Results of Ketso Workshop in Lithuania 2018

Date of workshop: 6th September 2018

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Title of the workshop / Words for the centrepiece:
Lithuanian Bioeconomy and the Role of Wood Construction

Aims of the workshop:
Map Strengths, Opportunities, Challenges and Solution to strengthen the role of wood in the Lithuanian Bioeconomy. Develop a Roadmap.

Nature and number of participants:
3 groups, ca 5-6 persons per group

B.A.S.I.C.S. - **A**ctivities

Legend:
Brown – What works well? Define strengths of the Lithuanian Bioeconomy
Green – Future possibilities: How and where could the Lithuanian Bioeconomy grow?
Grey - Challenges and barriers: what is hindering growth wood use?
Green – Solutions to challenges
Yellow – Goals and next steps: Who and how can changes be made?
White cards: comments / questions

B.A.**S**.I.C.S. - **S**equencing

11:00-11:10	Method explanation (5 min), separation into groups (depending on number of participants)
11:10-11:35	What works well? (brown): 5 min silent, then share and note down/arrange)
11:35-12:00	Future possibilities – green
12:00-12:30	Challenges and barriers (grey) And solutions (green)
12:30-12:45	Goals and next steps – yellow
12:45- 13:00	SUMMARY and report back per group

B.A.S.**I**.C.S. - **I**nputs

Branches:
Investment 2, International Cooperation, (More ecological production processes & machines), Energy, Educated work force, Competitive industry, Research and application, Good Market/New Market for Biomass, Location & Lithuania,
Bioenergy, Biomass Resources, (Innovations 2), Technical standards, (Good Environment in Investments/Tax reduction in in investments & research), Legal-Governance/Policy, Education and know how, Construction, Governance
Outreach-Media/Public opinion, Society, Raw material, Innovation 1, Industry, Investment 1, Forest Resources, Public perception/policy, Markets

B.A.S.I.**C**.**S**. - **C**onclusions

Lithuania has available forest resources to support Lithuanian bioeconomy sector. Yet, lack

of dialog between wood industry, forestry sector, politicians and society limits its development. Cooperation of science and industry in development of new innovative products would create new possibilities. The main remaining goals are education of society via media, and search for the investments to promote Lithuanian bioeconomy.

1. Background of the workshop and goals

"Lithuania has forest resources and a strong forest industry – How can the local wood construction sector help pave the way for a strong bioeconomy? "

Mitigation of climate change, carbon sequestration and low carbon economy are some of the corner stones of the European bioeconomy strategy. In recent years, wood has gained increased interest and also become more visible in several cities throughout Europe. This may have a positive impact on climate targets, as studies suggest that building with wood can cut the production emissions by a third compared to a conventional concrete building.

Lithuania has sufficient forest resources and a competitive wood industry, and more than 20% of annual harvest level is exported. Also, Lithuania exports about 80% of glue laminated timber for wooden constructions and wooden houses, using only 20% for national house construction. Because of this, Lithuania losses possibility to develop its low carbon economy based on high value added products.

In order to change the present situation, the current status of the Lithuanian construction sector and bioeconomy needs to discussed and the untapped potentials unveiled. For example, during the Soviet times, many block houses were built in Lithuania for local residents. The life span of these houses is about 50 years and a large share of these houses is already beyond it. Construction of wooden houses could be a part of solution to replace these buildings with comfortable living space while contributing to the bioeconomy goals.

Thus the main goal of this study was to promote Lithuanian Bioeconomy sector by clarifying main strengths, possibilities, challenges and barriers as well as who and how have to implement the changes.

Method (sequencing)

2.1 Participants and groups

To clarify the present situation of Lithuanian Bioeconomy as well as its future development possibilities, the stakeholders' workshop was organized in May of 2018. Stakeholders, representing wood industry, reinforced concrete industry, policymakers, science, environment and house construction sector, were invited. Invitations were sent by e-mails. Also some persons were invited personally, by calling them. Totally, about twenty stakeholders participated in the discussion.

During the first hours, stakeholders had a chance to get more familiar with the ERANET Sumforest project "Bench value" and its main achievements. Next, the workshop and discussions regarding Lithuanian bio-economy were started. To have better organized and more straight forward oriented discussions the KETSO method (described in next chapter) was used.

For this purpose, all the stakeholders were divided into three more or less equal numbered groups. It was taken into account that in each group representatives from different stakeholder groups would be represented. Totally about five to six people were assigned to each group.

Before starting the discussion and work on the topic, all the stakeholders were clearly informed about the KETSO method and all its peculiarities.

2.2 Ketso method

Ketso method is based on learning by doing, and stimulates the outcomes trough the interaction (Kolb, 1984). It is also involves creative thinking and mind mapping methods. The Ketso workshop process uses the analogy of a tree. The trunk becomes the main focus of the workshop and the branches are themes associated with the main focus. Individuals have to identify issues independently. Further these issues are noted down and grouped as sets of common ideas during the course of the group discussion. Themes are inductively derived by the participants during the group discussion (McIntosh & Cockburn-Wootten, 2016).

The questions to guide the workshop process are asked. Four key questions guide the workshop and are aligned to color-coded re-usable plastic leaves. The participants have to write their answers on the leaves placing them on a relevant theme/branch of the tree, which they think represents the leaf's point. The color codes relate to the questions and to the analogy of the growth of the tree. The first question (brown leaf), is related to the soil; what is currently happening that is good and should be continued? The second question (green leaf) relates to growth; what would you like to see grow/what could be done to build upon what currently exists? The third question relates to grey skies (grey leaf); what are the barriers to achieving growth? Usually only one or two grey leaves are given to the participants. The fourth question relates to the sun coming out; what are the future solutions? The questions allow participants time to develop their ideas before sharing them.

Visually, Ketso allows participants to see areas of the greatest barriers (i.e. most grey leaves) and, most importantly, the greatest development and growth potential (most green and yellow leaves). Instant visualization allows participants to explore meaning and perceptions of their key ideas. (McIntosh & Cockburn-Wootten, 2016).

Ideas are generated from the ground up, starting with each participant, then opening the discussion up to all participants in the workshop in a way that is not leading and which levels power inequalities. Due to the questioning process and theming of ideas, the toolkit enables valuable conversations to be had and complex problems to be discussed. In conclusion, the Ketso toolkit contributes a new effective participatory method for co-created knowledge between researchers, stakeholders and the wider community.

