EXPO ASTANA 2017
Future Energy

Italy
CONCEPT

SECTION 1 - Introduction

The present document imagines a way to represent the Italian energy sector in the Italy Pavilion in EXPO Astana 2017 Future Energy.

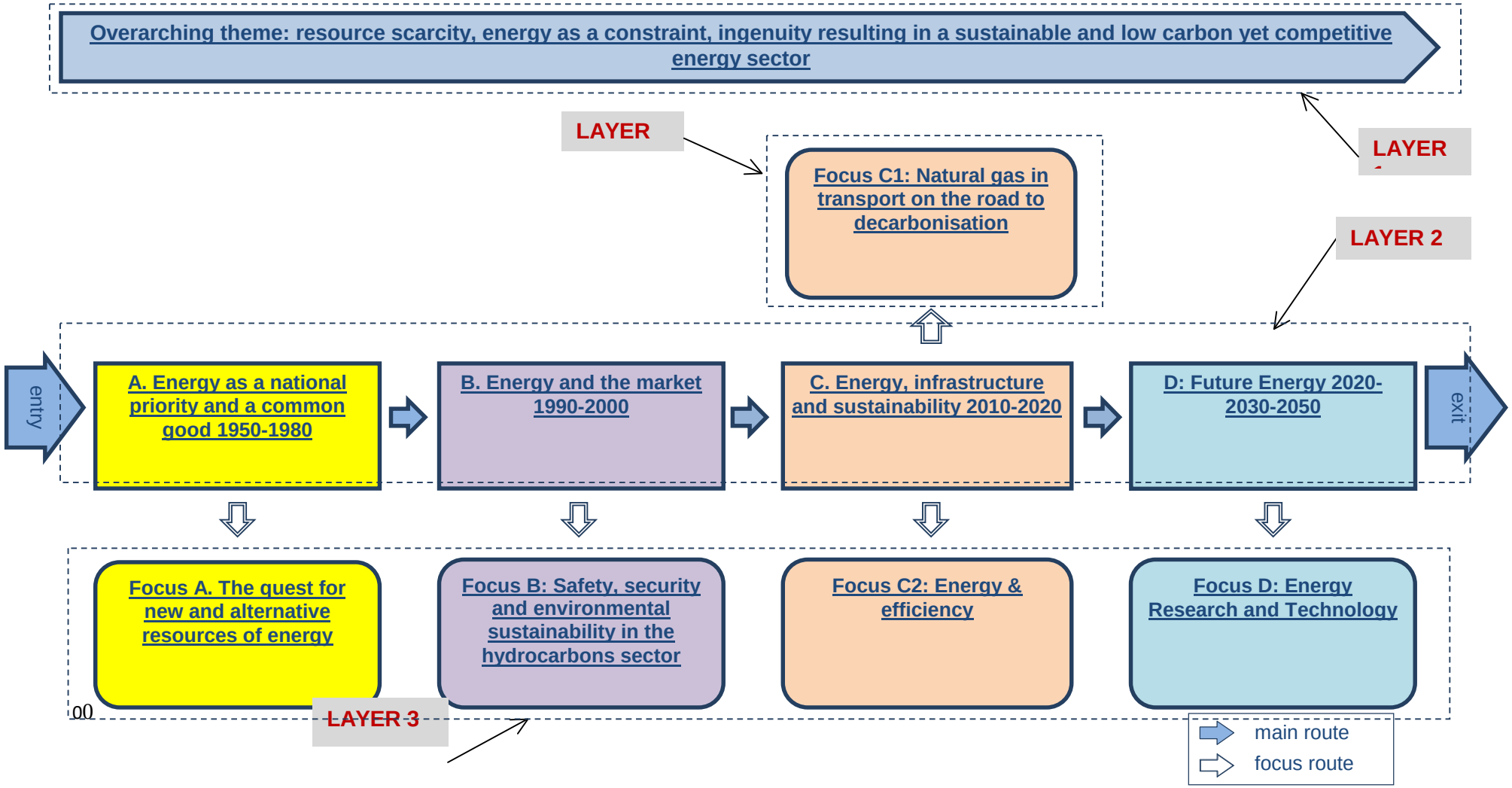
The representation has three layers:

LAYER 1	an overarching layer, represented by the main concept: energy in Italy as a constraint, scarcity of resources and ingenuity, resulting in sustainable and low carbon yet competitive energy sector;
LAYER 2	a main, chronological layer, identifying 4 important periods of energy development in Italy
LAYER 3	a focus layer, identifying one or more specific areas of interest for each chronological period; the focus areas have been selected as those having a lasting impact on current and future

Section 2 graphically represents this concept. Without wanting to condition the artistic layout of the Italy Pavilion, the graphical representation also lays out a conceptual route that a visitor to the Italy Pavilion would embark on.

