# Real Time Optimization in Repsol Refineries

November 17th, 2020

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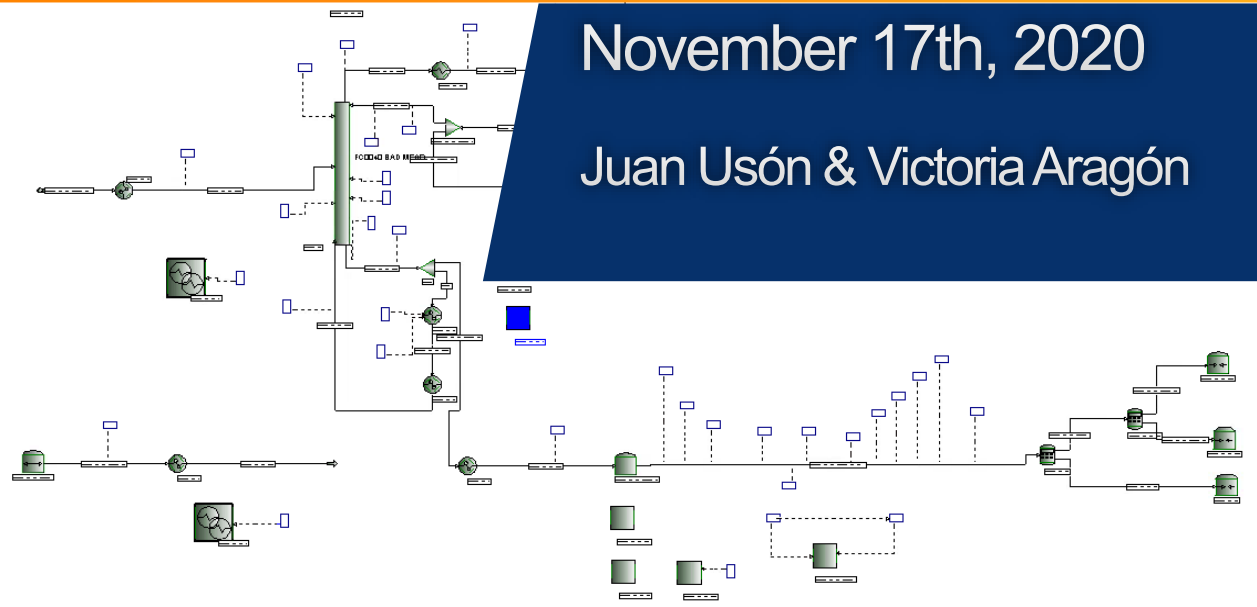


