

# PROFORBIOMED

## 3rd Steering Group Meeting. Work Package 3. PROMOTION OF RESIDUAL FORESTRY BIOMASS IN THE MEDITERRANEAN BASIN

### *Work Package 3. CLUSTERS REPORT*

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# CLUSTERS REPORT

## Introduction

Clusters are geographic concentrations of interconnected companies or institutions that manufacture products or deliver services to a particular field or industry. Clusters typically include companies in the same industry or technology area that share infrastructure, suppliers, and distribution networks. Supporting firms that provide components, support services, and raw materials come together with like minded firms in related industries to develop joint solutions and combine resources to take advantage of market opportunities. These are groups of related businesses and organizations—sometimes direct competitors, but more often operating in a complementary manner. They may comprise more than just one industry classification, and a true cluster is more than just a supplier producer-buyer model.

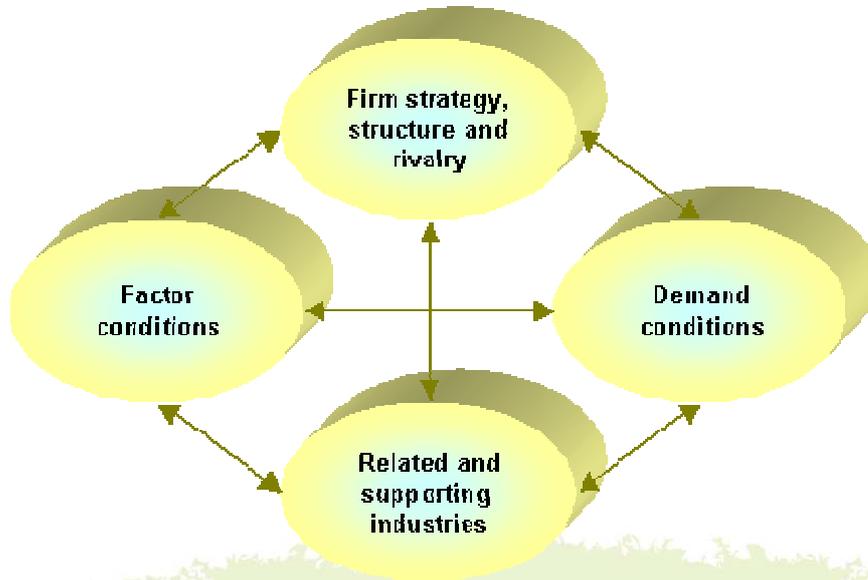
An economic cluster - or several clusters - serves as the driving force in most regional economies. Examples include Detroit's auto industry concentration, computer chip production in California's Silicon Valley, London's financial sector, the Napa Valley's wine production, and Hollywood's movie production industry.

The clustering concept was popularized by Harvard Business School professor Michael Porter (1990). His techniques teach communities to analyze their existing business and industrial bases and build their economic development on those strengths. From the identified clusters in an area, the next step is to develop a marketing plan for industry.

By developing a massive database of companies, county by county, Dr. Porter's research has statistically grouped businesses together in clusters. A strong cluster will include the suppliers of raw materials and the distributors, as well as the primary producers. But it will also include specialized services in finance, marketing, packaging, education, and more, including specialized trade associations. In general, the broader the base of related businesses, the better for the cluster, for that often reflects the specialization that comes with concentrated resources.

