

CUSTOMER DAY

TECHNICAL PRESENTATIONS STORY

How we help you to stay competitive in the current and future markets

09:00

Ansaldo Energia Welcome

09.10 - 09.30

Markets Scenarios – External speaker Bloomberg

09.30 – 09.50

Ansaldo Energia Answers to Market Challenges

09.50 – 10.10

Ansaldo Energia – New Units

10.10 – 10.30

Ansaldo Energia – Service

10.30 – 11.15

Coffee & Meet the Expert

11.15 – 11.35

Premium Technologies

11.35 – 11.55

Ansaldo Green Tech

11.55 – 12.15

Ansaldo Nucleare

12.15 – 13.45

Lunch & Meet the Expert

FACTORY TOUR

Ansaldo Energia Factory Open Day

13.45 – 14.15

Transfer from Magazzini del Cotone to Ansaldo Energia Headquarters

14.15 - 14.45

Ansaldo Energia registration & EHS tutorial

14.45 – 16.45

Factory Tour

Corner 1

Spin Pit

Corner 2

Rotors Production – TIG

Corner 3

Rotor Production – Lathe Machines

Corner 4

Genoa Repair Center

Corner 5

Diagnostic Center

Corner 6

Microturbine – Electrolyzer

16.45 – 17.00

Conclusion

170
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SERVICE

Solutions for Future-Proofing of Assets

Speaker: Luca Buzzoni

CUSTOMER DAY - October 4th 2023

AGENDA

Service Solutions for Assets Future-Proofing

TWO CASES FROM LATEST REAL APPLICATION

PIACENZA (94.3A) UPGRADE

Increase capacity, extending the Plant lifetime

MAXIMA CENTRALE (GT26) UPGRADE

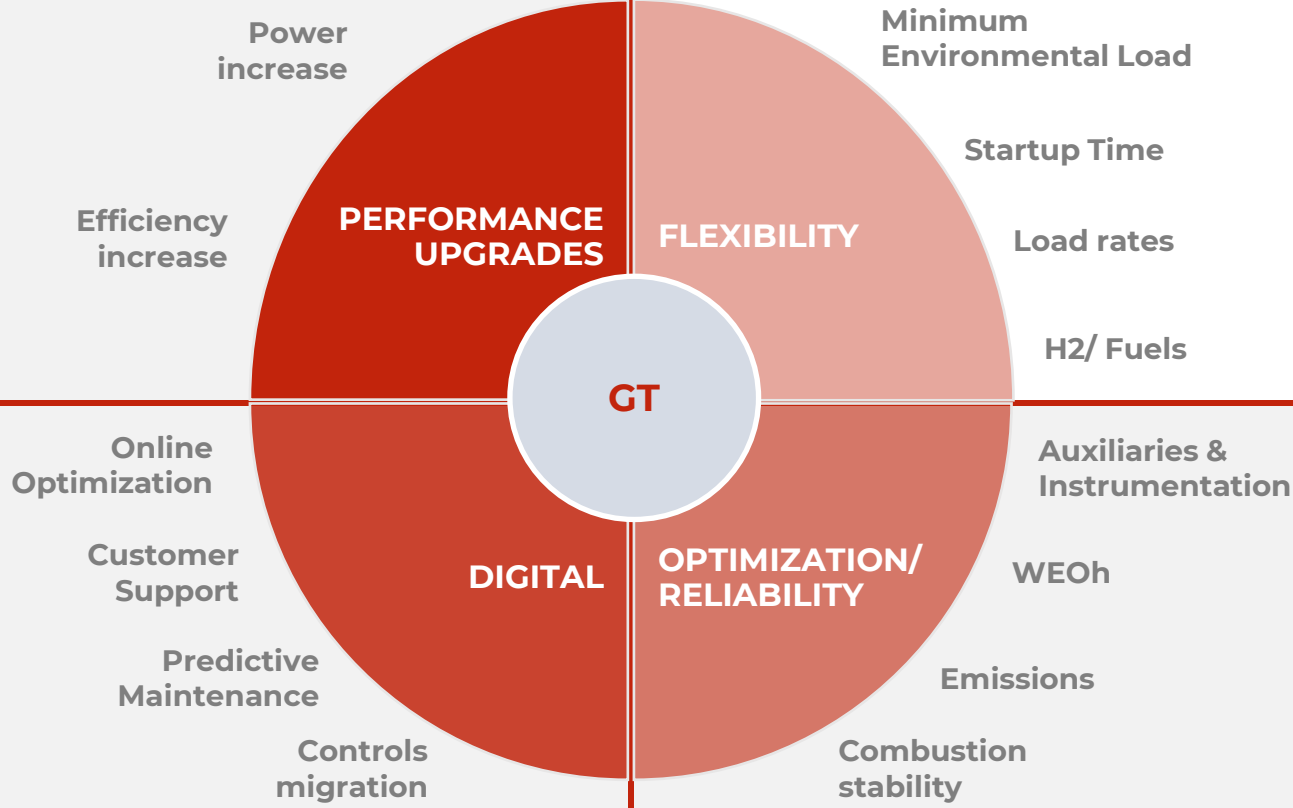
Maximize efficiency for carbon footprint and opex reduction