Thus, following KETSO method, during the Lithuania workshop each group responded to the following questions, that made the leaf types of the branch:

1. Brown – What works well? Define strengths of the Lithuanian bioeconomy
2. Green – Future possibilities: How and where could the Lithuanian bioeconomy grow?

3. Grey - Challenges and barriers: what is hindering growth wood use?
4. Yellow – Goals and next steps: Who and how can changes be made?

For each question the participants needed about 20 minutes to come to their common understanding on the topic at hand.

2. Results per group

2.1. Group 1:

2.1.1. Branches

The main branches identified by Group 1 were as follows: *Forest resources*, *Public perception*, *Investments*, *Innovation*, *Construction*, *Markets* and *Energy*. All the defined branches and also other KETSO results are visualized in Figure 1.

Figure 1. Photo representing KETSO results of group 1.

2.1.2. Per Activity:

Results, by producing ideas for each branch identify very productive discussions (Figure 2).

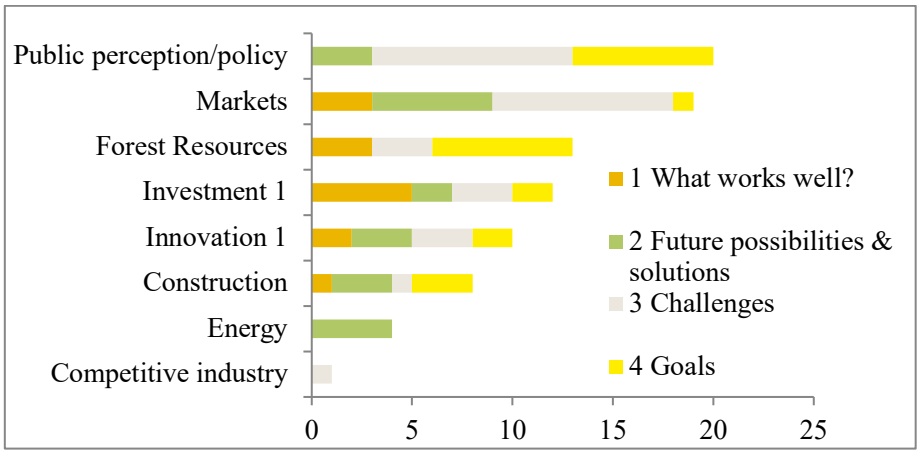

Figure 2. Produced ideas by branch, Group 1.

For each branch, quite many ideas were related with issues, mainly related to investments and markets that work well (up to 5 for each branch). Yet, much more challenges were identified that appear in each branch (up to 10). Stakeholders also identified comparably high number of future possibilities (up to 5) and goals that have to be reached (up to 6).

For example, for *Forest resources branch*, the main strength accumulated forest resources and large timber harvest were identified. Yet, usage of forest resources is limited by international and national legal restrictions. Yet, cooperation between science and industry can help to move forward on this issue.

For the branch *Public perception*, the main challenges were identified as Bureaucracy, NGOs and not adequate political solutions. Yet, clear bioeconomy strategy could overcome these problems.

For the branch *Investments*, the main strength was identified as European funds and competitive and cheap work force. These create possibilities for increased sawmilling and wood gluing industries. Yet, here comes the main challenges: lack of will to invest due to companies' internal strategies and the lack of international standards for cost moderation. According to stakeholders, scientific initiatives or lobbying would help to solve these issues.

The branch *Innovation* has the following strengths: human capacity and support from forest-oriented industry. It creates possibilities to make innovative composite materials, cascade use of wood, develop and export technologies. However, youth emigration, limited cooperation between science and industry, competition from steel, plastic and concrete sectors hinders the innovation. The following inhibitors could be managed by promoting scientific investments, by decreasing modern products' prices or by joint ventures between concrete and wood sectors.

For the branch *Construction* no strengths were identified. Yet, many possibilities like increase in wooden constructions, building residential buildings, public wooden buildings, building with wood were named. Yet, planning at municipality level is still the main challenge and barrier that could be reduced by promotion of use of wood for the construction.

For the branch *Markets*, many strengths (export markets, glulam, close to markets, foreign markets) and possibilities (clean end production, Increased certification, export of wooden prebuilt houses to the Nordic countries, improve trade balance, Increased degree of refinement and people are

becoming richer). However, many challenges were clarified as well, mainly related with strength of carbon based industry, wood exports, shadow economy, competition from concrete industry, competition between different industry sectors, access to the bioproducts technologies and markets, investments abroad require feedstock. No clear answer was given who and how should help to deal with challenges. It is believed that natural market development maybe will be a solution.

For the branch *Energy*, stakeholders from the first group identified only following possibilities like replace fossil energy with biomass, green energy, energy plantations, and increased use of country residuals. No strengths, challenges or who and how were named.

2.1.3. Noteworthy observations

To summarize, according to the Group 1, the main strength of Lithuanian bioeconomy are available forest resources, as well as cheap and skilled labor force, close markets and available EU funds. Contrary, bureaucracy, planning at the municipality level, also other political solutions are the main challenges. Scientific capacity also cooperation between science and industry seems to create the main possibilities.

2.2. Group 2:

2.2.1. Branches

The main branches identified by Group 2 were as follows: *Educated work force*, *Legal governance*, *Policy*, *Research and application*, *Innovations*, *Bioenergy*, *Biomass Resources*, *Good new markets for biomass*, *Location of Lithuania*, *Competitive industry*, *Outreach media and public opinion*, *International cooperation and technical standard* (Figure 3).

Figure 3. Photo representing KETSO results of group 2.

2.2.2. Per Activity:

Number of produced ideas for each branch by Group 2 is visualized in Figure 4. Stakeholders in this group mainly focused on identifying what works well. Also comparably many ideas related with future possibilities were listed as well. Yet, this group identified comparably low number ideas related with challenges. Little bit more ideas were listed for branches that are related with goals.