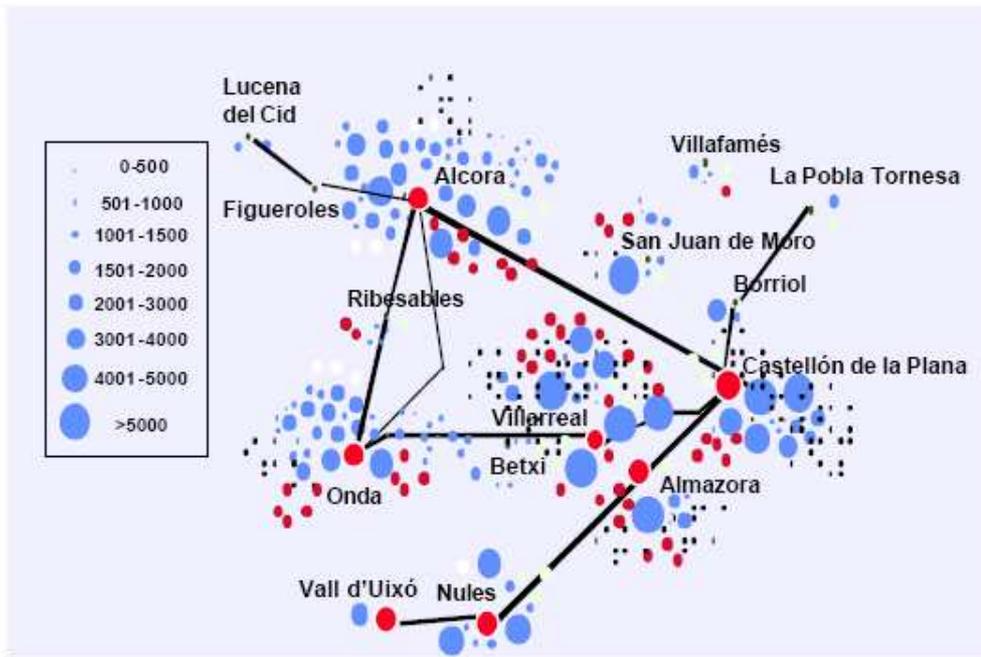


## Michael Porter's Diamond Model



Related firms and industries have tended to locate in close geographical proximity for a number of reasons. In his 1916 economic text, Alfred Marshall was one of the first to see the benefits of spatial clustering: the existence of a pooled market for specialized workers; the provision of specialized inputs from suppliers and service providers; and the rapid flow of business-related knowledge among firms, which results in technological spillovers. It may be difficult to predict where clusters will emerge beforehand, but their growth is easier to predict due to the benefits gained from the strategy. A variety of terms are synonymous to a cluster; these include co-location, industrial districts, and innovative milieus.





## Emergence and growth of clusters

Clusters often go through a history of emergence, growth, decline or transformation. Although individual clusters develop differently, six steps in a model of cluster development are outlined below.

Firstly, the birth of a cluster can often be traced to historical circumstances, such as the availability of raw materials, specific knowledge in R&D organisations or traditional know-how, the specific or sophisticated needs of a certain group of (geographically concentrated) customers or firms, and the location of firms or entrepreneurs performing some important new technological innovations that stimulate the growth of many others. Accidental reasons may also affect the growth of a cluster. However, the growth is often set off by some explicit location factors, in particular long-term development of specific knowledge that may be turned into new productive use (Pinch and Henry 1999). Emerging clusters can often be traced back to a history of events that led to the 'sudden' rise of clusters in more recent years. The first stage in cluster development often involves new firm spin-offs leading to a geographical concentration of firms in nearly the same production stage. The agglomeration is followed by local competition that is an essential driver of innovation and entrepreneurship (Porter 1998b).



Secondly, once an agglomeration of firms becomes established, progressively more external economies are created, forming a cumulative process. The first external economies often include (i) the creation of a set of specialised suppliers and service firms, frequently originating from vertical disintegration of firms, and (ii) the creation of a specialised labour market (Storper and Walker 1989). The development may lower the cost of shared inputs as savings in production costs are passed from specialised suppliers (serving numerous local firms) to client firms.

The client firms will then derive a benefit not available to similar firms in less highly localised settings (Harrison et al. 1996). Cost saving also occurs through the presence of a pool of experienced and skilled workers.

A third step may be the formation of new organisations that serve several firms in the growing cluster, e.g. knowledge organisations, specialised education establishments and business associations. The organisations advance local collaboration, learning process and technological knowledge spill-overs, as well as the creation of localised forms of knowledge by key personnel in the local industry. An example is the set up of centres for real services in some industrial districts in the 'Third Italy' during the 1980s. These centres hold specialised competence (on market development, technology, strategy etc.), and are able to supply the system of firms with professional competence that small firms seldom acquire themselves, but which is often necessary in accomplishing larger innovations. Brusco (1990) claims that the introduction of the centres raised the innovative capability in the local network of small producers.

Fourthly, the development of external economies and the emergence of new local organisations increase the visibility, prestige, and attractiveness of a cluster. This may result in more firms and skilled employees moving into the cluster, thus raising the attractiveness even further, as well as resulting in a fertile breeding-place for new local companies.

