Implementation of sustainability assessment for wood biomass project proposals in Ukraine

Colofon

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This study was carried out in the framework of the Netherlands Programs Sustainable Biomass by

Name organization: PE Gabrielyan G.O.
Contact person: Gyevorg Gabrielyan and Alexei Stoyanovsky

Although this report has been put together with the greatest possible care, NL Agency does not accept liability for possible errors.
Contacts

Netherlands Programs Sustainable Biomass

Mr. Kees Kwant
NL Agency
NL Global Cooperation Energy and Climate Change
Croeselaan 15, 3521 BJ Utrecht
P.O. Box 8242, 3503 RE Utrecht
The Netherlands
Email: kees.kwant@agentschapnl.nl
Phone: +31 (0)88 602 24 58
www.agentschapNL.nl/biomass

Private Entrepreneur Gabriyelyan Gyevorg Olegovich

Gyevorg Gabriyelyan and Alexei Stoyanovsky
PE Gabriyelyan G.O.
Gogol str. 66, apt 4
95051 Simferopol
Ukraine
Email: ggevorg@list.ru; bioexpert@ukr.net
Phone: (+38) 050 357 93 83; (+38) 050 511 14 34
www.biomass.in.ua
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Guidance for the reader

This document aims to provide guidance and relative analytical info to organizations, policy makers, financers, economy operators and project developers on sustainability risk assessment for wood biomass project proposals to be implemented in Ukraine.

The study has been carried out for NL Agency in the period from November 2012 to November 2013.

Chapter 1 provides helpful stats and analysis based on European data to see the real growth potential for wood biomass sector in Ukraine and how it is related to sustainability. It is assumed to show that sustainability is so far neglected but absolutely vital factor to ensure much more success for the sector in Ukraine.

Chapter 2 Explains ways how one can proof wood biomass project is sustainable in Ukraine. It reviews available voluntary schemes related to wood biomass sustainability, provides insight on the possibilities to prove and requirements applied to wood biomass sustainability through national and European legislation. Reviews compliance of biomass incentives of Ukrainian legislation w sustainability

Chapter 3 Contains details on public consultation for sustainability risks assessment with detail coverage of each risk and recommendations as well as proposed scope for sustainability criteria

Conclusions section expresses a need for a panel to implement wood biomass sustainability in Ukraine with suggestions on the approach; also contains suggestions for follow up in wood biomass sector and highlights other requests for sustainable approach to biomass in Ukraine

Attachments provide info of interest for project developers: summary for sustainable project development in Ukraine, advices for investor to build wood biomass project in Ukraine, typical mistakes to be avoided in biomass project design, list of wastes and residues from NTA8080, added value business recommendations on biomass sector in Ukraine

This report expresses the findings of the project team, and not necessarily NL Agency's views.

The information for this report was compiled with the utmost care. Comments or suggestions on the information presented in this report are highly welcomed: please contact the authors to share your views. The authors cannot be held responsible for the consequences of any errors or mistakes in the report.
Acknowledgements

The only way to address biomass sustainability effectively is through both global and national networking and via cross-sector approach. Due to ongoing efforts of NL Agency on biomass in Ukraine the network keeps expanding with every next project.

The preparation of this report would not have been possible without the support and efforts of our colleagues in such a number that we can’t really list all those whose input was valuable.

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Project’s team would like to thank each and everyone who provided their most valuable feedback into the consultation thus allowing to analyze the trends at national-wide stakeholder approach.

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Definitions and abbreviations

CB  
Certification Body

CEN  
European Committee of Standardization

CoC  
Chain-of-custody. This is an audit process that reviews the path taken by raw materials, beginning with a certified source and continuing through processing, manufacturing, distribution until the material becomes a final product ready for sale to the end-use consumer. The chronological documentation or paper trail, showing the seizure, custody, control, transfer, analysis, and disposition of evidence, physical or electronic

Term is taken from criminal investigation sphere where it originated as framework to collect and provide accurate evidences

CSR  
Corporate Social Responsibility

Due diligence  
Approach that economy operator must implement to prove legal origin timber in compliance with EUTR

EC, Commission  
European Commission

EC Recommendation  

EIA  
Environmental Impact Assessment

EPA  
US Environmental Protection Agency

EU  
European Union

EUTR, Timber Regulation  
European Union Regulation 995/2010 that requires a must prove of legal origin for every timber products first placed at EU market

FLEGT  
EU Action Plan for Forest Law Enforcement, Governance and Trade

FSC  
Forest Stewardship Council

GGL  
Green Gold Label (Essent/RWE label) sustainability scheme

GHG  
Greenhouse gas

GAP  
Good Agricultural Practices

Illegal logging  
The harvesting of timber in contravention of the laws and regulations of the country of harvest or in violation of relative International legislation

ILUC  
Indirect Land Use Change
Indicator | Compliance indicator used by the auditors to check whether a requirement of a standard is fulfilled
ISO | International Organization for Standardization
Lacey Act | The 2008 Farm Bill (the Food, Conservation, and Energy Act of 2008), effective May 22, 2008, amended the Lacey Act, combats trafficking in “illegal” wildlife, fish, and plants into the USA
MS, EU MS | Member-states of the EU
NTA8080, NTA8080/8081 | National Standard of the Netherlands and International Certification Scheme for Biomass Sustainability
PEFC | Program for the Endorsement of Forest Certification
RA | Rainforest Alliance
RBSA | Abengoa RED Bioenergy Sustainability Assurance standard
RSB | Roundtable on Sustainable Biofuels
SIA | Social Impact Assessment
Preface

The desire to implement the project in Ukraine had appeared in the result of close bioenergy cooperation between Ukrainian and Dutch experts for the last five years.

Other strong motive behind the idea comes from the personal field experience of the project team in solid biomass sector consulting in Ukraine both for Ukrainian and European clients as well as from several years of analyzing biomass market with the team of Bioenergy International. Russia focused mostly on Russia, Ukraine and Belarus.

We both got the same impression that unlike Western Europe where the main hindrance for further biomass growth lies in the area of resource availability, the wood biomass sector in Ukraine faces different hindrances which in fact got better recognition and awareness in Western Europe under the general concept of biomass sustainability.

As soon as news of Cramer Criteria found its way to our ears we found a good approach that we thought of desirable to be promoted in Ukraine more than in NL where it originated.

In a way we felt a need in bridge building between EU (the author and still main driving force for the global wood biomass market) and Ukraine to exchange experience and join efforts in building sustainable wood biomass market together.

We also noticed that both EC and Ukrainian government are concerned about balanced way to grow bioenergies. The EC discusses how to make biomass imports sustainable while Ukrainian government is also interested to improve the situation in this sector and see same success of bioenergies as it is in the EU. This study is an attempt to come up with mutual language for benefit of both sides.

The EU in general and some of its member-states promote policies providing market advantages for the players who produce biofuels or energy from it in a sustainable way. This approach embodies the social justice principle for business: responsible investors, whose activity makes a greater contribution to the public welfare, get market advantages.

General policy of the EU on renewables seems to get rid of the use of biomass that has no proof of its sustainable origin. This position receives broad public support due to its environmental and social focus and allows to use funds more efficiently (wisely).

Even the customers in NL and other main wood biomass importing countries welcome the idea that the commodity is sustainable.

Among all types of biofuels, which are produced in Ukraine, the most common one is wood biomass (fire wood, sawdust, wood chips, briquettes, pellets). It’s expected that its use both for domestic consumption and for exports will have further increase in the coming years. Thus the industry attracts a considerable investment interest. The expected nation-wide capacity increase in the use of wood biomass requires careful impact assessment of possible side effects. First of all – prevent significant harm to the environment, such as improper logging or air pollution.
To identify these and other risks in Ukraine, which are covered by the concept of sustainability, there appeared idea to study public and expert opinions.

The conclusions of this study are needed not only to prevent non-sustainable management practices in the field of renewable energy. Those may also serve as a guidance for environmentally and socially responsible investors to work in Ukraine.

Thus the **Goal** of the Project is not only to identify and assess the risks but also to develop a helpful guidance to be of support to carry sustainability (risk) assessment for biomass projects in Ukraine.

Not all sustainability requirements, referred to in the Project, are currently required by Ukrainian legislation. However, Ukraine's membership in the Energy Community (full membership since Feb. 1, 2011) leads step-by-step to the harmonization with European energy legislation that may influence business environment. Therefore it makes sense even for domestic investors to plan their business activities in a way to get ready to face more emphases on social and environmental factors in the bioenergy sphere.

We think this study project to be of help for market players, project developers, financing institutions, policy makers as well as for S&R, NGOs and even for wide public (we tried to avoid plain scientific slang when possible so that one should not learn many terms by heart before reading).
Chapter 1. Wood biomass potential and sustainability: case of Ukraine

1.1 Forests of Ukraine: general info

Forests, mainly mixed and steppe forests, cover 9.6 million hectares or 16.5 percent of Ukraine’s land area, which is predominantly devoted to agriculture. About half of the forests are classified as semi-natural; 4.4 million hectares are planted forests. Broad-leaved species make up roughly half the growing stock, with oaks, beech, birch and poplars among the most common. Pines, Norway spruce and firs are the main coniferous species.

A large proportion of forest stands represents young and middle-aged age classes, many of them planted since the Second World War. Partly because of the young age-class structure, fellings are less than half the net increment, resulting in a strong expansion in growing stock in recent decades. All forests are State owned.

Nearly two-thirds of the forest is available for wood supply; the remainder is not available, mostly for conservation and protection reasons. A particularly important function is soil protection from wind and water erosion.

Source (www.dklg.gov.ua)
1.2 Do we expect further growth for wood energy biomass sector in Ukraine?

The simple answer is yes. Couple reasons for that:

– Large growth potential and biomass availability (also true for the whole wood industry)
– The consumption of wood biomass and particularly of wood pellets will keep growing in EU at least until 2020 due to the RE Targets
– Several EU countries welcome biomass imports to reach the targets (NL, UK, Belgium, Poland)
– Finally arises demand within Ukraine primarily for heating purposes. Plans for biomass CHPs are also discussed all over the country.

Positive answer is provided by both conservative and optimistic viewpoints. Simple reason to that is that wood bioenergies within the country are still in its infancy stage and thus far from reaching its maturity. The field experts argue only on the potential for market growth and on how rapid would be the real growth. They also provide different figures and data to prove their ideas.

We don’t feel that our job is to share one more prediction. Within the EU there are different growth expectations even on the most popular wood biomass commodity which are wood pellets. Different scenarios for 2020 EU consumption range from 25 up to about 100 million Mt annually.

As the EU market served as main driving force for Ukrainian biomass production, we would suggest to look at available Eurostat and other recognized statistics on EU market and on Ukraine to prove the above mentioned statements.
1.2.1 Large growth potential and biomass availability (also true for the whole wood industry)

1.2.1.1 Wood industry growth potential of Ukraine

Wood biomass sector closely related to the wood industry sector as a whole and largely depends on its residues supply. According to Eurostat’s Agriculture, Fishery and Forestry Statistics the Ukraine possess sure place in the very middle of top-10 EU suppliers of wood and wood products (aggregated data from 2007 till 2011 is analyzed).

Diagram 1. EU imports of wood and wood products: Top-10 suppliers, 2007-2011

Source: Eurostat (COMExCN 44)

Regardless global economy decline in 2008 and 2009, Ukraine is among the only two countries on the list (accompanies also by Croatia) which were able to fully restore its exports to EU already in 2011. This result should be viewed as remarkable as on the average the top 10 suppliers were 30% behind in 2011 comparing to pre-crisis year 2007.

Ukrainian wood industry ability to quickly restore and show progress is explained by the fact that its capacity was still far from reaching its full potential before the crisis broke out in 2008. Indeed this particular industry of Ukraine should be considered as one of the most quickly emerging economy sectors with yet still great potential for further growth.

To be fair should be mentioned that the above EU trade growth should be greatly credited also to the perfect geographical location of Ukraine right at the border with the EU.
1.2.1.2 Ukraine among EU Wood biomass importers

Moving on to the statistics on wood biomass sector we should keep in mind its correlation with the general trends in wood industry as a whole.

However among all other wood products – the wood biomass market was probably the least affected by crisis and kept showing overall growth which could only be dreamed by traditional wood industry. Wood biomass is generally considered as low income commodity adding some value to the core timber commodities. Yet during the decline this added value sector had actually helped some of the core wood industry businesses to survive through the recession. The main credits for the phenomena should be given to the consistency of the EU environmental and sustainable development policy raising RE share in domestic energy consumption. The trend was noticed by businessmen in Ukraine as well.

According to Eurostat, Ukraine is again seen among the top-10 EU-27 suppliers also of the wood pellets being able to double the deliveries every single year!

<table>
<thead>
<tr>
<th>Exporting country</th>
<th>2009*</th>
<th>2010*</th>
<th>2011*</th>
<th>2012**</th>
<th>Main target country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>520</td>
<td>983</td>
<td>1.160</td>
<td>1.346</td>
<td>UK, NL, BE</td>
</tr>
<tr>
<td>USA</td>
<td>535</td>
<td>763</td>
<td>1.001</td>
<td>1.764</td>
<td>NL, UK, BE</td>
</tr>
<tr>
<td>Russia</td>
<td>379</td>
<td>396</td>
<td>475</td>
<td>637</td>
<td>DK, SE</td>
</tr>
<tr>
<td>Ukraine</td>
<td>30</td>
<td>57</td>
<td>149</td>
<td>217</td>
<td>PL</td>
</tr>
<tr>
<td>Croatia</td>
<td>73</td>
<td>95</td>
<td>115</td>
<td>136</td>
<td>IT</td>
</tr>
<tr>
<td>Belarus</td>
<td>75</td>
<td>90</td>
<td>100</td>
<td>112</td>
<td>LT, DK</td>
</tr>
<tr>
<td>Bosnia</td>
<td>54</td>
<td>44</td>
<td>47</td>
<td>n/a</td>
<td>IT, SLO</td>
</tr>
<tr>
<td>South Africa</td>
<td>42</td>
<td>25</td>
<td>43</td>
<td>n/a</td>
<td>NL, UK</td>
</tr>
<tr>
<td>Australia</td>
<td>9</td>
<td>66</td>
<td>14</td>
<td>n/a</td>
<td>NL</td>
</tr>
<tr>
<td>Norway</td>
<td>10</td>
<td>4</td>
<td>13</td>
<td>n/a</td>
<td>SE</td>
</tr>
</tbody>
</table>

**Total import to EU27** | 1.742 | 2.569 | 3.161 | 4.491 |

* - AEBIOM’s Wood Pellet Report 2012

** - EU Biofuels Annual 2013

Ukraine has moved 4 steps up since 2009. Only Canada, USA and Russia are ahead.
In three years Ukraine had increased its EU supplies over 7 times!

Ukraine is the only (!) country among the top 10 that showed advance progress higher than the average EU import growth rate in each of the three consequent years observed: 2010, 2011 and 2012.

Given above statistics on wood pellet imports became available only since 2009. Prior to that year the Eurostat didn’t collect a separate data on wood pellet imports to EU apart from wood waste supply.

Even from the above mentioned statistics on supply trends of wood and wood industry projects and of wood pellets from Ukraine to the EU27 its clear that the country hadn’t hit its peak neither in wood industry nor in producing wood pellets.
1.2.1.3 Forestry cover vs. wood pellet performance

1.2.1.3.1 Comparing forestry cover area

![Diagram 3. Wood cover area](image)

Source – Forestry statbook 2011 and State forestry Agency of Ukraine web-site

However same countries show different wood pellet performance

1.2.1.3.2 Comparing annual country wood pellet output

Countries with less forestry cover show higher performance than Ukraine proving Ukraine’s growth potential.

![Diagram 4. Annual country wood pellet output 2012](image)

Source EU Biofuel Annual. Data for Ukraine is assessment of Bioenergy Expert in Ukraine
1.2.1.3.3 Conclusions

The ability for Ukraine to increase its wood biomass capacity comes from the big growth potential which is still untapped in the following areas:

1. improving forestry management (and thus increasing the national wood stand);
2. further developments in wood industry sector (which still awaits for investment outpour);
3. Implementing (wood) waste management all the way along the wood biomass life cycle chain.