Gas Turbines Service product portfolio

- **MXL**
- **MXL2**
- **MXL3**
- **IGV turn up**
- **CMF++**
- **AirFlex**
- **Fuel Gas Preheating**
- **Fogging / Hi-Fogging**

- **AutoTune**
- **Digital Plant Support**
- **APEX**
- **TXP migration**
- **ALSPA migration**



Complete Product Portfolio addressing all market needs



Piacenza

Combined Cycle Power Plant Upgrade

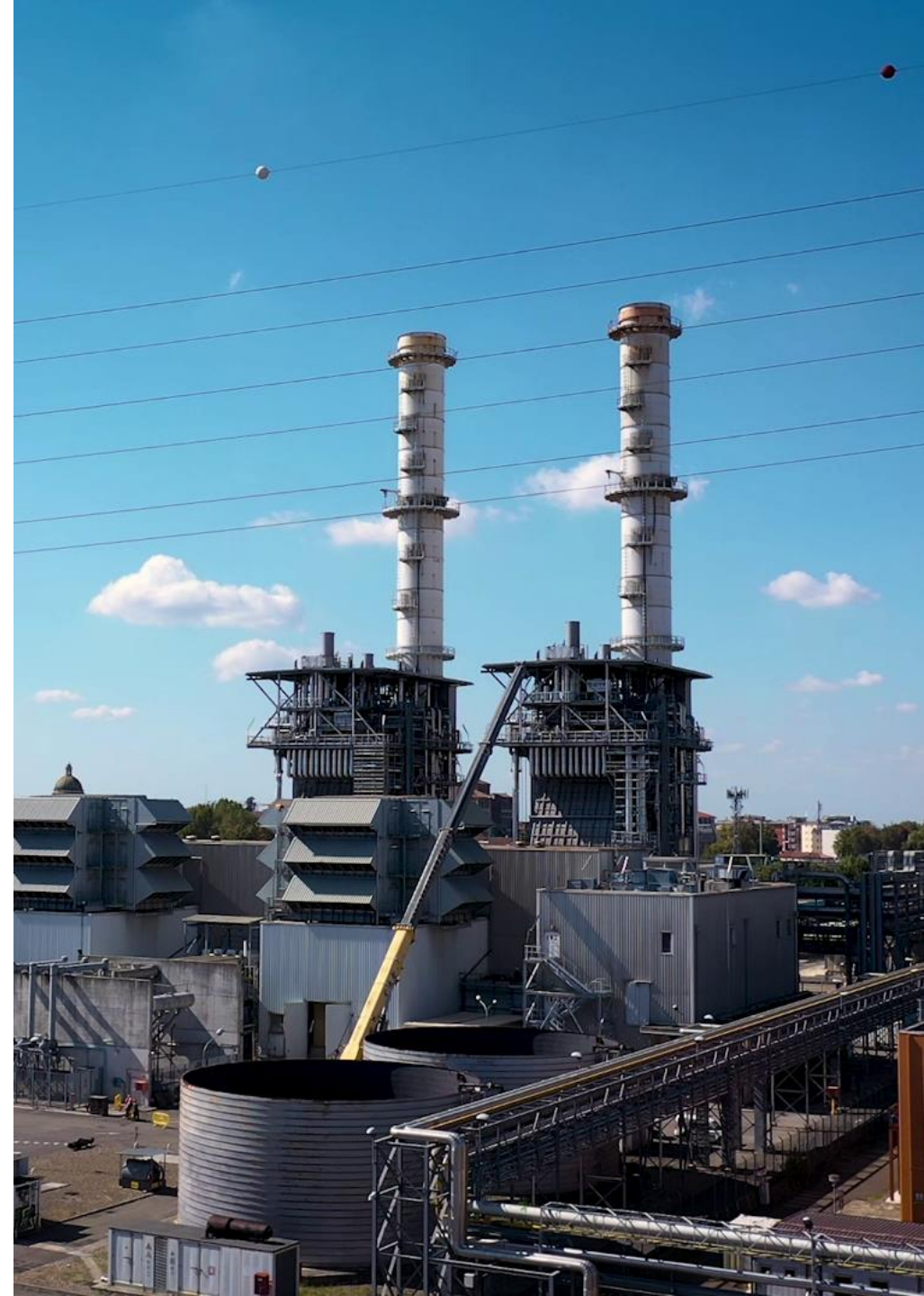
Where: COUNTRY: Italy
REGION: Emilia Romagna
CITY: Piacenza

