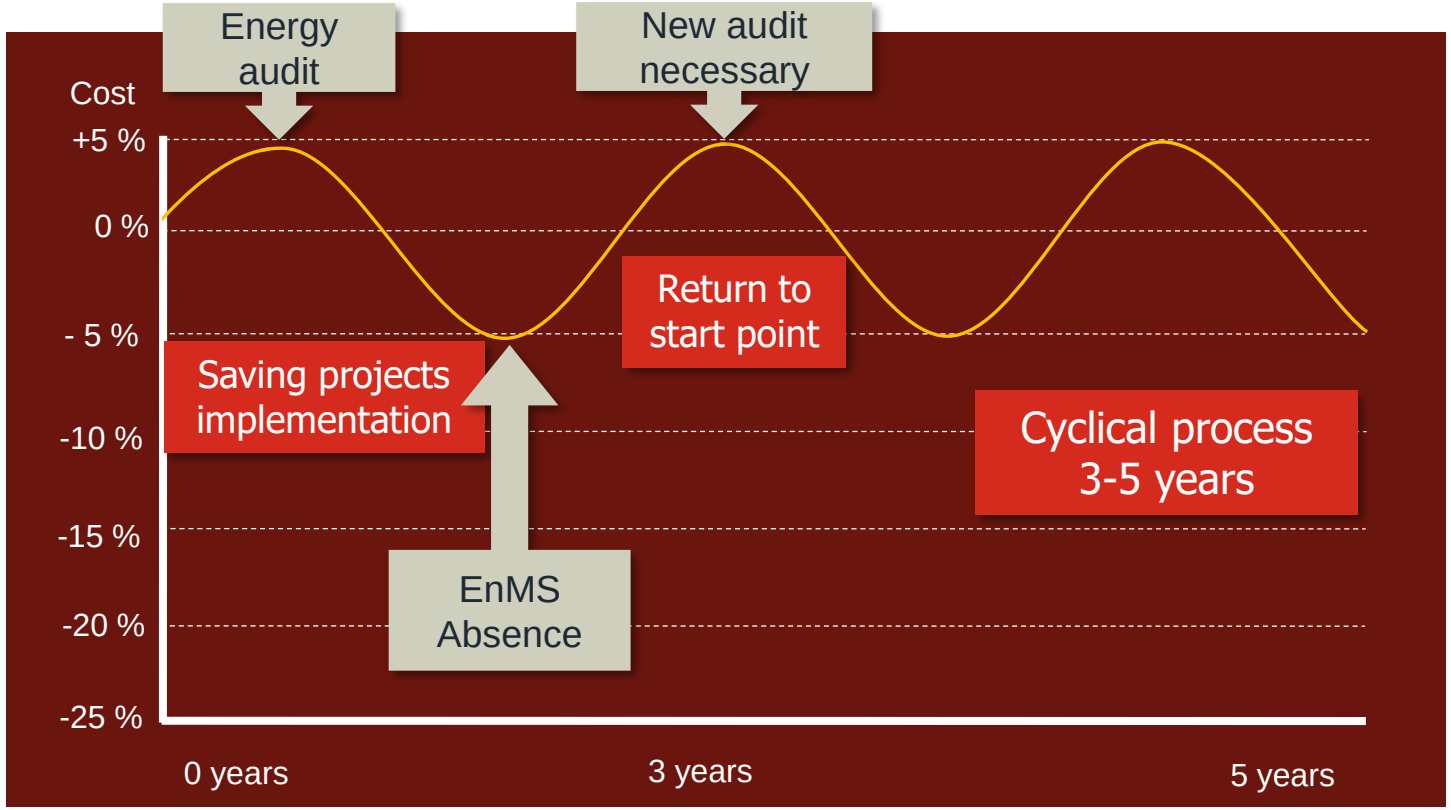
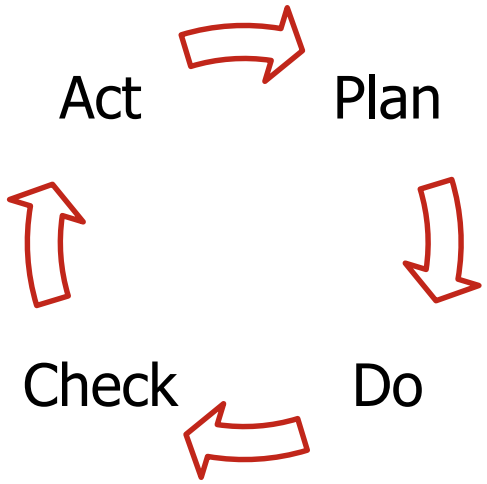
ISO 50.001