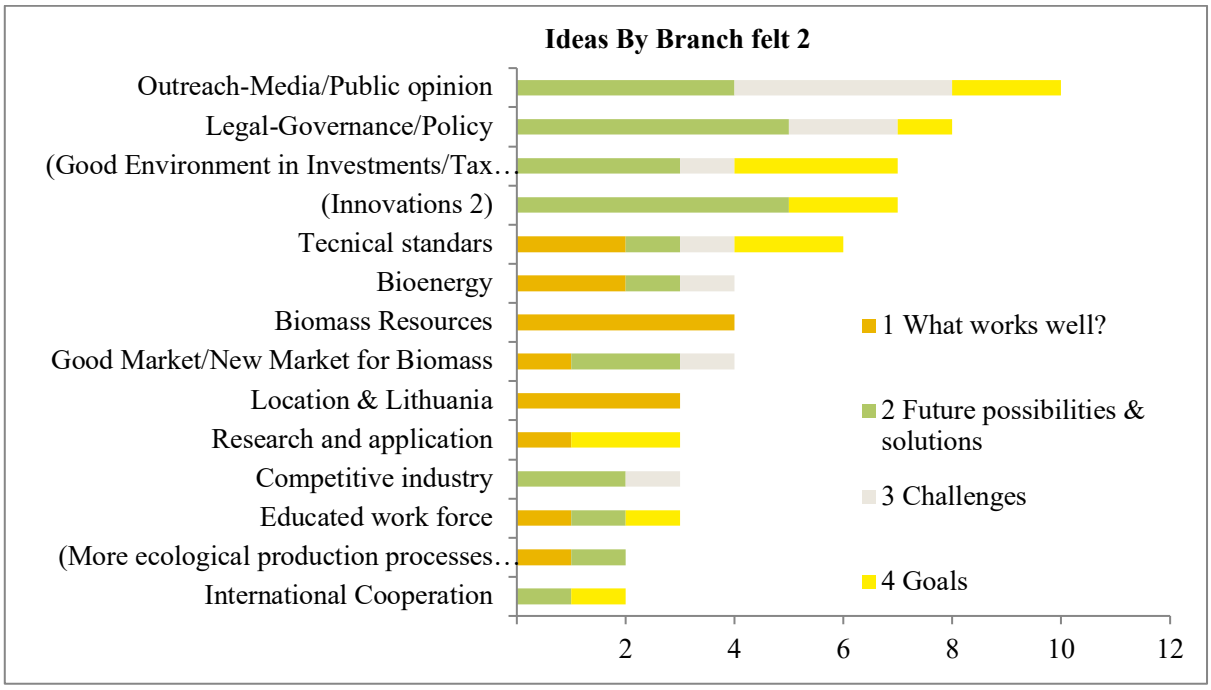

Figure 4. Produced ideas by branch, Group 2.

For the branch *Educated work force*, educated work force willing to work was noted. Also, stakeholders saw the potential in education and support at governmental level and change of programs at universities. The main challenge that architects and engineers do not have enough knowledge about designing wooden buildings was identified for this branch. Future goals are related to architects' education in wood construction and a propaganda promoting green buildings.

For the branch *Legal-Governance/Policy* no present strengths were listed. Yet, potentials relate to better political decisions, bounding certification schemes and good learning base. Weak cooperation between forestry and wood industry and bad governance as well as no policy official support were identified as the main threat for this branch. The main goal for this branch was identified as ministry of environment has to give more attention to governance and wood usage.

The main strength of *Research and application* branch is related to research on bioeconomy are done also practice works with science on these questions. Stakeholders did not mention any challenges or future possibilities. Yet, the following main goals are related to implementation of more projects that involve science and industry and to change legal basis to be more suitable for bio products.

Also, no strengths were mentioned for *Innovation branch*. Yet, the following possibilities were identified: forestry sector and wood industry should cooperate better, new innovative products, climate friendly forestry, investments to new technologies were mentioned. Future goals were related to more investments in new products, tax free for 5 years to produce new products. For this branch no challenges that would hinder branch development were identified.

Two strengths for the *Bioenergy* branch were identified: using biofuel in heating systems and biofuel use becomes more popular. Possibilities for this branch are related to the better involvement

of forestry and forest industry sector. The main challenge of this branch is that in bio application, forestry sector in it is not as a priority.

For the branch *Biomass resources* only strengths, mainly related to the availability of forest resources were listed.

For the branch *Good new markets for biomass* as the main strength was named presently good possibilities for the biomass usage. Yet, the main challenge is related to the higher prices of bio products. Stakeholders also stated as the main opportunity to produce more bio products and make them cheaper. No challenges or goals were listed by stakeholders.

For the branch *Location of Lithuania* only strengths related with geographical location were named by the stakeholders. No possibilities, challenges or goals were listed for this branch.

For the branch *Competitive industry* as the main strength dynamic or adaptive industry was identified. Yet, the following challenges were listed as well: to increase capacities of production and strong competitors in non-bio economic sector. Further possibilities for this branch, according to stakeholders, should create bigger finance support from the government. No further goals were listed for this branch.

For the branch *Outreach media and public opinion* the main strength is started theoretical and practical discussions. Yet, some barriers like negative public opinion, perception of wood constructions, still negative society opinion about the forest cuttings. Yet, future possibilities should provide more information for society about bioeconomy, wooden constructions, biofuel and biomass benefits. Future goals are related with following: public media could solve society information problem, also, to promote bioeconomy by doing advertisements and promotional campaigns in national medias.

For the branch *International cooperation* stakeholders listed following possibility: cooperate with foreign experts and learn from them. This creates the following goal to create the international network of expert and politicians.

For the branch *Technical standard* the main strength was listed existing technical standards. The main possibility was named as advertisement and education about forest cuttings to overcome the main challenge still negative opinion about forest cuttings.

2.2.3. Noteworthy observations

Stakeholders from the second group identified some key messages. The main strength of Lithuanian bioeconomy is related to educated work force, willing to work, research on bio economy, dynamic or adaptive industry. Yet, there are also some important barriers related Weak cooperation between forestry and wood industry and bad governance as well as no policy official support. Also, architects and engineers do not have enough knowledge was identified for this branch. The main possibilities lie in forestry sector and wood industry cooperation, new innovative

products, climate friendly forestry, investments to the new technologies. Future goals are related with education of society via national media channels.

2.3. Group 3:

2.3.1. Branches

The main branches identified by Group 3 were: *Industry*, *Education and Know how*, *Governance*, *Society*, *Investment*, *Markets*, and *Raw materials* (Figure 5).

Figure 5. Photo representing KETSO results of group 3.

2.3.2. Per Activity:

Number of produced ideas for each branch by Group 3 is visualized in Figure 6. Stakeholders in this group mainly focused on identifying what works well. Most of the ideas, related with strength appeared for raw material and industry branches. Also, comparably many ideas related with future possibilities were listed as well, mainly for *Society*, *Raw material* and *Education and know how* branches. Comparably low amount of challenges and goals were named for all branches.