Year of Operation: 2005



What:

	UNIT	MODEL	OEM
GAS TURBINE	1-2	V94.3A V4	Siemens
GENERATOR	1-2	TLRI 118 <i>Air cooled</i>	Siemens WH
STEAM TURBINE	3	W27R <i>4 casings HP – IP and LP double flow</i>	F. Tosi 1967
GENERATOR	3	WTF122 <i>H2 cooled</i>	TIBB B. Boveri
Cycle Power Output [MW]			840



LTSA Activation

LTSA with
ANSALDO ENERGIA
Starting year
2015

2019

HGPI 02 – Unit 2

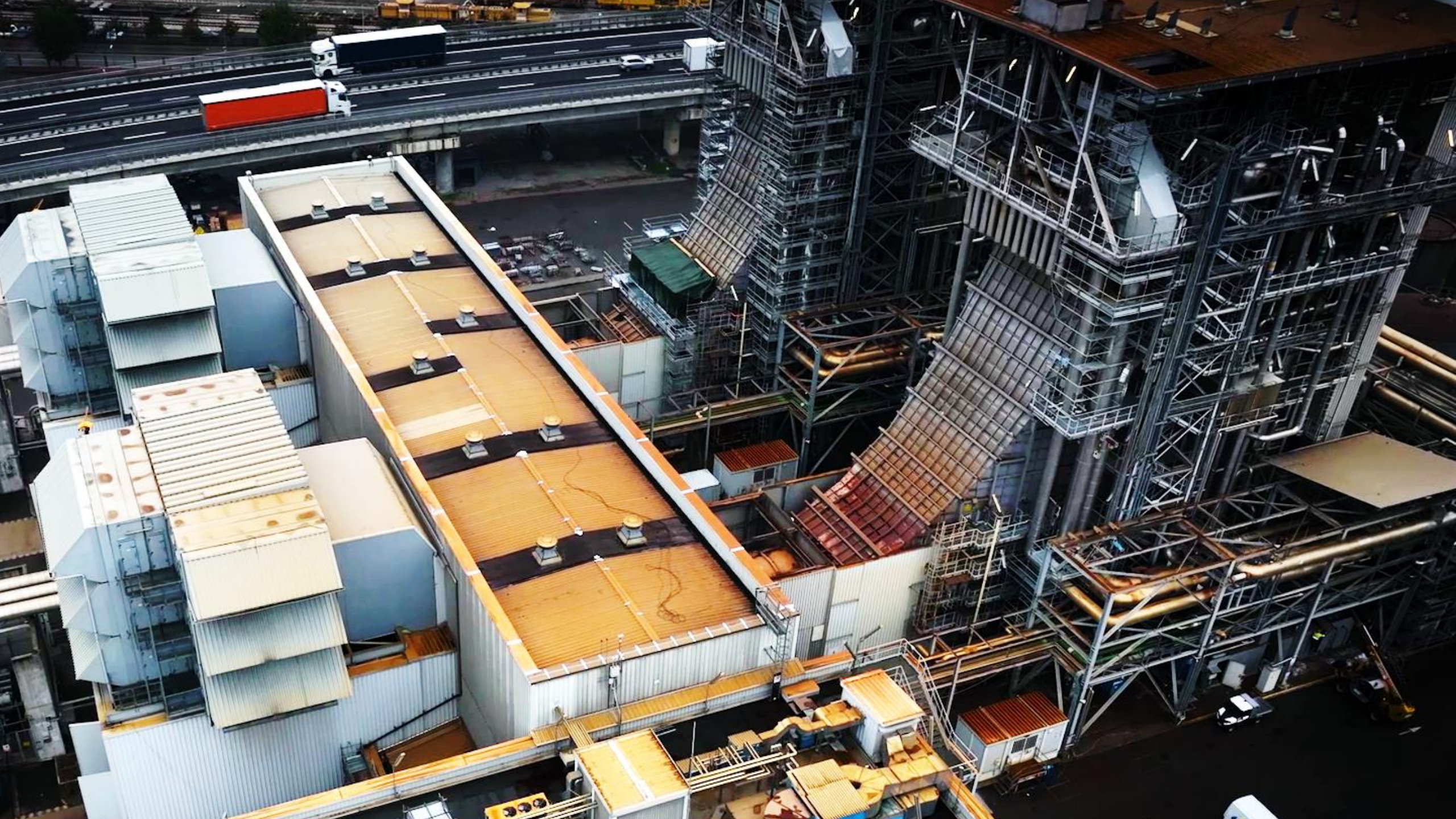
New model of Turbine B&V
extended maintenance pace
+ Major Generator Unit 2

