

A NEW GOVERNANCE APPROACH TO IMPROVE THE ECONOMIC PERFORMANCE OF THE COMPANIES MINIMIZE ENVIRONMENTAL IMPACT

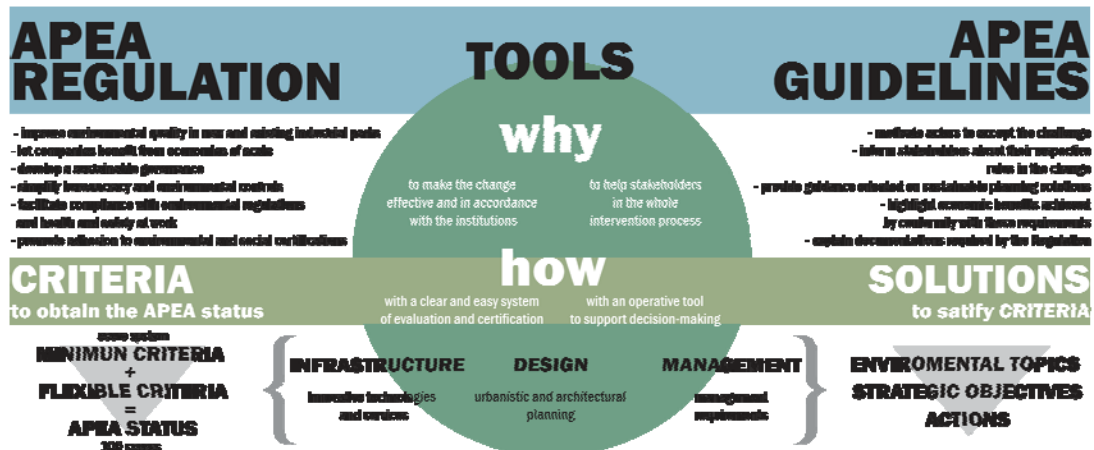


Fig 1: The scheme of the Tuscany Region approach for ecologic industrial areas

WHICH ARE YOUR ARCHITECTURAL (R)SOLUTIONS TO THE SOCIAL, ENVIRONMENTAL AND ECONOMIC CHALLENGES OF TODAY?

Research summary

The presence of a productive area in a territory generates changes to the elements that make up that ecological environment, to the economic flow and to the supply and demand of social services. The three systems, Environmental, Social and Economic, are often interdependent, and the changes they undergo, due to the presence of an industrial area, may be negative on a system, meanwhile positive on another, or manifest diverse effects over time. Precisely because of the different spheres of government and the different effects that determines an industrial area in a defined territorial context, the industry's management in all its life phases, Location, Design, Operation, Requalification and Dismissal, is characterized by the involvement of a number of individuals, private and public: these individuals often pursue different goals that generate effects with specific consequences within the same local system, that is, a set of Production systems - Territory – Population. Improvements of these environmental, economic and social components, cannot be ignored by a logic of sharing and partnership between installed businesses, institutions and public companies that operate in this context and other parties present in order to achieve new models of development that point towards economy widespread, the ability to improve the quality of life and economic future of our cities. This approach, in line with the principles of Industrial Ecology, offers a valid alternative to achieve the goals of sustainability in this sector, by adopting the principle of precaution and prevention of pollution and abandoning the end-of-pipe approach that is typical of traditional linear production systems.

Keywords: industrial ecology, Eco-industrial parks, industrial symbiosis, voluntary environmental certification, environmental policy

1. Introduction

The sustainable management of productive areas has become a crucial issue in the scenario of environmental policies for the industrial system. This sector is usually responsible for negative environmental repercussions, resulting from unsustainable patterns of production. Over-exploitation of raw materials, the use of non-renewable energy resources, and the emission of pollutants and the production of waste have weakened the industrial and manufacturing sectors.

The competitive performance of a production area is strongly influenced by the conditions in which the business world conducts its activities, organizes production and interacts with other economic entities, in particular, the relationships that a company is able to establish with its own suppliers, with other businesses and open end markets, are crucial in their own ability to compete and grow (Daddi T., S. Tessitore, and M. Frey. 2012). A large part of these relationships are made possible, activated and enriched thanks to the "territorial dimension" of the production area in which these businesses operate, it is thanks to the proximity between them, surely enough, that develop so-called "Economies of Agglomeration". This type of economy allows companies to gain efficiency margins from the economic relationships they have with other companies located in the same area of production.