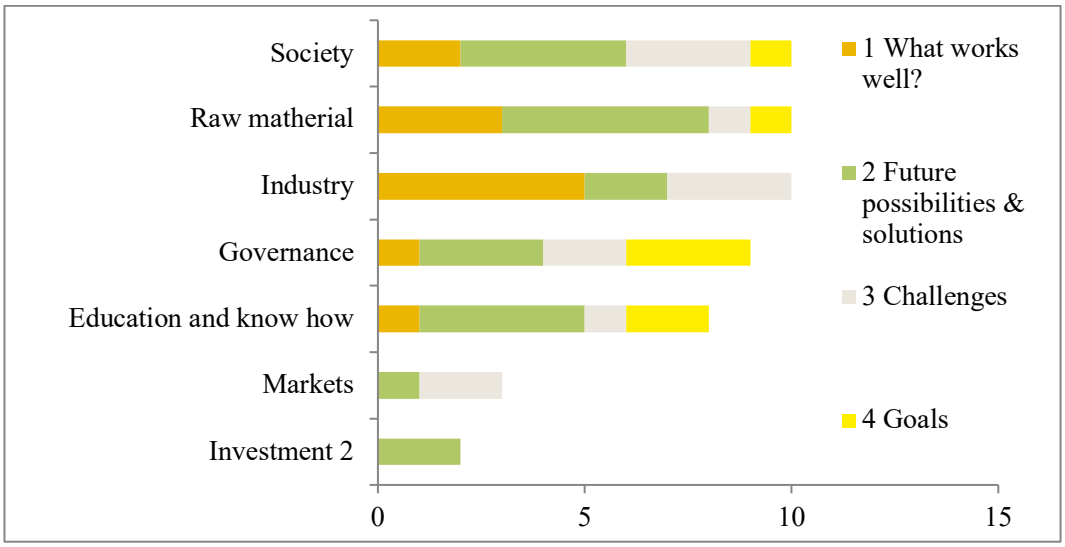

Figure 6. Produced ideas by branch, Group 3.

For the branch *Industry*, multiple sector application, furniture and biomass sectors were identified as the main strengths. Also, stakeholders identified following possibilities: resource efficiency and reuse, easy to use tools for the assessment of the environmental impact and wider building assessment schemes. The main challenges still remain use of small diameter round wood and increased automation and modernization. Yet, stakeholders did not identify who should do it.

Education and Know how branch has one strength in Lithuania – it is the good education system for foresters. Innovative solutions, also easy to use tools for practitioners are the main possibilities for this branch. Only one challenge was named – lack of human resources in the same sector. According to stakeholders, this challenge could be solved by improving education in schools and universities on bioeconomy issues.

Governance branch has green public procurement as the main strength. Further possibilities for this branch are review of wood building regulations, and policy development. Yet, tendency of non-cooperation of state forests by ignoring wood industry was identified as the main challenge and barrier. According to stakeholders, fast communication across industries, initiatives for domestic markets, bioeconomy strategy are the main goals for this branch.

For the branch *Society*, jobs and potentially new jobs was identified as the main strengths. This branch also has comparably high number of possibilities: media building, promoting wood energy usage, increased ecological awareness of society. Yet, there are also many challenges for this branch: public perception, public opinion, traditions in building, why wood is better if it costs more? The main goal to response to these challenges is to inform (or educate) society about benefits from bioeconomy.

The branch *Investments*, according to stakeholders has only possibilities like infrastructure and basic wood processing modernization and expansion. No strengths, challenges or goals were identified.

For the branch *Markets* the main possibility according to stakeholders was additional markets to export wood products. Yet, to do so, the following challenges has to be solved like high competing prices or entry into globalized markets. No strengths or goals were named.

For the branch *Raw materials* the availability of Lithuanian forest resources was identified as the main strength. This creates further possibilities: usage of renewable energy sources, raw material availability and its fair price, biofuel, usage of new technologies. Yet, some challenges can appear in processing of fuel resources due to lacking knowledge and infrastructure. In order to better utilize forest resources, the main goal to increase annual harvest rate up to 70% of annual increment has to be set. It is accepted that sustainable harvest level should not be higher than 100% of annual increment.

2.3.3. Noteworthy observations

According to the stakeholders from the third group, the main strength of the Lithuanian bioeconomy is available forest resources, good education system and access to markets. Yet, a tendency of non-cooperation of state forests with wood industry, public perception, public opinion and traditions in building, why wood is better if it costs more were identified as the main challenges and barriers. Resource efficiency and reuse, wider use of sustainable/green building assessment schemes, review of wood building regulations are the main opportunities. According to stakeholders, fast communication across industries, initiatives for domestic markets, bioeconomy strategy are the main goals for this branch.

3.4 Combined results from all groups

During the stakeholder day 205 ideas in total were developed in three groups, meaning on average 10 ideas per stakeholder. The first group of stakeholders produced the most number of challenges (29) and goals (22), yet the second group produced most ideas for possibilities (26) and the third group focused more on possibilities (21) as well (Figure 7).

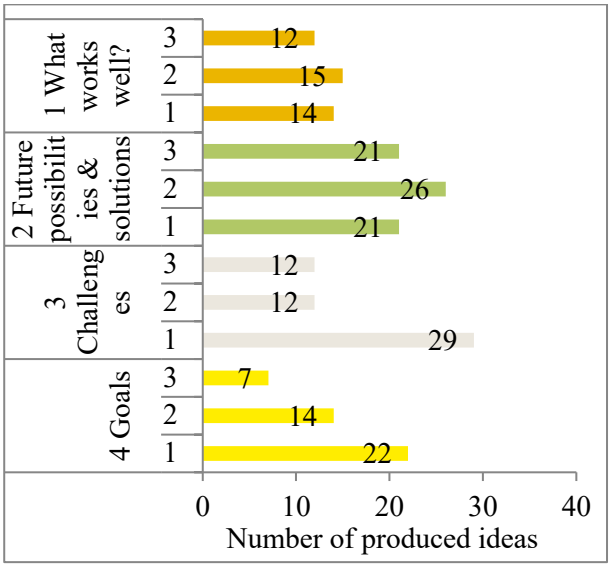

Figure 7. Number of produced ideas by leaf type for all four categories.

