

FUTUR –E: Quale futuro per la centrale Marzocco a Livorno?

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Abstract

Lo scenario energetico italiano ha conosciuto, in questi ultimi anni, un cambiamento repentino sulle linee delle norme nazionali e sovranazionali in merito a questioni climatiche e ambientali. Il rapido sviluppo di nuove tecnologie ha assestato un duro colpo al vecchio sistema elettrico centralizzato che ha lasciato ormai lo schema “one-to-many” per passare ad uno più integrato. Cosa fare quindi con le vecchie infrastrutture elettriche? Possono essere considerate parte del patrimonio industriale e culturale italiano? A che stregua? Questo paper analizza innanzitutto il progetto promosso da Enel S.p.A. dal nome Futur-E, alludendo al futuro dell’energia. Il caso preso in considerazione è quello della Centrale Marzocco, sita a Livorno e scelta per la sua rilevanza architettonica, situazione urbana ambigua e interesse ambientale. L’impianto è infatti collocato vicino al centro cittadino all’interno dell’area industriale portuale, che costituisce un terzo dell’agglomerato urbano.

Il paper ha come obiettivo l’analisi del sito e della città di Livorno, e lo studio di uno scenario di sviluppo per l’area che non neghi il suo passato produttivo ma che ne rafforzi l’identità industriale, mettendo in luce la qualità architettonica e paesaggistica di un’area al momento conclusa. Lo scenario prevede l’inserimento di funzioni che abbiano come tema centrale il ciclo e il ri-ciclo dell’acqua, promuovendo da una parte la valorizzazione dell’asset industriale e dall’altra la cultura dell’acqua in una città nata e scolpita da questa risorsa naturale.

Parole chiave: energy; urban design; waterfronts and harbors.

Brief history of electricity in Italy

The introduction of electricity represented one of the major technological revolution in recent history, touching every sphere of human behaviour: from the production one, to the social life and home comfort. It had the force to modify dominant cultural models, reshape territories and social conditions while promoting technological development.

In Italy, the introduction of electricity is related to the beginning of industrialization processes in a country mainly devoted to agriculture: the new technology fuelled the myth of positive development leading to hope to finally fill the gap with other European countries. The history of the Italian electrical development can be divided in three main periods: the first, that includes the beginning of the electrical era, the second between 1930s and 1950s characterized by its expansion, and the last, from 1962 up to today, that regards the electric redefinition (Castronovo, 1994). The first phase started in 1880 when the first applications of electronic devices were made mostly in northern Italy, and in 1883 the first thermoelectric plant in Italy was realized in Via Santa Radegonda in Milan (Mori, 1992). The progressive electrification of the city, led to the need of finding a more powerful alternative with respect to small thermoelectric plants: Italy chose to exploit the wide water reserves in the Alps and to start the hydroelectrical production, made possible by the technological development in terms of transmission of energy.

During that period, the electrical production was managed at a municipal level in an independent way. At the end of 1890s big cities like Milano, Torino, Roma, Genova, Palermo, Napoli, Firenze and smaller ones as Livorno, Messina, Avellino, Udine and Cuneo had their own electrical plant (Labbate, 2013). 1900 opened as a century of economic expansion, with the increase of energy requirements: once again the exploitation of water led to the construction of several new plants in rural and mountain areas with the need to coordinate and manage in integrated way the transportation facilities from remote areas. In this

period, Italy was the world's sixth country for installed power: the electrified municipalities passed from 401 to 4600 and before the I World War the national industry covered 60% of national requirements.

During the War, the difficulties in procuring petroleum led to an even greater development of electricity, acting as a booster for the industry. The hydroelectrical power was chosen to be employed even after WWI and Italy reached the 82% of installed power with the construction of some of the biggest plants. This trend has been fostered also under the fascist regime, with its autarkic plans to get to an energetic independence. In this period, the major electric groups emerged also with the help of governmental grants and foreign capitals: SIP, Sade, La Centrale, Edison, SME, Bastogi (Galasso, 1993).

