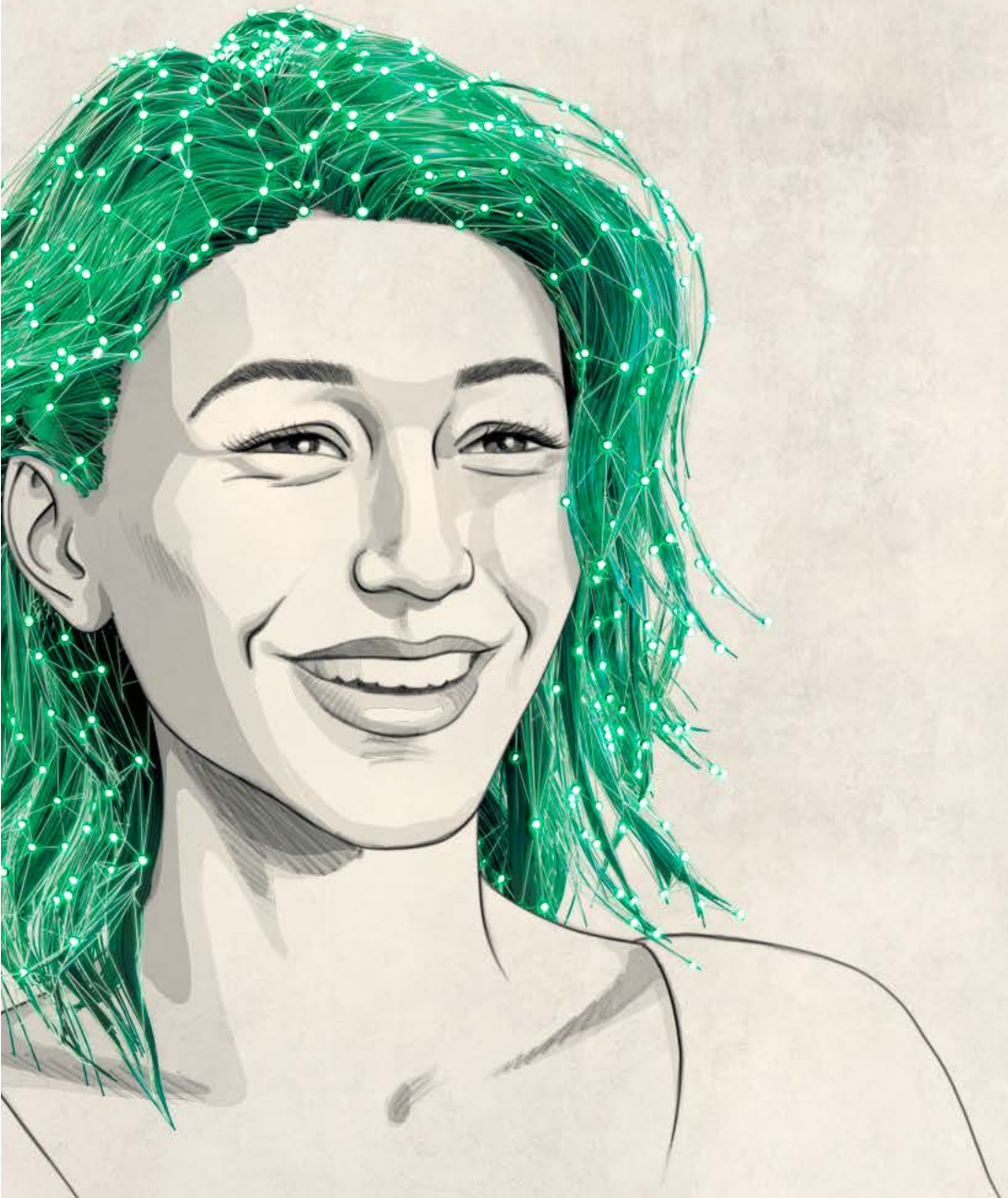


# Progetti Eni

A.A. 2021-2022

# *Progetto n.1: Virtual Commissioning*

***Paolo De Francesco***
*Manager Engineering and Construction – Technologies*
*Eni S.p.A. / Digital and Information Technologies*