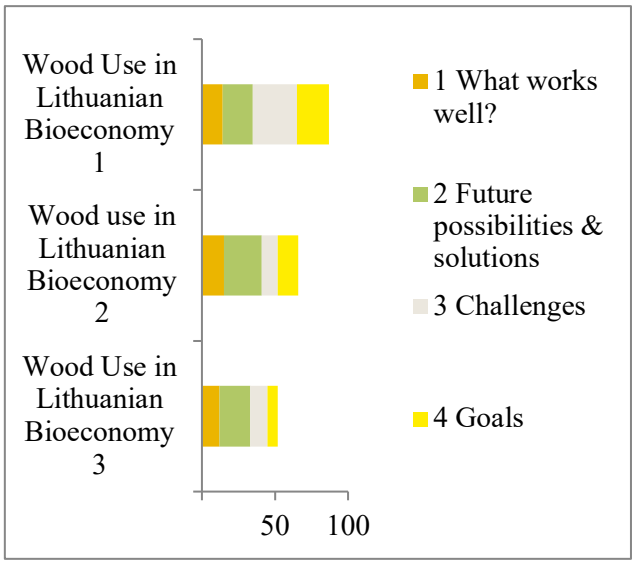

Figure 8. Total number of produced ideas by each group.

Most of the ideas (22), stakeholders produsedfor the branch Markets. In contrast, the lowest number of the ideas was produced for the branches *Location of Lithuania*, *International cooperation* and *Ecological production processes* (Figure 9).

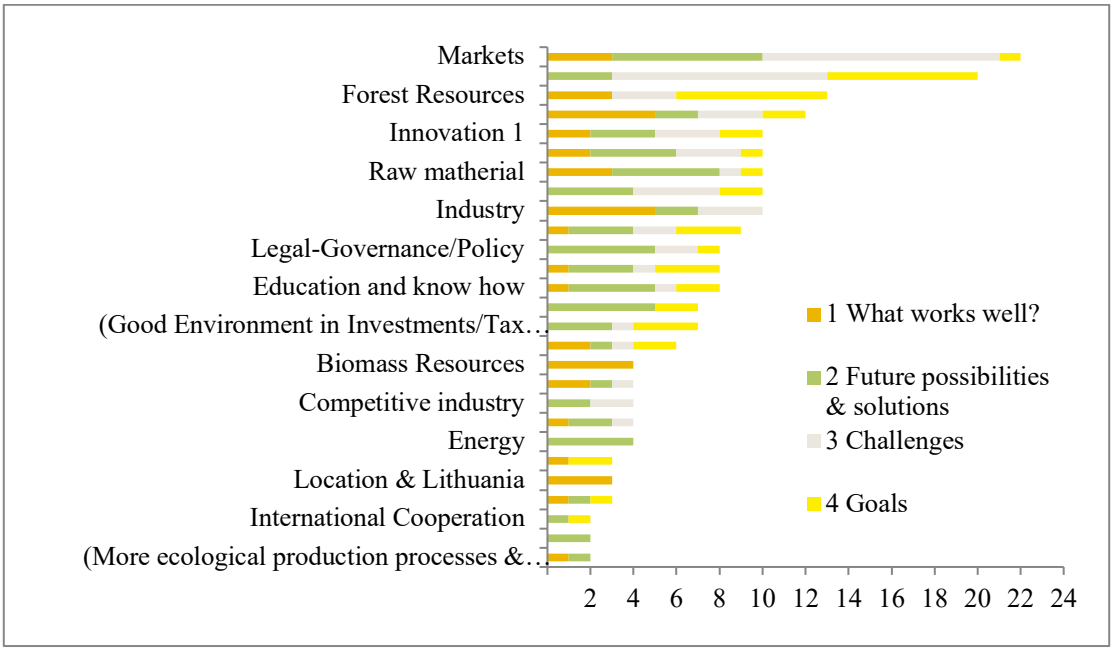

Figure 9. Total number of ideas produced per branch.

Figure 10 summarizes all the ideas produced by each branch regarding the leaf type. According to it, most ideas regarding what works well, were produced for Investments, Industry, Biomass resources and Forest resources branches.