First contact about Units
UPGRADE
2020

2021

HGPI 01 – Unit 1

New model of Turbine B&V
extended maintenance pace
+ Major Generator Unit 1



A2A Piacenza – Plant Revamping

Target

Increase capacity and profitability to cope with future market requirements

Ensure the Reliable Plant **Life Extension for the next 20 year** with a sustainable investment

Boundaries

Face and manage the upgrade complexity: plant limits, ageing, different OEM
Minimize the outage time

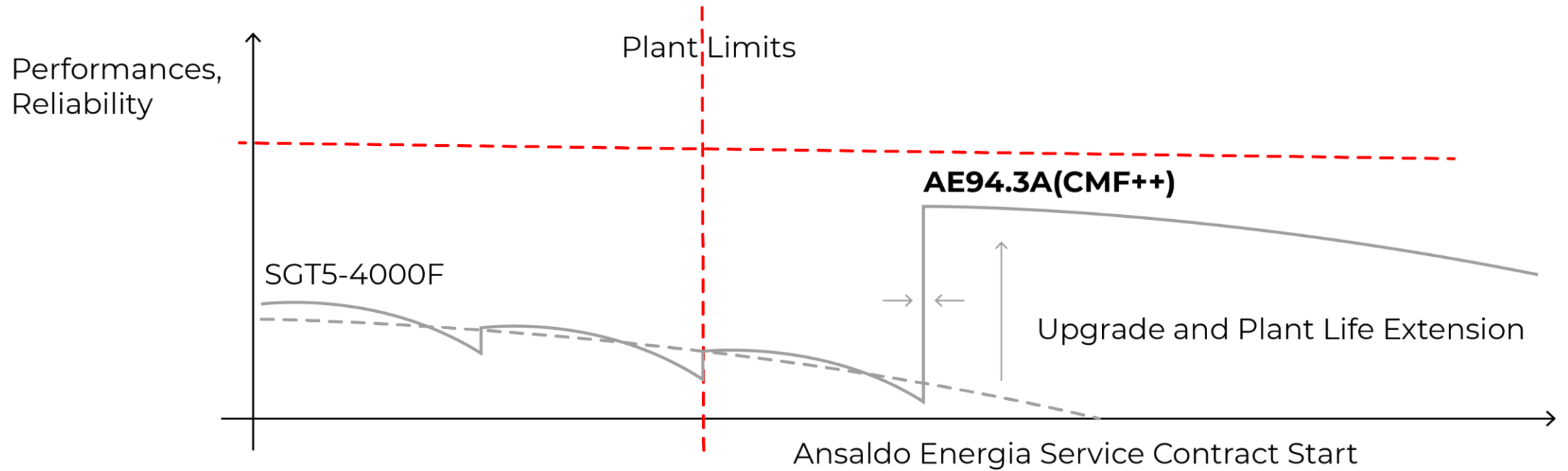
Approach

Verify the plant capability through a detailed feasibility study and select the optimal gas turbine upgrade:

- Increase GT exhaust energy through a compressor massflow upgrade
- Improve the combustion chamber cooling system with the latest design



High Ansaldo Energia expertise in whole plant areas to safely exploit the capacity margin



AE94.3A CMF++ and SAS-UP2 upgrade

Main Scope Of Work

Compressor:

New Compressor Discs CD1-CD5

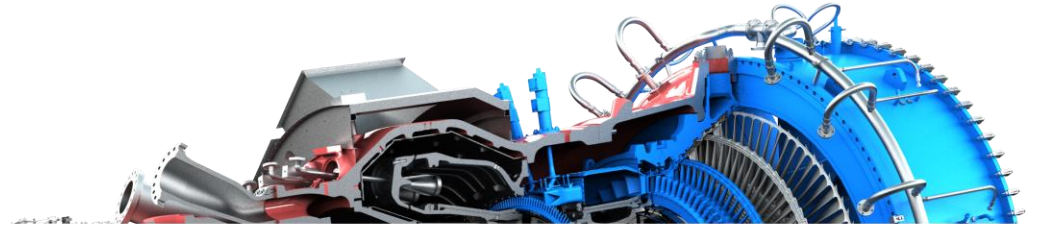
- New casing (CVC1)
- FHS and Journal Bearing
- Other modifications: air intake, intermediate shaft
- Blow off lines

Combustor:

- SAS-UP2
- Acoustic Dampers

Turbine:

- MXL (from previous HGPI)



35 Including **3** upgrades

Upgrade of V94.3A(4) - SGT5-4000F(4)