1.2.1.4 Basic SWOT Analysis of Ukraine’s wood pellet sector in 2009-2012

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Growing Polish market demand</td>
<td>– Ukrainian pellets are generally assumed as low quality</td>
</tr>
<tr>
<td>welcomed Ukrainian wood biomass regardless of quality or certification</td>
<td>– Outdated equipment and processes</td>
</tr>
<tr>
<td>– Relatively close supply distance</td>
<td>– No wood pellets logistics</td>
</tr>
<tr>
<td>– Minor investments necessary to produce and deliver wood biomass</td>
<td>– “Poor” feedstock supply management</td>
</tr>
<tr>
<td>– Fast sector growth: exports grew 7 times in 3 years!</td>
<td>– Pellet producers are unable to ensure quality and output</td>
</tr>
<tr>
<td>– Wood pellet imports had reached the total of € 22-23 mln value in 2012!</td>
<td>– No EU certified producers</td>
</tr>
<tr>
<td></td>
<td>– Not competitive at better EU markets</td>
</tr>
<tr>
<td></td>
<td>– 20-40% or € 4-9 mln annual commodity value loss in 2012</td>
</tr>
<tr>
<td></td>
<td>– Single market dependency</td>
</tr>
<tr>
<td></td>
<td>– Little efforts to grow own market for consumption</td>
</tr>
</tbody>
</table>

**Conclusion:** Ukraine got fast growing wood pellet sector yet in its infancy stage

*Good news: current infancy stage points out at great potential ahead for growth and maturity!*

**Note:** Ukrainian biomass community should have closer look at EU market trends
1.2.2 Wood pellet imports trends in the EU

Since 2008 the demand in wood pellets had outpaced domestic production in Europe. In 2012 the EU-27 had imported over 4 mln MT of wood pellets.

According to EU Biofuel Annual 2013 the imports in 2014 may grow to as much as 6-7 mln MT while current major EU wood pellet importers are:

![Diagram 5. Main EU pellet importers](image)

Further growth of wood pellet market is mainly expected in Benelux countries and in the UK due to their dependency on the imports to meet the 2020 renewable targets.

In general wood consumption in Europe could be divided into several groups. In the countries like NL, Belgium and UK most of the pellets are used by power plants. There also big power plants consuming wood pellets in Denmark and Sweden but those countries have also developed market for households and smaller heating installations. Other countries like Germany, Italy and Austria mostly use wood pellets for household. Those differences in consumption provide wide market opportunities for wood pellet producers. However one should keep in mind that supply approaches and requirements should be market focused.

There are also other market segregation assessments based on the assumption that in the EU there are sustainable (Benelux) and other markets. However we foresee that sustainability is introduced step-by-step throughout the EU not as individual market’s requirement but as the general EU policy and will review this subject further.
1.2.3 Finally grows biomass demand for internal heating and electricity

```
<table>
<thead>
<tr>
<th>Total output</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 MW  of electric power</td>
</tr>
<tr>
<td>9,000 MW of heating energy</td>
</tr>
</tbody>
</table>

Market volume for investment:
over €2 bln.
```

1.3 Quality, Price, Supply Security or Sustainability? All of it wanted!

There are no doubts that Quality, Price and Supply Security are important to become competitive supplier. (However Ukrainian producers still have to do this homework)

Should we be also concerned in Ukraine about Sustainability?

UK governmental informational Biomass Energy Center states that "There is no reason why the production and use of biomass can’t be sustainable."

Can we claim the same also for Ukraine?
Maybe EU is simply not interested in Ukrainian biomass and wants to place trade barrier?

1.3.1 Sustainability applies not only to wood biomass but to biofuels as well

Wood biomass sector is not the only sector that faces sustainability requirements. It also applies to biofuels.

In fact it should not be an exaggeration to say that Ukrainian businessmen of agrarian, food and forestry sectors were the most active participants among their countrymen in the EU’s efforts to implement renewables regardless whether they were even aware of the reasons, purposes and objectives of the EU policies.

At first, the country had become EU’s key strategic partner in supplying transport biofuel feedstocks (mostly rapes seeds) which in return had a very strong impact on agriculture and agrifood business in Ukraine.

It’s worth mentioning though that recently carried out research and training project of GIZ in Ukraine ([http://www.infobio.ru/analytics/1331.html](http://www.infobio.ru/analytics/1331.html), [http://www.ier.com.ua/files/Projects/2011/1_Biomass/GHG_emissions_from_rapeseed_and_corn_en.pdf](http://www.ier.com.ua/files/Projects/2011/1_Biomass/GHG_emissions_from_rapeseed_and_corn_en.pdf)) had clearly shown that serious measures should be taken to reduce CO2 emissions in the chain of agrarian biomass supply from Ukraine in order not to hinder those supplies to the EU as stricter sustainability threshold will be enforced from 2017.

1.3.2 EU public consultation on solid biomass sustainability

Specific answers to the question if sustainability is a trade barrier or not are found in the results of the EU public consultation (2011) on additional sustainability measures for solid and gaseous biomass.
1. “Wood pellets and woodchips are identified as the types of solid biomass most likely to be imported from the third countries...until 2020.”
2. “…Ukraine and Belarus were also identified as future exporters of solid biomass to the EU due to their geographical proximity and high biomass availability.”
3. “The Majority of respondents (72%) believed that additional measures at EU level are needed to ensure the sustainability of biomass…”

Most chosen explanation for such response was that “Biomass imports from outside the EU will increase, which may lead to higher risks for biomass sustainability.”

Conclusion: the EU respondents expressed that they welcome increase of wood biomass import from Ukraine but want to make sure that this biomass is sustainable.

1.3.3 What are specific sustainability risks for Ukraine?

General public opinion is that producers in NL or Germany are more sustainable than those in Ukraine.

“It is very important to keep focused on the sustainability especially in countries who are not let say famous for their activities in that field” (Markus Blachnik, DINplus wood pellets certification Product Manager, DIN CERTCO (Germany)).

Then what are those risks for Ukraine? Unlike Indonesia or Malaysia, Ukraine doesn’t have to protect tropical rainforests. Also the risks for wood biomass are different than those for agrarian.

To simplify the task, we excluded woody energy plantations and woody residues of agro-food sector (kernels, etc) to focus on “normal” wood biomass, originating from real forests.
To identify the risks it was decided to use the consultation approach.

1.3.4 Consultation on wood biomass sustainability risks for Ukraine

We used our field experience and carefully studied relevant experience in NL and in the EU to launch consultation with stakeholders in Ukraine to find out how they evaluate the proposed set of risks for wood biomass, and to find out if the respondents have more important risks on their mind.

We didn’t copy all of sustainability issues discussed within the EU. Yet we considered those (see preface to consultation analysis) and came up with list of risks that Ukrainian respondents are familiar with.
We grouped the risks in 10 sections with a total of 45 risks. One more risk was added by a UNIDO consultant.

1.3.4.1 Preliminary results of the consultation

Not even one risk was evaluated as negligible. All the risks were evaluated as moderate, high or very high. We separated internal from external sustainability risks. Internal risk is the one up to the business operator. Among the highest internal risks were mentioned:
- biodiversity violations (primarily - illegal logging)
- environmental pollutions (especially air pollution)
- engineering inefficiency (outdated/improper equipment, poor project design)
- lack of business integrity (frauds, forgery, falsification, bribes, etc)
- ignoring the interests of local community

Also the other risks worthwhile to be inspected (legislation mismatch, safety violation etc)

1.3.4.2 Some preliminary conclusions from public and expert consultation

- Wood biomass sector in Ukraine does have high sustainability risks. Both the investors and policy makers should consider that.
- The identified risks, if ignored, would not make it possible to comply with third-party audit if required and thus could become a real trade barrier
- Without implementing sustainability, wood biomass in Ukraine would fail to serve as reliable and long-lasting source of energy.
- If no measures are taken further growth of wood biomass will cause side-effects on environment, social and economic well-being.

Good news: Implementing sustainability may turn the whole picture around!

Note: The risks assessed via consultation should be all considered to produce wood biomass sustainably in Ukraine.
Chapter 2. Proving wood biomass sustainability in Ukraine

2.1 What are the most common ways to prove wood biomass sustainability?

Wood biomass sector is under special attention within the EU of all the solid biomass for two main reasons:

1. *It is the largest solid biomass market also for imports into the EU.*
2. *Also it is subject to control by EU’s forestry law enforcement policies (FLEGT - Forest Law Enforcement, Governance and Trade).*

Therefore two main sectoral ways to address sustainability for wood biomass are:

1. *Through forestry management and wood industries.*
2. *Through bioenergies.*

Other options:
- Approaches from Agriculture and Food sector may be referred (woody biomass plantations like salix; wastes and residues of food sector woody plants).
- Waste management and disposal derived products (wood biomass from municipal and non-wood industry wastes).

Forestry management approach to wood biomass sustainability is vital and essential part of it but so far is incomplete for energy biomass projects as it is not supposed to deal with the specific sustainability aspects for (renewable) energy sector (like energy efficiency for processing and conversion, GHG output and savings, energy air pollution & emissions control etc). *Therefore as a primary angle for evaluation we will consider that of bioenergy.*

**Note1:** under the bio-based economy the uniform sustainability rules are welcomed for all biomass regardless of its end use. The same biomass feedstocks can be requested by different economy sectors (energy, wood based industries, chemicals, construction materials, food, feed, fertilizers etc).

**Note2:** there are different angles that one can look at wood biomass and its sustainability. Whatever angle is chosen – wood biomass would still be cross-sector phenomena.

2.2 How one can officially prove its wood biomass project is sustainable in the Ukraine?

The Renewable Energy Directive (2009/28/EC) lists three ways which we can think of:

1. *Voluntary schemes (recognized by the Commission in the case for biofuels).*
2. *Schemes adopted by national legislation (of the EU countries).*
3. *Bilateral or Multilateral Agreements (with third countries).*

There are no mandatory binding criteria for solid biomass at EU level yet. Also no requirement are enforced in Ukraine.
Yet there is EU binding requirement to prove legal and transparent origin for all timber commodities, imported to EU, including wood biomass, according to EU Timber Regulation 995/2010 (further referred as EUTR). The EUTR requires a must inspection for the following biomass at EU market since March 3, 2013:

**Fuel wood, in logs, in billets, in twigs, in faggots or in similar forms;**

**wood in chips or particles;**

**sawdust and wood waste and scrap, whether or not agglomerated in logs, briquettes, pellets or similar forms**

*(The compliance procedure for EUTR and other related issues are explained further in 1.4.1-3)*

What’s available in the bioenergies sector for solid biomass (status Nov 2013) is the EC Report on sustainability requirements for solid and gaseous biomass (COM (2010) 11 final of Feb 25, 2010) describing recommended criteria for heating, electricity and cooling. The criteria were offered to be used by those Member States that wish to introduce a regulatory framework at national level.

http://ec.europa.eu/energy/renewables/bioenergy/sustainability_criteria_en.htm

Netherlands was the first and so far the only EU country to come up with a voluntary national sustainability standard and certification scheme NTA8080/8081 to be used also for solids. In fact this system was already in place even before the EC Recommendation Report. Some other MS came up with (not uniform) schemes (UK, Belgium) and with no standard. Most of MS wait for clear communication/decision from the EC.

Clear communication of the Commission on mandatory binding criteria is being expected for already few years. Most likely we will see the similar rules for solid and gaseous biomass as those for biofuels.

Meanwhile both European (CEN) and International (ISO) standardization organizations carry out the work (CEN/TC 383 and ISO/PC 248 respectively) to develop sustainability standards for bioenergy sustainability. The first aim of CEN/TC 383 is to develop standards that help companies in implementing the European Renewable Energy Directive (RED), that is to prove sustainability for transport sector biofuels. Developing the standard for solids depends on the EC decision or on the elaboration of ISO standard. ISO/PC 248 develops a standard that covers sustainability criteria for bioenergy, so including solids. This standard doesn’t set any threshold values or limits.

It is also likely to see changes/amendments in 2014 even to existing sustainability legal framework and criteria as those are currently (status of Sep 2013) revised by EU institutions.

*One should thus look for the ways to assess wood biomass sustainability in Ukraine both with bioenergy and forestry management perspective and being aware of the risks, typical for Ukraine (as assessed via consultation).*

25
2.2.1 Testing wood biomass through voluntary certification schemes

**Note1:** Normally before producing (supplying) the biomass or energy from it one should:
- ask if the clients have any specific requirements on sustainability in addition to the product quality
- be aware of the market access requirements.

Note2: Full biomass sustainability requires assessing the whole life cycle from harvesting/collecting residues to conversion into the energy (chain-of-custody approach adjusted to solid biofuel sector)

There exist a whole variety of biomass/biofuel/bioenergy voluntary sustainability schemes. Many of those appeared in response to the RED that introduced a mandatory sustainability criteria for biomass and provided framework to apply for voluntary schemes recognized by the EC for the RED purposes.

The list of those schemes is found here:


However all those schemes were only tested to comply with a mandatory criteria that is applied so far only for transport biofuels and not for solids.

Therefore most of those schemes, including ISCC, RSB, Bonsucro, RBSA etc are not meant to deal with solids. One may found NTA8080 there as well. This scheme as such does apply to solids. But the above mentioned EC recognition refers only to how it deals with (liquid) biofuels.

Still the very fact of getting the recognition even only for liquids should be viewed as benefit.

In this study we provide a list of (certification) schemes which apply to wood biomass. Not all of those are referred to as sustainable. Yet all of those could be of some help to address at least some of the risks important for Ukraine.

Once again: the list of schemes provided below do not make one recognized wood biomass producer according to the RED as the Directive doesn’t yet include mandatory sustainability criteria for solid biomass.

**List of voluntary certification possibilities to be used for biomass operators:**

1. The least is to apply for ISO 9001. This step is welcomed by itself and also beneficial if one is to apply further for forestry and/or bioenergy certification. ISO 9001 certified commodities are generally not called as sustainable (no chain-of-custody approach and no sustainability criteria) but the certification does cover some of the basic sustainability risks for individual operator (ensuring adequate quality management system is in place) and provides general assurance in a trade partner or producer. (Flyer of a wood pellet solution provider from Poland suggests looking for ISO 9001 certified sawdust suppliers as more sure source).
2. As the pollution risks (especially air pollution) are considered as high by the consultation respondents – both biomass producer and especially energy producer should consider applying for ISO 14001.

This standard and certification is also not referred as sustainable but provides wider coverage for environmental risks than ISO 9001 and thus could be used to claim the project somewhat sustainable on the issues of pollution prevention and control, especially while no binding (national or international) criteria are in place. ISO 14001 does not include environmental performance indicators; those should be established by the biomass operator itself.

3. Forestry & wood industry sustainability certification schemes.

A. Most popular are FSC and PEFC. Both schemes are referred to as sustainable by wood industry, and are highly welcomed at the EU and at global timber markets. Their main benefit is incorporation of chain-of-custody approach allowing end user to be sure that wood resources were properly treated along the whole chain from its very origin.

For biomass operators looking to be sustainable it’s strongly recommended that the feedstock (or biofuel in case for energy company) supplier is also certified.

However for those aimed to supply to EU, the very fact that biomass operator is FSC or PEFC certified, doesn’t automatically mean that the provisions of EUTR are met (enforced since March 2013).

To meet the EUTR, if importer already has FSC and PEFC, there is also a need to implement a due diligence system into the company’s management. As soon as it’s there – then sustainably certified forest material is considered to be a negligible risk material and can almost automatically be imported into the EU.

B. LegalSource sustainability scheme. The certification system is run by the international ecoforestry NEPCON NGO. The NGO has got its EU recognition in Aug. 2013 as monitoring organization to implement due diligence approach for the EUTR purposes.

http://www.nepcon.net/7630/English/HOME/News_2013/NEPCon_recognised_as_EUTR_Monitoring_Organisation/

The LegalSource system is used to measure compliance with EUTR, U.S. Lacey Act and Australian Illegal Protection Act (and possible other upcoming laws against illegal wood). That’s the only scheme so far that’s been recognized by the EU for the purposes of illegal logging ban.

NEPCON also offers the program to develop and strengthen due diligence for legal timber sourcing or meet one’s demands for legality assurance. More details at:

http://www.nepcon.net/5022/English/Certification/Timber_Legality_assurance/LegalSource_Programme/

4. NTA8080 certification system (www.sustainable-biomass.org) for bioenergies. Managed by NEN (Dutch Standardization Institute, www.nen.nl). The scheme is recommended when one’s customer or targeted market are interested in comprehensive bioenergy-tailored sustainability proof. NTA8080 may serve to certify any type of biomass (including that of wood origin) to be used for energy or transport. So far this is the only single national (NL) bioenergy standard and
international scheme for comprehensive certification sustainability for all types of biomass. Applying for it is an appropriate step for Ukrainian producers to access more reliable and demanding wood biomass markets (mostly that of Benelux, also Denmark, UK, Germany, etc). It is also welcomed when approaching some of leading energy companies of Europe incorporating biomass supply sustainability especially for electricity sector.