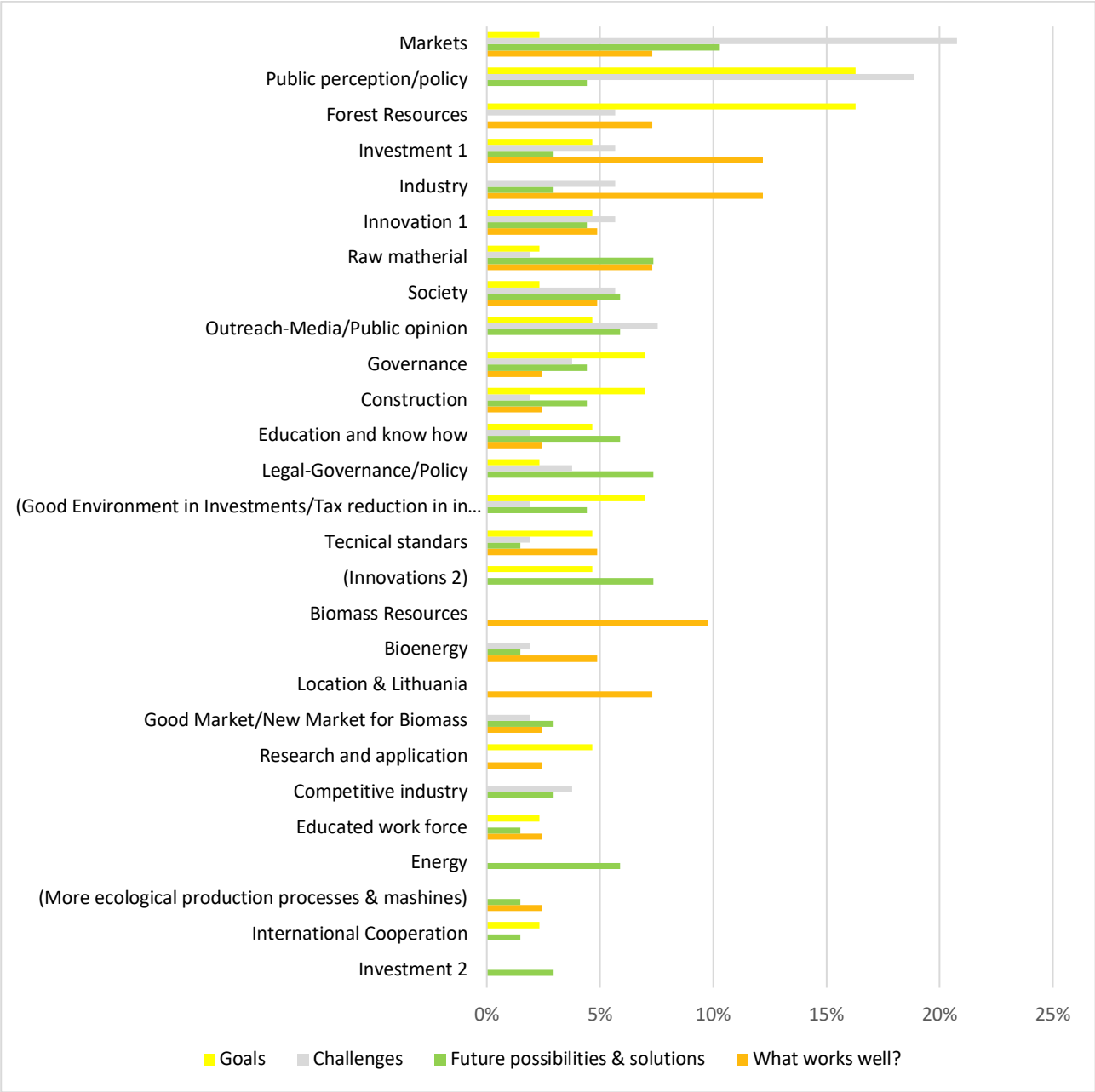

Figure 10. Overview of all ideas for all branches and leaf types.

In contrast, most of the ideas regarding challenges were produced to for Markets, Public perception/policy, Investments and innovations. Most ideas regarding possibilities were found for the branches Markets, Innovations, Legal governance, Education, and Raw material. Most of the goals were related to Public perception /policy, Forest resources, Governance and Construction branches.

Full list of the ideas regarding leaf types and branches is presented in Appendix I.

3. Conclusions

3.1. Reoccurring elements between the groups

Strengths

1. Available forest resources
2. Available biofuel and biomass resources
3. Cheap and skilled labour force
4. Good education system
5. Available export markets within short distance (Poland, Latvia, Belarus, Russia directly by land; Finland, Sweden, Denmark, Germany by sea)

Possibilities

1. Increased sawmilling and wood gluing industries
2. Cooperation between science and industry
3. Review of wood building regulations
4. New innovative products
5. Decrease of modern product price or joint ventures between concrete and wood sectors

Challenges

1. Bureaucracy, planning at the municipality level, also other political solutions
2. Bad cooperation between forestry and wood industry
3. Architects and engineers do not have enough knowledge for the wooden constructions
4. Strong competitors in non bioeconomy sector

Goals

1. Education of society via national media channels on bioeconomy, forestry and sustainability
2. Fast communication across industries
3. More investments to the new wood-based products
4. Lobbying for Lithuanian investments

3.2. conflicting messages per group and between the groups

3.2.1 Group 1

1. Joint ventures between concrete VS wood and competition from concrete industry, Competition from steel plastic, concrete, Competition between different industry sectors
2. Science and industry limited cooperation VS Cooperation between science and industry
3. Political decisions to use 80-90% of wood annual increment VS Bureaucracy, NGO, Political solutions
4. Lobbying for increase cutting VS Lack on know-how on using public management
5. Public distrust of science VS Scientific initiatives
6. Youth emigration VS Competitive work force , Human capacity, Cheap work force

3.2.2 Group 2

1. Educated resource potential, Good learning base VS Change programs in universities, education and support in governmental level, more education and propaganda.
2. Smart specialisation-forestry sector is not in it as priority VS Political positive decisions.
3. It will be more biomass products, may be it will be possible to produce it for lover price VS Bigger prices for bio products.
4. Bioeconomy speciality at universities VS Lot of research on bioeconomy.
5. No official policy support VS Political positive decisions.
6. Increase composition of production VS Increase composition of production, mixed material construction.
7. Public opinion negative to innovations VS Bigger financial support from government, Increase composition of production.

3.2.3 Group 3

1. Good education system for foresters VS Lack of human resources in same sector.
1. Additional markets to export wood products VS Globalized markets*,* Initiatives for domestic markets.
2. Mobilize wood resources VS Public opinion, Increased ecological awareness of society.
3. Raw material availability stable and fair price VS Price?, Increase wood harvest up to 70 percent

3.2.4 Between groups

1. Educated resource potential (Group 2), Cheap work force (Group 1) VS Youth emigration (Group 1).
2. Lot of research on bioeconomy, practice work with science (Group 2) VS Science and industry limited cooperation (Group 1).
3. Science and industry limited cooperation (Group 1) VS Lot of research on bioeconomy, practice work with science

3.3. Highlighted messages

Strengths

1. Available forest resources and possibility to increase harvest rates

Challenges

2. Limited cooperation between science and wood industry
3. Limited cooperation between foresters and wood industry
4. Negative public opinion regarding increased harvests
5. Concept of bioeconomy is unknown

Possibilities

1. Available markets
2. Development of new bio based products
3. Development of education system.

Who and how

1. Development of bioeconomy strategy for Lithuania
2. Promote use of wood for the construction in the media, educate society

4. References

McIntosh, A. J., & Cockburn-Wootten, C. 2016. Using Ketso for engaged tourism scholarship. Annals of Tourism Research, 56, 148-151.

D.A.1984. Experiential learning: Experience as the source of learning and development. Prentice Hall, Englewood Cliffs, NJ.

Apendix I. Detailed list of branches, leaf types and ideas.