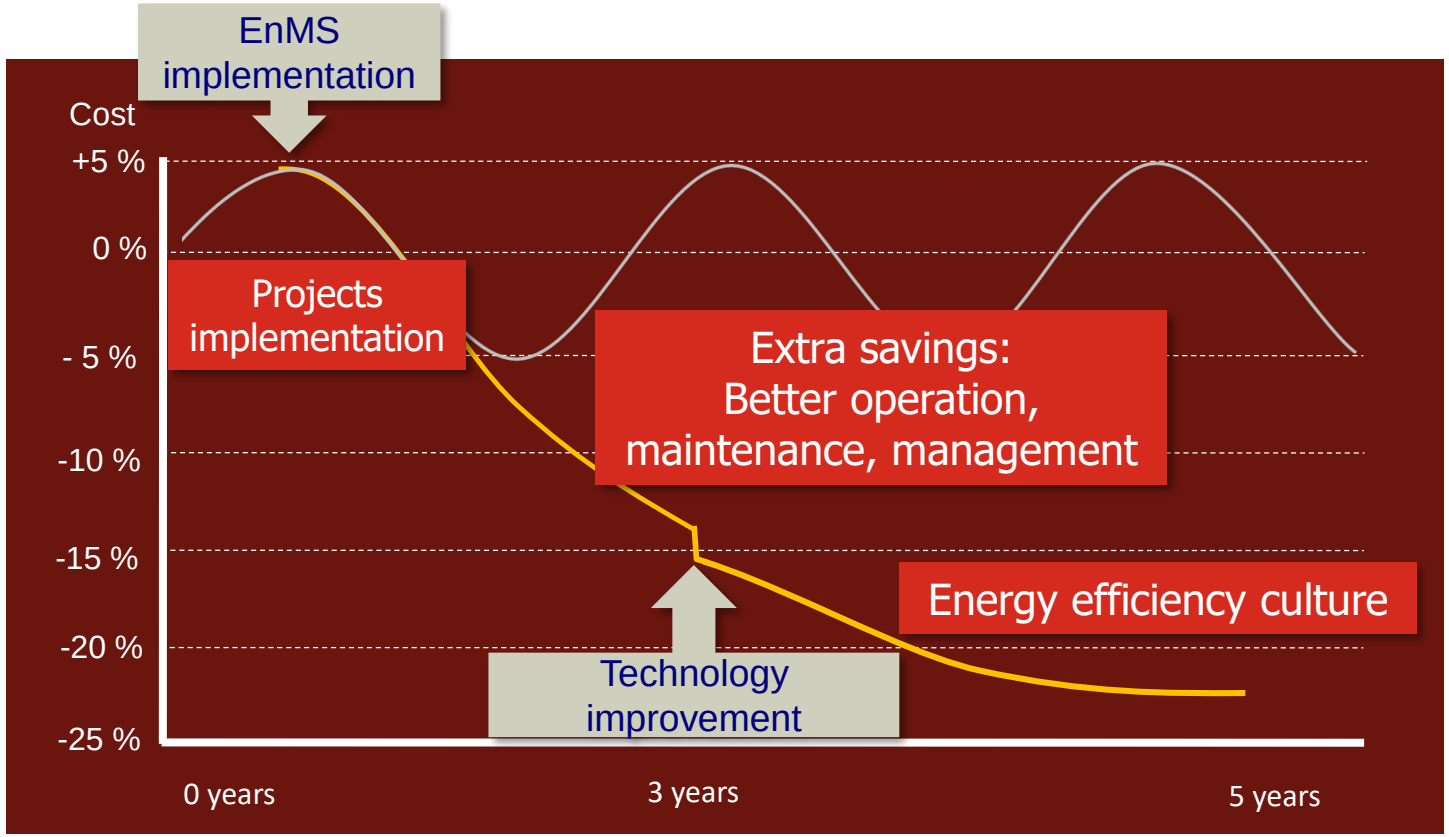
- Reference structure to EnMS
- LRR certified since 2014