At the moment the scheme is recognized by the EC to serve as biofuel sustainability proof by all MS. According to Harmen Willemse (NEN, scheme manager), “the scheme will most probably comply with the expected EU binding criteria for solid and gaseous biomass as well or will be easily adjusted to it.”

Just like the Netherlands where the standard was developed, the experience from its implementation may also serve Ukraine to develop its own well-grounded national support scheme for bioenergies and as a pathway to introduce biomass for power generation while mitigating a variety of sustainability risks.

5. Green Gold Label (GGL) sustainable biomass certification system. http://www.greengoldlabel.org Developed by Essent Energy Company (NL) (nowadays part of RWE) and Control Union Certifications. (Control Union is also one of the stakeholders while developing Cramer Criteria in NL). The scheme is run by a group of market stakeholders. It provides a whole set of the group’s sustainability standards for solid biomass based on the type of operator activity in a biomass supply chain (i.e. transport & logistics, biomass processor/producer, etc) and of the type of biomass user (CHP, power plant, etc). Whole chain certification is also available.

6. The scheme is mostly welcomed by biomass for power markets of UK and NL. However the certification efforts for solid biomass sustainability are expected to join the SBP multi-stakeholder initiative (see SBP scheme further).

Two quality certification systems are specifically tailored for wood pellets to ensure compliance with the European standard “Wood pellets for non-industrial use” EN 14961-2 (and with the coming ISO 17225-2).


The scheme operates since 2002. Its experience benefited to the elaboration of the European standard for wood pellets.

Nowadays DINplus mark serves to certify compliance with EN 14961-2 standard (Class A1) to ensure high quality wood pellet to be used for household boilers and for small-scale non-household applications.

In addition the scheme may serve also to certify wood pellet logistics and delivery and to certify household heating appliances (boilers, stoves, heaters, etc) using wood pellets. Main purpose is to ensure high pellet quality however the evaluation procedure covers some of the sustainability risks as well (document, facility and biomass flow management, pollution emission control for boilers).

Also available certification for industrial quality pellets (equivalent to B class of EN 14961-2). DINplus mark is not awarded for this class.
Wood briquettes are subject for certification to meet EN 14961-3 quality standard. However, the certification process for briquettes covers less sustainability risks comparing to DINplus wood pellets as site inspection is not carried out. According to Marcus Blachnik from DIN CERTCO “at the moment there is no intention to implement sustainability criteria”. However it is possible to consider “cooperation with sustainability certification scheme in future”. So far there is only one DINplus certified producer in Ukraine.

**Warning:** Google search shows many more offering DINplus pellets from Ukraine. To avoid the risk – check with DIN CERTCO.

B. ENplus. The certification scheme, introduced in 2011, ensures the quality of the wood pellets for the end user by covering the entire supply chain – from the producer to the final customer. Offers ENplus A1 and A2 marks to certify premium quality pellets meant for household use. Pellets of Class B standard quality are also subject to certification but not awarded with ENplus mark and often assumed as more proper for industrial sector.

Allows the company to certify only part of its pellets dedicated to the domestic use (pellets sold to power plants or for animal bedding are excluded from license payments under this scheme). Some of the sustainability risks, which are typical for Ukraine, would already be covered due to on-site quality control inspection. According to Gilles Gauthier (AEBIOM), “The ENplus certification system offers some guarantee about the sustainability of the certified pellets.

- The carbon footprint of each pellet producer is calculated and aggregated by the AEBIOM/EPC.
- The producers have to mention the percentage of certified wood they are using for the pellets production.
- The producer has to sign a statement of commitment to sustainable pellet production”

So far no Ukrainian company got certified.

7. Sustainability certification scheme by Sustainable Biomass Partnership (SBP), former IWB (Industrial wood pellet buyer initiative).


The scheme and industrial standard for wood pellets is under development since 2011. Since it’s not yet in place we put in the end of voluntary scheme’s list. However it shows important trend. The initiative was launched by a number of leading European utility companies (GDF Suez, RWE-Essent, E.on, Drax Power, Dong Energy) consuming large amounts of wood pellets with the goal of enabling reliable and smooth trading of industrial wood pellets among the partnering companies. CBs like Control Union and SGS are also involved. The group claims intention to develop uniform branch standard for quality and sustainability of wood pellets for power markets. Experience and findings of NTA8080, GGL and forestry certification approaches are used for this work.

This initiative shows significant EU energy market interest that wood pellets become sustainable commodity.
2.2.2 Testing wood biomass projects through national schemes (of the EU countries)

a. Forestry and Wood Industry

Every EU country is supposed to meet mandatory EUTR requirements through implementation of its provisions into its own legislation. Each country is therefore responsible to source the origin of imported wood commodities when those are placed at EU market for the first time. Wood biomass is also included into the list of commodities (see 2.2).

As far as we know the customs at the EU boarders with Ukraine do not require any additional documents yet (as of October 2013). As soon as they do we will most likely see Ukrainian producers applying for voluntary certifications or whatever the procedure is.

To provide more clarity we asked Debora van Boven-Flier (Certification Co-ordinator and Lead Auditor, NEPCon Netherlands) to provide input on EU Timber Regulation impact on biomass supply from Ukraine:

Q: Would there be any difference to supply wood biomass, mentioned in the Annex to EUTR, including wood chips, pellets, briquettes etc, to EU now comparing with the situation before March 3, 2013?

A: “Yes, this is certainly affected by the EU TR, although you might not immediately notice it. Officially the importers in the Netherlands have to prove that the products they import from outside the EU are legal and they have to have a due diligence system in place. Such a system is based on three pillars:

1. Have (access to) information about the origin
2. Risk assessment
3. Risk mitigation

So, the client in Europe might ask extra documents from the Ukrainian suppliers and also ask them for signed declarations. Also audits might be conducted, either by the client or an external third party. They will check if all documents are in order and a chain of custody is set up in the company, if there are flows of illegal and legal wood”.

Q: Sounds like at the moment (Oct 2013) no changes are in place and the real procedure is not certain yet?

However one should better get ready and not be ignorant as the enforcement will take place, but later.

A: This is not true: all these rules are in force right now. However, the competent authorities, which have to enforce the laws in each European country, are not equally active in enforcing. In the Netherlands for example, they are doing inspections in the various companies, but until now (November 2013) no sanctions have been issued yet, because they consider the first year a startup year.

Wood importers in NL, importing wood from Ukraine, have stopped importing from Ukraine, for this reason. In other countries however, competent authorities haven’t even started inspections. But over
time each country will have to follow and implement the rules, so it’s absolutely right for operators to start taking action immediately and be ready.

Summarizing: The actual procedures are in force, clearly defined and certain and equal for each European country, enforcement might not be the same at this stage.

Therefore in the very near future (over the next year) we will see national schemes implemented in each of the MS. Ukrainian consumers must get ready to show compliance with the due diligence system regardless of the destination country.

It’s not clear yet if wood biomass will start to be checked as soon as the “regular” timber commodities will.

It’s also not clear if all the countries will be equally rigorous/diligent in their access entry practice for Ukrainian biomass.

Yet it’s clear that the rules will get stricter over the time thus granting sure market access only to sustainable producers.

b. Bioenergies and Renewables

The NTA8080 serves both as national Dutch standard for biomass sustainability and as voluntary international certification scheme. No other EU country has got national standard for sustainability. So far Belgium and UK had also introduced sustainability schemes (incentives) for solid biomass energy but not uniform and with no chain-of-custody approach. The rest of EU MS are probably waiting for the EU decision on solid biomass sustainability.

The Ukraine is obliged to implement RED provisions for transport biofuels. Unlike the EUTR which requires checks only for commodities imported into the EU, the implementation of RED by Ukraine (expected in 2014) would serve both the purposes of sustainable supply to EU and for reaching its own RE share 2020 target. It is not decided yet if a scheme to be implemented would be of uniform type or only for biofuels.

The RED introduces principle that only sustainable biomass energy is eligible for financial support or other benefits.

Three incentives introduced by Ukrainian government, are:

1. custom tax and value added tax exemption for imported equipment;
2. profit tax exemption for biomass producers;
3. feed-in-tariff for electricity.
Ukrainian bioenergy support incentives do not incorporate sustainability rules (of the RED). However in the recent years there appeared two attempts that could be viewed as sustainable. Both are referred to feed-in-tariff.

One is through the new definition of eligible biomass. The biomass should be only wastes or residues. Even processing into pellets or briquettes is not valid. Obviously the national authority had in mind to make sure no support goes to non-residual biomass thus probably protecting against misuse of wood resources and of agrarian products. Yet the definition is vulnerable as it doesn’t track down the biomass source. One could thus turn timber wood into sawdust to comply with the definition. On the other hand if pellets were properly produced from genuine sawdust residues – those wouldn’t qualify. This dilemma is not new and widely discussed across the EU. Applying sustainability approach with proper verification brings balanced solution to separate responsible operators from the rest thus ensuring good stewardship over financial support.

Other rule which may look as somewhat sustainable is in the efforts to grant some benefit for local business stakeholders and get them involved in building bioenergy projects through introducing a minimum cost share (30 – 50%) for local services, materials and equipment to be eligible for feed-in-tariff. However according to sustainability principles only SMEs (and not holdings) should be considered for better opportunities.

When favoring the development of the market for renewable energy sources, it is necessary to take into account the positive impact on regional and local development opportunities, export prospects, social cohesion and employment opportunities, in particular as concerns SMEs and independent energy producers. (RED, abstract 4)

Also in sustainability approach also described at RED, the “local stakeholders” and “local community prosperity” means “really local”, maximum - region-wide. But not nation-wide (if a state consists of more than one region) as it is in case of existing incentive. If sustainability is applied – no need to place that high barrier for developers.

The producers of biomass/biofuel commodities may also apply for state Certificate of Alternative Fuel Producer issued by the Energy Efficiency Agency of Ukraine and thus get national official recognition. Holding the certificate allows to apply for profit tax exemption. However the procedure requires enhancement to ensure sustainability and/or quality assurance. It is expected that the rules to get the certificate would be upgraded to be based on sustainability as described in the RED.
2.2.3 Testing wood biomass under bilateral or multilateral agreements

To be able to use this approach for the purpose of EU supplies Ukraine must have its own national scheme to test sustainability (could be either designed by itself or “imported” from the EU or any of its members.)

**a. Forestry and Wood Industry**

One way to meet the EUTR requirements is for every operator to implement due diligence system individually. However according to Yuri Derbal (FORZA NGO, Ukraine), there is also a way for the country to implement its own internal procedure for the checks of its exports so that national forestry authority would take responsibility over all the timber exports to the EU. This very approach is now introduced by Swiss government for the supplies to the EU.

Most likely is that EU countries will accept such guarantee from Switzerland as the country is famous for its sustainable forestry activities. Would be good to expect the similar efforts from Ukrainian government. And according to Mr. Derbal Ukrainian Forestry Agency does take the efforts. However Ukraine should do more to meet the EUTR than Switzerland. Those efforts are definitely worthwhile taking even if recognition will not be granted as easily as to some others.

It’s not clear at this point if Ukrainian State Forestry Agency will take responsibility also for the wood biomass sector supplies. Until now they carry no responsibility for it.

Meanwhile Ukrainian government does promote forestry certifications for all state forestries across the country. Also the electronic chip labeling system for timber is under implementation to eliminate illegal timer risks at country-wide level.

**b. Bioenergies and Renewables.**

As explained above, the Ukraine is obliged via the Energy Community to come up with a scheme for at least transport biofuels. When the national scheme is in place – the membership in the Energy Community allows to have even multilateral agreement with all EU MS for sustainable biomass supply for the purposes of RED. Not sure yet if solids will be incorporated into it.
2.2.4 Ways to prove biomass sustainability: Conclusion

So far to prove wood biomass sustainability in Ukraine one may refer only to voluntary certification schemes and procedures (see 1.4.1). Probably the most sure sustainability evidence is provided by using the combination of forestry and bioenergy certification. However quality certification also has its role to enhance sustainable performance.
Chapter 3. Risk Assessment: Public Consultation & Recommendations

3.1 Introduction for the consultation

3.1.1 Proposed set of risks

To assess typical sustainability risks, the approach of public & expert consultation was used. The questionnaire was developed reflecting possible sustainability risks that socially and environmentally responsible investors/businessmen may face in Ukraine. Those risk were grouped in Sections.

The set of risks we proposed didn’t include all of sustainability risks which are currently under discussion within the EU.

Sustainability is not yet approved as government policy in Ukraine regardless of the declarations signed by its governments in the past. Thus we understood that awareness of the concept will very a lot among biomass stakeholders ranging from better awareness among forestry and environmental experts to almost ignorance among local business operators. We still wanted to run the consultation publicly rather than express opinion of a limited circle of experts even to raise the awareness among biomass community. Useless to implement concepts that people have no idea of.

Thus coming with the set of risks we didn’t want to overburden the respondents in Ukraine with all concepts available in the sector in the EU. Rather we offered and expressed risks in the way that would appeal to the current mentality of stakeholders in Ukraine.

Instead we offered the respondents an option to add the important risks which we hadn’t mentioned. In result no one of our respondents had asked us to add concern for ILUC or carbon stocks so far (consultation is still on).

We don’t think that those risks are not important. Rather that currently in Ukraine the stakeholders are concerned about more simple and basic risks or just about other risks than biomass community in EU. Those are things that EU community takes for granted or have less concern for.

However to keep things as clear as possible and to keep EU sustainability concerns in mind we didn’t include into assessment special woody energy plantations/crops (like salix or poplar) nor woody residues from agrifood sector (like kernels etc) to stay focused on wood biomass originating from “normal” wooderies. Doing that we eliminated major risk areas exposed to ILUC.

When it comes to carbon stocks – avoiding assessment for energy plantations also reduces (but not eliminates) the need for this risk assessment. (We are positive that woody energy plantations should
be a subject of separate assessment to be effective for implementation purposes (see suggestions for follow-up at Conclusions Chapter)). Furthermore, we implicitly had touched on carbon stocks risk while asking to assess if respondents are concerned on whether feedstock or biomass come from wastes or residues or not. Even in the recommendations we pointed out that EU guidelines are also in favor to use residues as biomass itself but also as feedstock to produce biomass.

Yet our respondents did use the option to express additional concerns. Thus we decided to add one risk to the set soon after the consultation has begun. It was communicated by UNIDO team expert in Ukraine. The risk was assessed by respondents among the top high (last risk in the field for Investments and Economic Activity Section).

### 3.1.2 Assumptions and Definitions

For the purposes of this consultation, the term "biomass" is defined as solid biomass of wooden origin used by economic operators:

1. as a raw material (feedstock) for the production of other (more comprehensive) types of solid biofuels, primarily for wood chips, briquettes and pellets;
2. as solid biofuel in pressed or not pressed form (firewood, sawdust, wood chips, briquettes, pellets, etc.) which is used for direct energy (heat or electricity) generation in boilers, industrial furnaces and power plants.