# Digital & Technology are recognized as key levers for Repsol 2018-2020 Strategic Update

## Digitalization

Ambitious digital program **to transform the company for the future**

## Technology

Enables the future Repsol: **lower emissions, more efficient, more competitive**

## Talent

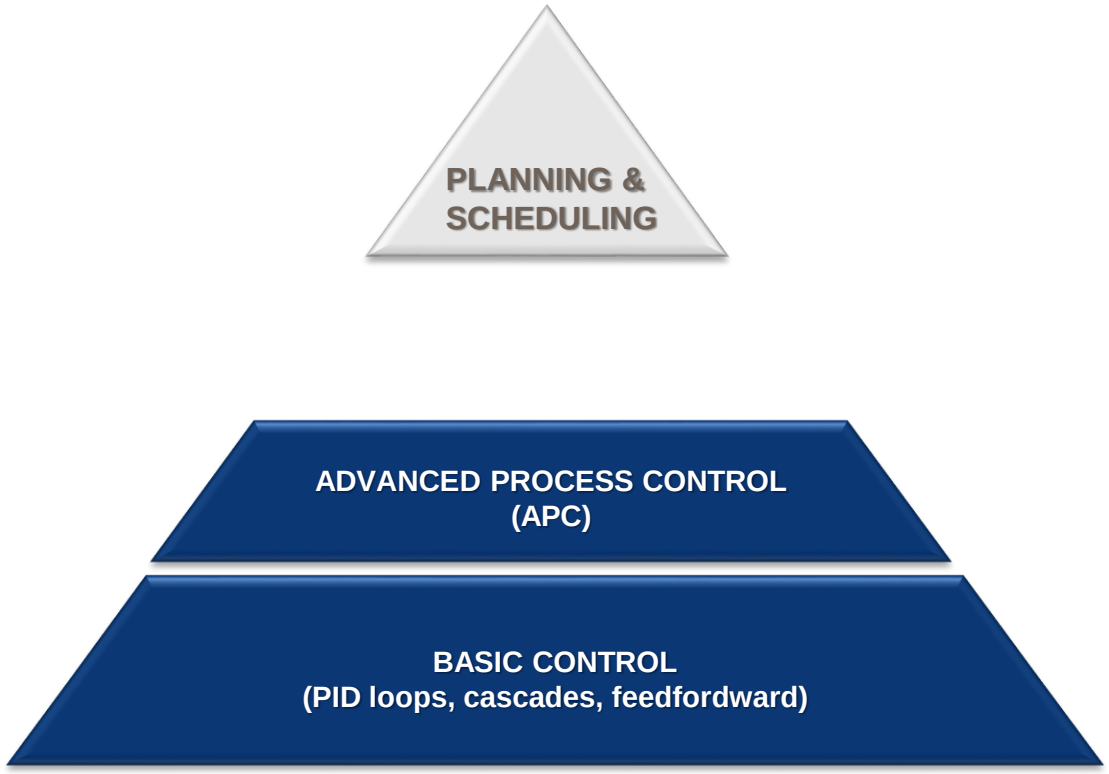
Developing **skills and capabilities** into the **new Repsol culture** to lead the future