Section 3 describes the contents of the three layers.

SECTION 2 – Graphical representation



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SECTION 3

Overarching theme: Energy as a constraint

Energy has always been an important constraint for development in Italy. Compared internationally, Italy is poor in natural and energy resources. At the centre of economic and scientific attention, scarcity of resources has conditioned Italian social and industrial development from the beginning of the 20th century. In the context of recent industrialisation, starting in the 1960s, linked to a strong increase of energy demand, Italy found herself in the early 1990 as one of the countries with the highest rate of external energy dependence, close to 90%. Notwithstanding this historical competitive disadvantage, by making virtue of necessity and through creativity, Italy managed to build up a diversified and competitive manufacturing industry, accumulate wealth and attain a status of global player.

1. **graphs (energy, industry)**
2. **images, etc.**

A. Energy as a national priority and a common good 1950-1980

Access to modern forms of energy is a challenge that eventually every Government had (or has) to tackle. In Italy this challenge was met by setting up a national hydrocarbons board in the 1950s that helped fuelling the booming car industry, the infrastructural development and the demand for individual transportation. By nationalising the electricity sector in the 1960s Italy succeeded in the challenging task of electrifying the country in record time while granting universal access.

3. **creation of Agip/Eni**
4. **development of automobile industry**
5. **development of motorways**
6. **creation of Enel**

Focus A. The quest for new and alternative resources of energy

The need to access energy from external resources limited the use of energy on the one hand, but on the other hand it spurred, starting in the early 1900s, a relentless search for new and alternative resources and to deal with energy carefully and efficiently. In fact, Italy was at the very forefront in the development of hydropower, based on its water resources in the Alps, and of geothermal power, based on the volcanic nature of its territory. The country was also among the first in the world to exploit nuclear fission for electrical power generation. However, the share of nuclear energy has never reached strategic importance, and ended in the late 1980s in the wake of the Chernobyl nuclear accident with a political decision supported by citizen consensus. Moreover, the very first solar thermal power station was also built in Italy.

7. **development of hydropower**
8. **development of Larderello geothermal power**
9. **discovery of natural gas in Po valley**

10. **discovery of geothermal resources in Po Valley**
11. **development of natural gas infrastructures (Algeria, Russia)**
12. **development of the first natural gas underground storages**
13. **implementation of first energy efficiency principles in 1980s**

B. Energy and the market 1990-2000

In the late 1990s, Italy helped shaping a common European energy framework and set itself ambitious targets for energy governance by taking key policy decisions that fostered private investment, brought in competition, increased system efficiency and improved energy security. Early key decisions were taken to properly address energy sustainability issues, also based on the abundance of solar energy in the country.

14. **transformation of Eni and Enel in joint stock companies**
15. **creation of independent competition and regulatory authorities**
16. **opening of Italian electricity and gas markets and new competitors**
17. **launch of 1st generation smart grids development**
18. **new gas infrastructures in Italy (LNG, pipelines, storage)**
19. **shift from oil to natural gas in power generation**
20. **investments of Italian companies abroad**
21. **start of energy efficiency schemes of the modern era**
22. **start of renewable energy schemes and first wave of investments**

Focus B: Safety, security and environmental sustainability in the hydrocarbons sector

In the oil sector, the Italian upstream industry has a record in safety and security both in Italy and abroad. Significant investments have been made to demonstrate the technological and economic viability of advanced generation biofuels, that will contribute to further decarbonising the transport sector and are designed to create a virtuous circle of local development, providing economic drivers to a rational use of marginal lands, agricultural waste and food residues. It has also established an innovative state-owned stockholding agency that has significantly lowered the cost of oil security in the country by rationalising and monitoring stocks.

23. **Government monitoring and inspection of upstream activities**
24. **focus on upstream industry**
25. **development and restructuring of the refining sector**
26. **advanced generation biofuels**
27. **biofuels sector and industry (targets and achievements)**
28. **Italian Navy Green Fleet Project**

29. **creation of OCSIT**
30. **monitoring and centralised management of oil stocks**

C. Energy, infrastructure and sustainability 2010-2020

The real drive for new and sustainable energy came in the second half of the first decade of the 2000s. Just like 15 years before, Italy helped shape the European energy and climate framework and started an ambitious renewable energy programme; key decisions allowed developing the market structure in the early 2000s, creating the context for robust and innovative grid development both at national and local level. Thanks to this development the renewable energy programme turned out to be much more effective than foreseen, catapulting Italy into the forefront of renewable energy development worldwide and making it the country with the highest share of renewables among countries of similar size and geography.

