



SYNERGIES EFFECTS OF CLUSTERISATION PROCESSES: BIOMASS CLUSTER CASE

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Annotation

This research aim is propose prevailing biomass cluster model and explore synergy effects, which initiate cluster activity. Authors propose foreign countries experience to develop biomass clusters, indicate such type cluster structure, who dominate various countries. Also indicate main ranges, which making researches, related with biomass clusters competitive and benefit creation increase. Systemize all information prescribe synergy effects, which comprise developing biomass cluster, when therein participate business and science institutions. Herewith highlight benefit, who biomass cluster activity gives business and society.

KEY WORDS: *competitive ability; clusterization; biomass cluster; synergy effects; multiplication effects.*

Introduction

Recently develop countries observable development of new interorganization business connects – members of different markets collaborate huddle on clusters. Clusters can be concerned with production, services or operate composite principle. Clusterization processes various aspects analysed Porter (1990, 1998, 2000, 2003), Bildirici, Ozaksoy (2013). Developing renewable energetic, begin formation biomass clusters, who assist more rationally supply energetic needs of regions. Clusters actions and allot benefit are versatile, so it lets achieve various synergy effects, which feel various society groups and subjects. Business synergy effects analysed Buzzell and Gale (1987), Milgrom, Roberts (1995). However, clusters synergy effects, especially biomass clusters, in fact aren't exploring.

Though various business sectors exist analysis examples of synergy effects, but biomass clusters their investigation is fairly little, because great part old develop countries, yet not fully merge at biomass use in energy production processes, and not be demand detail explore the benefits of biomass clusters in his members and society. Other countries, biomass market is not yet fully form. Clusters develop process in this countries become a difficult process, which be slow rate and create less benefit nor can give at this moment.

Novelty of the study: Authors' research indicates, that biomass cluster gives a synergy effect. The last-mentioned divided cluster members, the significantly enhance their competitiveness. Synergy effects divide mechanism is difficult, contradictory and few investigate. Therefore study authors thought given expedient introduce particular parameters and indexes, which relieve this process and bring on this process more clarity. Also authors found that multiplication effects can approach how the specific forms of synergy effects.

Object of the study: Biomass clusters synergization

Goal: investigate synergy effects, dominant on biomass clusters.

Objectives:

1. Describe biomass clusters in Europe countries;
2. Investigate biomass cluster structure;
3. Identify clusterization processes synergy on biomass clusters.

Biomass clusters development in Europe countries

Biomass resort in Europe constantly grows. This relates to improved and cheapen biomass using mechanisms, which can get produce heat and electricity. More on biomass resort currently invest Austria, Finland, Germany and United Kingdom. Constant investment in sector proceed large renewable energy resort system possessed Denmark and Sweden. Over this countries may attach few Organization for Economic Co-operation and Development (OECD) countries, primarily the USA, who engage actively biomass using of the remaining world. Less-developed countries significantly expendable nascent agribusiness wastes (Bildirici, Ozaksoy, 2013).

Recently in Germany develop all renewable energetic kinds, including various biomass types using on energy production. Widely expendable wood wastes, straw, biological liquid wastes. They comprised from animal faeces and wastes, available from cereal cultures. Biomass is most expendable renewable resource in this country (Konig, 2011). In Germany exist wide-ranging biodynamic cluster, whose aim is more effective use wood and other biologic wastes, that there can create better value added. Cluster have 50 subjects – companies, institutes, and other science agency (Germanian bioeconomic cluster, 2015). Cluster researches can help effectively use nascent wood wastes, reduce to atmosphere pass CO₂ emissions, also create additional

value added to the country's economy, because using local resources.

In France wider biomass resort concerned with row of factors. Biomass resort not only heat produced, but earned by way of creating a new product, concerned with constructional, high-tech, food sectors. All of this made a separate business markets and warrant country and her regions sustainable development (Thomas, 2014). At this moment France about 20 % energy make from renewable resources, and most part belong a biogas. In country operates at 71 clusters, which concerned with biomass resort and innovations. This structures doing scientific researches, engage biomass production and resort, export knowledge and equipment into foreign countries (Netherlands enterprise agency, 2014). French biomass clusters distinguish a characteristic participate international associations, who goal – unfold sustainable development idea and expand biomass resort that much energy production, also create and developing other manufacture parts.