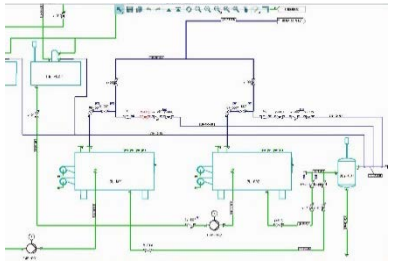
# Eni Digital programme

The Digital Program in Eni and Eniprogetti (Eni Engineering Company) fulfils two main needs:

- A modernization of the engineering process to get higher levels of efficiency, effectiveness and resilience
- Compliance with Eni requirements concerning asset integrity

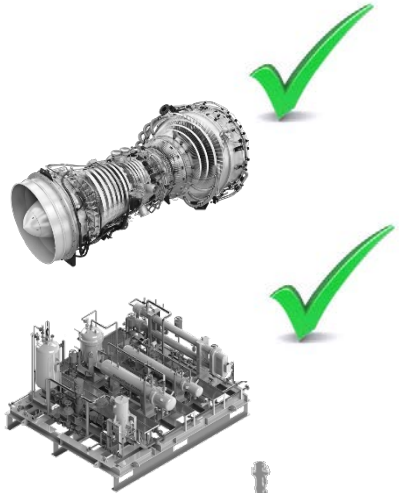
# What is commissioning?

- Commissioning is a *systematic process aimed to orderly execute and document all Functional, Service and Operational tests necessary to bring a whole Facility from the Construction stage up to its Start-up and stable operations, in compliance with approved design requirements and applicable Rules, Regulation, Codes and Standards.*
- Commissioning is the last step after construction and completion



- How does the whole process work?
  - Breakdown the plant in Systems and Subsystems
  - Assign inspection and test plans to items

  - Execute tests (Inspection Test Reports)
  - Set of items all tested ➔ test them altogether (SubSystem) – Issue certificate
  - Set of Subsystems all tested ➔ test them altogether (System) – Issue certificate
  - Set of Systems all tested ➔ Assess Facility readiness for start up ➔ Plant is ready to go