The compactness of production activities in industrial areas permit, indeed, achievements of economies of scale for investments in public infrastructures on one hand, and on the other, allows to minimize environmental impacts as much as possible and avoid the coexistence of residential areas and production areas. The goal is clearly to achieve collective benefits

superior to those that would be by bringing together the individual benefits that each company would reach by optimizing their economies of scale.

These simple considerations are the basis of a new concept of productive areas, that if followed in accordance with the latest European regulations, can be defined as an instrument of environmental value for the territory, but at the same time is potentially a way that guarantees a better environmental management of the production area benefiting not only the companies settling down, but mainly the community (Iraldo, F., F. Testa, M. Frey 2009).

In recent years, thanks to the European Union's decisive drive, is emerged the need to consider the goals of developing businesses within a new concept of competitiveness: to the economic and social dimensions of development, the European Union has explicitly added the environmental component as an opportunity to improve the potential of innovative technology and investment that can create jobs and wealth.

But how does this direction affect the developmental components and how can this be enough in order for there to be an urgent return to the industrial areas that are persistent in our territories?

More and more frequently businesses and their representatives up against new boundaries of technological and international competition, have often found that their competitiveness is also linked to territorial and contextual factors, hence the need for a political system that points to an integrated approach to subjects and actions.

Many governments have taken this opportunity, interpreting the needs of renewal of systems and production procedures to create a favorable environment for the development of businesses and carry out

innovative capabilities, focused not only and not as much on the quality of the product, but on the quality of the area that generates it.

The industrial areas that are expanding and restoring, represent an opportunity to become the scenario of a new generation of productive areas perceived in an ecological sense; the environmental management in an industrial area, in fact, must be an advantage for businesses to reach greater sustainability in the production and manifest themselves through a better quality of life within the industrial area and the area where it is located. The solutions are therefore of a complex nature and should take into account the details of the territory and anything that lives in the industrial area in which they apply.

2. The Italian situation

A productive area generates environmental "externalities" that are governed by regulatory instruments with the task of managing the changes in the territory's ecological system; one way of governing the production cycles in a way that consume raw materials, waste management, energy supply, the flow of traffic entering and exiting and emissions in the water and into the atmosphere follow a series of regulations in response to economic, social and ecological necessities.

For the past few years in the European range, community action has been identified and has advanced the awareness of a harmonious approach for the government to such extended externalities regarding an entire area, that it is capable of combining in a more effective manner an environmental protection and the economic needs of businesses, with a particular connection to their ability to compete (Lowe, E. A. 2003).

Despite the presence of these tools, such as the

Framework of Action for Sustainable European Urban Development, at an Italian standard, the unified management and sustainable development of industrial areas is a relatively new issue, given the lack there of, until about fifteen years ago, whether it be a regulatory framework or of a cultural fabric that is capable of incorporating this new concept. On the basis of experiences conducted abroad (Eilering JAM, Vermeulen WJV 2004), one of them being the realization of Eco Industrial Park (EIP), the Emscher Park in the Ruhr of Germany, in 1999 and the adjustment of provisions in policies, the reality of Italian production is now changing its approach are exempt, evolving into the application of Industrial Ecology's guiding principles.

The theme of APEA (Area Produttiva Ecologicamente Attrezzata) as ecologically equipped productive areas, was introduced in Italy by D.Lgs. n. 112/98 "Bassanini decree", which refers to each individual Region, the task to discipline matters by placing some basic reference points:

1. the APEA is endowed by infrastructures and systems necessary to guarantee the right to good health, safety and environment protection;
2. are characterized by forms of unified management of infrastructure and services;
3. production facilities located within are exempt from the acquisition of permits that cover the use of the services therein.

The aim of the decree was to direct the individuals appointed for the management and area planning to give way to the establishment of an innovative model of a production area whose strategic goal is to reduce resource consumption and the environmental impact of installed businesses to a minimum, using the same principles of industrial ecology (Lowe E.A .2001), an evolutionary system designed to exchange energy and materials, meanwhile

developing, internally, economic, ecologic and socially sustainable relationships.

The specific goals, that legislated regions are currently pursuing, are:

- to bring towards a system those whom, already operational, have produced starting from readings of individual contexts and through subsequent processes of "decontextualization", trying to build replicable models for operations in other nations;
- qualify ecologically equipped productive areas characterized by management and infrastructural performances, that once implemented will all together enable organizations in the area with an easy approach to comply with the environmental certification processes, to commend with qualifying recognition the environmental excellence achieved;
- revive the debate, through the installation of operating laboratories, for the creation of new configurations for parts of the city today mainly lacking room for flexibility, characterized for decades of following intensified usage, monofunction usage and ghettoisation of the space;



Fig 2: Lombardia: APEA Kilometro Rosso, Bergamo

The still gradual development of the APEA suffers, however, many regional regulations have a very wide field of standards, ranging

from waste management, water resources, transport and logistics, security, etc.. In order to cover all environmental aspects in a systematic way.