A fifth step relates to the creation of non-market, relational assets that foster an untraded circulation of information and knowledge, through e.g. informal collaboration, and help with coordinating economic activity. Thus, mature regional clusters may contain ensembles of specific, differentiated, and localised relations between persons and organisations that are coordinated by routines or conventions that often only work in the context of proximity (Storper 1997). Communication that contains flows of non-codified knowledge, and which is complex and uncertain, frequently involves dense human relations, which in turn are stimulated by proximity between individuals, firms, and organisations.

Lastly, although a cluster can renew its success for decades or become part of a new cluster, many regional clusters sooner or later enter a period of decline. Cluster decline is often seen to reflect a situation of technological, institutional, social and/or cultural 'lock-in' in business



behaviour. Regional industrial development may become 'locked in' by the very socio-economic conditions that once made the region into a core region in a specific industry.

The initial strength of a regional cluster in the past - be it a well educated or experienced workforce holding unique know-how and skill; a highly developed and specialised infrastructure of firms, knowledge organisations, and education and training institutions; close inter-firm linkages; or strong political support by regional institutions - may turn into an inflexible obstacle to innovation (Grabher 1993). Clusters may fall into a trap of 'rigid specialisation'. Cluster development sometimes tends to reinforce old behaviours and suppress new ideas, which in particular is a danger for the continued survival of a cluster when technological and global economic conditions change (Porter 1998b).

## Benefits of clustering

A well developed concentration of related business spurs three important activities: increased productivity (through specialized inputs, access to information, synergies, and access to public goods), more rapid innovation (through cooperative research and competitive striving), and new business formation (filling in niches and expanding the boundaries of the cluster map).

Clusters are always changing. They respond to the constant shifting of the marketplace. They usually begin through entrepreneurship. Silicon Valley is a relatively new cluster of computer-related industries; in the past, Detroit was the same for automobiles. Nothing sparks productive innovation better than having your competitor across the street.

Clustering helps cities and counties direct their economic development and recruiting efforts. It also encourages communities to refocus efforts on existing industries. Communities understand that the best way to expand their own economies and those of the surrounding region is to support a cluster of firms rather than to try to attract companies one at a time to an area. Chambers of Commerce, business incubators, and some universities work with companies to develop clusters and synergies in business communities.



Strong domestic clusters also help attract foreign investment. If clusters are leading centers for their industries, they will attract all the key players from both home and abroad. In fact, foreign-owned companies can enhance the leadership of the cluster and contribute to its upgrading, according to research by Julian Brikshaw (2000).

For small and developing businesses, locating in a cluster near competitors and related industries may aid the firm in faster growth, recognition, and status within the market. Economies of scale can be gained by group purchasing within the cluster. There can be discussions among cluster members about their unique competitive advantages and future challenges. Linked supply chain networks can naturally be created within a tightly-linked cluster. Informal day-to-day contact with similar companies is also important, according to Natasha Muktarsingh. Of course, physical location proximity is not always required to be a cluster. Many firms, including retailers and publishers, can be grouped together on an Internet site.

### A cluster example: “the Carpet Capital of the World”

The city of Dalton, Georgia—located between Atlanta, Georgia, and Chattanooga, Tennessee—is unrivaled in its production of carpet. Almost 90 percent of the functional carpet produced worldwide is made within a 25-mile radius of Dalton. In their 1999 book about the industry, Randall L. Patton and David B. Parker note that Dalton has evolved in much the same way as California's Silicon Valley, through a rapid expansion of new firms started by entrepreneurs and through cooperation among owners, mills, and local government. It was only after World War II that the carpet industry came to be identified with this region. Entrepreneurs developed a new tufting technology and captured the carpet industry previously dominated by woven-wool carpet manufacturers in the Northeast.

The six largest carpet companies and 18 of the largest 35 carpet companies are headquartered in Georgia. The carpet cluster includes the carpet tufting mills, yarn mills, finishers, backing manufacturers, machinery suppliers, maintenance services, and sample companies that directly support the carpet industry. Seventy-five to eighty percent of the yarn used by the carpet industry is produced and processed in Georgia. Over 50,000 employees in Dalton are engaged in carpet



manufacturing, and seventy-two interstate trucking companies are utilized to transport carpet and raw materials, in addition to fleets owned by many carpet companies.

## A clustering model in progress

Porter recently applied his work in industry clusters and economic analysis to the community that includes the carpet cluster. His data is available at the county level and organizes businesses into some 50 industry clusters producing non-local goods and services. Many familiar businesses are excluded. Fastfood restaurants, automobile dealers, and newspapers, for instance, are spread rather evenly across the country, for they serve basically local customers.

