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The structure and achievements of the Bioenergy Network of Excellence

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ABSTRACT

This paper explains the origins of the Bioenergy Network of Excellence (NoE) "Overcoming Barriers to Bioenergy". It outlines the reasoning behind the project's overall objective of covering the entire bioenergy chain from biomass feedstock to end-products. One of the network's other aims was to integrate partner activities scientifically and practically in such a way that it could continue beyond the period of European Community financial support. The consortium consisted of eight key bioenergy R&D institutes in Europe. The work programme structure had three stages:

1. The initial phase was identification of barriers to increase use of bioenergy in Europe, which included both technical and non-technical barriers. During this stage, barriers were analysed in terms of business opportunities. It was believed that by analysing case studies and industrial projects, common barriers can be identified.
2. The second phase was to address RTD goals and how to remove the barriers. A common strategy to overcome the barriers was considered. The target was to activate and carry-out jointly executed research projects. The integration structure could be established based on these projects.
3. In the final phase, the integration structure and a legal framework was considered with regard to the partners' present organisations and new EU initiatives concerning future network activities.

1. Networks of Excellence

Networks of Excellence (NoE) were introduced in the European Community's Sixth Framework Programme (FP6) with the objective of combating fragmentation in the European Research Area by integrating the critical mass of resources and expertise needed to enhance Europe's global competitiveness in key areas relevant to a knowledge-based economy. The intended long-term impact is to create efficient organisations operating at the European level, thereby eliminating wasteful duplication of research effort and, by facilitating joint planning and resource sharing, overcoming any inadequacies faced by individual institutes in terms of human resources, expertise, equipment and infrastructure. This should also help to break down traditional barriers between the scientific disciplines. The crucial difference from the Thematic Networks of the previous FP5, which focused purely on coordination activities, is that EC support via the NoE instrument was intended to lead

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to the creation of **Durable Integration Structures (DIS)** with the momentum to survive and grow on a long-term basis.

The European Commission defined the Network of Excellence [1]:

Networks of Excellence are designed to strengthen scientific and technological excellence on a particular research topic by integrating at a European level the critical mass of resources and expertise needed to provide European leadership and to be a world force in that topic.

Networks of Excellence are therefore an instrument aimed at tackling fragmentation of existing research capacities. They should be implemented provided that:

- research capacity is fragmented in the (thematic) area being considered;
- this fragmentation prevents Europe from being competitive at international level in that area;
- the proposed integration of research capacity is likely to lead to higher scientific excellence and more efficient use of resources.

Networks of Excellence projects were implemented across the various thematic areas of the Sixth Framework Programme aiming to shape the way of European research and to achieve durable integration as main deliverable. Although there is wide diversity of the networks, all have the common feature of dealing with fragmentation as their main objective.

A survey on FP6 new instruments [2] showed that participants in the Networks mostly consisted of research centres, universities, and research and technology organisations with businesses represented to the least extent. The number of project partners shows the huge variation with regards the Networks of Excellence instruments. Most of the consortia included between 20 and 50 partners, however, there was a project that reported partners from about 100 institutions with 1100 individuals. The FP6 database shows a broad range of NoEs regarding the number of participants, with the smallest network comprising eight while the largest one had 116 participants. The networks usually consisted of core groups based on previous collaboration in addition to newly engaged cooperation partners. This particular network "Overcoming Barriers to Bioenergy" (Bioenergy NoE) decided at an early stage to keep the consortium manageable and restrict the number of partners to eight with an option to complement the consortium later during the project if considered reasonable.

The main additional concerns for the NoEs were that the concept of durable integration was not well understood at the start of the programme, and the networks were lacking in real continuation or exit strategies [2]. A further issue raised was that NoEs could not directly fund "traditional" research activities, although they could and did fund research on supporting or integrating topics.

2. Project objectives

2.1. *Overall objectives*

The Bioenergy Network of Excellence (Bioenergy NoE) initially covered the entire field of bioenergy. The reason for choosing the wide scope lies in the fact that so many competing and related factors affect the field. These include:

- Availability of heterogeneous resource base,
- Competing uses for biomass,
- Complex properties of bio-materials,
- Socio-economic factors related to crop production,
- Technical challenges both in production and utilisation,
- Economic boundary conditions.

Bioenergy is very complex, as it is affected by several policies such as common agricultural policy, Kyoto policy, waste and land filling policy, forest policy etc. The complexity of bioenergy is emphasised as the bioenergy chain involves agricultural, transport and industrial sectors, in addition to final consumers. To overcome the barriers of bioenergy development, the entire chain from resource base to end-use markets have to be considered.

An overall strategy was developed at an early stage of the project (Fig. 1), with a clear view that the strategy and the specific actions related to the implementation of the strategy would be further developed and refined during the five year duration of the Bioenergy NoE project. It was also expected that the guidelines from the Commission should evolve into more concrete expectations as experience was accumulated from this instrument in time.

The overall integration included the following topics:

- Technical scope
- Strategy to enlarge partnership
- Organisation of "day to day cooperation" in the partner organizations
- Catalyzing human mobility and joint infrastructure
- Options for "legal entities"
- Rules and guidelines

A three-phase process was initially contemplated for integration: identification of overcoming barriers for bioenergy, synthesis to overcome the barriers, and implementation of integration, shown in Fig. 1. The first phase was largely completed during the first 24 months of the project. Since initialization of the Bioenergy NoE, the Industrial Technology Platforms and ERA-NET Bioenergy were launched, which both affected the progress of the NoE. Members of the NoE are participating in two Industrial Platform actions (biofuels and forest industry), and the ERA-NET offered further opportunities for collaboration.

2.2. *Specific objectives*

The **primary objective** of the Bioenergy NoE was to integrate partner activities in such a way that eventually a deep and durable integration continues beyond the period of Community financial support. Successful execution of the project would therefore constitute a road map to integration.

ntegration of the R&D activities was the primary goal of the NoE and should be achieved by converting the "Independently Executed Research" carried out at each partner organisation initially to "Jointly Executed Research" as shown in Fig. 2. This transition was supported by the grant given to the NoE, which