In Italy biomass clusters operate fairly large extent. Most biomass company's alliance unifies over 300 companies, which active biomass fatigue and resort sectors (Francescato, Negrin, 2013). Italy action to use biomass and their wastes additionally stimulated European Union (EU) directives, which indicated enhance energy production from renewable resources. Necessary emphasize it, that Italy is one most wood import country, then important place on cluster fall a wood import companies, which country provide a biomass. To use biomass Italy amount same purposes how other countries – to enlarge benefit of sustainable development, saves the environment and give benefit from suitable waste resort (Manzone, Airoldi, Balsari, 2009). Important place in the sector gets an energy plant, which assist warrant continuous local stock and assist necessary energy production power (Cosentino, Copani, Patanè, Mantineo, D'Agosta, 2008).

Develop European countries experience create biomass clusters and end grow value added when remake biologic and wood waste currently expendable less-developed countries. At Latvia biomass resort is more, neither other Baltic states – country have much wood waste, also is much not renewable peat resources. Latvian biomass business companies flock into clusters for a few reasons. First and foremost reason, Latvia promote small power-plant creation, then they need resource, mechanisms, and cluster help solves nascent challenges. Significantly maintain new biogas power-plants, who can together produce both heat and electricity, to use faeces and animal wastes. Also promote biomass from agricultural wastes resort – to use straw, osiers. Together with the cluster creation it is oriented to rural territories involvement in economic processes, to solve their social problems. Herewith diversify agricultural sector, rear various plants, able provides power-plants more thermal firing. 2012 m. in Latvia work 37 biomass power-plants (Melece, Krieviņa, 2014). Recently Latvian company's usable industry production pending nascent wood waste, who later become heat and electricity. Large biomass usable is North and West Latvia regions (Melece, Krieviņa, 2015).

In Poland recently also observe cumulative biomass resort, though main energy production part is concerned with carbon use. However, their apparent single initiatives, develop just particular energy clusters components. Nevertheless, Poland, same as Latvia, seeks similar purposes – help rural territories enhance economic and social welfare, also enhance the growth speed. Also absorb EU Directive of Sustainable development principles. Poland significantly more than Baltic States use straw – particularly large their resort potential is north and mid-Poland (Berggren, Ljunggren, Johnsson, 2008). Emphasize biogas resort, but all action is singly and about cluster creation is not involved. Emphasize, that growing biomass resort will help warrant country sustainable development opportunities and rural territory growth (Bielski, 2015).

Romania is one in the poorest country in the EU, but country apparently declares, that need keep sustainable development principles when create a new energy policy. Biomass resort in the country not yet very active, but exists energy cluster, who inclusive water and geothermal resources parts. In cluster subdue energy producers, mechanism suppliers and science institutions. Central Romania exists biomass cluster, who unify biomass production, adaptation, consumption companies. In 2011 founded Romania Cluster organization, who coordinate and maintain all work of active clusters and clusterization principles practice (Benedek, Cristea, Bartók, 2013). Basic biomass cluster resources concerned with biomass wastes resort. Cluster purpose is to encourage national and multinational collaboration and apply sustainable development principles. Now cluster has 38 members (Romanian biomass cluster, 2015).

Currently, biomass clusters is slightly, but all of these clusters is apparently orient to sustainable development security and new fuel kinds researches. Huge meaning affords a science institution and waste, who can use how fuel, intended energy production. Countries unify general principle – extensive biomass resort is close-knit with rural territories development incentive, because in these territories can create new work places, who be commit less qualification village peoples. That lets achieve maximum benefit in country economy, because complex solves economic and social problems in this vulnerable regions.

Biomass clusters structure

Biomass clusters by his structure is similar to other clusters, because cluster made basic and supportive elements, who can be oriented to local or foreign market needs appeasement. Mostly biomass clusters involve raw produce, resort and mechanism create ranges. Discernible wide collaboration with scientific institutions, when she suggests innovations in the sector, so more enhance cluster to create benefit for cluster companies and society.