Porter also helped the city of Chattanooga, Tennessee, to perform a cluster analysis. To implement a regional growth initiative, the city appointed two groups: a steering committee of 25 members, including prominent business and government leaders, to provide guidance and policy direction; and a core team of business and academic leaders to research local conditions and manage cluster team meetings. The region for study was based on geographic features, political boundaries, local sentiments, economic strengths, and even commuting patterns. For each cluster, a "location quotient" was developed and defined as the cluster's strength here compared to what might be expected if that industry were spread evenly across the country.

The "Textiles and Floor Coverings Cluster," centered in Dalton but with related businesses elsewhere in the region, was by far the strongest cluster. The carpeting businesses also accounted for most of the strength in the second strongest cluster, "Construction Materials." Three additional clusters emerged: "Confectionery and Baked Goods," "Tourism and Hospitality," and "Medical Devices and Health Services."

Leaders in each field, and others from lists generated by Standard Industry Classification code numbers, were invited to become part of the cluster team and attend a series of meetings over four weeks. The agenda for the teams included a discussion of conditions in the cluster; issues holding the cluster back; opportunities for creating better inputs, sharper demand, and high-quality related institutions; and problems with regulation, the labor pool, and the physical infrastructure. The meetings also included a discussion of what cluster team members could do



about these issues; what types of legislation or change in processes could make the cluster better; cooperative efforts toward applied research; and ways to attract complementary businesses to the region.

The immediate goal was a plan for action that went well beyond analysis. The ultimate goal was to accomplish change. The core or "diamond" of the cluster included: factor input conditions (labor, capital, resources, etc.); demand conditions (nature of the home market, including any special conditions or expertise locally); related and supporting industries (from service industries to trade associations); and context for firm strategy and rivalry (the level of entrepreneurship, and tradition of united actions). The team in Chattanooga learned that concentrated competition leads to greater prosperity, and the best strategy means not trying to do all things but focusing on your cluster. There was also a more general appreciation that the cluster process could, indeed, lead to more and better-paying jobs and that a strong cluster would enhance the general economic situation for its members. In the end, the Chattanooga region should see a shift in its own business culture. It should move away from traditional reliance on fixed endowments, and move toward real competition, true productivity, effective collaboration and greater prosperity.

## Industry and Government (national, regional and local) policies

Even if governments follow a non-interventionist policy, they affect economy with a number of competencies as subsidies, legislation, creation of infrastructures (technology parks, etc.) or with public purchases.

Government influence is though unquestionable and it can be or not used with a cluster perspective. On the other hand, Governments in the European Union action capabilities are limited in the fields of monetary policies, subsidies and tax breaks. There is an increasing emphasis in strengthening local firms networks. Especially since in 1990 Prof. Michael E. Porter described how clusters or locally based networks of firms in the same industry could constitute a source of competitive advantage. Most advanced economies are increasingly using cluster policies as they are market driven.



Some tools governments have are identification of existing or potential clusters in their region; providing clusters with strategic information such as benchmarking or trends; invest in technologies and capabilities that are beneficial to cluster firms; fill in gaps in the cluster with FDI or others; link firms to training programs from local universities and centers; foster networking, service centers and associations; etc. Support to firms in clusters, directly or through suitable supporting structures is a basic priority in the economic development and industrial policy political agendas.

Having clusters is no guarantee of a solid economy, though. Clusters size (in terms of market share in their specialization) can be determinant in the mid term. For example, in United States there is one relevant furniture cluster in North Carolina while only in Spain there are around fifteen. As trade barriers disappear and capital and labor flow freely, firms that were protected must reconsider their sources of competitive advantage.

Cluster-based initiatives provide governments with a better perspective of their territory economic reality as well as:

- A better understanding of the industry needs and a direct dialog means with the cluster firms
- A new way to create awareness of existing support programs to firms and associations in the industry
- Designing tailor made support for the industry, involving private sector in their financing and management
- Coordination within different Government departments to support the industry



## How to work in a cluster?

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#### Policy measures to foster cluster development

Cluster-based economic development strategies take advantage of clusters efficiency, flow of information, economies of scale and innovation potential.

There are various tools to work with clusters: from simple observation to change management.