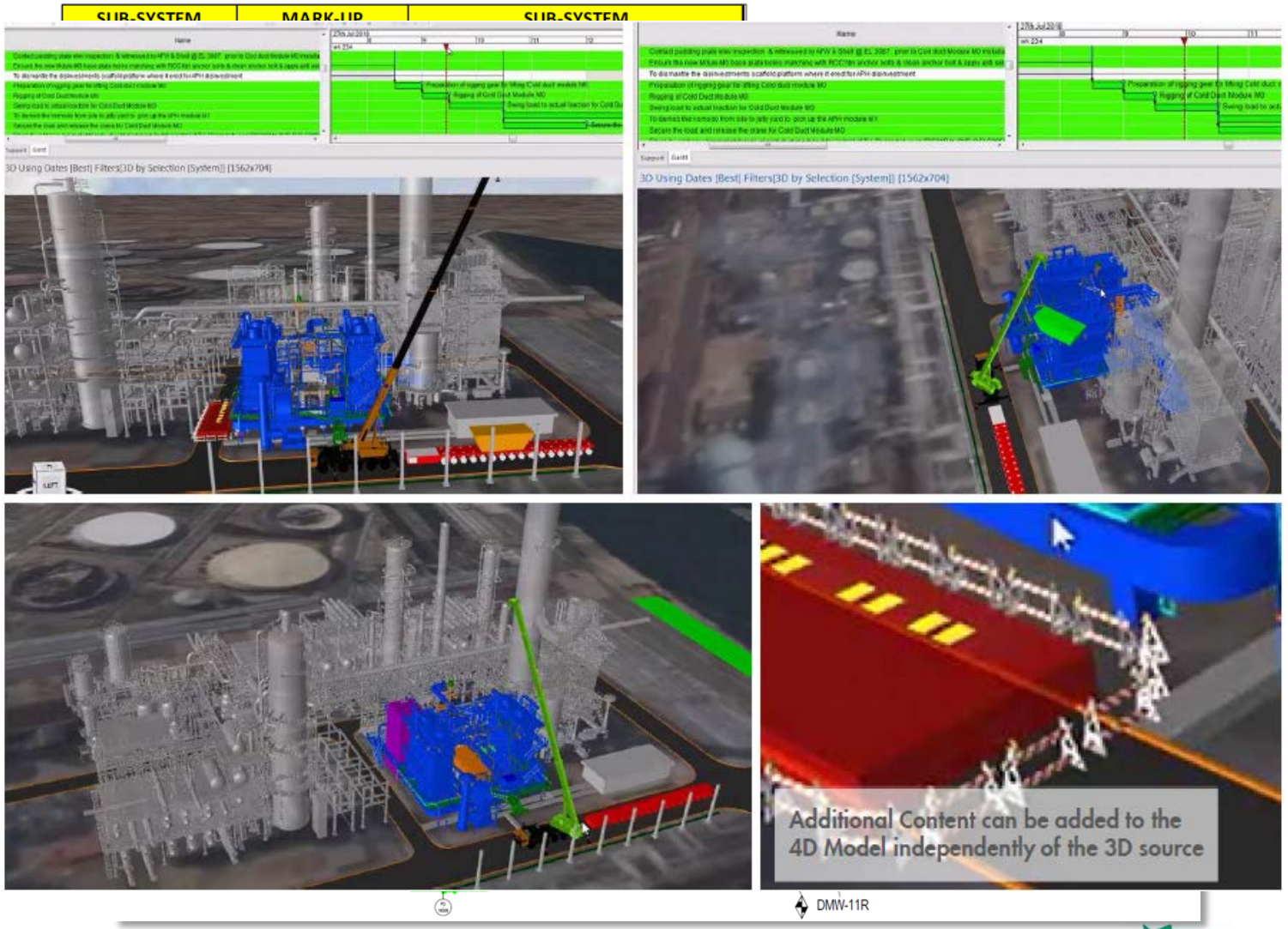


# What does «virtual [completion &] commissioning» mean?

- Commissioning made smart
- …that is?
- Manage design, construction, completion and commissioning to streamline the whole process

E.g.:

- Look ahead
- Start thinking about construction and completion&commissioning during design
- On  2D CAD
- On 3D CAD