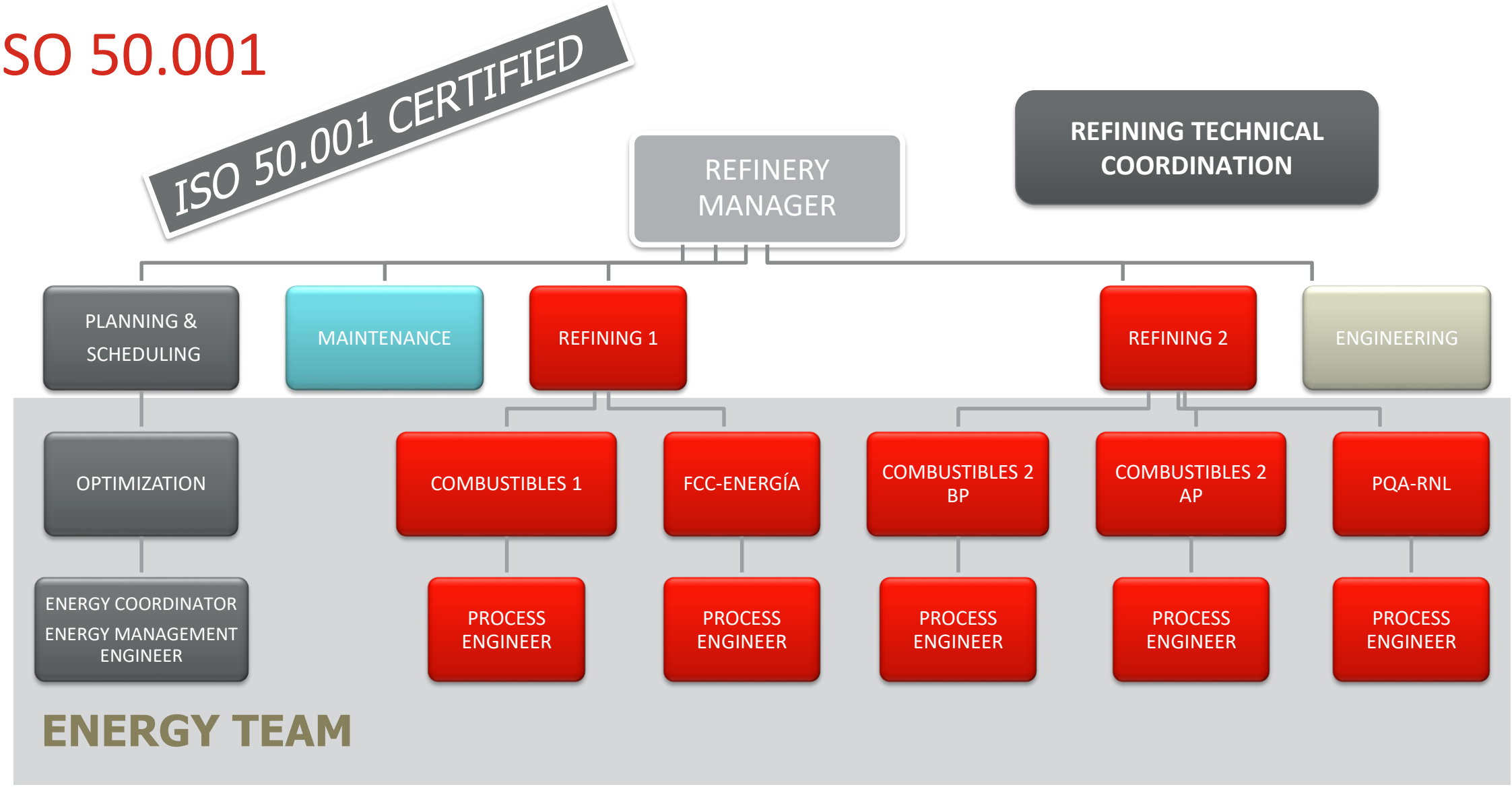
ISO 50.001

- Reference structure to EnMS
- LRR certified since 2014
- PDCA cycle: Ensures continuous improvement





ISO 50.001


ISO 50.001 CERTIFIED
REFINERY MANAGER
REFINING TECHNICAL COORDINATION
PLANNING & SCHEDULING
MAINTENANCE
REFINING 1
REFINING 2
ENGINEERING
OPTIMIZATION
COMBUSTIBLES 1
FCC-ENERGÍA
COMBUSTIBLES 2 BP
COMBUSTIBLES 2 AP
PQA-RNL
ENERGY COORDINATOR
ENERGY MANAGEMENT ENGINEER
PROCESS ENGINEER
PROCESS ENGINEER
PROCESS ENGINEER
PROCESS ENGINEER
PROCESS ENGINEER
ENERGY TEAM