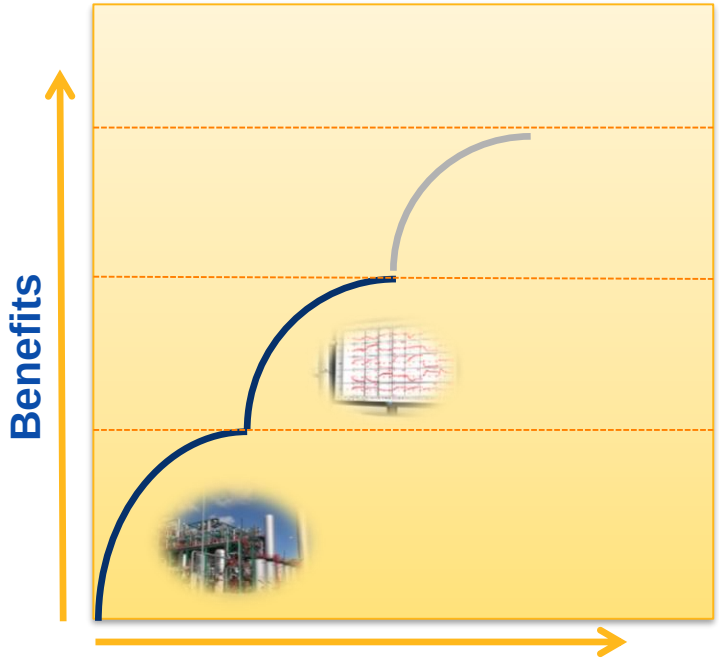
## Lean Corporation

Further improve **corporate savings** reaching **9% cost reduction** by 2020

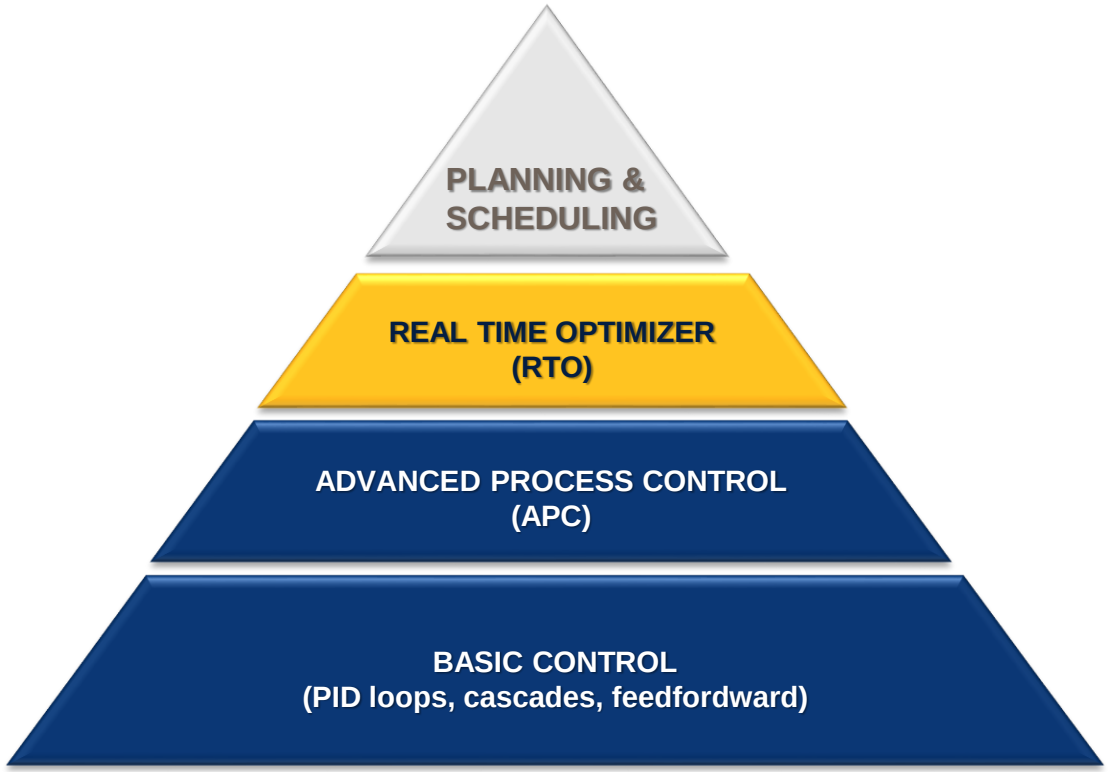
## Four strategic priorities in Industrial Digital portfolio