#### STATISTICAL OBSERVATION

#### INDUSTRY STUDIES

#### FIRMS FORAE

#### CHANGE MANAGEMENT



#### *Statistical observation.*

Identification of existing or potential clusters in the territory and their strengths and weaknesses, through mapping and analysis exercises.

#### *Industry studies.*

Industry studies and strategic plans result in useful diagnosis and improvement areas for policy design. The problem is they do not involve private sector in the implementation of solutions and therefore there is no change. This type of studies has been very popular in the 80's decade.



*Fora.*

*Fora are a means to establish dialog between public and private sector. This is a correct tool if firms that form the forum are aware of their challenges and have consistent future plans. Most SMEs do not have access to this information and these groups become a source of questionable petitions to governments.*

*Change management.*

Generally, the aim is to foster strategic change and the tools are a combination of strategy analysis and change management techniques to influence the improvement of firms' position. Those are the initiatives that have proven useful and have been implemented throughout the entire world over the last decades.

### Considerations on Public Policy

There are a number of considerations to take into account, but there are three fundamental ones when talking about clusters:

- **Build on local differences:** competitive advantage is based on being different. It makes no sense to try to clone two clusters in the same industry and same territory. Each of the clusters can follow diverse strategies successfully and have different optimal environments.
- **Understand when industries cluster:** not all industries tend to cluster and clustering principles are not useful for every industry. For example, petrochemicals do not need to cluster.



- Understand the cluster life cycle:** governments must differentiate actions on consolidated clusters from potentialities or wishes. One can act on existing clusters while “creating” clusters (e.g. around a multinational or a new technology) requires a different – and complicated - perspective.



## Step – by – step approach

A much consolidated framework of a step - by - step approach for the establishment of clusters may include the following:

Cluster mapping	Identification of clusters and their main challenges in a defined territory
Cluster initiatives	Action oriented, cluster specific initiatives to foster competitiveness
Inter-cluster initiatives	Action oriented, multiple related clusters initiatives to foster competitiveness
Observatories	Intelligence tools to follow up and react to clusters strategic change
Horizontal policies	Bottom-up designed policies that cover relevant needs in clusters (e.g. innovation, internationalization)

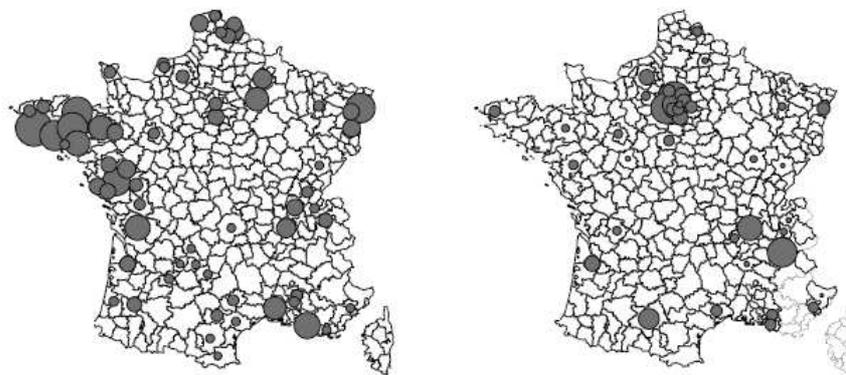
These are steps that can be followed totally or partially, i.e. a region may decide not to develop an observatory, to omit the inter-cluster initiatives, etc. This is an ideal intervention scheme, but it is not a sine qua non procedure: according to the local and regional context, a region will ultimately decide which the optimum mix of actions is.

A more detailed analysis of the first two steps from the above table that are the most appropriate for local and regional level decision making processes, is provided below, in order to assist the partners in the preparation of their initial cluster support activities.



## Cluster mapping

This is the first step of the whole procedure and very essential in terms of identifying the existing or potential cluster – ready formations or those agglomerations that demonstrate a potential to become clusters. There are many methods that are used throughout the world, such as the SPL (France) etc