ISO 50.001

- Regular meetings:
  - Global Energy Committee - CEPSA Refining BU
  - Energy Committee - LRR Management
  - Energy team - Process Engineers
  - TRM’s

TRMs

Engineers & managers from refineries

12 Different Technologies

KPI comparison & analysis

ENSURE MARGIN IMPROVEMENT THROUGH NEW IDEAS AND PROJECTS

Collaborators

1-2 annual meetings

Operating best practices discussion

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ROP/CROP

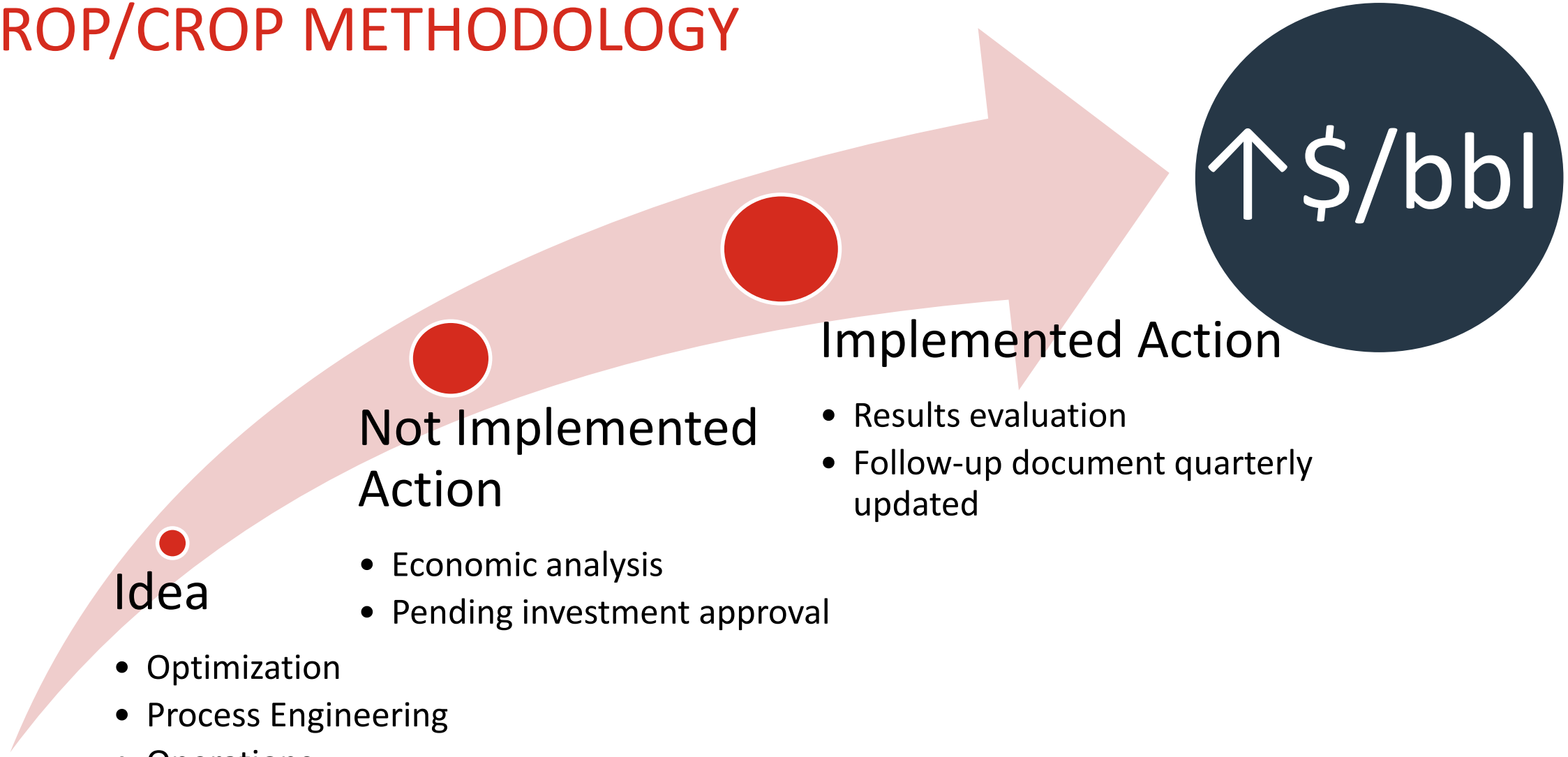
ROP

- 2012-2017
- Objective: +$1,5/bbl
- Budget: 318 M€

CROP

- 2015-2021
- Ideas 2015-2017
- Objective: +$1,8/bbl
- Budget: 500 M€
- 166 implemented actions