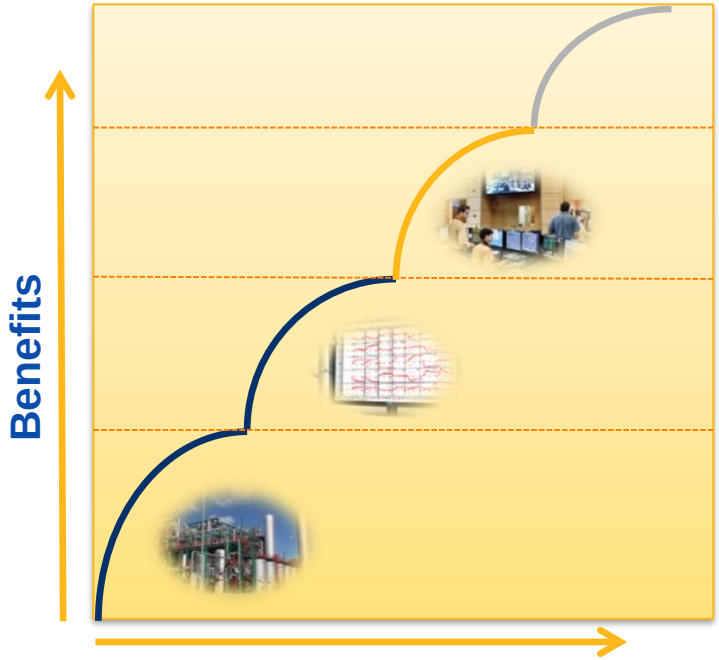
# RTO opportunities and fundamentals



# RTO opportunities and fundamentals



# RTO opportunities and fundamentals

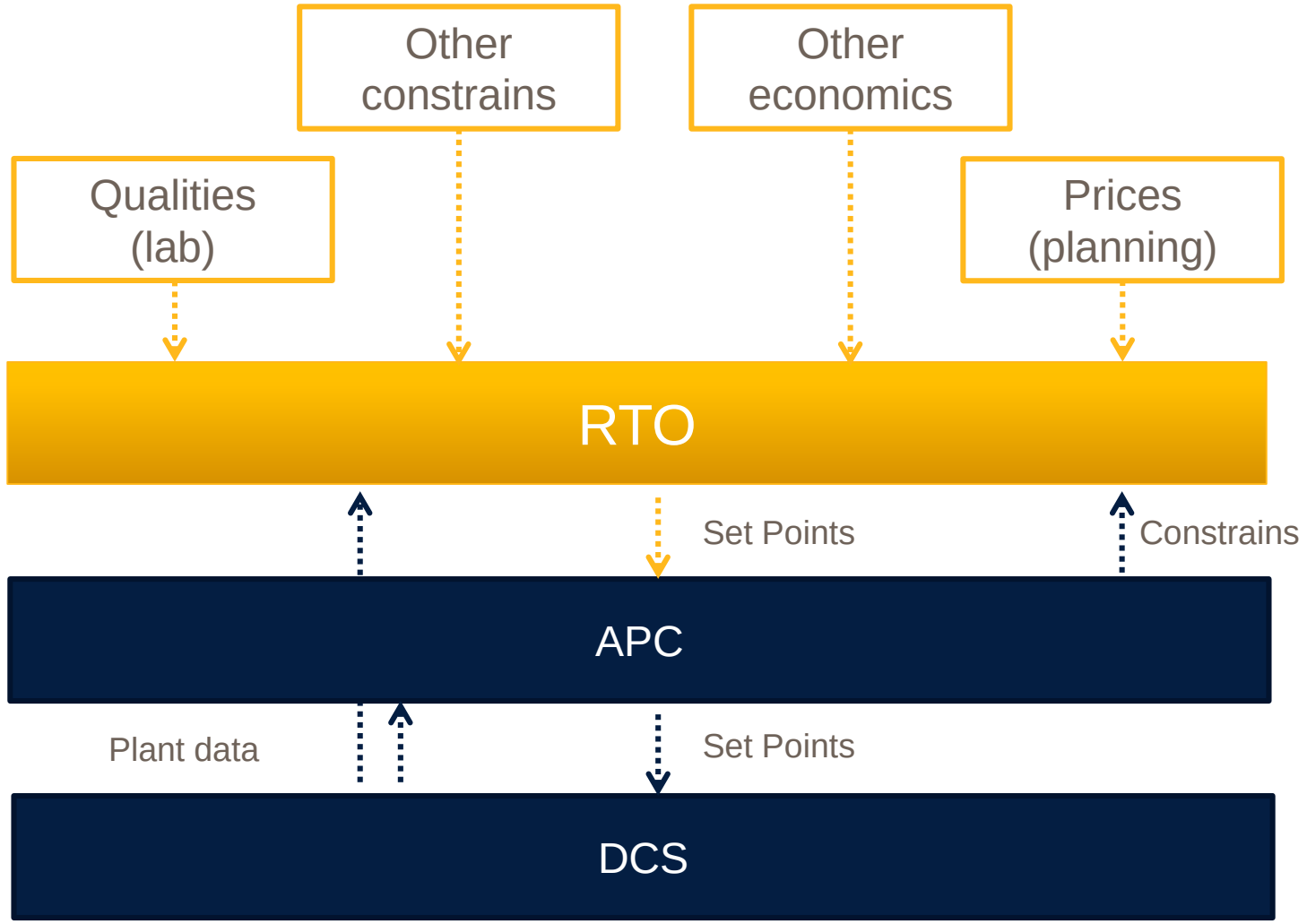
- **Rigorous simulation** of the unit, based on first principle equations, that is able to **self-calibrate** along the time to represents the plant evolution at every stage.