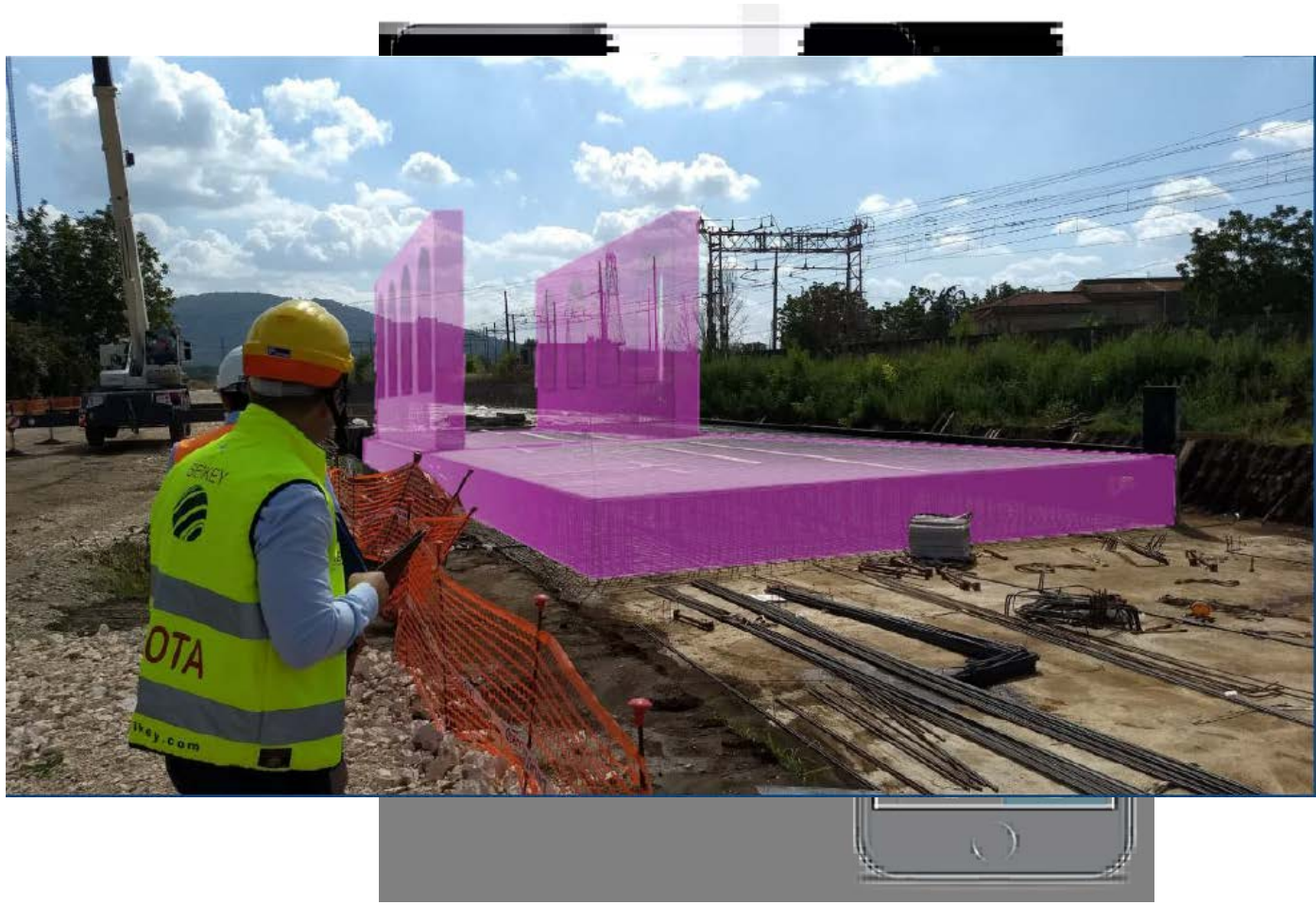
# What does «virtual commissioning» mean?

- Use smarter - dematerialized and digitalized - checksheet (e.g. ITR)

- Or *smarter* approaches

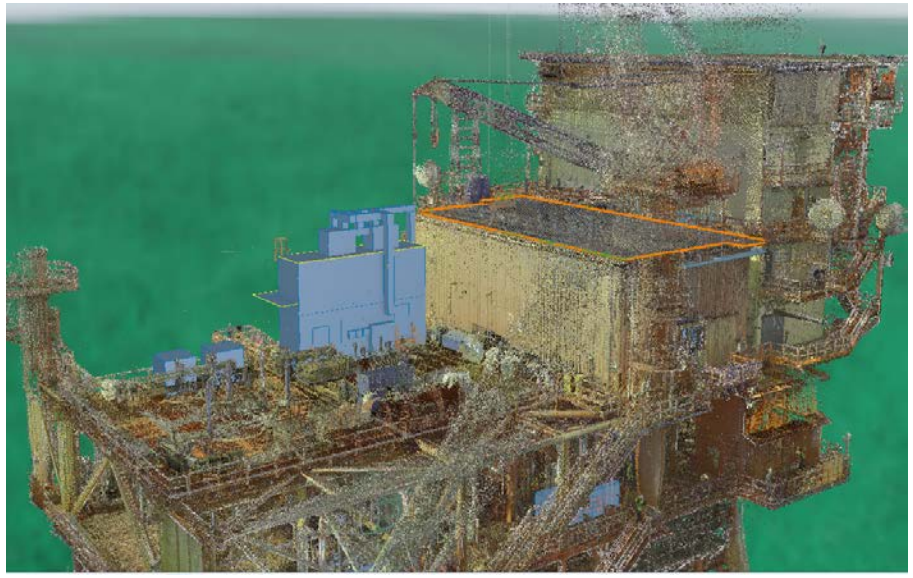
(dematerialize drawings)