This process of execution and transformation may take several years, nonetheless the case studies made throughout the country that are already present, though sometimes only partially, the features provided by national regulations are not many.



Fig 3: Marche: APEA ZIPA Jesi, Monte San Vito (AN)

3. Strategic goals of the APEA model in Tuscany

In december 2009, Tuscany, which is one of the Italian Regions that is most engaged with the Industrial Ecology (IE) approach as a policy tool, launched a new initiative that sparked an innovative policy stream based on the voluntary approach. The new regional law known as Tuscan Regulation 74/2009 (Regione Toscana, 2009a) and Resolution 1245/2009 (Regione Toscana, 2009b) established the scheme and the criteria to enable the ecologically equipped productive areas to voluntarily achieve APEA certification. This

certification standard is fully managed at the Regional level.

The criteria were drafted and approved through the involvement of a group of experts, that contributed to defining the criteria that represent the first public standard for EIPs in Italy and Europe. This is the first time that a legislation in Tuscany has attempted to incentivize local policy makers to plan new or to reconvert existing industrial parks in a more sustainable way. The Regional Environmental and Energy Plan, which is the main important regional plan in the field of sustainable development, identifies eco-industrial policies and the APEA as key issues to pursue. In addition the current law for the “government of the territory” (published in 2015) contains important references to the APEA confirming the availability of public funds to spread APEA certification in the future.

The APEA model promotes the realization and/or the conversion of the industrial area, in such a way that these areas are the most compatible with the environment in which they are located, through the setting of rules which establish the criteria and the requirements for the their planning, design, implementation and management. The facilities mentioned in the Bassanini decree need to be able to stimulate the creation of areas characterized by high quality environment standards and the availability of innovative and effective standards. These services must generate advantages for the located industries such as the decrease of the operational costs which is given by the joint management of the environmental issues (such as energy saving or water recycling), the administrative simplification that comes out from the possibility to use joint infrastructure (i.e. collective purifier) and to use unified authorization or exploit fiscal incentives which are given for the location choice (for example

the reduction of tax on properties or of the infrastructure costs. In general the sustainable management of such productive areas must get to the cycle closing of different material such as water, energy and the sharing of the most important environmental services.

To be APEA on the Tuscany territory means three levels of action:

- the research of excellent performances connected to the new concept of the spaces within the industrial area, to the design of technological and road network and the formulation of rules which govern the urbanization
- construction of structures within the area such as the application of the best available techniques on the environmental side (i.e. the energy self-production) or the realization of spaces and collective facilities (i.e. the stock areas for the household waste)
- optimization of the organizational and operational synergies to be activated by all the firms located, and the opportunities of a unified management of the spaces and the centralized plants (i.e. mobility and energy management)

It's this third level that represents the most innovative element of the APEA approach and it can be translated in the need to identify a Management Body (MB), who consists of a subject, engine of the environmental improvement process, having the role to promote and manage the environmental services within the area and representing the companies with the external contacts (even with potential promotion actions of the sustainability of the area and territorial marketing).

3.1 Unified management

The MB plays a prominent role. The MB is generally a mixed public-private company,

which covers a range of roles and functions within the APEAs and is a “facilitator” in the area, in order to activate and support specific measures that are essential for the success of EIPs, such as the proactive participation of private and public stakeholders, cooperation among local firms, and regular monitoring of the environmental goals and program to be achieved.

The regional government supervises the appropriate implementation of the certification scheme and carries out spot checks in certified areas to ensure compliance with the criteria established by the regional law. The provincial governments aim to guarantee territorial coordination and efficient and effective use of land. Municipalities have various functions in the APEA system: they choose the location, identify the MB and verify the compliance of the area with the APEA certification criteria.

A key issue is the engagement of local companies. The standard requires the MB to sign an agreement with all of them. The agreement is required to define some of the companies' duties such as actively participating in the implementation of the relevant criteria, contributing to the initiatives of the MB for the improvement of environmental management in the area, and authorizing the MB to represent them in the marketing in the local area.