ROP/CROP METHODOLOGY



Idea

- Optimization
- Process Engineering
- Operations

Not Implemented Action

- Economic analysis
- Pending investment approval

Implemented Action

- Results evaluation
- Follow-up document quarterly updated

ROP/CROP @ LRR

- Improving process integration
  - Preflash in CDU
  - Increasing exchange area in preheat trains (CDU, VDU)
- Improving steam system
  - Hot condensate destination optimization
  - Replacing steam turbines by electric motors
- Improving fired heater efficiencies
  - Flue gas steam generators
  - Air Preheaters

ROP/CROP @ LRR

- Increasing throughput/market diversification
  - OPA (Aromatics Production Optimization)
  - CDU/VDU debottlenecking
  - Light Naphtha Catalytic Reformer capacity increase:
    - Phase 1: Debottlenecking
    - Phase 2: Revamping
  - Hydrocracker Revamping

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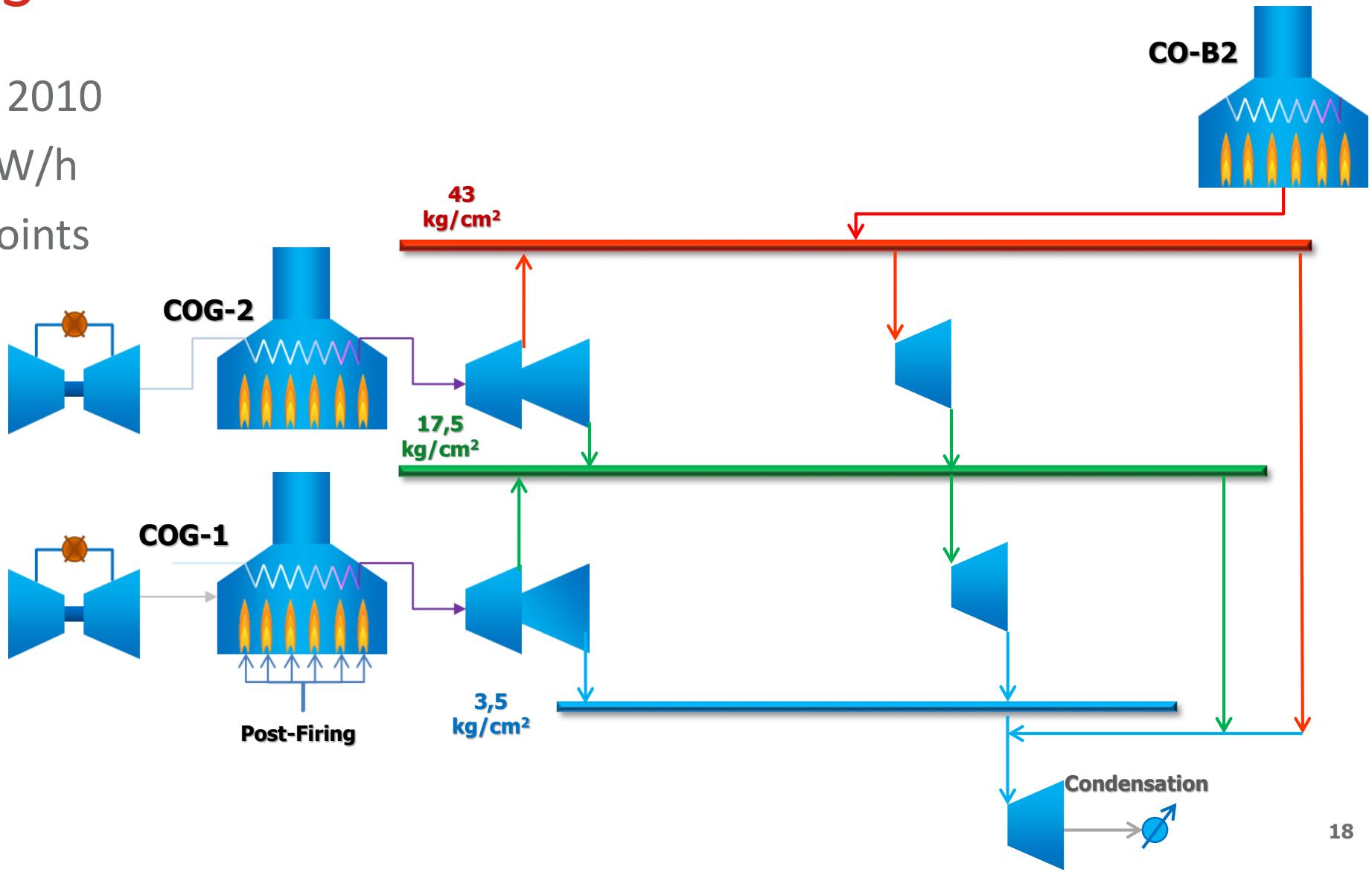
KEY PROJECTS