**SPL maps for Clusters of Agrofood (left) and electric/electronic manufacturing (right) in France**

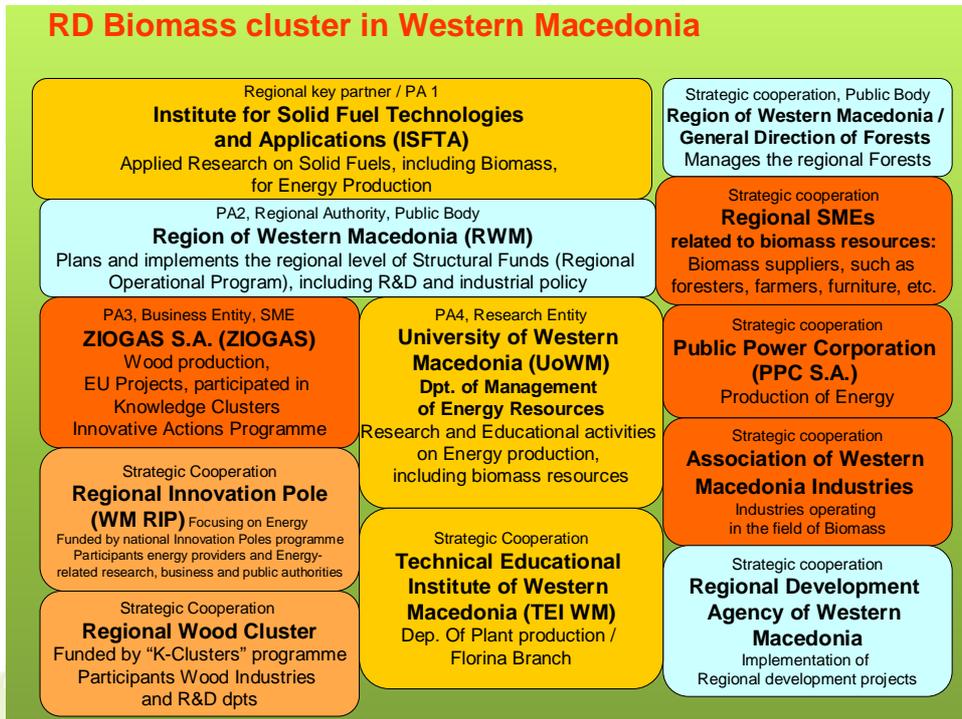
These methods are mainly used at national or supra-regional level, to identify those concentrations of enterprises that are higher than usual and therefore show some potential for higher interactions due to geographic proximity. Of course, at regional level, these groupings of SME's are more or less well known, therefore it is there more essential to perform a more detailed analysis of each of the clusters identified, existing or potential.

The description of this analysis is provided below.

### Cluster analysis

This analysis involves a clear description of the three main pillars of each cluster according to the triple – helix model (private sector, academia and public sector, including local and regional authorities). An example of this description is depicted in the following picture (Western Macedonia Region, biomass cluster). In this example, all the stakeholders involved more or less in the biomass cluster are demonstrated in the picture, with those in the core of the BioClus project being mentioned as PA1, 2, etc



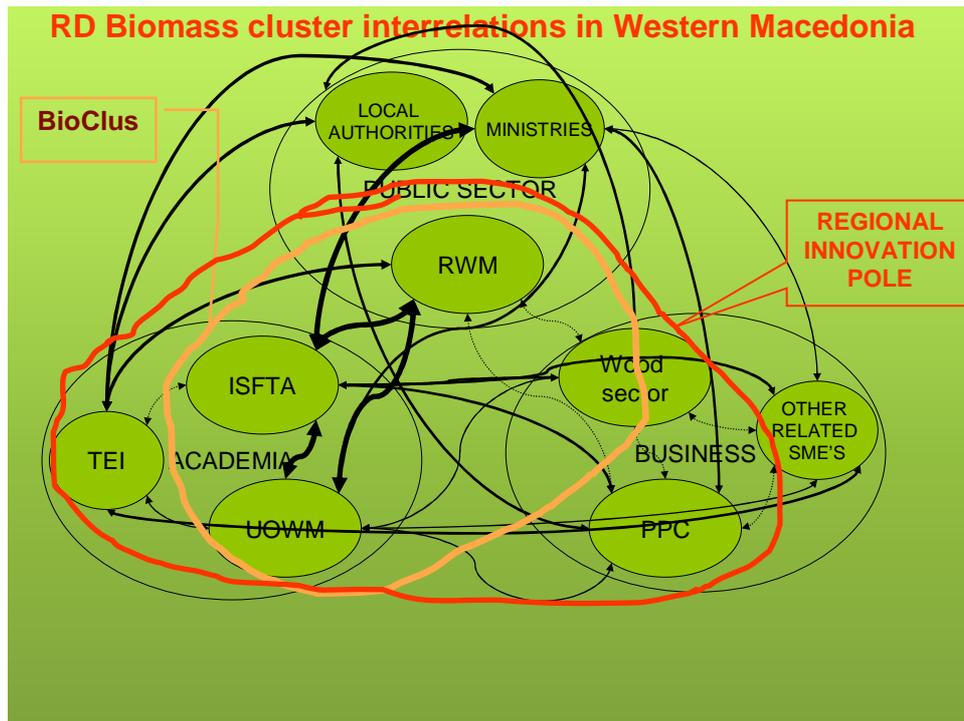


**Biomass Cluster in Western Macedonia / Greece: players and stakeholders of the Triple Helix**  
[www.bioclus.eu](http://www.bioclus.eu)