Branch, Leaf Type, Idea	1 What works well?	2 Future possibilities & solutions	3 Challenges	4 Goals	Grand Total
(Good Environment in Investments/Tax reduction in in investments & research)		**3**	**1**	**3**	**7**
2 Future possibilities & solutions		**3**			**3**
Find more investments for bioeconomy sector		1			1
Invest in technologies and produce final products		1			1
modernisation of furniture and wood processing factories		1			1
3 Challenges			**1**		**1**
Looking for tax reduction and selling non final products			1		1
4 Goals				**3**	**3**
Investment main construction companies				1	1
More investments for new product creations in production sector				1	1
Tax free for at least 5 years for new final products in Bioeconomy producers				1	1
(Innovations 2)		**5**		**2**	**7**
2 Future possibilities & solutions		**5**			**5**
Investments to the new technologies		1			1
Mixed material construction		1			1
modernization of production processes		1			1
new innovative products -climate friendly forestry and agriculture		1			1
Robotization/prefabrication		1			1
4 Goals				**2**	**2**
Ministry of Economy should support innovation wood industry sector				1	1
(blank)				1	1
(More ecological production processes & machines)	**1**	**1**			**2**
1 What works well?	**1**				**1**
Dynamic industry able to export	1				1
2 Future possibilities & solutions		**1**			**1**
Increase in trucks and cars with electric engines		1			1
Bioenergy	**2**	**1**	**1**		**4**
1 What works well?	**2**				**2**
Biofuel use become more popular	1				1
using biofuel in heating systems	1				1
2 Future possibilities & solutions		**1**			**1**
Forestry sector and forest industry should be better involved		1			1
3 Challenges			**1**		**1**
Smart specialization-forestry sector is not in it as a priority			1		1
Biomass Resources	**4**				**4**
1 What works well?	**4**				**4**
A lot of forest resources	1				1

Branch, Leaf Type, Idea	1 What works well?	2 Future possibilities & solutions	3 Challenges	4 Goals	Grand Total
Forest Resources	1				1
Rich in natural resources	1				1
Sufficient resources and materials	1				1
Competitive industry		**2**	**2**		**4**
2 Future possibilities & solutions		**2**			**2**
Bigger finance support from government		1			1
Legal international regulations for support		1			1
3 Challenges			**2**		**2**
Increased competition of production			1		1
Strong competitors in non bioeconomy sector			1		1
Construction	**1**	**3**	**1**	**3**	**8**
1 What works well?	**1**				**1**
Hard to find argument for what works well	1				1
2 Future possibilities & solutions		**3**			**3**
Building wooden homes for living		1			1
Construction sector (building with wood)		1			1
Public Buildings		1			1
3 Challenges			**1**		**1**
Competition from steel, plastics, concrete			1		1
4 Goals				**3**	**3**
Joint ventures between concrete and wood				1	1
Promote use of wood for construction				1	1
Work with other sectors				1	1
Educated work force	**1**	**1**		**1**	**3**
1 What works well?	**1**				**1**
Educated human resources potential	1				1
2 Future possibilities & solutions		**1**			**1**
education and support in governmental level		1			1
4 Goals				**1**	**1**
Bioeconomy specialization in universities				1	1
Education and know how	**1**	**4**	**1**	**2**	**8**
1 What works well?	**1**				**1**
good education system for foresters	1				1
2 Future possibilities & solutions		**4**			**4**
Easy to use tools for assessment of environmental impact		1			1
Innovative solutions R&D		1			1
R&D capacities		1			1
Wider use of building sustainability assessment studies		1			1
3 Challenges			**1**		**1**
Lack of human resources in same sector			1		1
4 Goals				**2**	**2**
education in schools and universities				1	1

Branch, Leaf Type, Idea	1 What works well?	2 Future possibilities & solutions	3 Challenges	4 Goals	Grand Total
foster communication across institutions				1	1
Energy		**4**			**4**
2 Future possibilities & solutions		**4**			**4**
Energy plantations		1			1
Green Energy		1			1
Increase use of cutting residuals		1			1
Replace fossil energy with biomass		1			1
Forest Resources	**3**		**3**	**7**	**13**
1 What works well?	**3**				**3**
Accumulation of bio-resources storage	1				1
Forest resources and management	1				1
Large timber harvest	1				1
3 Challenges			**3**		**3**
(How Paris agreement will be implemented) International legal restrictions			1		1
Agriculture vs Forestry			1		1
lack of know how on using public procurement			1		1
4 Goals				**7**	**7**
Address barriers to wood mobilization				1	1
Cooperation and common interest				1	1
Cooperation between science and industry, society				1	1
Forest-Political decision to use 80-90% of annual increment				1	1
Lobbying for increased cutting				1	1
Promote short value chain-Tax initiative to introduce criteria of CO2 footprint				1	1
Tap into existing legal competence				1	1
Good Market/New Market for Biomass	**1**	**2**	**1**		**4**
1 What works well?	**1**				**1**
Big possibilities for biomass usage	1				1
2 Future possibilities & solutions		**2**			**2**
It will be possible to produce more bio products, maybe it will be possible to do it for lower price		1			1
Market harmonization		1			1
3 Challenges			**1**		**1**
Higher prices of bio products			1		1
Governance	**1**	**3**	**2**	**3**	**9**
1 What works well?	**1**				**1**
Green public procurement	1				1
2 Future possibilities & solutions		**3**			**3**
Amendment of the list of green public procurement criteria		1			1
Policy development		1			1
review of wood buildings regulation (fire safety)		1			1
3 Challenges			**2**		**2**
Criteria SDG's			1		1

Branch, Leaf Type, Idea	1 What works well?	2 Future possibilities & solutions	3 Challenges	4 Goals	Grand Total
State common strategy how to aggregate "worlds"			1		1
4 Goals				**3**	**3**
bioeconomy strategy				1	1
Incentive for domestic markets				1	1
Set main goal! target...				1	1
Industry	**5**	**2**	**3**		**10**
1 What works well?	**5**				**5**
biomass energy sector	1				1
furniture industry	1				1
Multiple sector applications	1				1
Strong industry reach history	1				1
vital strong wood based industry	1				1
2 Future possibilities & solutions		**2**			**2**
Innovations collaboration between science and business		1			1
resources efficiency and reuse		1			1
3 Challenges			**3**		**3**
Increased automation and mechanization			1		1
the risk of incompatibility of interests between different industry sectors			1		1
Use of small diameter round wood			1		1
Innovation 1	**2**	**3**	**3**	**2**	**10**
1 What works well?	**2**				**2**
Human Capacity	1				1
Support from foreign organization	1				1
2 Future possibilities & solutions		**3**			**3**
Cascade use of wood		1			1
Development and export of technologies		1			1
Innovative composite bio-materials		1			1
3 Challenges			**3**		**3**
limited coordination between science and industry			1		1
Support for industry research and development			1		1
Youth Emigration			1		1
4 Goals				**2**	**2**
Decrease of wooden products price				1	1
Scientific initiatives				1	1
International Cooperation		**1**		**1**	**2**
2 Future possibilities & solutions		**1**			**1**
Cooperate with foreign experts and learn from them		1			1
4 Goals				**1**	**1**
To create international network of experts and politics				1	1
Investment 1	**5**	**2**	**3**	**2**	**12**
1 What works well?	**5**				**5**
Cheap working force	1				1