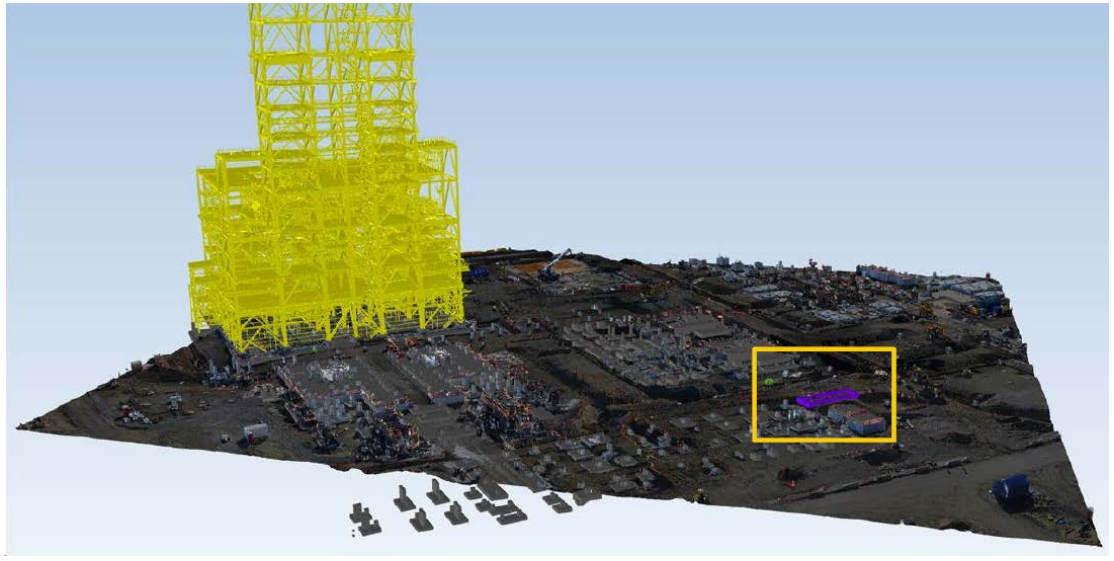
- Or **smarter** approaches



# What does «virtual commissioning» mean?

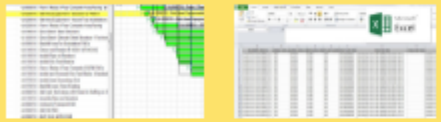
- Monitor construction in real-time
- With laser scanning, photogrammetry, smart cameras
- Drones





# Target: 4-5…7D Construction Management

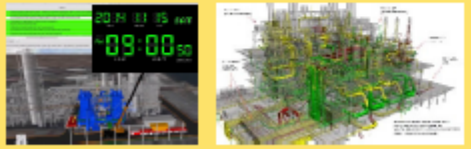
## 1D
Schedules, Spreadsheets, Data Bases & Reports



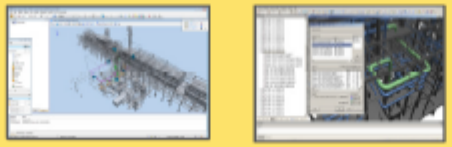
## 2D
Drawings
Layouts & Schematics

## 3D
Models, Laser Scans & Photogrammetry (AV)

## 4D
Time & Status Visuals



## 5D
Real Time Material Status allowing Work Face Planning



## 6D
Cost

## 7D
All dimensions used in the development of the project used in the lifecycle of the Facilities.

Asset Visualisation

CSU

T&T

# Scope of work

- Assess current completion&commissioning practices in Eni
- Identify gaps - areas of improvement
- Look for new approaches (cutting edge tech or consolidated best practices from industry)
- Design solutions - fit for purpose