Upgrade roadmap



New Upgraded rotor and ACC



2022

UPGRADE to CMF++ Unit 1
Installed Std rotor and ACC



2023

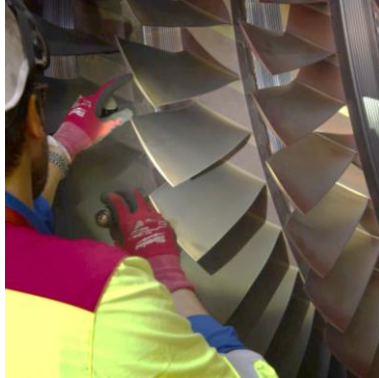
UPGRADE to CMF ++ Unit 2



Some numbers

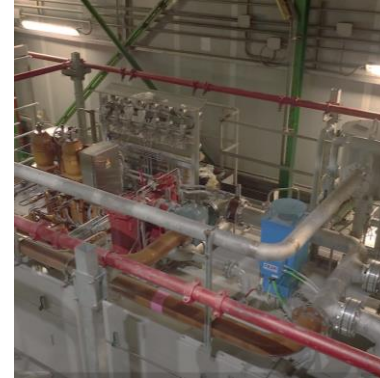
4550

Engineering
Hours



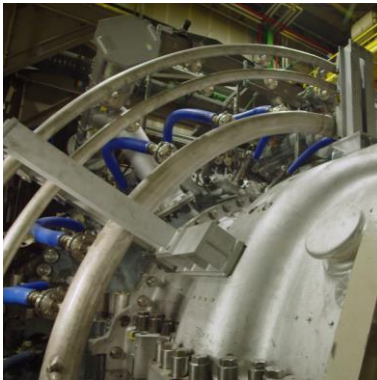
150

People
involved
on site



942

Signals
checked



397

New
instruments
installed



16850

mt of cables
used

A2A Piacenza AE94.3A CMF++ upgrade success story

Key points



Power Increase: Ageing recovery and full exploitation of plant capacity margin



Plant Life Extension granted



Sustainable Scope of Work: GT upgrade only, no plant modifications

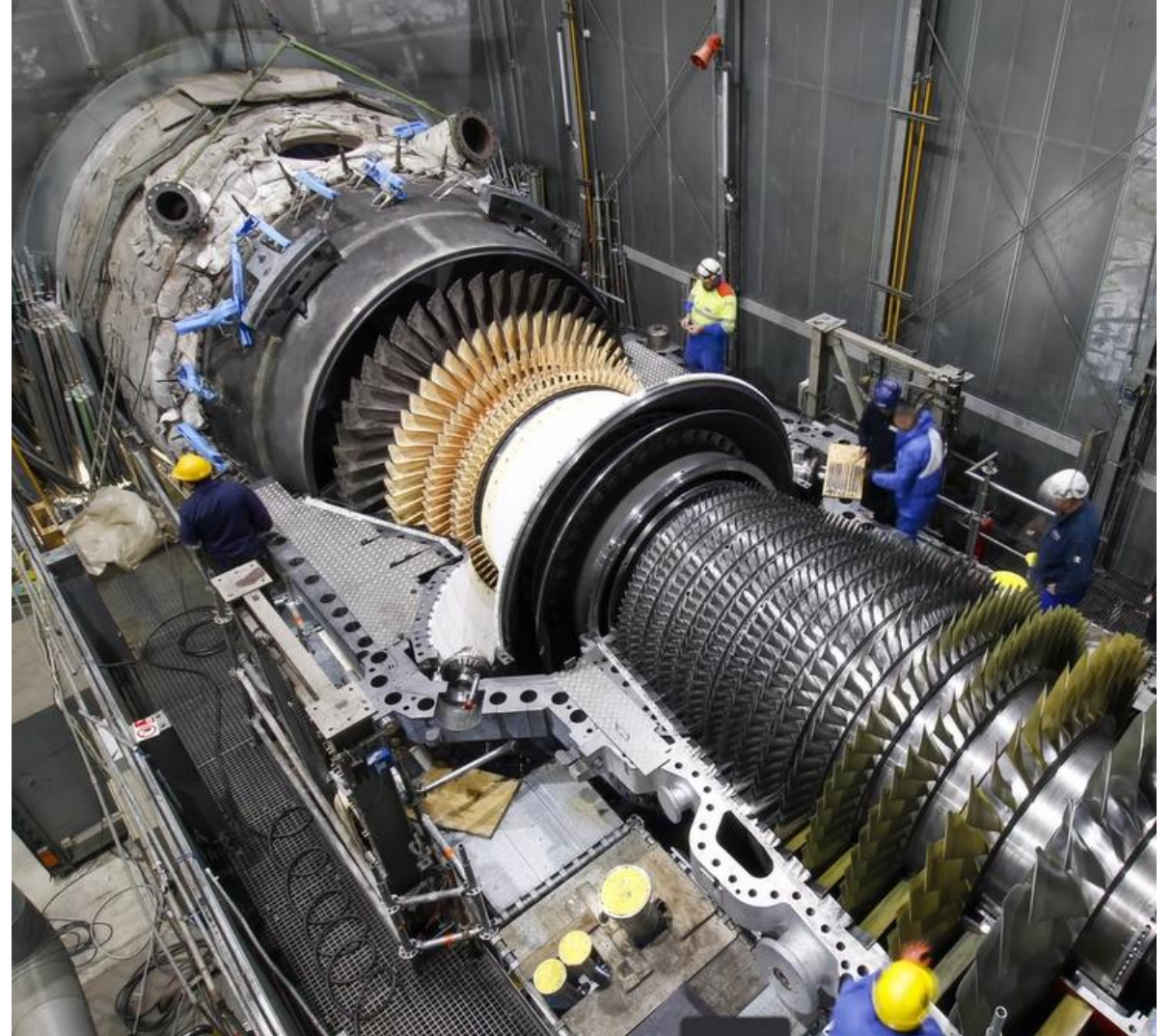


Maintenance interval extension



Technology update with GT noble parts from latest Rating (Compressor and Combustion Chamber)

Additional Flexibility and Digital upgrades to cope with highly dynamic market challenges



Delta Performance	Upgrade GT 1 + GT2	Upgrade CC (2+1)
Power	+ 46 MW (23+23)	+ 66 MW



Maxima Centrale Combined Cycle Power Plant Upgrade