- ACPDM (Middle Distillates Production Capacity Expansion) – 2010
  - Capacity: 4.2 Mt/y
  - Units:
    - CDU / VDU / Gascon
    - Hydrocracker
    - GO Hydrodesulphuration
    - Steam Reforming
    - Amine/SWS/ 3 Sulphur Plants
  - EII Impact: -14 points

KEY PROJECTS

- Cogeneration 2 – 2010
  - 110 t/h + 50 MW/h
  - EII Impact: -2 points



KEY PROJECTS

- OPA (Aromatics Production Optimization) - 2017
  - 3 new distillation columns
  - New sulfolane unit
  - New tanks
  - Steer production towards petrochemicals:
    - Added value to aromatic products
    - Greater benzene production
  - EII: +1.6 → Increased steam demand (+49 t/h)

SOLOMON'S EII®

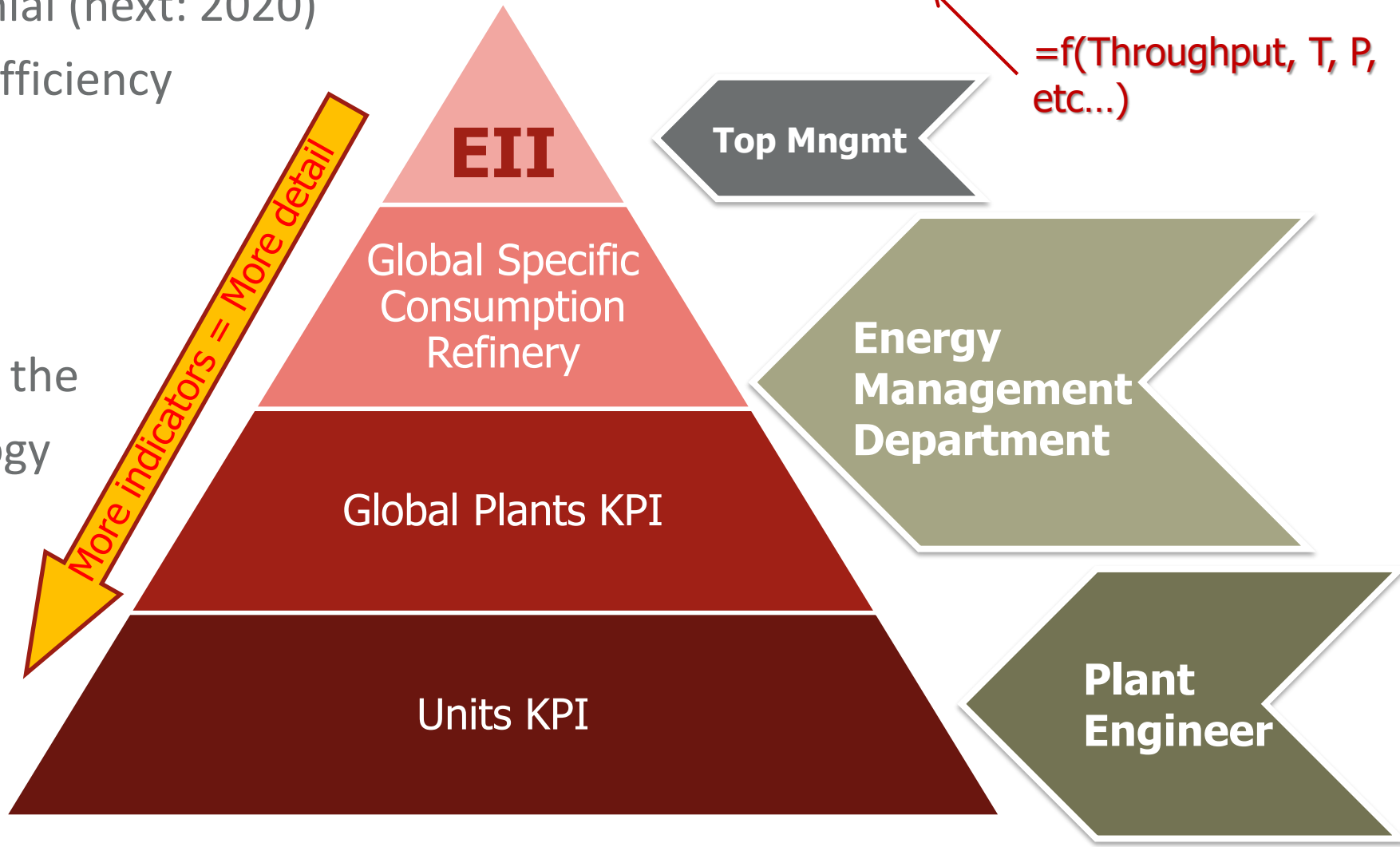
Solomon Associates
M³ – Measure. Manage. Maximize.®