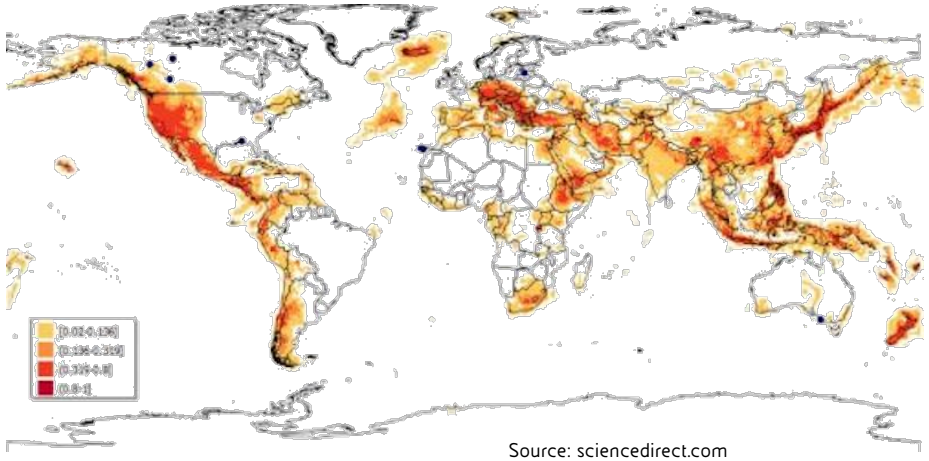
# *Progetto n.2: Thermal modeling of geothermal applications*

***Vincenzo Norelli***
*Reservoir Engineer*
*Reservoir & Petroleum Engineering*
*Reservoir Innovative Technologies Dept.*

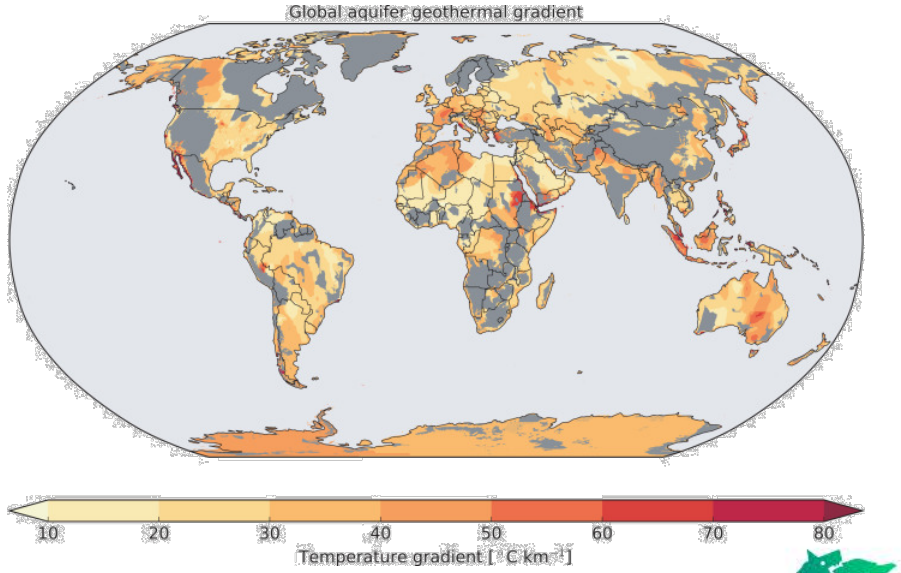
## Geothermal energy availability

### Background

- Geothermal power has considerable potential for growth.
- The amount of heat within 10.000 meters of the earth's surface is estimated to contain 50.000 times more energy than all oil and gas resources worldwide.
- Thermal properties and geological uncertainties can significantly influence the available enthalpy at surface.