Where: COUNTRY: Netherlands
REGION: Flevoland
CITY: Lelystad



Year of Operation: 2010
Ansaldo Energia FA (LTPRA):
Since 2007

COD for MXL3: 8th August 2023

What:

	UNIT	MODEL	OEM
GAS TURBINE		GT26 2006-B2.2	Ansaldo Energia
GENERATOR		50WT21H-120 <i>Cooling: Hydrogen</i>	ABB
STEAM TURBINE		DKYZ3-2N41B <i>HP, IP, double flow LP</i>	ABB

Cycle Power Output [MW]
280 Gas Turbine
900 Combined Cycle



Maxima Centrale Combined Cycle Power Plant Upgrade

Target

Increased combined cycle performance (efficiency)

Increase maintenance interval

Boundaries

Comply with existing plant limits

Remain compatible with existing product portfolio

Approach

Reduced inlet mass-flow to limit power increase

Increase turbine inlet temperature to optimize GT performance

Designed to have little to no impact on BOP/WSC

Gas Turbine upgrade only – Rest of plant is untouched

Reduce and redistribute cooling air flow



GT26 MXL3 upgrade

Main Scope Of Work

Compressor:

- New rear stages for optimized massflow

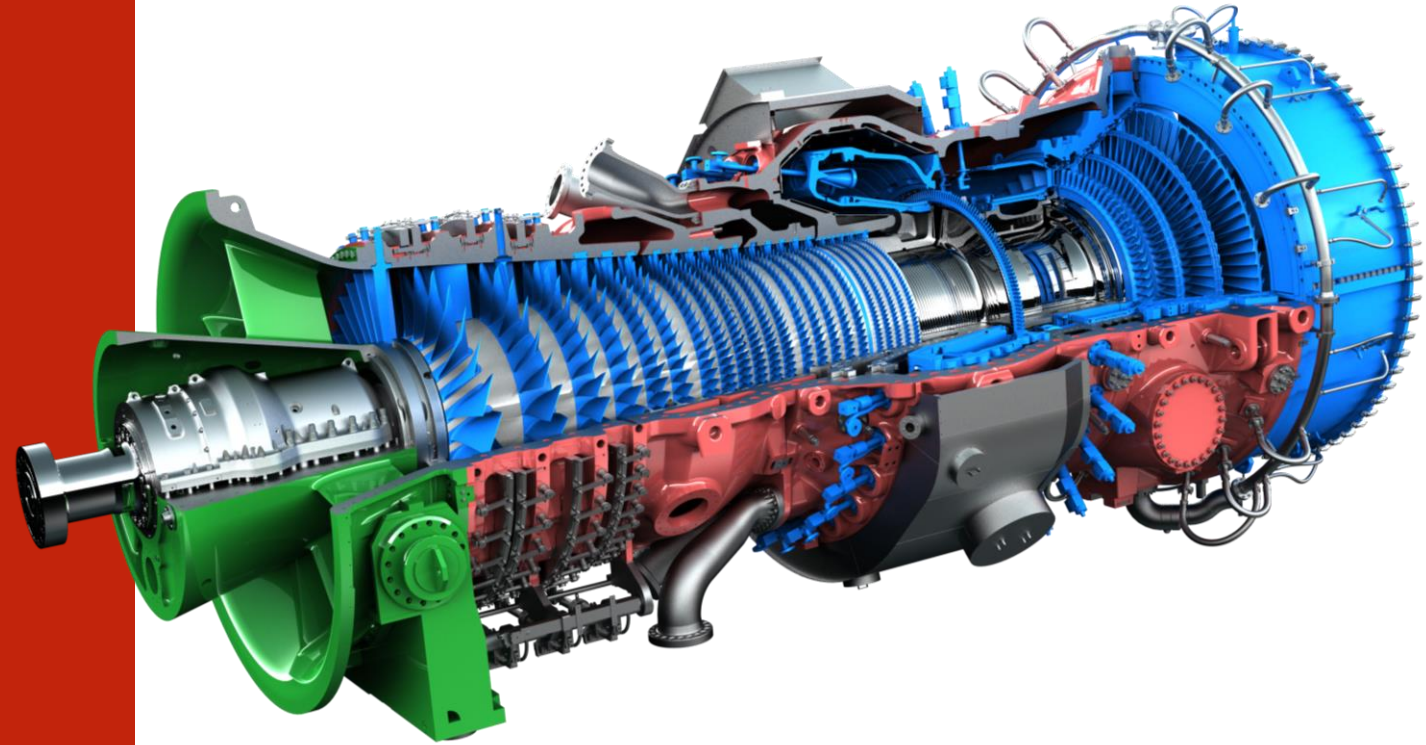
SEV Combustor:

- New burners

High Pressure Turbine B&V

High & Low Pressure Turbines:

- High pressure turbine
- Low pressure turbine Blades and Vaned stage 1 to 4



Maxima Centrale GT26 MXL3 upgrade

This is Ansaldo's first MXL3 upgrade
in our fleet – our **validation** project

10.000

Engineering
Hours

0

Lost Time
Accident

120

People
involved
on site

300

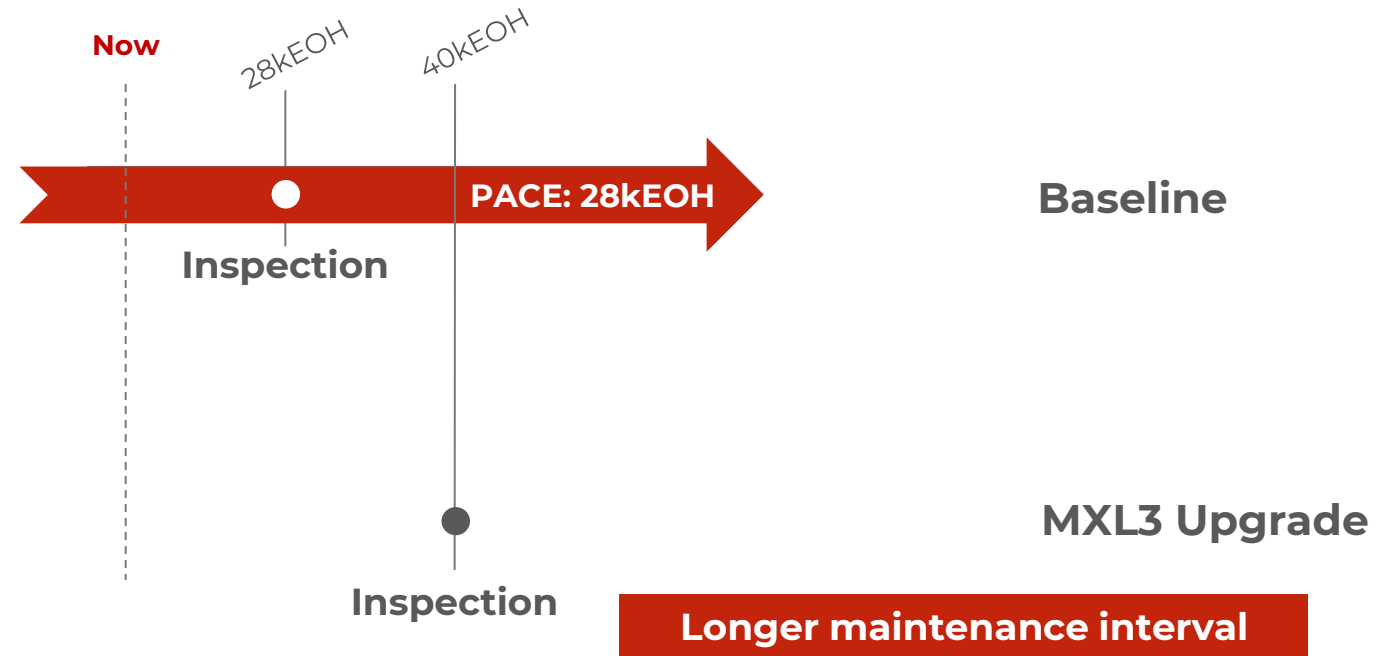
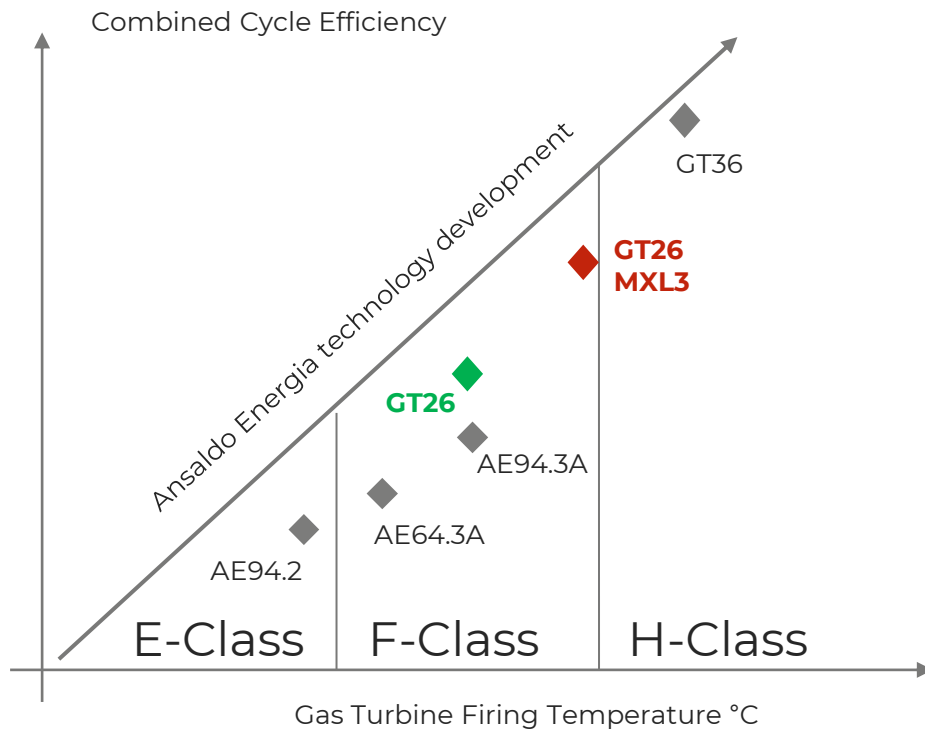
Validation
points