Observable divers biomass cluster modifications, however widely common this structure, when biomass cluster made four elements (Ministry of Economy of the Republic of Lithuania, 2012):

1. Wood biomass source;
2. Biomass producers (wood granule, briquet)‘
3. Market, who use biomass;

4. All elements should be sited near each other.

It is important that the emerging biomass heat sector be efficient and competitive from the beginning. Transportation is a key component of a biomass project, and projects with long transportation distances increase risk and lower the chances of getting built. By grouping projects together and lowering transportation costs, projects are more resilient to rising fossil fuel prices. The cluster strategy will create more attractive investment opportunities and ultimately improve forest health, create local jobs and help rural communities be more energy independent (U.S. Department of the interior, 2012).

Cluster involves all business chain, which main parts are raw materials supply and resort. Basic cluster plus is it that cluster can work in a local environment, but separate cluster products can supply other regions or countries.

Cluster market, who use biomass, asserts in various aspects. If usable heat, market is local – generally it a town or town type locality. If usual or cogeneration manner produces electricity, the market can develop from country to foreign markets, because the electricity supply wide hereupon situated country residents demand.

Herewith biomass clusters occasion, often geographical position is not necessary, because biomass are easily transported material. Also biomass equipment producers dispensable be in separate regions, because both equipment installation and observation can do expeditiously. However, on purpose a profitability and appreciate other objective cases (biogas and their components resort in locally) need try, that basic biomass raw centers will be wherewith locally cluster core.

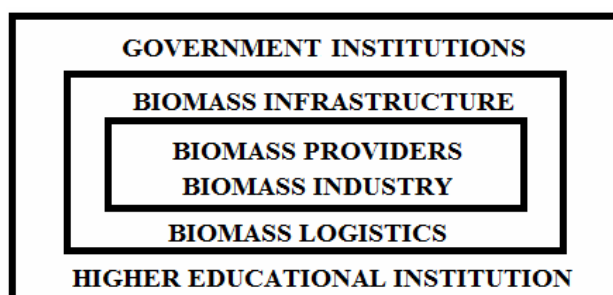


Fig. 1 Simplified biomass cluster structure

Biomass cluster core is biomass providers and biomass industry subjects – biomass cauldron, equipment producers, construction and exploitation subjects. Second layer operate service structures – infrastructure concerned with the necessary electricity transmission system, also biomass logistics companies. Policy dictates government institutions, and higher education institution's purpose – search more effective cluster work ways, enrich him innovations.

Alternative energy using tendency, biomass resort and with this process concerned researches are increasing. Scientists exclude substantial ranges, which concerned with basic biomass researches objects.

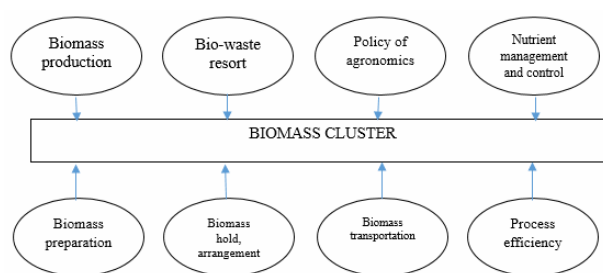


Fig. 2 Fundamental biomass clusters research areas

Noticeably, that scientific research ranges give a synergy effects formation basis, because biomass cluster can help solve problems, concerned with biomass and waste resort. Herewith cluster can help form an agricultural policy – there, where farming is insufficient explicate, or him disturb geographic circumstances, can rear energetic plants, intended heat and making electricity.

Biomass clusters relation with other clusters is sufficiently versatile. Basic energy clusters purpose – provide regions and countries necessary energy amount, who later usable home or business purposes. Energy clusters difference the fuel type – can dominate fossil fuel or renewable fuel using clusters, also their supply structures.

Biomass cluster is sufficiently versatile structure, inclusive different fuel kind, which generally is waste form and exist in every country. Active cluster obtains various synergy effects, which feel that own cluster, that his partners and working environment. In this instance biomass clusters perform clearly social function – promote at environment clean and use already needless resources. However exist and other benefit forms, which create synergy effects and economic avail.