Within this context, all stakeholders are included and grouped according to the three helixes, depicted in different colours (you can also add other actors or schemes affecting and being part of the cluster, in a fourth element, again as demonstrated above).

However, this is a rather static image and it is difficult to draw any conclusions on the behaviour and relations of the various stakeholders among them. Therefore, it is also important to draw the relations of the cluster's stakeholders with each other, in order to demonstrate the interactions and synergies among them, as depicted in the following picture.





### Biomass Cluster in Western Macedonia / Greece: interdependencies and interactions of key players

In this drawing, the key players are identified and their inter-relations are drafted, according to the intensity of their interaction: thus, a bold line demonstrates a strong interaction, a medium an average one, etc. With this picture, it is easier for policy makers to understand where the core of the cluster is based and prepare their policies accordingly, in order, for instance, to enhance the “weaker” parts of the cluster, or capitalize upon its strengths.

The coloured lines, red and orange in this example that demonstrate the boundaries of the named projects (i.e. the players of the cluster that participate in those projects). Interestingly enough, these areas coincide with the most intense activities of the cluster interactions, which shows the importance of these projects for the development of clusters at regional level.



### Cluster Initiatives

Cluster initiatives are organised efforts to increase the growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community (Örjan Sölvell, Göran Lindqvist & Christian Ketels in *The Cluster Initiative Greenbook* - 2003).

These efforts can either take the form of the support towards the establishment of the cluster under a legal form, or the support of actions and projects commonly carried out by actors of the cluster, or both of the above.

The establishment of the cluster under a legal form offers the advantage of mobilising all players under one common goal and objective. In this sense, it can have some self-consciousness effects on the same enterprises, research institutions and authorities that coexisted in the same geographical location, but they were never conscious of belonging to a larger group. In fact, this action is in the position of adding the “cooperation” factor to the already existing “competition” factor and, thus, create some favourable conditions for the cluster to develop and flourish.

The financial support for the legal establishment has many forms in the various countries, depending on local conditions. In average, an initial support is provided for the horizontal connection of the actors, i.e. for the equipment of some premises (“headquarters” of the cluster), lobbying and networking, both internal and external to the cluster, marketing and promotion, common production lines and/or distribution lines, etc. There is also quite often a minimum number of enterprises and / or research institutions that are required as a threshold to be able to take part in a cluster. This actually reflects the fact that a cluster means a higher concentration of enterprises, which implies a bigger number active in the area under consideration.

The support of actions that link the stakeholders of the cluster can either be an integral part of the previous form of legal establishment of a cluster, or even a “stand-alone” procedure, mainly depending on the overall policy of the specific region. Thus, the legal establishment of clusters indicates a more interventionism spirit, whereas only the 2<sup>nd</sup> option is closer to a “laissez faire” policy of regional development. In any case, the support of actions usually includes horizontal and sectoral or thematic axes: the thematic actions support specific activities related to a focused thematic field or an industry, usually but not exclusively concentrated on a group of actors, while the horizontal refers to more generic actions that apply to almost all the actors of a cluster. These two pillars have to be closely planned and implemented, in order to create the desired added value within the greater picture of the cluster.

Due to the importance of developing linkages between the R&D players, where knowledge is born and the end-users of this knowledge (companies, innovation hubs, etc), quite often the



support measures aim at developing exactly these synergies. Thus, co-financing the joint development of a product by a number of SME's and labs is a way to enhance interaction among them, but this happens in a horizontally interlinked environment of easier knowledge flow among academia and entrepreneurship, it can boost the flow of knowledge and, consequently, the creation of new knowledge.

Therefore, the mix of policies and actions for the development of clusters within a regional context has to be carefully planned and implemented, according to the local specificities, mentality and the financial potential and opportunities.



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