- The optimization function takes the **prices from Planning** for products and utilities and provides the most economical solution, while keeping the **real constrains** of the plant.

- The RTO runs continuously, taking live data from the plant at **each stationary** and automatically providing the **optimal operating point** for the current situation.

- The optimizer **relies on the APC and basic control** to move the plant to that optimum while keeping the plant stable and safe.

# RTO opportunities and fundamentals



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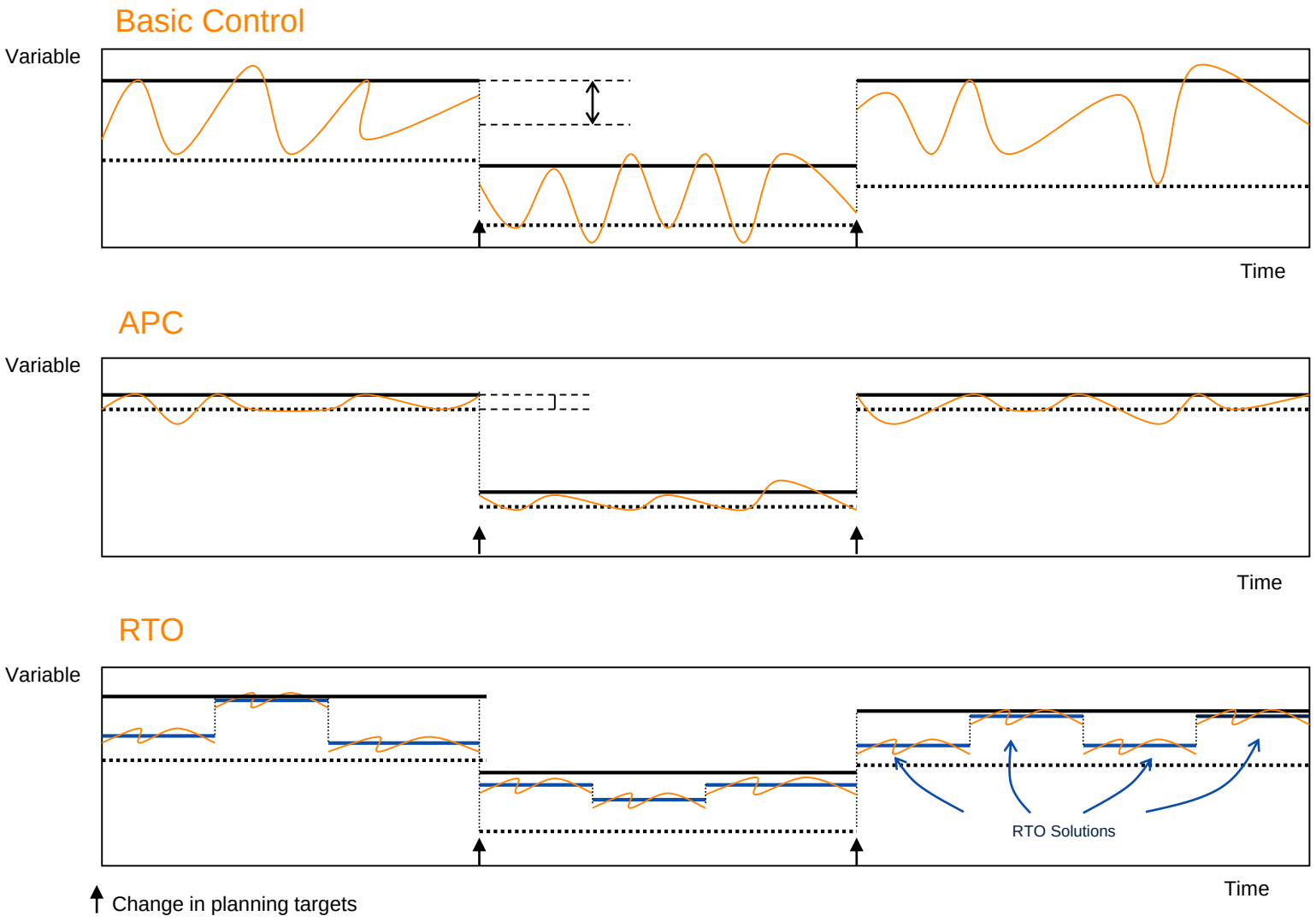