Clusterization processes synergies effects in biomass clusters

Synergies effects in biomass clusters are more wide nor ordinarily, because biomass cluster can essentially replace both several region and all country economy, seeing that cumulative energetic independence emerge opportunity finance, committed energy import, invest other purposes. Companies, involved in cluster, also feel the large financial benefit, because they involved one of the most underlying business – energetic business, - which necessarily warrant other business functions.

When creating various type clusters always desirable tangible benefits, who show growing profitability and customer's amount. Clusterization also help achieve other goals – affect company culture, enrich her modern management solutions. Discernible this cluster affords benefit their members (Skaržauskienė, Gudelytė, Lančinskienė, 2014):

- When operate together, cluster companies have more opportunities, enhance productivity nor operate individually;
- Clusterization assist enhance no one company, but all sector competitive abilities;
- Together with entrepreneur perception, create opening for innovations.

Milgrom and Roberts (1995), reference „grid“ and „supermodular“ theories indicated, that some organizations works is given connect, add each other and enhance either input, a obtain synergy effect. Cluster is good environment achieve synergies effects, because clusters purpose is achieved more value added creation when coordinate several companies work.

In common meaning, synergy effect can evidence various forms. Mostly prevalent – linear effect – it is a synergy, resultant from additional or wide resort phenomenon. Also not a few scientists attention attained newly emergent characteristic phenomenon, when several parts, collaborate to whole, have a new, theretofore lack characteristics. In management context, relevant is functional addition, synergy, often encrust with newly emergent characteristics (several parts, in function add each other create much more effect); functional convergence (work-sharing, to treat market than whole); risk and costs division, information division (Kvedaravičius, Narbutienė, 2005).

Main synergies effects in biomass clusters relate to diversified increase, inclusive separate activity direction. Diversify increase strategy essence – business company work amount increase and financial result betterment, when enhance strategic business work number, when nearby works reclamation new works or redistribute resources between available business works and new reclamation (Gargasas. Mūgienė, 2012). In biomass cluster case synergy available then, when increase both wood and biologic waste adaptation to heat and electricity. Herewith pending country burning problems, as waste arrangement and environmental condition amendment. Hereupon be resource redistribution from the pollution energy production of renewable resources maintain energetic, grow energetic independence.

Diversify increase strategy can be (Gargasas. Mūgienė, 2012):

- Concentric, when business company tries for better final result, assimilate new business activities, near available by using resources and technologies, with an eye to the synergy effect of business activities industrial elements adjustment;
- Horizontal, when assimilate new business activities, near available by market segments and marketing system, with an eye to the synergy effect of business activities marketing elements adjustment;
- Conglomeratic, when assimilate new business activities, which devoid connection with available business activities, and doubt clear synergy effect.

Biomass clusters help create synergy then, when use all basic cluster raw resources, and nor remain a waste. Basic biomass cluster advantage in economy concerned with the disused waste resort. Expendable agricultural wastes help solves impurity problems, safe surface-water resources. Herewith synergy display, then, when try connecting various subjects types. If development is sustainable, then achieve environmental gain, which increase clusters create synergy effects influence of country, regions and clusters members

When explore the cluster synergy effects, be particularly important exclude productivity increase factor. Because cluster members are oriented to one purpose and activity opportunities they find in concentrate, productivity increase equally and coherently, because the workload and order allocate equally between cluster members. Meanwhile, when increase competitive, that increase company's income and importance in sector.

Everybody business structure innovations play an important role, because they help business survive competitive. Clusters help achieve more value added creation, when underway available activity. Organizations business models interneccine collaboration can contribute in their innovation growth, and this formation and encourage new integrated worth create, synergy effect extraction and better competitive (Kunderis, Jucevičius, 2013). Instance synergy help cheapen innovation installation costs, herewith apply her wide clients circle, connecting companies, which participate cluster, customer segments. Innovation costs can cheapen, because more companies develop same innovations, and that help both cheapen innovation costs and enlist new customers, who emerged when cluster companies coalesce to one formation.