Source: sciencedirect.com



## Tasks and activities

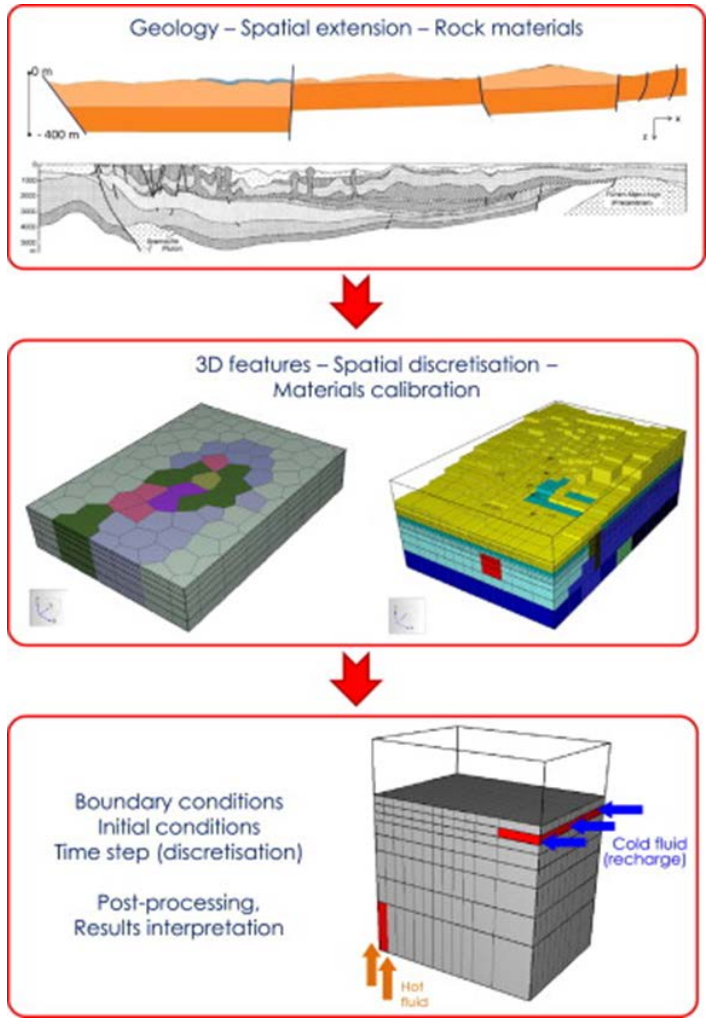
- Literature review on state of art of thermal modeling
- Implementation of thermal model
- Application to reservoir models to estimate the available enthalpy as function of input thermal and geological properties

## Educational Requirements

- Topics: energy, geothermal, reservoir
- Exams: basic knowledge geology, reservoir and simulation