# RTO implementation

## Viability study

Two different units selected in two refineries for the viability study

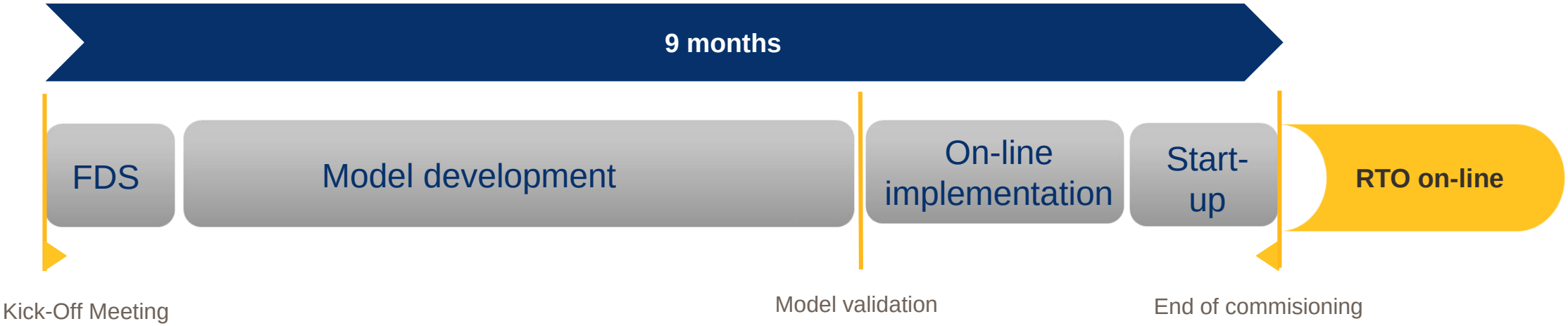
Representative historical scenarios studied

Preliminary simulation models developed

Potential optimization margin calculated for each unit

# RTO implementation

## Project schedule & Milestones:




- Core team: 2 people from AVEVA + 2 people from Repsol. Additional support requested when needed.
- Complex project, some unexpected technical issues required changes in the original approach but only minor impact in expected schedule.