Clusters gain is not only economic, but can promote at social partners create benefit. Financial and technological cluster member's success contribute at community interest's appeasement: incomes, additional work places, social welfare create and general economic growth, which is upper nor non-clusterization regions (Bernat, 1999). Clusters can help include more number of various qualified representatives, who can use their knowledge and resources general welfare growth. When economic situation is ameliorative, additional finance, receive from taxes can invest to infrastructure amendment and other implements, who help amendment social situation.

Working in cluster often backed-up synergy effect seek logic. Companies, which collaborate to cluster have better opportunities achieve resources expendable and basic business knowledge exchange efficiency.

Exist and other types synergies effects. One of there is spill-over: even then, when this activity is not separate, business in cluster often affords an indirect benefit from marketing and resource development costs, receive in related business (Kvedaravičius, Narbutienė, 2005).

Namely synergies effects expression and assumption get a synergies effects perceptible how substantial feature, illustrative developmental and advance processes all modern society living areas (Melnikas, 2013).

Systematize synergies effects, who is in biomass clusters, can invoke several factors, which operate different subjects, who is together closely concerned.

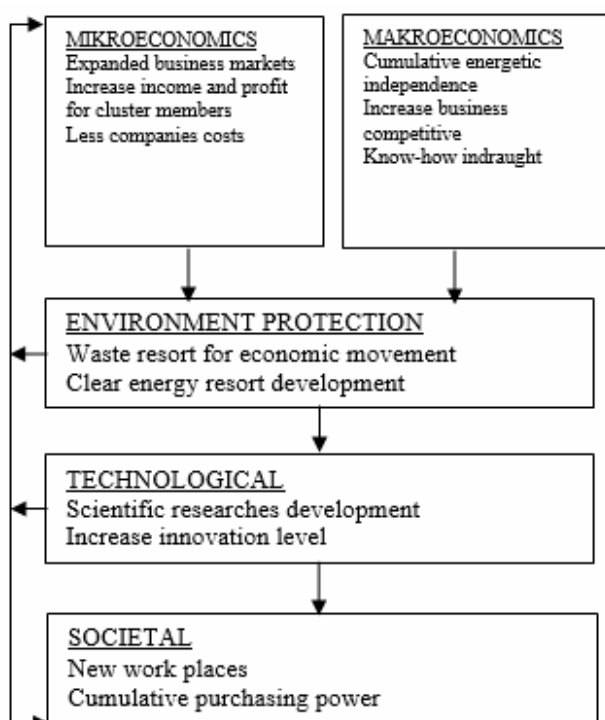


Fig. 3 Biomass cluster synergies effects

Most synergies effects group involve with economic factors. Cluster creates more economic gain both cluster members, country and society. Near economy effect apparent environment protection effect – from waste available ecologic energy, who expendable general energy demand supply. With the view efficiently energy production, which and get moreover economic gain strives to grow innovations amount, then underway scientific researches and create novelties. All factors together increase new work places creation and increase country citizens purchasing power.

Biomass cluster is comprehensively useful for the country, because not only solve economic and social countries' problems, but help companies create a stable and competitive system, who provide stable incomes and herewith contributory at new global trends – sustainable development incentive. In the future cluster activity can develop, because will emerge opportunities better use biomass and biologic waste. Herewith will grow research divisions, which create innovations for business.

Conclusions

This research indicate, that biomass clusters synergies effects is closely concerned each other and help create complex benefit for cluster members and society. Analysis indicate, that economic factors make most synergies effects, because of their come environment protection, technological, societal solutions, who assist biomass cluster success and creates more value added. Biomass clusters synergies effects significantly concerned with ranges, who is objects of scientific researches, because researches encourage more effectively resources resort, herewith enhance synergies effects plenty. Synergies effects can be concerned also with new business activities development, and marketing solutions it lets expand the available benefint amount and

achieve more economic gain when doing current processes. Biomass cluster model made considering to environmental influence – this is a local model, who influence do government institutions, and it strengthens new scientific discoveries, who help achieve work effectively. Cluster activity is more rational than, when cluster operates in a local environment, when not be large biomass transportation and logistic costs. Made synergies effects scheme lets highlight biomass clusters creative advantage both business companies and country, herewith cluster form opportunities develop science and business collaboration.

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