Branch, Leaf Type, Idea	1 What works well?	2 Future possibilities & solutions	3 Challenges	4 Goals	Grand Total
Competitive work force	1				1
European Funds	1				1
Location-Belorussia/Russia	1				1
Untapped forest resources	1				1
2 Future possibilities & solutions		**2**			**2**
Increased sawmilling industry		1			1
Increased wood growing industry		1			1
3 Challenges			**3**		**3**
Company internal strategies			1		1
lack of international standards for construction models			1		1
Will to invest			1		1
4 Goals				**2**	**2**
Lobbying for Lithuanian investments				1	1
Lobbying for wooden homes				1	1
Investment 2		**2**			**2**
2 Future possibilities & solutions		**2**			**2**
Basic wood processing modernization and expansion		1			1
Infrastructure		1			1
Legal-Governance/Policy		**5**	**2**	**1**	**8**
2 Future possibilities & solutions		**5**			**5**
A good legal base		1			1
Building certification schemes		1			1
Political positive decisions		1			1
Should be created common strategies for wood usage		1			1
(blank)		1			1
3 Challenges			**2**		**2**
Bad cooperation between forestry sector and industry, bad governance			1		1
No official policy support			1		1
4 Goals				**1**	**1**
Ministry of Environment should have a strategy for more effective wood resources usage				1	1
Location & Lithuania	**3**				**3**
1 What works well?	**3**				**3**
Big possibilities for biowork usage	1				1
Geographical location of LT	1				1
Increase in practical and theoretical solutions	1				1
Markets	**3**	**7**	**11**	**1**	**22**
1 What works well?	**3**				**3**
Close to Markets	1				1
Export markets-Glulam	1				1
Foreign markets	1				1
2 Future possibilities & solutions		**7**			**7**

Branch, Leaf Type, Idea	1 What works well?	2 Future possibilities & solutions	3 Challenges	4 Goals	Grand Total
Are people becoming richer?		1			1
Clean Eco production		1			1
Export of pre-built wooden houses to Sweden		1			1
Global markets to export products		1			1
Improve trade balance		1			1
Increase degree of refinement		1			1
Increased certification		1			1
3 Challenges			**11**		**11**
access to the bio products technology and markets			1		1
competition between different industry sectors			1		1
Competition from concrete industry			1		1
Globalized markets cause trouble			1		1
Investments abroad require feedstock			1		1
Perceptions against wooden buildings			1		1
Planning on municipality level			1		1
Price?			1		1
shadow economy			1		1
Strength of carbon based industry			1		1
Wood exporters			1		1
4 Goals				**1**	**1**
Market development				1	1
Outreach-Media/Public opinion		**4**	**4**	**2**	**10**
2 Future possibilities & solutions		**4**			**4**
Advertisement and education about forest cuttings		1			1
More education for society about biofuel and bioenergy		1			1
More information for society		1			1
Public education on media and internet		1			1
3 Challenges			**4**		**4**
Perception of wood construction			1		1
Public opinion negative to uncertainty			1		1
society has "uninformed green thinking"			1		1
Strict social opinion about forest cutting			1		1
4 Goals				**2**	**2**
Bioeconomy promoting on national TV translator				1	1
Public media could solve lack of society information problem				1	1
Public perception/policy		**3**	**10**	**7**	**20**
2 Future possibilities & solutions		**3**			**3**
Change and fashion of wood (Public opinion)		1			1
Public procurement		1			1
Wooden construction increase		1			1
3 Challenges			**10**		**10**
Bureaucracy			1		1

Branch, Leaf Type, Idea	1 What works well?	2 Future possibilities & solutions	3 Challenges	4 Goals	Grand Total
Concept of Bioeconomy is unknown			1		1
Corruption			1		1
Evidence based policies (not-populism)			1		1
NGO's			1		1
Political green populism			1		1
Political solutions			1		1
Public distrust of science			1		1
Public opinion against forest use			1		1
Society awareness			1		1
4 Goals				**7**	**7**
Bioeconomy strategy				1	1
Bioeconomy wood awareness				1	1
Develop bioeconomy forum				1	1
Eliminate unnecessary Bureaucracy				1	1
Inform society for CLT				1	1
More focus on one bioeconomy branch				1	1
Strategy with goals				1	1
Raw material	**3**	**5**	**1**	**1**	**10**
1 What works well?	**3**				**3**
Country reach of wood resources	1				1
National forest resources	1				1
resources	1				1
2 Future possibilities & solutions		**5**			**5**
biofuel		1			1
mobilize wood resources		1			1
nano technology nano materials		1			1
raw material availability stable and fair price		1			1
renewable energy sources		1			1
3 Challenges			**1**		**1**
processing fuel sources			1		1
4 Goals				**1**	**1**
Increase wood harvest to 70%				1	1
Research and application	**1**			**2**	**3**
1 What works well?	**1**				**1**
Lot of research on bioeconomy, practical work with science	1				1
4 Goals				**2**	**2**
Change legal applications targeted to bio				1	1
Do projects which will connect research, business and decision making				1	1
Society	**2**	**4**	**3**	**1**	**10**
1 What works well?	**2**				**2**
Jobs	1				1
Potential of new jobs	1				1

Branch, Leaf Type, Idea	1 What works well?	2 Future possibilities & solutions	3 Challenges	4 Goals	Grand Total
2 Future possibilities & solutions		**4**			**4**
education of the client		1			1
Increased ecological consciousness of society		1			1
Media/Building examples		1			1
promoting wood energy usage		1			1
3 Challenges			**3**		**3**
Perception on the disatvantage of wood			1		1
Public opinion			1		1
Public perception			1		1
4 Goals				**1**	**1**
propaganda-info on material use - trendy				1	1
Technical standards	**2**	**1**	**1**	**2**	**6**
1 What works well?	**2**				**2**
existing technical standards in Lithuania	1				1
still have skilled people	1				1
2 Future possibilities & solutions		**1**			**1**
Unique programs in universities		1			1
3 Challenges			**1**		**1**
Architects and engineers do not have enough knowledge on timber			1		1
4 Goals				**2**	**2**
more education and propaganda				1	1
teach wood construction in architecture				1	1
Grand Total	**41**	**68**	**53**	**43**	**205**