GT26 MXL3
success story

GT26 MXL3 success story

Efficiency improvement



Maxima Centrale GT26 MXL3 upgrade success story

Key points

MXL3 GT26 upgrade achievements



Boundary conditions remained the same



GT upgrade only, no plant modifications
F-class upgrade - Injected latest H-class
technology
(exploited the plant limits margin of existing CC
units)



Maximization of efficiency for carbon footprint and
OPEX reduction



H2 ready – Possible up to 45%



Maximum performance or extended maintenance
interval



Delta Performance	GT «M mode»	GT «XL mode»
Power [MW]	+27,5	+ 25
Efficiency [%]	+1,75	+ 1,7

SUMMARY

SERVICE

Solutions for Future-Proofing of Assets

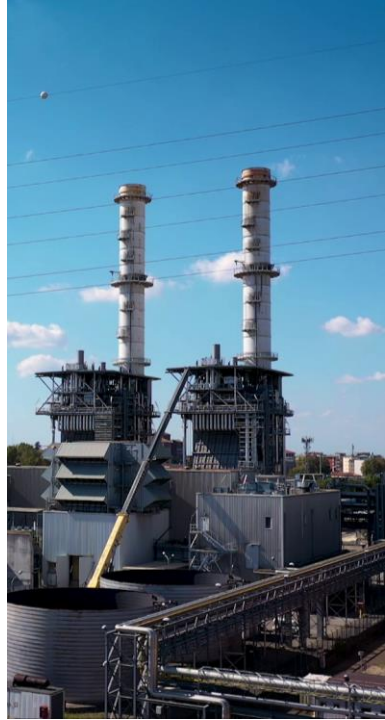
REAL CASES

PIACENZA (94.3A) UPGRADE

Increase capacity, extending the Plant lifetime

MAXIMA CENTRALE (GT26) UPGRADE

Maximize efficiency for carbon footprint and opex reduction



A decorative background graphic consisting of a network of white lines and dots on a red background, resembling a molecular or data network structure. The lines connect various points, creating a complex web of triangles and polygons. The dots are small and white, serving as nodes in the network.

THANK YOU FOR YOUR ATTENTION

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