- SOLOMON study – biennial (next: 2020)
- EII® - Measures Energy Efficiency
- Monthly follow-up
- After 20 years:
  - Deep understanding
  - Suggestions to change the SOLOMON methodology

$$EII = \frac{\text{Real Energy Consumption}}{\text{Standard Energy Consumption}}$$

Fuel, Steam, Electricity

=f(Throughput, T, P, etc…)



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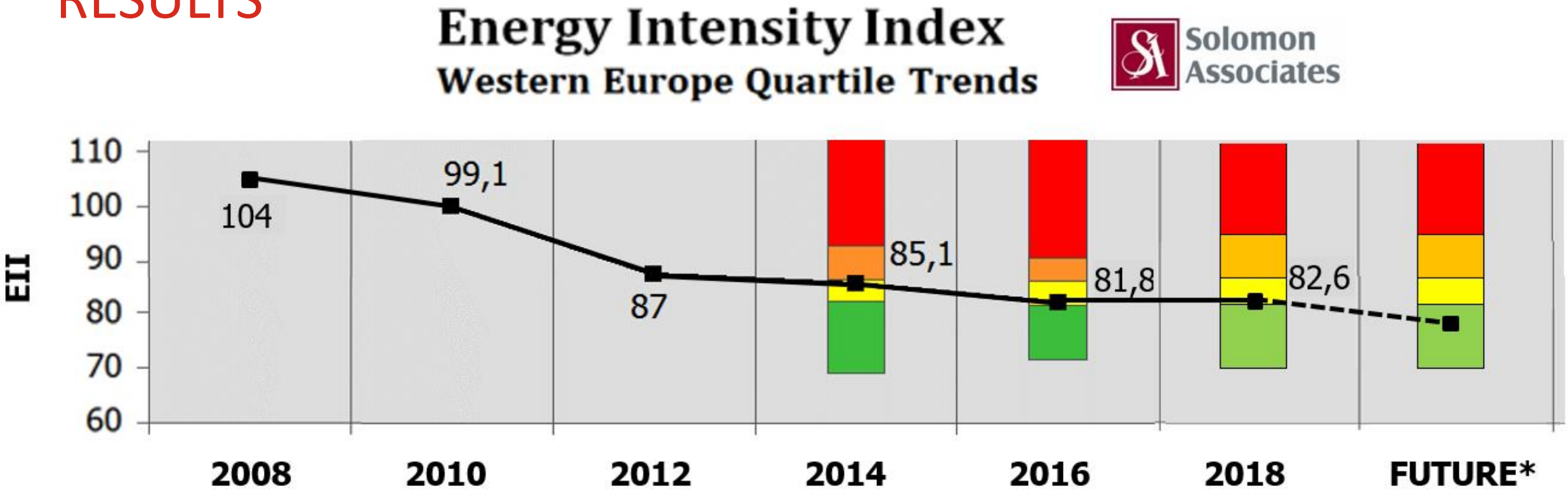
RESULTS



LRR EII®: 104 in 2008 → 82,6 in 2018

1 EII® point costs 3M€/year → CAPEX = 9M€ (3-year payback)

THANK YOU

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