### 3.1.3 Rules to fill in the questionnaire

The input from the respondents was taken into account in the following way:

1. **Rank the level for each sustainability risk.**
   Scale of 1 to 5, where 5 - "very high risk", 1 - "unlikely"

2. **Rank the importance to consider this type of risk for the overall sustainability of the project.**
   Scale of 1 to 5, where 5 - "very important", 1 - "not worth mentioning"

3. **Comments if needed can be given in the last column.**

4. **Add a type of risk not included in the questionnaire by filling the field "Other" at the end of each chapter.**
3.2 Preliminary feedback analysis (as of 02.07.2013) for public & expert consultation to assess wood biomass sustainability risks in Ukraine

Regions provided feedback

Regions approached yet no feedback

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Table 3. Type of respondent organization

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<tbody>
<tr>
<td>Science and research</td>
<td>36 56,2</td>
</tr>
<tr>
<td>Biofuel producer</td>
<td>3  4,7</td>
</tr>
<tr>
<td>Forestry</td>
<td>1  1,6</td>
</tr>
<tr>
<td>Consulting</td>
<td>2  3,1</td>
</tr>
<tr>
<td>Non-Profit / NGO</td>
<td>9  14,1</td>
</tr>
<tr>
<td>Design &amp; Engineering</td>
<td>3  4,7</td>
</tr>
<tr>
<td>Government organization</td>
<td>3  4,7</td>
</tr>
<tr>
<td>Media</td>
<td>1  1,6</td>
</tr>
<tr>
<td>Other</td>
<td>6  9,4</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>64</strong></td>
</tr>
</tbody>
</table>

Table 4. Average feedback scores

<table>
<thead>
<tr>
<th></th>
<th>Assessing risk level</th>
<th>How important is the risk for overall sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1. Common Organizational and Legal Issues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1. Document management (missing, incomplete, inadequate)</td>
<td>3,39</td>
<td>3,83</td>
</tr>
<tr>
<td>1.2. The national legislation (unawareness, mismatch)</td>
<td>3,78</td>
<td>4,23</td>
</tr>
<tr>
<td>1.3. Stakeholder consultation (absent, incomplete)</td>
<td>3,34</td>
<td>3,68</td>
</tr>
<tr>
<td><strong>Section 2. Climate Change</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1. No significant improvement for CO2 balance through biomass chain</td>
<td>3,63</td>
<td>3,90</td>
</tr>
<tr>
<td>2.2. Natural disaster:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Landslides and floods (for highlands and mountain area)</td>
<td>3,24</td>
<td>3,55</td>
</tr>
<tr>
<td>2.3. Natural disaster:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Forest fires</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1. Illegal harvesting/logging</td>
<td>3,91</td>
<td>4,10</td>
</tr>
<tr>
<td>3.2. Unofficial supply (unknown origin) of biomass</td>
<td>3,65</td>
<td>3,74</td>
</tr>
<tr>
<td>Section 4. Investments and Economic Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>4.1. Significant change of rules for investors during the payback period</td>
<td>3.78</td>
<td>4.06</td>
</tr>
<tr>
<td>4.2. Corruption and lack of transparency in obtaining permits, approvals and fiscal exemptions/benefits</td>
<td>4.32</td>
<td>4.45</td>
</tr>
<tr>
<td>4.3. Lack of transparency, illegal pressure from fiscal and inspection bodies</td>
<td>4.24</td>
<td>4.37</td>
</tr>
<tr>
<td>4.4. Fraud, forgery, bribery and other illegal activities, initiated by the company itself or its employees</td>
<td>3.70</td>
<td>3.94</td>
</tr>
<tr>
<td>4.5. Lack of transparency in matters of land acquisition</td>
<td>3.85</td>
<td>4.05</td>
</tr>
<tr>
<td>4.6. Lack of transparency and inefficiency of the judicial system to protect the investor’s rights</td>
<td>4.00</td>
<td>4.50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 5. Ecology</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1. No environment impact assessment</td>
<td>3.62</td>
<td>3.81</td>
</tr>
<tr>
<td>5.2. Water and soil pollution by sewage and waste</td>
<td>3.91</td>
<td>4.17</td>
</tr>
<tr>
<td>5.3. Air pollution / lack of flue gas purification / inefficient combustion</td>
<td>3.92</td>
<td>4.16</td>
</tr>
<tr>
<td>5.4. No waste management</td>
<td>3.89</td>
<td>3.90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 6. Construction and Production</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1. Absence / mismatch of project design documents, expert examinations and relevant permissions</td>
<td>3.48</td>
<td>3.89</td>
</tr>
<tr>
<td>6.2. Late, poor, unskilled performance of works by contractors</td>
<td>3.54</td>
<td>3.79</td>
</tr>
<tr>
<td>6.3. The use of inefficient, non-specialized, low-quality or outdated equipment, vehicles, machinery and technology</td>
<td>3.81</td>
<td>3.94</td>
</tr>
<tr>
<td>6.4. No quality management system for production in place</td>
<td>3.60</td>
<td>3.69</td>
</tr>
</tbody>
</table>
## Section 7. Working Conditions

| Violation of working conditions / safety regulations | 3.37 | 3.65 |
| On-the-job training is not provided | 3.02 | 3.38 |
| Fire safety violation | 3.38 | 3.63 |
| Social security system is not in place | 3.56 | 3.63 |

## Section 8. Local Community Well-Being

| No impact assessment on local community and stakeholders | 3.77 | 3.86 |
| No transparent interactions with the local residents / community | 3.70 | 3.97 |
| Failure to provide priority employment opportunities to local population | 3.37 | 3.59 |
| Competition with local use of wood waste and residues | 3.16 | 3.30 |
| No plan to contribute to the development of local social and economic infrastructure | 3.45 | 3.67 |

## Section 9. Economic Planning

| Absence of long-term planning and agreements for biomass provision | 3.85 | 3.98 |
| Risk of failure/contract violation by biomass suppliers | 3.75 | 3.89 |
| No economic forecasting of prices for biomass to be supplied during the payback period | 3.63 | 3.77 |
| No assessment of available transport infrastructure (dirt roads, off road) | 3.83 | 3.79 |
| Lack of available local workers with appropriate qualifications and skills | 3.12 | 3.48 |

## Section 10. Use of Wood Wastes

| Wastes and residues are of unknown/uncertain origin | 3.40 | 3.58 |
| Use of wood that is not classified as waste | 3.61 | 3.79 |
| Use of wood waste contaminated with radionuclides and (or) hazardous substances | 3.53 | 3.63 |

### Mark ups used in Table № 4:

Higher risk values (2nd column) are marked up with the following colors:

- **red** - high risk (over 3.60)
- **brown** - very high risk (over 3.90)

Higher values to assess risk importance for overall sustainability (3rd column) are marked up:
- in **bold** print for values over 3.70;
- in **bold print and underlined** for values over 4.00.

More detail analysis of the consultation is provided at [www.biomass.in.ua](http://www.biomass.in.ua)
3.3 Risk assessment and recommendations

The purpose of the project is to help assess project (idea) sustainably prior to its implementation while typical certification deals with the already operating facility. Together with assessing the risk this Section also provides recommendations on how to avoid or at least mitigate those.

3.3.1 Internal vs. external risks

Via the consultation it was offered a wide set of risks that effect sustainability whether or not the risk itself is of internal or external character. Under internal risk we consider a risk that is up to the biomass operator. The rest of risks are considered as external.

To made successful installation in real life case one has to consider and deal with both. However when it comes to sustainability certification – the auditor will off course be evaluating only operator’s (sustainable) performance regardless of the external risks that one had faced to implement it.

During the consultation it was assessed that some of external risks are in fact of too high importance for Ukraine. Therefore under this project we decided to cover those risks with recommendations as well. Also a number of risks are of both external and internal character. Those risks we assume as cross-character risks and cover with recommendations twice.

Diagram 6. Cross Character Risks

3.3.2 External risks

Of the assessed risk we consider the list below as those which originated not by the operator. Some of those may appear even as serious challenge to the project. Hopefully as national legislation for bioenergies and for investment sphere develops – those external risks would lessen as time goes by. One of the possible development scenarios for Ukraine would be to come up with the rules to support
biomass sustainability performance. Meanwhile the operator has to consider those risks while developing the project idea and find ways to deal or avoid those risks also in sustainable way. Most of the external risks are part of the Section for Investments and Economic Operations:

Section 4. Investments and Economic Operations

This Section was assessed as the one with high risks. As the mentioned risks deal mostly with effectiveness of government and government policies of Ukraine at all levels (that’s why it’s under External Risks) we would like to express that the World Bank’s annual Doing Business ranking finally shows some overall progress for Ukraine especially in the area of construction permits which is of real importance for biomass sector. In general WB assessment corresponds to the feedback from the consultation respondents. Thus we hope that the trend for positive business climate improvements maintains as the potential for that is really big.

Table №4. World Bank Ease of Doing Business 2014 ranking for Ukraine

<table>
<thead>
<tr>
<th>TOPICS</th>
<th>Doing Business 2014</th>
<th>Doing Business 2013</th>
<th>Change in Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting a Business</td>
<td>47</td>
<td>50</td>
<td>+3</td>
</tr>
<tr>
<td>Dealing with Construction Permits</td>
<td>41</td>
<td>186</td>
<td>+145</td>
</tr>
<tr>
<td>Getting Electricity</td>
<td>172</td>
<td>170</td>
<td>-2</td>
</tr>
<tr>
<td>Registering Property</td>
<td>97</td>
<td>158</td>
<td>+61</td>
</tr>
<tr>
<td>Getting Credit</td>
<td>13</td>
<td>24</td>
<td>+11</td>
</tr>
<tr>
<td>Protecting Investors</td>
<td>128</td>
<td>127</td>
<td>-1</td>
</tr>
<tr>
<td>Paying Taxes</td>
<td>164</td>
<td>168</td>
<td>+4</td>
</tr>
<tr>
<td>Trading Across Borders</td>
<td>148</td>
<td>148</td>
<td>No change</td>
</tr>
<tr>
<td>Enforcing Contracts</td>
<td>45</td>
<td>45</td>
<td>No change</td>
</tr>
<tr>
<td>Resolving Insolvency</td>
<td>162</td>
<td>157</td>
<td>-5</td>
</tr>
</tbody>
</table>

More: [http://www.doingbusiness.org/data/exploreeconomies/ukraine#protecting-investors](http://www.doingbusiness.org/data/exploreeconomies/ukraine#protecting-investors)
Keeping the above in mind let’s look at the risks assessed by consultation one by one.

4.1. Significant change of rules for investors during the payback period

Investment climate in Ukraine still requires improvements. The practice to treat already functioning investments fairly and consider those while introducing legislative proposals is still not as common as it should be. However the fact of implementing European Energy Law under Energy Community Ukraine’s membership as well as adapting to the Association with EU allows to forecast more investor friendly environment. However it’s a must to have local legal advisor and be updated on possible changes in regulations and legislation. Normally significant laws influencing bioenergies in Ukraine go through the approval process including first and second readings in the Parliament involving also discussions within parliament groups. All of it takes time which may allow operator either to mitigate to the coming changes or even provide insight to the legislation process. To express one’s opinion one may address biomass departments at National Energy Efficiency Agency, Ministry of Agriculture, Agency of National Projects (Energy of the Biomass Project), Green Investments Agency as those are traditionally active when discussing legislative amendments on biomass and renewables. Although Forestry Agency doesn’t carry on responsibility for bioenergies in Ukraine yet they are doing sustainable foresters and oversee forestry biomass flows. Thus may be of help on the matter as well.

4.2. Corruption and lack of transparency in obtaining permits, approvals and fiscal exemptions/benefits

Regardless of promises to simplify the permits and other related procedures the system still requires significant performance improvement. This sector was traditionally one of the most corrupted in Ukraine. Ukraine takes efforts noticed even by international community to reduce the number of permits and licenses. Yet while developing project one still faces authorities. Some of those could be very helpful. Yet even one corruptive authority may hinder the whole project. Publicity is always a good way to mitigate corruption. If project has foreign investor – it is advised to keep updated on your project progress both the appropriate Embassy and Ukrainian government body responsible to attract foreign investments – that is investment Agency and its regional branches. In Ukraine these days one of the important ways to evaluate how effective are local governments – both regional and district governments- is through how they attract investments. When those are informed of the intentions to build sustainable biomass project with clear PPP positive influences – they normally have enough authority to assist investor avoid most of the corruption. Lack of transparency in some of the routine operations of government bodies makes investor also feel vulnerable. In part it’s because the regulation system is not well-designed yet. Very important to follow advices from the government bodies themselves which are off course aware of the routine. Most of those bodies are listed for previous risks mentioned above. If person specifically faces corruption – one may follow advices from the Anticorruption web-portal http://www.acrc.org.ua/ua/news-and-events/articles/all/korupcziya-v-nashomu-sviti-rich-prirodna.html (Ukrainian only)

4.3. Lack of transparency, illegal pressure from fiscal and inspection bodies

http://www.acrc.org.ua/ua/news-and-events/articles/all/korupcziya-v-nashomu-sviti-rich-prirodna.html (Ukrainian only)
This risk which is assessed as one of the top appears mainly at local level. And the most effective would be to deal with it at the same level staying in touch with local government including offices for investments and regional development. At the same time one should be in touch with good reputation lawyer. Other support one can get as the benefit from establishing sustainable relationships with local community represented by elected officials (deputies) or NGOs. By no means one should get involved in corruption. It makes you even more exposed for further illegal pressure.

| 4.5. Lack of transparency in matters of land acquisition | 3.85 | 4.05 |

One of the traditional corruption risks for Ukraine. One must have legal advisor with good reputation and experience in the subject with successful project portfolio as Ukrainian legislation especially for land property is often not effective to meet business needs (Practical experience from wood pelleting project in Ukraine). As a general rule one should seek advice from local government as they normally have a list of property available for business purposes. If you don’t see that local government well-cooperating to assist realize your business project – better consider other location where you would be more welcomed. Also as a general advise it is good to formalize relationships with local governments. One may start with letter of intentions where the operator tells of its intention to build sustainable biomass facility while the local government (both administration and council of the deputies) claims their readiness to assist the investor within their responsibilities. More on that find at Summary for Project Developer (Attachment E)

| 4.6. Lack of transparency and inefficiency of the judicial system to protect the investor’s rights | 4.00 | 4.50 |

| 9.2. Risk of failure/ contract violation by biomass suppliers | 3.75 | 3.89 |

Section 9. Economic (operational) Planning

This risk is normally not even viewed by any of sustainability certification schemes however it’s a vital aspect to make the project feasible and get funding. Normally in Ukraine the risk of supply failure is higher than in the EU. Average Ukrainian wood pelleting plant usage rate is way less than average in NL, Austria, Germany etc. One of the reasons for the phenomena – more exposure to supply failures.

One reason is generally lack of business ethics but also less efficient judiciary system in place to force reimbursements/penalties.

For sure all supply contracts should be properly documented. Yet having contract is not a guarantee that supply is there on contract terms.

Supply management in Ukraine should be done carefully and use several approaches.

To minimize the risk one may consider taking itself as much responsibility for supply as possible. Must be ready to collect (not harvest – only forestries could do that), transport and process primary forestry residues as well as biomass from thinning. In Ukraine forestries often lack capacities to collect wood logging residues and biomass from thinning.
Other option is to work with several contractors which may require big size storage place for feedstocks. To have big storage place is welcomed not only in Ukraine but all over the EU. Only very few of the suppliers are able to store their wood waste protected from moisture. To mitigate risk of law quality supply one should rather pick up the wastes from suppliers as soon as those come up and thus have own large enough storage facility. Yet one should still consider the risk that in time there is be more demand in wood wastes in the area and thus more temptation for biomass suppliers to break their contracts. One should also consider investing into wood processing facility and thus become owner of the wastes. Even at this moment not many forestries have convenient types of wood wastes available (sawdust or wood chips). Yet what is lacking all over Ukraine are up-to-date wood processing plants that most of the forestry regions may welcome and have timber resources for.

To summarize, the risk could be mitigated by the following ways:

- All major supplies are contracted with insurance
- One should always have backup sources for feedstocks/biomass supply (keep ongoing supplies from more than two sources)
- Should be using a fairly large storage for feedstocks/biomass
- Should be considering own deep processing of larger residues (not just sawdust or wood chips) even those from thinning
- Consider getting involved in wood processing thus owning wastes and residues if there are no local competitors
- If there are competitors – check if those are interested to join efforts. A number of the local woodworking sites mostly SMEs would welcome having business partner bringing fueling investment. Mortgage (with reasonable interest rate) is often a problem in Ukraine

| 9.5. Lack of available local workers with appropriate qualifications and skills | 3.12 | 3.48 |

The risk is assessed as one of the lowest but still far from being negligible. In most cases biomass facilities are located in rural areas and that’s why the risk appears. Still recommended to place facility in a hub location at reasonable distance from several settlements to be able look for staff from a larger community. Also don’t be driven by looking for location with the highest unemployment rate thinking that labor would be cheapest and most available. You may find that local residents have accustomed to their own life style which doesn’t allow them to become effective and reliable workers. Don’t look for in Ukraine for those willing to work for cheap. Those may not care of how they perform. Look for those who are interested to earn more.

**Section 6. Construction and Production**

| 6.2. Late, poor, unskilled performance of works by contractors | 3.54 | 3.79 |

One should always seek to find contractors with good reputation in Ukraine. That’s the key to make the design, construction and installation process manageable in Ukraine. Common mistake of foreign investors is assumption that costs in Ukraine are always cheaper. So investors tend to go after those
cheaper prices. A number of businessmen in Ukraine can easily promise things that they know in advance they will not keep to. Often mentality of local contractor is the following – they may promise a lot just to get the contract signed. Don’t make your choice in Ukraine based on lower price. However if you do so – don’t pay in advance to those whose reputation is not proven. Also before you hire contractor – make sure he has proper skills, capacity and licenses. Make your assignment as specific as possible and part of agreement. (It will not give you 100% assurance yet will reduce the risk somewhat) May have sense to get insurance against the risk of contractor’s failure if you still question the reputation of contractor. Avoid making tight plans to start biomass supplies (or energy supply) until the installation process is over.