The 1929 economic crisis led to the exploitation of hydrological resources but the total absence of an energetic plan had a big impact on the delay in the infrastructure construction and the permanence of big imbalances. The WWII had merciless implications for the electric production; the most damaged areas were in central Italy, mostly located next to industrial and port areas (Castronovo, 1994). The international grants devoted to reconstruction had been seminal to regain competitiveness, and already in 1948, the installed power was superior with respect to the pre-war condition, along with the development of telephone and radio lines. The electric consumption increased in the following decades, in relation to the economic boom, availability of resources, availability of devices, and new pattern of consumption. Considering the production pattern, this period is a time of diversification: up until 1940 the major role was played by hydroelectric plants, while in the following decades a series of measures were put in place to foster the production through thermoelectric ones. The international energy market had been changing a lot during WWII and the routes of petroleum commerce had radically changed: the discovery of the Middle East deposits allowed Italy to experience a wide reduction of oil prices, leading to a favourable condition for the development of imported fossil fuels exploitation. In this scenario, the biggest part of the current thermoelectric park has been built to cover the ever-increasing demand. Meanwhile the hydrological resources registered a dramatic decrease that led to the final choice of thermoelectric as a base for the electric production. The realization of these new plants had a strong impact on the territory, contributing to the change of city skylines and port areas together with country sides and mountainous areas crossed by the electrical networks. The natural landscape became more and more artificial with an irreparable modification of natural territorial assets. In this period, a new form of energy begun to be highly discussed and researched: the nuclear one. From 1960s the first investments in the field had been made in technologies and machinery that worked only by the following decade in three sites.

1960s marked the process of nationalization, or rather the gradual absorption of all companies producing transforming and distributing electrical energy by one public state company, namely Enel. After almost one year long discussion, Enel was born the 12 December 1962. It gradually began the process of absorption while trying to complete the process of electrification and consequently new big plants and transport infrastructures such as the spine between Firenze and Roma and the interconnection with France and Switzerland (Zanetti, 1994). The complete electrification of the country was finally reached in 1971: 97% of the total territory was covered.

The 1970s have been mainly the years of oil crisis that hardly hit not only the production sphere but every aspect of the human life. The huge Italian dependency on fossil fuels has been a particularly harsh condition that led Italian government to move investments on nuclear sector and international cooperation projects, such as policies for the containment of energy consumption. The next decade opened with a strong concern over environmental issues and energy saving measures: for the first time in Italy, the third Piano Energetico Nazionale (PEN) in 1981 (Labbate, 2013) mentioned the use of renewable resources and promoted the containment of consumptions. The governmental plan acted as a booster for research on these matters, while implementing the nuclear application in short-time period, by creating the appropriate legislation. Nonetheless, on 26th April 1986 the disaster of Chernobyl changed completely the minds of the Italian population over the use of nuclear energy, renouncing to the nuclear program within the PEN and closing the three existing plants on the territory. The needed energy was then imported by nearby countries such as France and Switzerland.

In 1992, last year of existence of Enel as a public body, the electric production in Italy is assessed at 226 billion kWh, divided in 49 billion renewable resources and 177 billion traditional thermoelectric mostly on

fuel oil (Labbate, 2013). Between 1998 and 1999, following an EU regulation of 1996, Enel organized the spin-off of its previously integrated businesses (production, transmission, distribution) and restructured its organization to become a private holding. The liberalization process has been ruled by Decreto Bersani and Enel sold 15100 MW of installed power in a decade process that ended in 2003 when the production set of Enel has been set on 49,2% of national total diminishing up to 27,8% in 2010 (Paoloni, 2014).

What's next

The energetic scenario is now undergoing another moment of radical change worldwide. Two factors have lately influenced the global demand of energy: the world crisis of 2008/2009 and the emergence in the global scenario of new economical actors which are affecting the global market and its balance. The energy demand is expected to rapidly grow worldwide reaching +35% by 2035 but while the situation in Europe, and in general in the industrialized countries is characterized by a status quo situation, the developing ones will push the demand up to 60% (Ministero Sviluppo Economico, 2013).