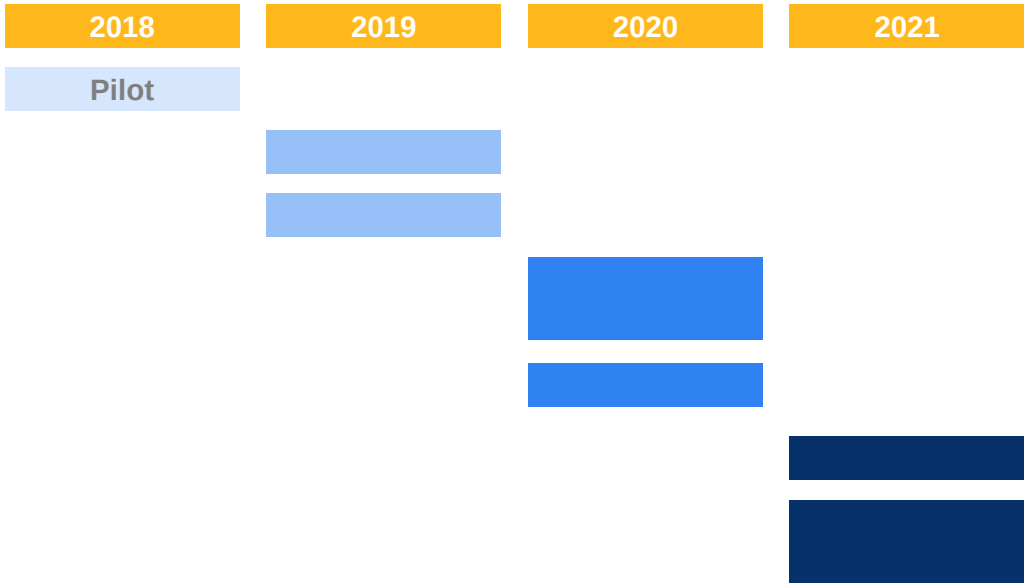
# RTO implementation

## Project schedule & Milestones:

- Plant test done after project completion:
  - Increased yield in most valuable products
  - Reduced utilities consumption
  - Optimization mechanism adapted to different price scenarios
- Benefits observed in the order of magnitude of the viability study.
- Quick return of investment (< 1 year)

# RTO implementation

## Scale up

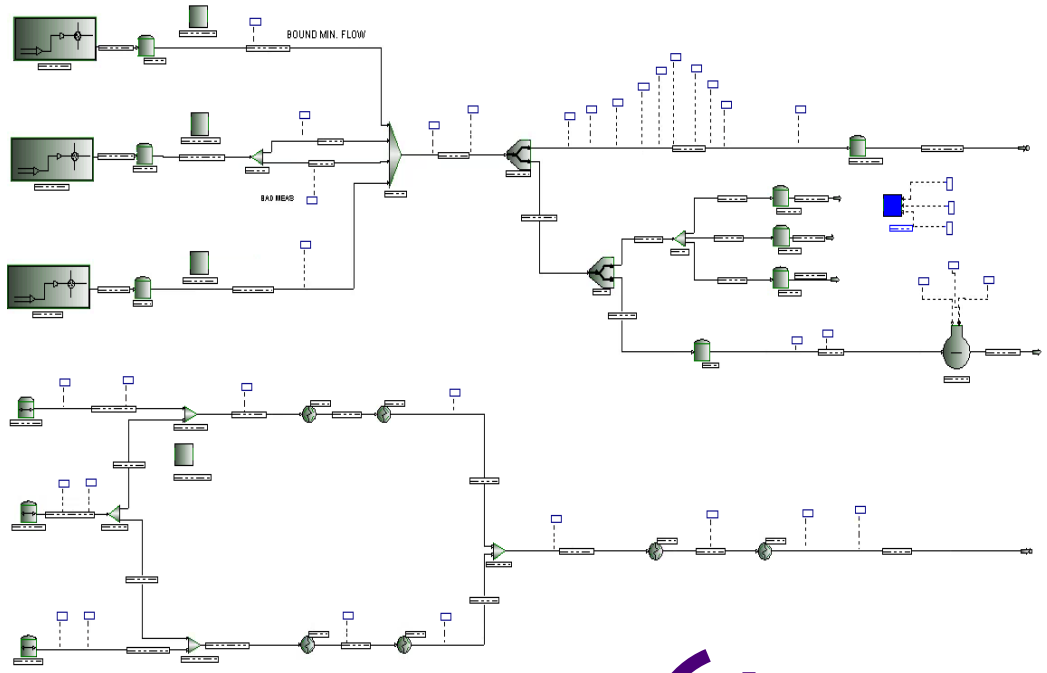


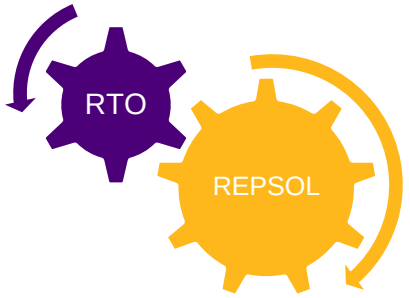

- Scale up RTO for other units and refineries
- Selection of units with greatest potential benefit
- Timing conditioned by resources availability and plant turn-arounds

# RTO implementation

## Keys to success

- Robust and proven technology
- Select a team witch knowledge and expertise
- Assure expert resources availability
- Choose the right units
- Adapt to the actual needs of the refinery
- Involve the final user of the product
- Training and knowledge transfer



# Thank you