Section 2. Climate Change

The risks below are of external and internal character

<table>
<thead>
<tr>
<th>2.2. Natural disaster:</th>
<th>2.3. Natural disaster:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Landslides and floods (for highlands and mountain area)</td>
<td>B. Forest fires</td>
</tr>
<tr>
<td>3,24</td>
<td>3,55</td>
</tr>
<tr>
<td>3,23</td>
<td>3,57</td>
</tr>
</tbody>
</table>

One must consider increasing risk of landslides and floods in Carpathians which is one of the main forestry areas of Ukraine. The risk showed increase after the collapse of the USSR due to lack of control and finances into forestry management which had especially bad effect on mountain areas. However the risk is observed all over the Carpathians (not only in Ukrainian part of it). Link in Ukrainian: [http://www.ie-rs.org/videomaterialy/poveni-ta-zasuchy/188-poven-ta-zasuhi-dv-problemi-odne-rshennya-dokumentalniy-film.html](http://www.ie-rs.org/videomaterialy/poveni-ta-zasuchy/188-poven-ta-zasuhi-dv-problemi-odne-rshennya-dokumentalniy-film.html) Link in English: [http://www.youtube.com/watch?v=yGcKLX601Ng&feature=c4-overview&list=UU1jaTrcZukYLoW2PwMYRW-g](http://www.youtube.com/watch?v=yGcKLX601Ng&feature=c4-overview&list=UU1jaTrcZukYLoW2PwMYRW-g) Choosing location of the facility and solution for infrastructure as well as their design should be done using designers aware of the risk and capable to mitigate it.

Danger of forestry fires raises more in non-mountain areas as summers get drier. Also wood biomass facilities do require fire protection measures anyway. To choose location and facility design one should consider forestry fires hazard as well.

Mitigating the above risks in the area where the facility is located should be also considered among company’s inputs into local sustainable development for the forestry and community.
3.3.3 Internal sustainability risks

What we call here as internal sustainability risks are actually the risks which are evaluated by auditors. Thus those risks are assumed to depend on the biomass operator.

However let us start from mentioning risks where the risks itself doesn’t come from the operator. Yet the biomass operator may respond to those risks in non-sustainable way which should not happen off course and thus is subject to be evaluated by auditor. Those risks are part of:

Section 4. Investments and Economic Operations

| 4.2. Corruption and lack of transparency in obtaining permits, approvals and fiscal exemptions/benefits | 4.32 | 4.45 |
| 4.5. Lack of transparency in matters of land acquisition | 3.85 | 4.05 |
| 4.6. Lack of transparency and inefficiency of the judicial system to protect the investor’s rights | 4.00 | 4.50 |

We think that internal part of those risks could be therefore summarized as

Risk for the operator to get involved in corruption or other illegal activities initiated by other stakeholders

Assessment values for these risks are not available as it was not explicitly assessed via consultation. Corruption and a number of similar illegal practices are generally condemned by operators in Ukraine but then unlike most of EU countries business community in Ukraine may still allow themselves to take part in corruption if they don’t see other way to solve this or other issue. In this case they don’t think it’s their fault if they were forced by other body that they have no authority over. Every investor should keep this risk in mind as one may find himself in the situation when local (Ukrainian) advisor would advise (teach) him of “how the issues are resolved in this country”.

Also all management staff in Ukraine should be informed well that no illegal activity is allowed regardless of how other market players handle similar situations in Ukraine.

| 4.4. Fraud, forgery, bribery and other illegal activities, initiated by the company itself or its employees | 3.70 | 3.94 |

The investor has to be very careful about appointing company’s management in Ukraine. Better if you appoint person whose integrity you know from your own experience. Or one can get advice from some close partner with experience in Ukraine. The owner should communicate well to the management that integrity is vital for every single operation. The owner should welcome that staff would contact management if they have doubts about specific situations. One must also be patient
with his staff in Ukraine as people’s business mentality is different in Ukraine. Also corruption is generally condemned but than many think it’s ok if they do little corruption when they see profit from it. At the same time there are also many people in Ukraine who would appreciate working for the company that confesses business integrity. Recall a story from a sales manager who was afraid to loose huge contract as his client demanded some personal gift for signing the contract. The sales manager asked his boss (from Sweden) what to do. The boss explained that the company should not do what’s illegal. They lost the contract. Yet the sales manager didn’t loose the job. He feels safe to run business with integrity.

On the other hand it is always sad to hear of foreign managers come to Ukraine thinking that corruption is the only way to do business successfully in Ukraine. One must be then aware that all those practices are illegal. And for sure such biomass operations are not sustainable regardless of how good is the products quality and/or price.

Section 1. Common Organizational and Legal Issues

1.1. Document management (missing, incomplete, inadequate)  
Most of wood biomass facilities are rather small in Ukraine and therefore try to reduce document management costs. Ukrainian legislation does allow simplified accounting for certain forms of small companies. However it should not be less simple than that. Also some additional document management may be required as a chain-of-custody proof for biomass sustainability (forestry certification) and to keep track of mass balance (biomass certification). Advice on that has to be taken from the field experts.
In general if company is ISO 9001 certified the risk becomes negligible.
The risk is covered by FSC and NTA8080.

1.2. The national legislation (unawareness, mismatch)  
Risk is assessed as very high. One must take efforts to keep being well informed of the relevant legislation. Often businessmen in Ukraine justify themselves by not doing things they should because of competition with other operators who allow some shady activities. According to the info from consultation run by Swiss-Ukrainian forestry project (www.forza.gov.ua) about 40% of timber and wood industry products turnover in Carpathians were in shade in 2008. Similar situation is for wood biomass.
The risk for mismatch or unawareness is rather high especially for wood biomass sector as this is rather new sector in Ukraine where legislation is still not as clear and complete as it should be.
Review on national legislation on bioenergies may be found at http://english.agentschapnl.nl/sites/default/files/2013/09/Bioenergy%20opportunities%20in%20Ukrain%20%20Tebodin%20%202013.pdf
If organization is ISO: 9001 certified – this risk would be partly covered. ISO 14001 should be able to provide even more assurance. The risk is covered by FSC and NTA8080.
1.3. Stakeholder consultation (absent, incomplete)  

This particular risk is assessed as lower one comparing to a number of others. However a number of field experts had assessed much higher than the average. And our team would also like to pay more attention to it. The whole issue of stakeholder consultation was never taken seriously neither in the former USSR nor currently in Ukraine. You will find difficult even to explain the term stakeholder to the residents in Ukraine just as it is also in case with the term “sustainability”. The awareness of the term and the concept of stakeholders and the need exists only among auditors and among the companies who already applied for certification. Yet existing biomass community hadn’t embraced the concept and the need in it yet. They look at it as of additional burden and as of source of threat for their operation rather than a way to make business stronger.

One has to train personnel how to run stakeholder consultation. Examples and advices can be taken from NGOs active in forestry areas (like FORZA).

Also one may learn from experience of stakeholder consultation under P4P NL Agency project yet in agricultural rural area in Ukraine.

The risk is well – covered by FSC and NTA8080.

Section 2. Climate Change

2.1. No significant improvement for CO2 balance through biomass chain

So far there is no European binding criteria for GHG performance for solid biofuels. What we have is Recommended Criteria by European Commission part of the relative EC Recommendation aired in 2010.

Therefore to prove GHG sustainability one should either come up with his own assessment to comply with EC recommended criterion or comply with requirements of NTA8080.

In the EC Recommendation report it is “recommended that the GHG performance criterion is not applied to wastes” used as fuel as those “routinely achieve high GHG savings”.

Products of forestry origin such as wood pellets or briquettes, wood chips and charcoal are to be assessed.

The recommendation is to use LCA (Life Cycle Assessment) with the same methodology that is laid down in the Renewable Energy Directive for consistency purposes. “As it makes sense to use the same methodology for all types of bio-energy”.

Therefore the final minimum savings must be 35% and raising to 50% on Jan 1, raising to 60% from Jan 1, 2018 for installations where production started on after Jan 1, 2017.


That’s why we recommend to take 60% criteria in sigh of possible soon to come changes to EU sustainability criteria.
However must be noted that the LCA method in the RED follows the energy chain from source to final energy which in the RED is fuel itself. However in case of solid biomass the final energy is not the final fuel, but electricity, heating and cooling.

Thus to assess GHG performance of biomass one should also include conversion of the biomass fuel into energy.

Methodology to assess GHG saving for solid biomass can be found in Annex 1 of the EC Recommendation report.

The Annex 2 of the EC Recommendation provides typical and default values for GHG emissions for a number of the most common solid biomass fuels. Among those one can find wood chips, wood pellets and briquettes originated from European temperate continental forests which is also the case for Ukraine. Those emissions were calculated with no net carbon emissions from land use changes. This requirement is also met in the current consultation where cultivated wood biomass types (like salix) were excluded.

Based on this methodology and on emission values provided we got the following results for GHG emission savings:

<table>
<thead>
<tr>
<th></th>
<th>Typical GHG emissions, gCO2eq/MJ</th>
<th>GHG savings (case of typical values), %</th>
<th>Default GHG emissions, gCO2eq/MJ</th>
<th>GHG savings (case of default values), %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood briquettes or pellets from forest residues (European temperate continental forests) – using wood as process fuel</td>
<td>2</td>
<td>97</td>
<td>96</td>
<td>2</td>
</tr>
<tr>
<td>Wood briquettes or pellets from forest residues (European temperate continental forests) – using natural gas as process fuel</td>
<td>17</td>
<td>77</td>
<td>65.6</td>
<td>20</td>
</tr>
</tbody>
</table>

* - case of Europe, transportation neglected

Economic operators may use either actual emission values to be calculated for their own cases or just take default values provided by the EC.

The values in the above Table 4 don’t really show any serious concern about not meeting the goals set by RED.
However the respondents had expressed their concern of the situation in Ukraine. As a matter of fact we share this concern for the following reasons:

1. **Less efficiency than in EU.**
   - Total emissions in the case for non-cultivated wood biomass with no land use change and no carbon stock emissions consist of emissions from:
     - processing;
     - transport and distribution;
     - emissions from fuels in use.
   They also depend on combustion efficiency which heavily depends on energy production method (heat, electricity or combined) as well as on individual installation.
   All of the above deal with efficiency for the processes, machinery and vehicles which is on the average lower in Ukraine than that in the EU. Not only energy-efficiency is involved but also lack of energy-saving, less efficient management for all processes. Therefore the values applied to the EU should be adjusted to Ukraine.
   The reality of this concern was proved recently by a GIZ study project on sustainability for biofuels in Ukraine. It showed that real savings from biofuel feedstocks in Ukraine are less than default values provided by RED.

2. **Ukraine’s standards for energy and transport are not as strict as in the EU.**
   - This concern is related to the previous one.

3. **Transportation distance for biomass to be supplied to EU is significant.**
   - This one refers mainly to wood pellets and wood briquettes as so far most of those products are supplied to EU and have less demand at internal market. Therefore the delivery and distribution distance in most cases is more than one assumed for EU typical and default values where emissions for transportation and distribution were considered as negligibly small (see EC communication on default values for biofuels (2010/C 160/01)).
   - Let’s see if transportation emissions could still be neglected.
   - 1000 km delivery of 22 metric tons of wood pellets by diesel truck (which is the case for deliveries to South-East of Germany, Austria and in some cases even to destinations in Poland) would add over 3 gCO2eq/MJ. Distances and thus emissions to other big markets like West of Germany, Italy, Benelux and Denmark would be twice as much or more.

Adjusted tables of GHG saving would then look this way
Implementation of sustainability assessment for wood biomass project proposals in Ukraine

Table 6. Adjusted GHG emission values and savings for wood briquettes/pellets*

<table>
<thead>
<tr>
<th></th>
<th>Typical GHG emissions, gCO2eq/MJ</th>
<th>GHG savings (case of typical values), %</th>
<th>Default GHG emissions, gCO2eq/MJ</th>
<th>GHG savings (case of default values), %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>heat</td>
<td>electricity</td>
<td>heat</td>
<td>electricity</td>
</tr>
<tr>
<td>Wood briquettes or pellets from forest residues</td>
<td>5</td>
<td>93</td>
<td>90</td>
<td>93</td>
</tr>
<tr>
<td>(European temperate continental forests) – using wood</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>as process fuel – final product truck delivery 1000km</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood briquettes or pellets from forest residues</td>
<td>20</td>
<td>73</td>
<td>59.6</td>
<td>69</td>
</tr>
<tr>
<td>(European temperate continental forests) – using</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>natural gas as process fuel – final product truck</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>delivery 1000 km</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* - case of import from Ukraine, truck delivery 1000km

Wood pellet application for heating is still “safe” regardless of the application.
Supplies for power plants in EU are already not so sure depending on what GHG performance criteria is applied.

However above given values would be less optimistic when considering lower energy-efficiency rate for processes in Ukraine resulting in adding GHGs along the life-cycle chain. For instance one may consider Annual Ukrainian Energy Index Ratings comparing Aggregated Energy efficiency of different regions in Ukraine with average EU level. The data shows almost twice less performance for Ukraine.


Therefore to achieve significant carbon footprint benefits from realizing biomass projects in Ukraine – one should look for the best practices and management along the whole life-cycle chain to ensure GHG efficient solutions. It will secure investments as GHG thresholds may grow stricter in few years. Also for a long distance supplies to EU one should prefer train or marine (where applicable) deliveries which would be more cost and carbon efficient. To do that one should be operating rather big pelleting facility.

At the moment there exist different proposals across the EU as to the GHG savings criteria. Since 2012 it’s a must to provide GHG saving rate when applying for EN plus

However those values are not really reflecting the EC Recommendation proposal with the need to calculate final saving from the resulting energy which depends on the conversion technology and
efficiency. The assumption for ENplus is that all the certified pellets are meant for household applications and not for industrial power sector.

So far only the NTA8080 provides a scheme with comprehensive consideration of the EC Recommendation for solids.

Even if EC comes up with a different criteria than the one presented in 2010 – then according to NEN which manages NTA8080 - the scheme will be able to get upgraded if required.

### Section 3. Forestry Environmental Management and Biodiversity

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Score</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Illegal harvesting/logging</td>
<td>3.91</td>
<td>4.10</td>
</tr>
<tr>
<td>3.2</td>
<td>Unofficial supply (unknown origin) of biomass</td>
<td>3.65</td>
<td>3.74</td>
</tr>
<tr>
<td>3.3</td>
<td>The biomass feedstocks originates from the forestries with no sustainable management system implemented</td>
<td>3.32</td>
<td>3.36</td>
</tr>
<tr>
<td>3.4</td>
<td>The feedstock biomass comes from sources not certified by any of independent certification systems (ISO 9001, 14001, FSC, etc.)</td>
<td>3.39</td>
<td>3.49</td>
</tr>
<tr>
<td>3.5</td>
<td>Use of biomass which has more valuable economic value (is not classified as waste or residues)</td>
<td>3.48</td>
<td>3.75</td>
</tr>
<tr>
<td>3.6</td>
<td>Own harvesting of feedstocks biomass by the technology that causes significant damage to the remaining forest resources/plants</td>
<td>3.62</td>
<td>3.90</td>
</tr>
<tr>
<td>3.7</td>
<td>Violation of protected areas and of forests with high conservation value (eg. virgin forests)</td>
<td>3.64</td>
<td>4.05</td>
</tr>
<tr>
<td>3.8</td>
<td>The deterioration of forest soils when it depends on a certain amount of wood waste to be left for digestion</td>
<td>3.33</td>
<td>3.55</td>
</tr>
<tr>
<td>3.9</td>
<td>The threat for natural landscapes by industrial and infrastructure facilities</td>
<td>3.35</td>
<td>3.79</td>
</tr>
</tbody>
</table>

The risks in this section were put up in the way that they are the recommendations themselves.

To make sure one is effective in dealing with those is good to get advice from organization actively involved in forestry certifications affairs in Ukraine (mostly FSC) or with NTA8080.

Even if one has experience with sustainably certified business in the EU – it is important to get advice from consultants with Ukrainian experience how to build up and operate the project avoiding the risks.

Summarizing most of the above risks it may have sense to do as much job in supplying feedstocks by yourself avoiding dealing with partners with not sure reputation as the sustainability assumes chain-of-custody approach for biomass flows. As a positive trend each year there are more FSC-certified operators in Ukraine.

We could advise to refer to the experience of Swiss-Ukrainian forestry project FORZA for the experience how to make a plan to do sustainable business in forestry areas of Ukraine (www.forza.gov.ua)
Most of the risk are covered well both by FSC and NTA8080. However NTA8080 gives more preferences to the projects where biomass or energy from it is produced from wastes or residues.