The Italian energetic mix is very much differentiated from the European one: while most of the countries have a discrete production of fossil fuels, Italy has almost none, and the potential of nuclear energy has never been exploited. In fact, 83% of the Italian total energy need is covered by imports, while the production of energy from renewable sources scores 10%, from gas 4% and from crude oil 3% (Ministero Sviluppo Economico, 2013). The total production of energy from renewable sources is already able to cover the national energy demand, and this is going to further grow in the near future. The once indispensable thermoelectric park, widely used also to control and balance the problems of supply during demand peaks, is called to operate in an increasingly limited time frame. In a long period, we can expect a complete shutdown of the oldest thermoelectric plants powered with fossil fuels because on one side of new emission limitations issued at community and national levels and because of their growing technological obsolescence (Ministero Sviluppo Economico, 2013). The massive introduction of renewable resources in a limited time-period led to a rapid reconfiguration of the supply system, requiring a complete resizing and restructuring of the thermoelectric park to rebalance the offer of energy, affecting the pricing policies on a national level.

Futur-E and the Electrical heritage management

Enel, as the first electricity actor in the Italian market, satisfies 27% of the overall need and is one of the first Italian companies which is interested by the supranational dimension of the energy market not only regarding the technical side but also considering the impact that this dimension is having on the overall system. The company recognized that the “one to many” old paradigm formed by centralized production points feeding an articulated territorial net is giving way to the smaller scale, decentralized “smart grid” system fostered also by the birth of many auto production plants – such as private PV systems for example - and consequently by a more active role of the client who is now more aware of his choices.

This scenario pushes Enel to be one of the main driver of the change, on one side investing on green and new technologies on a global level and on the other one, turning the attention to what can be called electrical heritage, made of many of the old Thermoelectric Plants resulting inefficient and non-competitive. The project Futur-E was born at the beginning of 2015 to bring the attention on the industrial heritage, mostly dated 1960- 80s that, in a short period of time found itself being obsolete, often shut down and abandoned. The project is promoted by Enel Group and promotes the reconversion of 22 Plants of the Italian Thermoelectric Park, in a wide range of territorial, production and social backgrounds to foster a more integrated territorial development able to actively engage a wider community. Many of the plants have been closed years ago and have been re-called to action during periods of need, such as after the 28th September 2003 blackout. The biggest share of the plants is located in rural areas but few plants, such as Genova, La Spezia, Livorno, Piombino and Bari plants sit in periurban or urban situation and represent a higher ambition target both for the company and for the territory itself (Chiesa, 2015).

For some of the plants, the company is opening a dialogue with citizens, public administration and private actors for the definition of the methods to use to set the proper strategy for the future uses of the plants. At the moment of writing (2016), the plants actively involved in the process of regeneration are: Alessandria, Porto Marghera, Rossano Calabro, Porto Tolle, Montalto di Castro, Carpi, Pietrafitta and Camerata Picena.

Centrale Marzocco - Livorno

In analysing the plants, and what uses can they still support, Livorno thermoelectric power plant was particularly interesting for a two-fold reason: the architectural relevance, and its geographic position, acting as a threshold between the city centre and the port itself - a marking character of Livorno. In that sense, the landscape of the city has been marked by the lines of the two chimneys since the late '50s becoming a presence which is recognised by the citizens.

The Electric Power Plant “Enel Marzocco” began the construction between 1960 and 1962¹ authorized by a Decree of Ministero dell’Industria e del Commercio. The site has historically been interested by the production of energy, hosting the first electric power plant of the city. Nowadays the site can be divided in several sub- areas according to the homogeneity of the functions and destinations: production and transformation area, electric transmission substation, fuel storage area, water treatment area, services area, and lastly the research centre. The area interested by the production and transformation of electricity occupies a total volume of 160 000 cubic meters. The transmission station is owned by Terna Group and is still working for the distribution of electricity on a national and local net. The fuel park extends parallel to the coast, near the water and was initially composed by four oil tanks for a total amount of 56000 cubic meters of capacity. Today, only two tanks are in place: they have been enhanced and have a volume of respectively 15 000 m³ and 13 900 cubic meters. The other two were quenched and removed from the site. The water treatment plant is a complex system including several sections depending on the type of water to treat. In the overall cycle, the water needs to be collected from the sea and purified before entering in contact with the structures to avoid its corrosion and consequently the dysfunction of the plant. It is then stored into water tanks and pumped into the boilers through the pumping system. The services area is located mainly along Via Salvatore Orlando: the reception desk, the management offices and three kinds of workshops are located there: the mechanical, the electrical components and the chemical workshops form the long line interfacing the plant area and one of the main mobility infrastructure of the city. The research area is managed by Enel Produzione S.p.A. and its Enel Ricerca branch, occupying the area towards the city centre. Up to 2013, it used to host also part of the International Flame Research Foundation (IFRF) research group, specialized on the field of combustion plants, efficiency of boiler houses and fuels.