## Deliverables

- Progress presentations and final report
- Thermal reservoir model

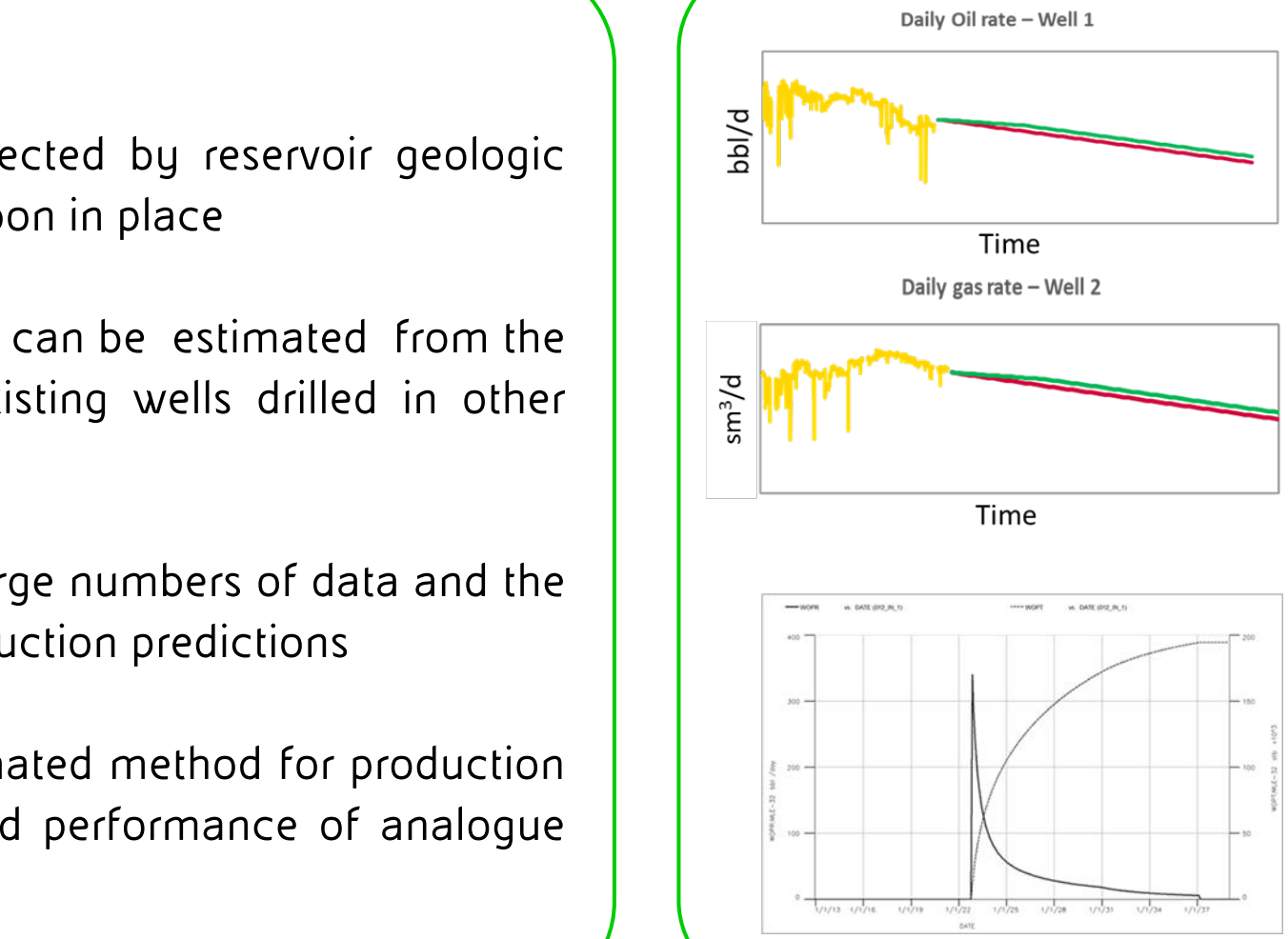


# *Progetto n.3:*
# *Production forecast automatization of hydrocarbon well through statistical analysis of production decline curves of analogues*

***Carlo Monico***
*Reservoir Engineer*
*Reservoir & Development Project / Eni*

## Background

- The production decline of a well is affected by reservoir geologic features and original volume of hydrocarbon in place
- Production forecast of new planned wells can be estimated from the observed production performance of existing wells drilled in other reservoirs with similar characteristics
- Possible criticalities are the analysis of large numbers of data and the synthesis to obtain a reliable tool for production predictions
- Scope of the thesis is to devise an automated method for production forecast of new wells based on observed performance of analogue wells



## Tasks and activities

- Analogue  wells identification
- Decline curves analysis
- Statistical study of production decline
- Production forecast

## Educational Requirements

- Topics: Competence in programming languages (MATLAB, Visual Basic, Excel)

## Deliverables

- Ppt presentation
- Final report

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UN'ALTRA ENERGIA