**Section 5. Ecology**

| 5.1. No environment impact assessment | 3.62 | 3.81 |
| 5.2. Water and soil pollution by sewage and waste | 3.91 | 4.17 |
| 5.3. Air pollution / lack of flue gas purification / inefficient combustion | 3.92 | 4.16 |
| 5.4. No waste management | 3.89 | 3.90 |

The whole Section consists of top risks. Not only that the respondents consider as important to monitor the risks but they are also sure that wood biomass sector already has very high environmental risks.

Let’s first describe why it is so and then would look at what can be done under current circumstances. Ukraine’s economy is one of the most polluting in Europe. In general government policy has been ineffective to provide incentives to attract environmental investments required. No wonder that it’s common thing for business operators to try spend as less as possible into pollution reduction and waste management if they don’t see opportunity for fast capital return.

Biomass sphere is not exception in this rule. Filters and pollution prevention technologies are often considered as unnecessary burden by the biomass community. They think of it as at barrier that makes many biomass projects unfeasible.

To be fair we should admit that the sector of SMEs in Ukraine is unable to have access to funds with reasonable interest rate. Being environmental gives their project no preference over other applicants. International lending facilities operating in Ukraine (like IFC and USELF) unfortunately prefer to deal with larger projects. Thus only bigger companies or holdings may effort applying. Only NEFCO is available for middle scale projects. Yet the selection procedure is the longest there.

Also the pollution risk is assessed as high due to the fact that the government specifically welcomes efforts to replace natural gas to avoid paying high prices for its import.

However replacing natural gas with non-gaseous carbon fuels like oil, coal or biomass would obviously lead to increase pollutions if no special efforts are taken for pollution prevention and control.

According to Strategic Environmental Review performed by USELF program:

...Financial hardships could force enterprises to switch from more expensive gas to coal and oil as a source of energy...If under such circumstances there will be no available financing to control and reduce pollution ... then air pollution in industrialized part of Ukraine will continue to increase.

*It is expected, that when new renewable energy facilities appear in the regions with high pollution levels those would allow to lessen the severe air pollution through replacement of fossil energies by environmentally clean and carbon-neutral types of energy, which would lead to lessen the pollution volumes.*

Feedbacks from respondents shows that they share the need not to increase pollution and they question that wood biomass is doing that in Ukraine.

As the risks are assessed as high – the most effective tool used worldwide is for every biomass company to come up with environmental impact assessment (EIA) whether or not it is required from by current national legislation.

If it is required – one should follow national rules for it. If not - one should volunteer to do it to make sure the risks are mitigated. Environmental NGOs may be asked for help with that.

Ukrainian legislation on EIA undergoes changes. Since 2011 in the efforts to lessen administrative burden, the government reduced the list of economic activities for a must state examination of the company’s EIA. The biomass is not part of the list. The only exception could be when transboundary effect is present meaning that the examination may be required in the regions alongside Ukrainian boarders.

Yet as Ukraine is heading to implement EU legislation there was already an effort of Cabinet of Ministers to introduce the rule at wide scale again (on Aug 28, 2013) so that the sites like biomass will most probably be subject to it. The Cabinet of Ministers thus is already considering to harmonize the national legislation on environmental impact assessment (Directive 85/337/EEC on EIA with amendments from the Directive 97/11/EC and Directive 2003/35/EC) as this is part of the Action Plan within Energy Community membership.

While the Cabinet of Ministers is discussing and negotiating the final national regulation, proper environmental impact assessment is already a must to get funding for biomass projects through the EBRDs USELF program and for NEFCO.

One may refer to those organizations for guidelines.

However most tailor-suited and clear solution for the environmental challenges for biomass in Ukraine could be met via applying simple NTA8080 principle:
quality of air, water (surface and ground) and soil should be preserved if not improved.
The principle is very important especially when thinking of replacing almost zero polluting energies based on natural gas.

One should explain this task to the project designer who may thus come up with proposal to install least polluting and most energy-efficient technologies in combination with best available filter technologies and recycling.

Other NTA principle is to avoid burning unless it’s fully controlled including control over fine particles from fuel gases. This principle should also be considered for project design.
In addition to sustainability, applying this rule by wood pellet producer is great advise how to make better quality (premium) pellets (light color and less ash) valued most by household sector across the EU and even in Ukraine.

In result the producer may even apply for ENplus certificate for premium quality wood pellets welcomed all over the EU.

Applying the principles from NTA will also help producer to communicate his EIA for stakeholder consultation and get support by local community.

These principles could also be used likewise by Ukrainian government to make sustainable switch from natural gas.

Likewise the principles of NTA should be used for every fuel switch (from one fossil to another and from fossils to biomass) as an effort of sustainable energies.

If this criterion is in place – it opens up wide public support for biomass around Ukraine. So far we see that residents in local communities using gas heating are skeptic about switching to biomass which is clearly reflected by the consultation feedback.

This sustainability principle is thus highly recommended to be embraced as criterion for project selection for municipal heating and for all other projects which receive government funds or other support also from international funds.

**Note:** generally the assessment on landscapes is also part of EIA. Yet it is also part of forestry management. As our project is on wood biomass we had placed the risk within Section for Forestry environmental management and Biodiversity.

Last but not least. It’s not enough to design and build biomass project embracing best practices. It will be meaningless if company fails to manage the facility according to the project design.

Thus the company should embrace environmental management in its daily operations. That would require proper training for personnel. Training and applying for ISO14001 would of sure benefit to reach this purpose. And a proof for sustainability. And a vital step towards NTA8080.

**Section 6. Construction and Production**

| 6.1. Absence / mismatch of project design documents, expert examinations and relevant permissions | 3,48 | 3,89 |

In Ukraine there is a typical practice to start project not at where it should start. The role of project design is thus often ignored.

Biomass producers think of it as of unnecessary administrative burden. One can often find businessmen building biomass facilities without any project design. Only when they see that installation is over – they contact project designer to ask for official papers. They also try to find the cheapest way to get those papers. Then the project in the papers may not even meet national legislation as the project designer is not qualified enough. Even if project design papers are in line
with legislation – they probably don’t reflect the real application as the factory was build before and not in accordance with the project. Such a factory could not meet independent auditor’s on-site inspection.

If investor is buying already operating facility - one should check out not only how the wood biomass is produced but also whether the facility has proper set of documents required by legislation and whether those documents are realistic for the actual facility (the set of document may look right but it doesn’t correspond to real case).

Try to find real reason why the seller sells the plant. (Often the reason is that the factory was build in wrong way and it doesn’t perform well).

To build new biomass project or to do retrofit of the existing facility one should carefully select a designer preferably with experience for biomass.

Typical list of mistakes during project design phase are part of Attachment C (Information provided during roundtable in Zaporizhzya).

<table>
<thead>
<tr>
<th>6.2. Late, poor, unskilled performance of works by contractors</th>
<th>3,54</th>
<th>3,79</th>
</tr>
</thead>
</table>

Respondents marked the risk as important one but didn’t mark it as very high though. The reason for that is that in Ukraine businessmen try to contract only those that they already know well. However building biomass project is a new activity for many. Therefore some of the contractors may be new even for local Ukrainian businessmen. One should thus carefully evaluate if the contractor has proper capacity. Also would be good to get insurance against this risk. All the work scope should be specified in details by the contract and penalties should be part of it. However insurance would be more sure way to get compensated if things go wrong. Also one must have a skillful person able to monitor the process on the regular basis and keep the owner updated on the real progress.

If the investor doesn’t have personal experience in building projects in Ukraine he should not assume that things would go smooth if proper contracts are signed. He should assign Ukrainian manager with a positive experience record.

<table>
<thead>
<tr>
<th>6.3. The use of inefficient, non-specialized, low-quality or outdated equipment, vehicles, machinery and technology</th>
<th>3,81</th>
<th>3,94</th>
</tr>
</thead>
</table>

The risk is assessed as very high. The main reason for that is that SME’s can’t lend funds at attractive interest rate for long enough period to be able consider purchasing equipment and machinery from reliable European or world manufacturers. Having limited funds available businessmen look for cheapest market offers.

According to Tebodin’s Report on Bioenergy Opportunities in Ukraine:

_Ukrainian producers often use modernized soviet technologies. Those are cheaper in comparison to the foreign analogues; however, the lifecycle of such equipment is shorter and the quality of the produced products is often lower._

Unfortunately in many cases the supplier of the remodeled Soviet equipment hides the origin and either sells it as brand new product or that it was produced outside Ukraine but nowadays. In this second case the supplier provides even counterfeit documents with the stamps of existing equipment producer outside of Ukraine. Unfortunately when the equipment was purchased the buyer didn’t
check it with the original producer if they had really manufactured the unit. This situation is typical both for Ukraine and Russia.

Link of the court case claiming that the buyer had purchased repainted pelletiser: [http://www.wood-pellets.com/cgi-bin/cms/index.cgi?ext=content&pid=1093&lang=1](http://www.wood-pellets.com/cgi-bin/cms/index.cgi?ext=content&pid=1093&lang=1)

Article by the CPM Europe representative in Ukraine

The illustration below shows the most common biomass dryer type used in Ukraine. It’s a repainted and somewhat remodeled Soviet biomass dryer designed for animal feed applications back in the 1970-s and produced in the 70-s and 80-s. Was not designed to be used for wood biomass. Photos taken at new wood pellet facility installed in 2010.

**Typical wood biomass dryer**

Zoom shows label “Unit for feed drying”

More zoom shows year of manufacturing
Quick web surfing allows to find following soviet equipment still for sale.
(nice option for someone to paint it and sell at best market price)

<table>
<thead>
<tr>
<th>Equipment set</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biomass dryer set</strong></td>
<td><img src="image1.jpg" alt="Biomass dryer set" /></td>
</tr>
<tr>
<td>(wood fuel feeder, biomass stove, drying drum)</td>
<td></td>
</tr>
<tr>
<td>(ad from 01.01.2013)</td>
<td></td>
</tr>
<tr>
<td><strong>Price for sale</strong></td>
<td>150,000 ukr hryvna (≈ 15,000 Euro)</td>
</tr>
</tbody>
</table>

| **Biomass pelletiser**                            | ![Biomass pelletiser](image2.jpg) |
| (ad from 24.10.2013)                              |       |
| **Price for sale**                                | 70,000 ukr hryvna (≈ 7,000 Euro) |

Conclusions:

a. It is highly recommended to install equipment and use machinery compliant with current relevant EU legislation and do this in strict accordance to the project design and installation plan

b. If there is any concern of the equipment origin – contact the manufacturer directly
c. If manufacturer is not a well-known company – ask for compliance certificates and for a visit to production site to see where and how the equipment is produced
(There are also more tricky advices available. 😊 However if concern is still there after the above steps are taken – it’s a clear sign of high risk).
6.4. No quality management system for production in place

One of the main challenges that face wood biomass sector in Ukraine is failure to operate ensuring desirable quality and output capacity.

Without that one can’t improve sales. So far there is no Ukrainian producer who got the wood pellet EN plus certificate for household pellets. However even industrial pellets should maintain its quality.

In Ukraine if biomass is produced as residue at larger facility, like cooking oil factory or larger wood processing facility there is already some quality management system in place which also oversees biomass department. Even to apply for state certificate of alternative type producer one must provide technical regulation document on the biomass that is produced. The list of certified companies is provided by State Energy – Efficiency Agency

However if one got right papers doesn’t mean he is able to maintain the quality and quantity. Most of the producers don’t have any quality management system implemented and they got no certificates.

To be able to implement quality management – one should hire manager aware how to do it. Otherwise one should arrange proper training for the management staff. In Ukraine to design technical regulation documents one may refer to CBs involved in biomass tests. Some of those (like SGS, TUV, Control Union etc) would also be of help to develop quality assurance system to qualify with European or international standards. Also project designer or equipment supplier may also be of some help to implement the quality and output control management.

Should be noted that neither FSC nor NTA8080 require that company is ISO 9001-certified. Yet the company should have clear rules in place allowing efficient operation and maintaining proper quality and capacity of its output.

Section 7. Working Conditions

7.1. Violation of working conditions / safety regulations 3,37 3,65
7.2. On-the-job training is not provided 3,02 3,38
7.3. Fire safety violation 3,38 3,63
7.4. Social security system is not in place 3,56 3,63

To the surprise of the project experts this Section was assessed as one carrying lowest risks comparing to other Sections. However our respondents from NGOs showed more concern than the average. We share this concern among project consultants. Below are typical illustrations for biomass sites in Ukraine. Citing mechanical engineer from Latvia with biomass experience in installations across Baltic countries as well as in Russia and Ukraine – “there is too much wood dust in the air at wood pelleting factories in Ukraine and Russia. It’s dangerous for one’s health. And yet the workers don’t demand any improvement. In Latvia nobody would work for such a factory even if well paid. We use powerful dust inhalation systems. In Ukraine the biomass facility owners are not willing to invest into working conditions.”
Illustrations for typical risk:

Fuel “Feeding system” for Dryer
Note smoke from fires above the feeding window

Explosive sawdust is spread all over the facility

No inhalation for fine particles (wood dust)
and even no mask for workers

Project design failure – no dust inhalation for vibrating screen

Exposure to wood dust has both health hazards (allergies, eye irritation, headaches even asthma) and safety hazards (dust fires ignited by spark or by overheat engines, or may explode if high concentration in the air).

Typically you may find that workers in Ukraine are not as safety demanding as in the EU and the manager should consider teaching and training them on this subject that they would not ignore the rules. Also one should control the process.

Other high risk area is fire hazard. Headlines about fires at pellet plants are unfortunately common around the world. Ukraine is no different. In a pellet manufacturing process there are several high-risk zones where fires or dust explosions can occur. The most frequent reasons for Ukraine would be
dust ignition and improper dryer operation especially if biomass is dried by heat flows (fuel gasses) from wood-fueled furnace. 
To reduce the risk it is highly recommended to follow NTA8080 principle already mentioned for air pollution Section:

**Avoid fire burning if relevant practices are available on the market or unless it’s under full control.**

Make sure that efficient fire prevention & control system is also in place. 
Proper safety management is also a must to avoid the risks. 
The risk of the section should be mitigated during project design. In Ukraine while dealing with design & engineering companies one should clarify that you are determined to meet all of the EU and national legislation (or at least all of national legislation) on the subject. And that you want not only formal compliance on paper required to obtain state permissions but also actual safety efficiency in the daily operation. 
More on wood dust hazards one can read at: [http://www.hse.gov.uk/woodworking/woodust.htm](http://www.hse.gov.uk/woodworking/woodust.htm)
More on proper project design see info from the project Roundtable.

**Section 8. Local Community Well-Being**

<table>
<thead>
<tr>
<th>8.1. No impact assessment on local community and stakeholders</th>
<th>3,77</th>
<th>3,86</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.2. No transparent interactions with the local residents / community</td>
<td>3,70</td>
<td>3,97</td>
</tr>
<tr>
<td>8.3. Failure to provide priority employment opportunities to local population</td>
<td>3,37</td>
<td>3,59</td>
</tr>
<tr>
<td>8.4. Competition with local use of wood waste and residues</td>
<td>3,16</td>
<td>3,30</td>
</tr>
<tr>
<td>8.5. No plan to contribute to the development of local social and economic infrastructure</td>
<td>3,45</td>
<td>3,67</td>
</tr>
</tbody>
</table>

The whole idea of a company to be actively involved in local community well-being is not yet a common practice in Ukraine. One can though find that larger companies which are subject for international certification and supplying products to EU may already faced the need to incorporating Social Responsibility or Sustainability principles (FSC). Yet wood biomass producers in Ukraine are mostly SMEs. Energy producing companies from biomass are so far doing that only for internal supply thus not hurrying up to incorporate social responsibility principles.

A number of Ukrainian NGOs could be of help to provide consultancy for the company’s management on the subject. And those could also help to monitor if the company is effective.

Basic idea behind this principle is that company uses limited biomass potential of the area. Therefore local community should also benefit from the one who makes profit using those resources and be interested that the company doesn’t misuse the biomass and thus doesn’t break the very basic sustainable development rule to meet the needs of the present without reducing the ability of next generation to meet their needs.

Also if company succeeds in building good relationships with local community it may serve even as factor to make company become less vulnerable to the risks explained above as External risks.
8.4. Competition with local use of wood waste and residues

As a separate comment on this issue the biomass company may actually even improve the situation in Ukraine as under current forestry legislation the residents have no right to harvest fuel wood even for their own needs. Only the forestries are allowed to do that and then sell to the residents. In reality the residents keep use fuel wood from forestries finding illegal ways to harvest it. In fact current legislation in the attempt for the resident’s safety had eliminated their traditional right to benefit from local natural resources.