31. **creation of GRTN/Terna & transmission grid development**
32. **creation of GSE renewable energy & increase of renewables**
33. **centralised management of RES schemes and market**
34. **new smart grid investment: AEEG pilot projects & DRM (advanced smart metering)**
35. **launch of 2nd generation smart grids development & integration of energy & TLC**
36. **continued development of energy efficiency schemes**
37. **RES industry**
38. **smart grid industry (DRM/RES integration/storage)**
39. **bioenergy/biofuel industry**

Focus C1: Natural gas in transport on the road to decarbonisation

Natural gas, Italy's preferred fossil fuel, will continue to play an important role in the 2050 decarbonisation Roadmap . It is the "cleanest" fossil fuel in terms of CO_2 and other pollutants emission. In its renewable version, in the form of both bio-methane and synthetic methane from biomass it is substantially carbon neutral. Fossil and renewable natural gas will play a key role as a bridge fuel in the decarbonisation process and will have the biggest impact in the ongoing and complex process of decarbonising the transport sector. On the other hand, Italy has not ignored the European Commission choice to speed up energy efficiency and decarbonisation of transport through Research and Innovation (R&I) in e-mobility, that calls for the creation of a smart recharging infrastructure based on technologies such as high-power fast chargers and wireless chargers. Also, Italy is participating in the European effort in building a hydrogen infrastructure that allows the expansion of fuel-cell electric vehicles (FEV).

40. **unbundling of national transmission system operator SNAM and expansion of natural gas infrastructure**
41. **natural gas in transport (statistics)**

42. **upcoming national CNG/LNG in transport strategy (transposition of DAFI Directive)**
43. **biomethane in transport (plans and targets)**
44. **natural gas passenger, LD & HD vehicle industry (CNG/LNG/BNG)**
45. **natural gas components and equipment industry**
46. **safety of NG vehicles**
47. **PNIRE**

Focus C2: Energy & efficiency

Italy has made energy efficiency a national priority in the National Energy Strategy and is continuing to make progress in improving its already highly energy efficient economy. By implementing and punctually monitoring innovative and renowned energy efficiency policies it has been able to conduct comprehensive evaluations of the cost-effectiveness of energy policies, developing and implementing an Energy Efficiency Action Plan that leads the way for the years ahead, both in industry and in buildings.

48. **ENEA (role and functions)**
49. **National Energy Efficiency Action Plan (targets, means and results achieved)**
50. **energy efficiency industry: end use efficiency, buildings, efficiency in industry; ESCos**
51. **Zero Energy Building programme**

D. Future Energy 2020-2030-2050

The profound energy sector reforms initiated in 1999/2000 and carried out in the subsequent decade have provided the foundations of Italy's National Energy Strategy, published in 2013, as the outcome of a comprehensive consultation process with the energy sector and all interested stakeholders. After setting the goal of exceeding the EU 2020 environmental and decarbonisation objectives, and having achieved this goal several years in advance, the country has taken a lead role in implementing the EU 2030 targets and setting a strategic and credible framework for achieving the EU 2050 Roadmap for decarbonisation.

52. **NES 2020-2050 priorities & targets**
53. **NES 2030-2050 in the making**
54. **Roadmap 2050**

Focus D: Energy Research and Technology

Research, development, demonstration and deployment of new energy technologies is a priority and is catalysing the interest and resources of the scientific, industrial and start-up communities. Italy's state agencies and universities, often in collaboration with the private sector, strongly contribute to the advancement of energy technologies, and have achieved world class results in key areas.

Italy's three key areas of energy research are renewables, energy efficiency and system integration. In order to maintain the lead in advanced energy technologies, the country invests in research and development on competitive standards at world level. This formidable challenge with natural resources on the one side and with international competitors on the other, is being addressed through a strong cooperation between companies and research organizations, notably universities and national research institutions (ENEA, CNR, RSE). A number of tools are used to encourage it, such as non-discloser agreements, spin-off participations, technology transfer programs.

A further area of innovation is occurring in the innovative start-up sector, closely monitored by public authorities. A favourable regulatory framework in this sector has contributed to identifying several hundreds of start-ups in the energy sector.

55. **RSE, ENEA, CNR**
56. **universities & academia**
57. **Italy's innovative start-ups & SMEs**
58. **statistics and achievements**
59. **international commitments in energy R&D**