The relation between the city and Centrale Marzocco: a possible future

Livorno appears to be a dynamic urban system, that is now defining its future urban tools and plans. Being a city born on the sea line, the water has always been a shaping element, since its foundation: the morphology of the city is still strongly shaped by a network of water canal that crosses the whole city centre, leading to its northern extension: the port. These two elements have been always connected: the port marked the birth of the historical core as now the articulated system of historical waterways marks the image of the city. The other principal character of the city is the presence, along the coast line, of several industrial heritage sites, always linked to the port infrastructures that are nowadays almost completely abandoned.

A possible scenario draws from these two fundamental points: the importance of the water in a city that has always been shaped by this natural element and depends on the efficiency of its water system, and the industrial heritage left by a central network infrastructure that characterized the city-scape.

The functions to be introduced have a tight relation with the needs of the city. Livorno is undergoing a process of redefinition, after the world economic crisis of 2008/2009. The city has been defined by the government “Area di Crisi Industriale Complessa” and needs investments to foster economic recovery. On the other side, Livorno hosts dated infrastructures, especially linked to the main element shaping the city: water. In particular, the company managing the water services is carrying out plans to move the waste water management infrastructures of the city.

As the power plant hosts water infrastructures that can be implemented and still proficiently used together with a wide 10 hectares surface to be exploited, it can successfully integrate the technical cleaning facilities with more urban functions, pledging to change the current paradigm that sees (especially in Italy) urban service areas set apart from the city centre and public life.

¹ Decreto Ministeriale n. 96 of 26.01.1960 and n. 118 of 29.03.1962.

The urban requalification of Marzocco Power Plant opens a twofold or threefold opportunity: that of regain of 10 hectares of land on the waterfront, establishing private and public functions with a proficient mix, that of land reclamation of an area falling into SIN perimetrations and mostly that of introducing the theme of depuration park in more participative perspective, in which citizens can benefit not only from the offered services but understand the process of water purification and draw closer to the matter of water management, considering the water a natural resource and not only a given-for-granted good. The area can be functionally divided into three stripes: the one on the street side, more related with public and purification auxiliary services, the central one in which are localized extensive (in open spaces) and intensive (into the power plant) purification functions and a third one, towards the sea, of the proper hydropark. The role of the power plant body is intentionally left isolated and hosts the most innovative and technologically advanced section of the purification process, together with a visitor path and spaces dedicated to a business incubator.

Being the area located in a strategic position, and by exploiting the functioning water facilities of the plant, the work tries to demonstrate how the area could be converted into an efficient and technologically advanced cleaning system, involving the totality of the area as an open-air giant machine for water depuration. The creation of a depuration park would foster the good functioning of the canals of the city, solve the lack of depuration problem and put under attention the issue of water depuration, an urban service that a great percentage of population don't consider as relevant.

The notion of cultural heritage is acknowledged here in its widest term, not only as physical conservation of a milestone for the industrial modern architecture but also, and mostly, as maintenance of the cultural heritage of Livorno by highlighting its shaping element – water – and giving to it a dignified space.

Conclusions

The project FUTUR-E aims at turning the attention to the new phenomenon of the obsolescence of electrical infrastructures. They represent a particular field of cultural and physical heritage that are seldom taken into consideration in the wider field of heritage, unless endowed of particular historical importance. Thus the number, mass and structural presence of the power plants still constitute a physical data to be taken into consideration in territorial and urban discourses.

The paper wants to highlight the importance of providing possible tailored made solutions that may help in the process of definition of future developments. Far from being exhaustive under the purely architecture point of view, this work aims at setting a strategy for urban regeneration linked to specific dynamics of the cities and to represent an innovative proposal that tackle the bias -urban services vs. urban amenities- that could be taken as a model for future developments.

The key points taken into consideration have been the physical integrity of the architectural work while redefining the identity of the area in relation to a new urban function(s) and the re-development of the waterfront, in the context of a process of punctual abandonment of port area.

Centrale Marzocco, as the other 22 plants in Italy, can become a place that can host new and renewed functions that can reconnect the history of the energy in the country while providing new and seminal functions to the city.

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