Wood biomass company if legally operating may get official supplies of wood biomass from forestries. And through open negotiations with forestries and local residents may help solve the issue somewhat thus adding sustainability into relationships between forestries and local community.

More specific advice one can get from FORZA NGO [www.forza.or.ua](http://www.forza.or.ua)

### Section 9. Economic Planning

9.1. Absence of long-term planning and agreements for biomass provision

There are several steps that could be taken. Everything what’s long-term is a risk in Ukraine.

One advice can be taken from Attachment 2: Practical experience from wood pelleting project in Ukraine.

According to FORZA NGO the sustainable approach in relationships with local community allows the company to take part in both strategic community development and Forestry management planning. If company is going to work sustainably it has better chances that company’s development plans would make synergy with community and forestry development. The company may actually assist the community to come up with its Development Plan based on sustainable use of natural resources. In the plan the community should define priorities for its development and for natural recourses usage in the area around its settlement. The community development plan provides a warranty to the residents that in the case of government change the development direction remains the same.

At the same time according to the national legislation there is continued process for Forestry Management plan to be elaborated by regional state forestry authority for 10 year period. Among the tasks which are to be solved while elaborating Forestry Management Plan one can find:

a) Describes measures to reach balance between environmental and social interests of different groups of users at the sustainable forestry management principles

b) Provides transparency for project decisions on forestry resources usage, regenerating forests and of their protection

c) Takes notice of available area development plans (regional, district, community) when those are related to forests, to consider those for project design in forestry management

In results if the company proves that’s its economic activity is beneficial for community and forestry management it provides company with possibility to use forestry resources on a long-term bases. The company’s interest will be considered by Forestry management Plan as it’s backed up by Community development plan.
More on this issue – contact FORZA NGO (www.forza.org.ua) and the Manual on “Integral planning of community development and forestry management”.

Also the biomass operator is welcomed to look for long-term supply agreements with local wood industry operators. Biomass to energy projects may do the same and include biomass producers and traders.

| 9.2. Risk of failure/ contract violation by biomass suppliers | 3.75 | 3.89 |

This risk is more of external character and discusses more in detail in that Section. However for the sake of convenience let us repeat that the risk could be mitigated by the following ways:

- All major supplies are contracted with insurance
- One should always have back up sources for feedstocks/biomass supply (keep ongoing supplies from more than two sources)
- Should be using a fairly large storage for feedstocks/biomass
- Should be considering own deep processing of larger residues (not just sawdust or wood chips) even those from thinning
- Consider getting involved in wood processing thus owning wastes and residues if there are no local competitors
- If there are competitors – check if those are interested to join efforts. A number of the local woodworking sites mostly SMEs would welcome having business partner bringing fueling investment. Mortgage (with reasonable interest rate) is often a problem in Ukraine

| 9.3. No economic forecasting of prices for biomass to be supplied during the payback period | 3.63 | 3.77 |

Most of the business plans that the consultants had personally seen in Ukraine and in Russia used the fixed biomass price for the whole pay-back period or when calculating Return on Investment rate. As history goes on more and more wastes are becoming welcomed feedstocks.

One should be aware that biomass prices depend on general energy market indexes. Prices for feedstocks keep growing as grows the demand for them. Those two processes don’t correlate. Biomass prices are rather market sensitive. Feedstocks indexes have inertia component. This risk could be reduced if either biomass operator co-owns the rights for feedstocks or when the feedstocks operator shares profit in biomass operator’s business.

| 9.4. No assessment of available transport infrastructure (dirt roads, off road) | 3.83 | 3.79 |

The factor of reasonable quality transportation infrastructure should be also taken a priority when choosing location site. Off roads are very typical for Ukraine. Also there is lack of any type of roads in forestry areas. One should thus be also thinking of seasonal climate indexes for the area like temperature, sunny days and precipitation to be able use dirt roads or low quality roads.

The company is allowed to improve roads only at its own site (consult your facility project designer). Some improvement may be achieved via local community support. However the community’s authority is limited even if funds are provided by investor.
The risk is evaluated as one the lowers. Yet the problem may occur especially if no well managed production facilities are in the area for a while. Which is the case in most of rural areas after the collapse of the Soviet economy. Local residents may not have skills anymore and may be lacking working discipline. To avoid risk it’s better to locate facilities not in remote places but in or nearby small towns or other larger settlements.

**Section 10. Use of Wood Wastes**

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<td>10.1. Wastes and residues are of unknown / uncertain origin</td>
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<td>10.3. The use of wood waste contaminated with radionuclides and (or) hazardous substances</td>
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The purpose to make a separate Section on using wastes and residues is to show that those are by default considered as more sustainable than if biomass is not a waste.

Using wastes and residues helps to get sustainability proof a lot easier which is reflected in the RED, in the EC communication on solid biomass sustainability criteria (see Section above on GHG performance).

This simplified compliance criteria is also reflected in NTA8080 Annex A that provides a detail list for such “residual biomass flows”.

Should be noted that NTA8080 makes difference between primary and secondary residues.

*Primary residues are residues from agriculture and forestry, which can be used at their place of generation for maintaining or improving soil quality. Primary residues should still prove compliance with all sustainability criteria.*

*While secondary residues should prove compliance only to GHG criteria and soil quality criteria*  
*In addition to it are applied requirements for traceability (chain of custody and mass balance approach) and general issues (document management and meeting the relevant legislation)*

Sustainability approach is not incorporated yet into Ukrainian legislation. However one can see an attempt to it when identifying biomass types enabled to apply for feed-in electricity tariff. According to the 2012 legal amendment the biomass used to produce electricity should be an (obvious) waste. Even pellets or briquettes are not qualified any more. Thus a debate is going on. The biomass community demanding that biomass term should also mean “a product” claiming that such as the EU practice. On the other hand the legislator which is trying to ensure proper use of government funds insists that the best way to make the energy renewable is to use wastes for it.

Obviously that there is missing the whole EU approach of sustainability to bring balance without a need to always change the meaning of the biomass terminology.
Ukraine will be implementing sustainability criteria from EU legislation but it will take time. For the moment investor should be aware of feed-in-tariff rules of Ukraine and of the NTA8080 rules on this matter.

Yet both FSC and NTA8080 and the EU criteria for solids require traceability/chain of custody proof. Wastes and residues should come from legal and sustainable origin and thus the economy operator should ask consulting bodies of the relevant procedure for him to prove that.

According to FORZA NGO the whole subject of making transparent chain-of custody proof for all timber products is under discussion and development in Ukraine.

On the subject of using contaminated or hazardous wastes and residues – the list of residues allowed for energy purposes by NTA8080 is listed within NTA8080 Annex A

However when supplied biomass has to confirm with the EU (ISO) quality standards. Excessive contamination may lead to purchase refusal. In case for biomass energy operator - one should consider if such waste is valid to be used by the designed technology both in terms of its maintenance and most important - air pollution control (see risks for Section 5, 6 and 7). Processing contaminated wood also creates additional safety hazards from wood dust for workers (Section 7).

Customers in the EU are also cautious about radionuclides for all timber products from Ukraine, Belarus and Russia. Special concern is for wood biomass as it is meant to be burned. This should also be a must for Ukraine even as our country has suffered more than EU from nuclear radiation. To produce biomass and its energy sustainably one should perform regular check-ups of biomass feedstocks against the limits. Check-ups frequency must be determined individually for every region.
3.4 **Conclusions: recommended scope of sustainability criteria for wood biomass in Ukraine.**

Based on the consultation assessment of the internal sustainability risks we propose the following list of items to be addressed by possible Sustainability criteria or Scheme for wood biomass sector in Ukraine:

1) GHG performance. Default values should be calculated based on real Ukrainian performance (real level of energy spent through biomass Life Cycle Assessment). Baseline for main fossil comparators (NG and coal) should be also calculated as well as type of biomass end use (which affect installations efficiency). The approach described in EC Recommendation for solid and gaseous biomass. For incentive support schemes it’s good to have threshold that include improved energy-efficiency and energy-saving measures taken by operator.

2) Environmental pollution prevention.

3) Forestry ecosystem protection and management.

4) Biomass flow legal origin traceability all over Life cycle (chain-of-custody approach including due diligence principles)

5) Improved labor safety management (based on mitigating safety hazard risks)

6) Innovative machinery and equipment. At least its origin should be sourced as responsible producer of relevant equipment. Otherwise we keep encouraging whole sector of non-sustainable solution providers which is negative side-effect by itself, creates unfair market competition and results in failure of many investment projects due to improper operation and maintenance. (Specific cases for Ukraine, Russia, Belarus, Moldova etc where no effective control of manufacturers).

7) Business integrity and legal compliance in all aspects.

8) Local community impact (social, environmental, economy)

9) Using properly sourced wastes and residues should be encouraged through some preferences (like simplified GHG compliance (EC Recommendation) or simplified compliance procedure (NTA8080). For this purpose the system should be able to source two things:

   a) biomass life cycle really starts from wastes or residues (must be avoided processing of non-residue biomass for sole purpose to make residues and meet residue requirement formally but not in the essence)

   b) that wastes and residues have legal and known origin (according to our respondents representing forestry field "*it is possible that origin of wastes and residues is unknown but legal*"")

10) Land Use Change where applied (is a must for energy crops)
Chapter 4. Conclusions and Follow-up Suggestions

4.1 Public concern for biomass sustainability in Ukraine

The risk assessment, carried out within the project, points out at a number of sustainability risks which hinder successful wood biomass growth, investments and trades. There is a clear need to mitigate those risks. Sustainability criteria approach is a good way for that.

The consultation approach was used not only to assess the sustainability risks but also to test the public awareness of those risks. The feedback provided showed high level of concern among respondents on the proposed set of risks. We consider this as a possible sign of public request to introduce sustainability approach and criteria to address those concerns.

Should be mentioned that the word sustainability itself is still not clear for many. However it always helps to name principles and risks involved.

4.2 A need to create a panel to develop sustainability framework

Based on the consultation and our expert opinion we provided our own view on the scope for such a Criteria for Ukraine (See Chapter 3.4). We hope it will be of help for any further initiative to come up or implement sustainability framework in Ukraine.

We expect that such an effort may appear soon in a form of clear request both from the market and/or from the government also with public and science involvement.

To be objective – most clearly we heard of the sustainability concern from NGOs, other development institutions, S&R and much less from the local market players. Regarding the governments of different levels (national, country, district, even local) – some of those got interested while other were not. As we watch the NL Agency efforts to introduce biomass sustainability in Ukraine since 2009 – there is a sure awareness progress in place. And the interest (to sustainability) keeps emerging.

We think now is proper time to create a panel of interested stakeholders consisting of civil society institutions, government, S&R and market players. The group members should be interested (and not forced) to take part in setting up framework for sustainable biomass in Ukraine.

4.3 Wood biomass could be addressed separately or via uniform approach

The framework and its criteria may apply only to wood biomass or to the whole sector of solid biomass or be uniform for bioenergies.
Should be reminded that when RED introduced new rules for transport biofuels – there appeared (or got adjusted) all kinds of schemes. Some are uniform for all biofuels (NTA8080, ISCC, RSB), others - only for specific biomass types (for palm oil or for soy). There are also schemes for specific countries with specific biomass commodities (Greenenergy – for Brazilian bioethanol, SQC for Scottish farm crops). There are even schemes for certain companies which certified their own supply chains (Ensus and Abengoa to protect market for their bioethanol production).

All of those schemes granted EU market access for market players from all over the world.

In alike manner the framework for wood biomass may even apply only to certain energy applications. Essent power utilities & Control Union efforts resulted in GGL certification primarily for power plants. Later GDF Suez initiative had led to pan-European panel, meant for wood pellets also for power plants. The UK Sustainable Heat Incentive (SHI) came up with sustainability requirement for biomass heating utilities.

The outcomes of this project should be of good help to start the process to implement sustainability also in Ukraine being aware of the above approaches.

4.4 **Helpful deliverables**

Our project provided the following deliverables:

1. Risk inventory and assessment for Ukraine
2. Recommendations to mitigate those risks.
4. Summary for project developers.
5. A review on the ways to prove biomass sustainability in Ukraine (including the list and briefs on the schemes).
6. Last but not least – the consultation had identified a whole network of stakeholders, interested in the follow-up. Most of those are actively involved in sustainable forestry developments and look forward to embrace or join efforts towards biomass sustainability.

4.5 **Follow-up possibilities and suggestions**

We think the following steps worthwhile to be taken for Ukraine:

A. For the Ukrainian government:
   1) Consider implementing sustainability approach and criteria for solid biomass sector into all existing support incentives.
   2) Consider applying uniform sustainability scheme also for solid biomass within the efforts to implement RED.
      Hesitation of the EU to introduce same rules for solids as those for liquids originate in major forestry countries (like Sweden and Austria) where forestry sustainability is already...
well-established and really no need to question sustainability of national wood biomass producers. To reach the same level of assurance in Ukrainian biomass producers and to improve its reputation at EU biomass market, Ukraine has to take proper efforts not waiting for mandatory EU decision.

3) Ukraine as country with impressive biomass potential (which would increase if addressed sustainably) should take more active part in European and international activities on the subject at all possible levels (developing standards, testing frameworks, panels, study projects, launching pilots, workgroups, etc). Its resource potential and hub location appeals to change passive status into active leading European player.

B. For international support efforts:

1) Keep raising awareness on biomass sustainability among all stakeholder groups, including wide public. Needed pilots of (more) open public character for different biomass types, applications and sizes (preferably for SMEs sector). The public, governments and SMEs must be sure that comprehensive, up-to-date, environmental and transparent (i.e. sustainable) biomass projects are possible to be realized in Ukraine and not only in Western Europe and not only by big players.

2) Assist in sustainable implementation of the identified project proposals within the regions which took most active part in the consultation (See Attachment).

3) Apart from wood biomass, assessed within current project, there is a need to assess sustainability risks for other key solid (bio) fuel types and applications, important for Ukraine:
   – wood energy plantations;
   – using wood (and other biomass) for co-firing with coal;
   o The project got best results for reeds and switchgrass. More work on switchgrass as well as on other energy crops is carried by FSG project in Ukraine [http://users.telenet.be/fsg/FSG/Current.html](http://users.telenet.be/fsg/FSG/Current.html)
   – more input into straw as this is major potential feedstock for Ukraine.
   – sunflower husk should be approached as Ukraine is leading EU importer.
   – livestock and especially poultry manure
   – peat for energy sustainability requirements. Peat is not considered as (renewable) biomass in EU. However in Ukraine it got status of alternative fuel. Currently it’s #3 alternative solid fuel after wood biomass and sunflower husk. Ukraine has big plans for using it for energy purposes as part of policy to replace NG. Whatever status the peat has – its role for ecosystems is very high. Real big need to assess it sustainably for policy makers
4) There is need to join efforts on biomass sustainability and bio-based economy concept promotion for Ukraine and possibilities for international cooperation. Bio-based economy is supposed to build on top of biomass sustainability allowing to achieve even better People-Planet-Profit performance if wider angle is applied. Yet it’s important to keep bio-based efforts sustainably as Planet and People part of it could be lost when implementing in real life situations in Ukraine. It is also a way for testing unified sustainability criteria for biomass regardless of its end use (energy or other industry).

5) Keep Ukraine in mind on possibilities to joint efforts on biomass sustainability (Ukraine is not as active international player as could be and thus is often not aware of possibilities)
NTA8080 standard on sustainability requirement for biomass
List with exceptions

The list with exceptions includes residual flows being biomass flows which are released during the production of other (main) products and which represent an economic value of less than 10 % of the value of the main product. Only the sustainability requirements specified in 5.2.1 and 5.5.1.2 are applicable to these biomass flows.

The list with exceptions has been classified according to NTA 8003:2008 Classification of biomass for energy application. The group number such as included in NTA 8003:2008 is mentioned between square brackets.