3.2 Environmental aspect

To achieve the sustainable approach, the first step operating of an environmental path, requires a deep knowledge of the characteristics of the local and regional ecosystems; it then becomes particularly important to be able to measure the impact that these structures have on the territory, assessing primarily the suitability of choice of a location, the level of spatial concentration of the various productive businesses and the hazards induced to the environment in terms of membership production type. In this way one can detect if the territories are subjected to stress and therefore plan design interventions accordingly to re-establish the environmental compatibility through a systemic management of the project, capable of combining architectural and environmental implications with the principles of industrial ecology; in particular, the design must consider the area as a whole and consider every infrastructure, building and equipment as part of a larger area system.

The design of the area must therefore be organized as follows:

- architectural identity;
- visual integration and landscapes;



- simple maintainability, reliability, safety and continuity of services;
- the use of efficient and environmental-friendly resources;
- the design of the area's ecological life-cycle;
- environmentally sustainable design principles applied to the area;
- integration of local, environmental and technological services.

These clearly articulated objectives in each area, agreed by project stakeholders, will be essential. With this clarity site managers, and public Administrations will be better able to determine the trade-offs among the objectives in all domains, economic and environmental objectives, social and environmental, or any other pair of domains. The Tuscany Regulation establishes requirements to qualify Industrial Area Environmentally Equipped and foresee a score system points in order to evaluate them: each criteria have a specific score to add in order to reach the APEA qualify.

There are two kinds of requirements:

1. Minimum requirements: their satisfaction is necessary to obtain APEA status;
2. Flexible requirements: it's possible to choice requirements functional and compatible with the territory, to obtain threshold necessary to obtain APEA status.

Several basic strategies are fundamental to developing an APEA; individually, each adds value and together they form a whole greater than the sum of its parts so, the criteria of Tuscan Regulation, to reach APEA status, are articulated in:

- urban, about planning and design of Industrial Areas Ecologically Equipped
- infrastructural, about innovative technologies and services
- management, about organizational requirements.

In detail, urban and infrastructural criteria provides with technical requirements directed

to diminish and to manage the pressures on environment in an integrated way, applied to buildings, industrial facilities and common areas, bought in, have the ambition and the aim of transforming the entire area in a body to serve its users. A body, which is in its integration, becomes a tool for its users by creating and providing content for environmental sustainability: living healthy, active safety, passive safety, comfort, but also socialization and connection services. Infrastructures (for sustainable mobility, energy saving and production, for water management, lighting, waste management, access control, the web server, WiFi access points, video surveillance, irrigation, etc..) will be centralized, and they are characterized by simplicity available to all actors involved.

The APEA planning aims that buildings and infrastructure are designed optimizing the efficient use of resources and minimizing pollution generation. It's essential to minimize ecosystem impacts by careful site preparation and environmentally sensitive construction practices. The whole area will be designed to be durable, maintainable, and readily reconfigured to adapt to change. At the end of its life, materials and systems can be easily re-used or recycled.

The realization of Industrial Areas Ecologically Equipped will be a tool for local governments and for the entire areas to support the economic and social development, which, since the implementation phases will generate jobs, and opportunities for the construction industry, and support socio-economic area (Gallo P., Iraldo F., Nepi A., Gianfrate V., Daddi T., Tessitore S., Tabani M., 2011)

4. Conclusions

A wide distribution and a correct application of the management of industrial areas, if done,

may have great potential in the Italian context strongly characterized by small and medium enterprises, which due the size, hardly ever detains financial and human resources to devote to the implementation of a system of environmental management. The attempt to apply the management system to entire production areas, as the APEA approach, could therefore offer advantages in this sense, allowing the area obtain a better overall environmental image with consequent benefits in terms of attracting businesses and investments.

The overview of the literature and the empirical evidence referring to the national context, highlights the Tuscan experience as a possible trend in using to holistic approach based on voluntary co-operation, bottom-up policy making and, particularly, a third-party certification scheme (connecting sustainability with competitiveness). Like all pioneers, the on-going Tuscan experience still needs to tackle some problems especially regarding the effectiveness of the approach adopted. This will have important implications for future research on industrial environmental policies.

Multifunctionality, as a shared vision of development, the use of innovative technologies, simplifications in the procedures, special arrangements and good management, all in accordance to the rules and environmental standards, therefore seem to be the essential elements towards the key to resolving the problem of industrial areas that effect a large part of our country.

5. Acknowledgments

The research for this paper was financially supported by the Tuscany Region. The developing of the Tuscan Regulation 74/2009 (RT 2009a) and Resolution 1245/2009 (RT

2009b) has been conducted by Tuscany Region, by *Scuola Superiore di S. Anna* of Pisa and by *Scuola di Architettura* of Florence.

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