When a residual flow is not included in this list, sufficient evidence shall be submitted that this biomass is nevertheless accepted as an exception. Reliable information about prices of residual flows and main products shall be submitted as sufficient evidence among other things:

- bark [112];
- prunings (park and public garden) [113];
- sawdust [115];
- remaining fresh wood [119] as far as it concerns the branch and top wood and/or low worthy spillage wood originating from forestry and nature grounds managed for a long term preservation of their function;
  Note: Examples of low worthy spillage wood are wood with limited value by limited diameter, wood with big curvatures, wood with many and heavy knots, wood with rottenness/mildew/discoloring, wood broken by a storm.
- processed wood [150]:
- untreated (A-wood) [160];
  Note: It concerns here a mixture of untreated wood [161], cork [162] and other untreated wood [169].
- painted/limed wood (B-wood) [170];
  Note: It concerns here a mixture of painted/limed wood [171], plate material/limed wood [172] and other painted/limed wood [179].
- impregnated wood (C-wood) [180];
  Note: It concerns here a mixture of impregnated [181], impregnated wood: heavy metals [182], impregnated wood: halogenated organic means [183], impregnated wood: not halogenated organic means [184] and other impregnated wood [189].
- wood from processing [190];
Note: It concerns here a mixture of wood from processing [191], wood from composting [192], wood from fermentation [193], wood that has been in water for a long time [194] and other wood from processing [199].
– grass from roadside [213];
– straw [220];
Note: It concerns here a mixture of straw [221], barley straw [222], wheat straw [223], rice stalk [224], hemp [225] and other straw [229].
– residual products (shucks) [230];
Note: It concerns here a mixture of shucks [231], cacao shucks [232], peanut shucks [233], (wal)nuts [234], almond shucks [235], rice skins [236] and other shucks [239].
– other residual products [250];
Note: It concerns here auction waste [251], horticulture waste [252], fruit culture [253], bulb peeling [254] and agriculture waste [255].
– manure [300];
Note: It concerns here a mixture of manure [301], other types of manure [309], poultry manure [310], cow manure [320], pig manure [330], horse manure [340], processed manure from manure fermentation (digestate) [351], processed manure from co-fermentation with manure (digestate) [352] and processed manure from other processing [359].
– sludge [400];
Note: It concerns here a mixture of sludge [401], other sludge (including industrial sludge) [409], sludge from sewage/waste water treatment plants [410], sludge from sewers, cesspits and pumping stations [420], sludge from preparation of drinking-water [430] and paper sludge [440].
– potato peelings shucks [522] as far as it concerns no concentrated potato juice and/or potato protein;
– rice skins [523] as far as it concerns rice chaff;
– pulp from manufacturing of sugar [532] as far as it concerns the press pulp of beets;
– beet pulp [533] as far as it concerns beet heads, beet tails and/or leaves;
– moist fiber/brewing dregs and waste [535] as far as it concerns brewer’s grain;
– coffee pulp [536];
– palm oil [554] as far as it concerns palm shells;
– used frying fats and oils [572];
– soft drink and light alcoholic spirits unsuitable for human consumption [581];
– dairy products unsuitable for human consumption [582];
– foodstuffs unsuitable for human consumption [583];
– offal [586];
– black liquor [594];
Note: Black liquor is chemical treated wood that comes from the production of paper. This is a mixture of chemicals and dissolved wood material that remains after boiling in sulphate.
– organic waste from households and companies [600];
Note: It concerns here organic waste from households [610] and organic waste from companies (trading, services, other) [620].

- solid recovered fuels (SRF) [900].

Note: Solid recovered fuels (SRF) are solid fuels which are prepared from non-dangerous waste products which are used for the recovery of energy in (co-)burning installations. It concerns here mixture [901], SRF from separation afterwards of garbage [902], SRF from separation afterwards of oversized trash [903], SRF from separation afterwards of industrial waste [904] and other SRF [909].

More info contact:

www.sustainable-biomass.org

Harmen Willemse (harmen.willemse@nen.nl)

Jarno Dakhorst (jarno.Dakhorst@nen.nl)
Recommendations for foreign investors in Ukraine
Practical experience from wood pelleting project in Ukraine

1. How to get the land in the long-term use/rent?
Buy a legal entity registered in Ukraine, which already has the right to rent the land.

*It is worth considering:*
  a. Hire a local competent lawyers and accountants who specialize on working with foreign companies
  b. The selected land plot must be initially of corresponding designation (changing the land-use designation is expensive, takes long time and in some cases is impossible)
  c. It’s desirable that the company to be acquired (hereinafter acquiree) was originally created to obtain the right to rent the land and was not engaged in other activities
  d. Conduct an audit of the acquiree
  e. Send an official request to the main instances (State Tax Inspection, Pension Found, other funds) to check if there is a debt of the acquiree to the state budget
  f. It’s desirable that in the history of the acquiree were no incorporated and later excluded owners/parties
  g. Carry out “double purchase” of the company
  h. Develop and register a new bilingual charter, listing all the possible activities + increase the charter capital to the amount you need for the investment
  i. Regularly pay the tax/rent for the land and other obligatory payments. Once non-payment or late payment of the tax/rent may become a reason of termination of the land rent contract.

2. How to get a manufacturing premises?
Buy already functioning production of your profile (with the manufacturing premises) and reformat it to fit your needs.

*It is worth considering:*
  a. Premises must be privately owned by person or legal entity (do not start the procedure for acquiring municipal or other public facilities – it will take a lot of time, will be expensive and risky)
  b. The land plot adjacent to the premises/building will remain in use of new owner (retaining the same right of use/rent/ownership which was given to the previous owner)
  c. It’s desirable to have an asphalt/concrete road leading from the nearest motorway to the acquiree + freight railway station within 20 km around
  d. Check for gas stations with the necessary fuel within 20km around
  e. Conduct a detailed audit of the acquiree
3. How to build own production premises/building?
You need to get financing and be patient

*It is worth considering:*

a. Prior to the beginning of this phase you need to ensure the right of ownership/rent of the land plot with industrial designation for the construction and operation of industrial buildings and structures
b. It’s desirable that the selected for construction land plot is located not closer than 100m from the nearest residential buildings
c. Construction of a new production facility/building involves the following steps: 1) Pre-design (including obtaining necessary technical requirements for connection to utilities); 2) Public consultations; 3) Design + approval of the project; 4) Construction; 5) Commissioning.
d. When the land ownership/rent is obtained, the construction process (including the collection of technical requirements, design, approvals and commissioning) takes about 2 years with timely funding and support
e. The terms announced by the engineering organization and the general contractor, as well as the construction budget can surely be multiplied by 2 to get the actual timing and costs

4. How to ensure your production with the necessary amounts of raw materials?
Create a full-cycle production which will provide you raw materials for your originally conceived production by at least 70-90%. Lacking materials you can purchase within a radius of 40-50 km.
Implementation of sustainability assessment
for wood biomass project proposals in Ukraine

It is worth considering:

a. It’s desirable to chose the region where the forestries have already been certified by FSC
b. Forestrues in Ukraine sign contracts only till the end of the calendar year regardless of the date the contract was signed
c. Most part of the goods in the forestry’s product line are sold at auction. To participate in the auctions the appropriate registration prior the new calendar year is required.
d. In the first phase of work with forestries is desirable to use the services of companies that monitor compliance with the range and volume of goods actually shipped
e. It is desirable to establish connection and start working with 2-3 forestries and select a production base at an equal distance from the forestry’s warehouses (but not far than 30-40 km from them)

5. How to ensure stable funding for the project?
To ensure the secure and stable funding for the project one should use its own funds or obtain a letter of guarantee with further funding from the foreign bank.

It is worth considering:

a. International currency transactions is desirable to conduct through Ukrainian bank, which as partly owned by foreign banks or is a bank with 100% foreign investments
b. Loans in Ukrainian banks are expensive, there is high percentage of discount on the pledged property, there is a risk of hostile takeover attempt or the imposition of contractors for cooperation
c. Foreign financing allows to optimize the taxation

6. What equipment to choose?
Choose from European and American equipment manufacturers

It is worth considering:

a. It is not recommended to purchase equipment made in Ukraine, Belarus, Russia, China, etc., as well as refurbished equipment from these countries.
b. The equipment’s capacity should be about 30% higher than the planned load
c. There should not be units of small productive capacity, because of which the rest of the equipment will be idle
d. Make sure that the contract for the supply of basic resources (electricity, gas, water) guarantees the delivery in the amount of 20-30% above the needs of your production, and there are available all the necessary utilities to deliver these resources to your facility
e. The nearest service center of the selected equipment must be within the 150-200km from your production base to ensure the timely planned and urgent maintenance
f. Teach a minimum of two employees at the equipment’s official representative for the basic and emergency equipment repair
7. How to select a qualified personnel?

Train workers from the nearest large city.

*It is worth considering:*

a. Most likely you will not find already-trained personnel exactly for your plant and equipment
b. Most likely your production base will be located in the village/suburb and not in a large city, which will affect on the qualification level, amount and motivation of the employees
c. Villagers often have their household plots, livestock and occupation (mushrooms, berries, fishing, hunting). It means that at certain times of the year the majority of your employees will be absent in the workplace at the same time
d. You may be forced to recruit stuff from the nearest large city, provide them transport and place to stay in the facility
e. The number of candidates, qualification and motivation of employees from the city are usually higher than those of workers from the villages, because the stuff from the city is more focused on the wage
f. All employees drink alcohol + most of them smoke and steal
g. About 10% of the profits of your company will somehow be stolen. It is necessary to be taken into account in the business plan as unforeseen and uncontrollable costs
h. You will need to teach every worker
i. You will face sharply the HR issue at least the first two years of the company’s operation

8. How to motivate employees?

There is no universal answer. The situation is individual for each company, style of management and staff. This is one of the most difficult issues. Neither high salary or bonuses, nor "social package", nor the status of "best employee of the month" separately solve the issue. Only individual approach and step-by-step combination of proposed options may help to maintain and increase the required level of employee’s motivation.

*It is worth considering:*

a. The mentality of the rural and urban residents in Ukraine is very different. Different approach is needed
b. Try to gather a non drinking team
c. Whatever you undertake employees feel that it is their own achievements and take it for granted. Whatever you do for the staff - It would appear for them not enough
9. **How to organize a competent accounting and taxation?**

Take advantage of the branches of international auditing companies in Ukraine or Ukrainian legal and auditing firms that specialize in providing services to foreign investors.

*It is worth considering:*

a. Tax optimization scheme and the mechanism of profit’s transfer abroad to the investor should be developed at an early stage

b. Hire a competent international lawyers, accountants and auditors from the Ukraine, and check their offers by foreign specialists

10. **Do I need to certify the production according to international standards (FSC, NTA 8080, etc.)?**

All types of certification are voluntary in Ukraine. However the certification of your production confirms your intention to work sustainable and it opens more opportunities for long-term cooperation with foreign partners.

*It is worth considering:*

a. In the first stage the certification of production is likely to be complicated by external factors beyond from your direct control and connection to your production process

b. In the beginning tune your production process and establish contacts with local contractors

c. Invite auditor to your production for the preliminary consultation and obtaining a list of necessary criteria for compliance. Try to adhere to the criteria from the beginning of production activity. It will help to discipline you and your employees

d. After adjusting all production processes and interactions organize internal audit for compliance with the criteria of the selected certification standard

e. Conduct the certification of your company by external auditor

f. Notify your counterparties abroad about the certificate obtained

g. Be prepared for the annual confirmation of certificate compliance

11. **Is it worth spending the time and efforts to ensure the sustainable development of the production?**

Yes, this is the only way to ensure a positive outcome in the medium and long term.

*It is worth considering:*

a. The business plan of production should be developed in conjunction with consultants and experts from Ukraine and take into account all the possible variations and cost overruns

b. Ensure a guaranteed and timely funding from abroad

c. Hire a competent international lawyers, accountants and representative/director in Ukraine. Your representative in Ukraine should be financially interested in the results of the work, but not only in salary
d. Certify your production according to international standards (FSC, NTA 8080, etc.). Please note that most of the criteria for the various certification schemes coincide. So while preparing for one type of certification at the same time you may pass several international certifications (this will cost you more money but will open new markets)

e. Compliance to the requirements and certification criteria mobilizes internal resources and encourages the management and employees of your organization as well as all the counterparties to work in sustainable way.

For more info contact:
Gyevorg Gabriyelyan (ggevorg@list.ru)
Typical Mistakes to be Avoid for Biomass Heating Project Design in Ukraine

Legal requirements

From our company’s experience in project design for biomass heating we came across a number of typical risks and mistakes that the clients in Ukraine are often exposed to.

1st and most common mistake. The customer is concerned only about proper project to install just the boiler itself while leaving the fuel depot out of the concern. Yet biomass fuel store is inflammable area where a number of fire safety requirements apply to. Among others - proper fire resistance facility class (should be of minimum 2nd class, which means that those should be build from bricks, aerated concrete or other nonflammable materials), be provided with fire alarm and other fire safety measures installed.

2nd mistake. Installing biomass boiler without relevant project design documentation developed by certified designer or licensed design agency. As a result, the owner of the boiler can’t commission the boiler with engineering communications and can’t start operating legally due to violations of building codes and fire safety regulations done by unskilled designer.

3rd mistake. Outdated (old), self-manufactured (not industrial) or not certified equipment is used for the boilers. There is a risk of explosion, fire, equipment breakdown, thus violating working safety.

4th mistake. Biomass heating operators tend to buy not certified biomass fuel of uncertain quality, without guaranteed faction size, moisture, calorific value etc. As a result boiler does not produce the required output expected. Leads to excessive air pollution and GHG emissions.

5th mistake. When installing the boiler without relevant design documentation, the client does not take into account the health safety standards and measures to protect the environment from hazardous emissions. Typically understated chimney height, low draft and low speed at the outlet of the chimney. As a result boiler operates intermittently and the emissions from the chimney do not dissipate in the atmosphere and fall around the boiler house.

6th mistake. Fuel storage is placed outdoors exposed to rains. Pellets, chips, husk can’t be stored outdoors like coal. Those should be stored in the fuel depot, which protects from extra moisture exposure, maintains the required fuel quality, provides ventilation, temperature control and fire safety for the facilities.

7th mistake. Some customers want to go on a simple and shortest way - get a modular biomass boiler, which already includes the boiler and fuel depot. This is a reasonable solution. However one should pay attention if the unit has been certified in Ukraine as a ready-to-use equipment or was it produced in Ukraine according to TU (technical conditions) as the ready-to-use equipment. Typically modular boilers offered at the market don’t have a state required certificate or those are not made according to the technical conditions and have not passed the tests by the relevant authorities which allow to use the modular boiler systems in Ukraine.
The seller is interested to sell his modular boiler system and tries to persuade the customer that no special permits are required. Often the box of a modular boiler is made of *sandwich panels*, which is a violation for a boiler house which operates with a fuel store. In addition modular boiler has *less distance than normative* between the separate equipment units, its thermal insulation for the walls and surfaces is not designed for the region where the boiler is installed. The customer who purchased a modular boiler system without a state issued certificate or not produced by technical conditions can’t legally put the boiler into operation.

**Conclusion:** Before building a biomass heating project one should order project design services from a certified designer or licensed design agency with experience in biomass heating, who would also help to choose the appropriate equipment.

For more info contact:
Tamara Zubko ([zubkoposta@ukr.net](mailto:zubkoposta@ukr.net)) Chairman, "Zaporozhye Diproelektro" design institute. The institute develops design & engineering documentation for the civil engineering and industrial projects, including biomass heating by pellets, sawdust, sun flower husk etc.
Attachment D

**Project’s added value: sustainable business proposals and possibilities**

During project realization we had picked up business proposals where sustainable cooperation/trade/investments are possible:

1. **Larger producers of Sun Flower Husk pellets in The Black Sea Area of Ukraine**

   Food oil industry of Ukraine is one of the most competing and prospering. A number of the companies are owned by international holdings.

   All the factory’s processes including pellet production are well managed.

   Due to that and also to the fact that the pellets are produced from wastes which appear at production site – we assume that NTA8080 certification or any other sustainable certification that could be applied to agrarian solid biomass would not be a problem.

   Fairly large capacities and proximity to the Sea ports of Black and Azov Seas open ways for effective shipments via sea vessels.

   Deliveries of 10,000 MT (FOB Black or Azov Sea) are possible. Is there market for this product elsewhere outside Poland? So far the region has interest to supply up to 100,000 MT annually. If market is there – more producers may join and larger deliveries could be a possibility.

2. **CHP plans of energy companies and of Agency of National Projects of Ukraine.**

   There are intentions to install at least one CHP (with minimum 6MWe) in every region of Ukraine. Total about 30.

   The Dutch biomass engineering company HOST is active to provide feasibility study for one of the CHPs in Kiev which is part of the leading Ukrainian DTEK energy holding.

   Those projects would also require sustainable supply. Even a single project to switch for biomass in Melitopol city would need 300,000 Mt of pellets annually.

   The first biomass-fired power plant in Ukraine is also under construction (18MWe). Developed by EIG Engineering. Location is in Kiev region halfway towards Chernobyl zone. The project went through Ernst&Young audit successfully to comply with all relevant legislation. The company looks for build two more biomass power plants also in Western Ukraine.
3. The region of Carpathians is attractive to locate wood biomass facilities due to proximity to the markets and biomass resources.

Sustainable forestries have higher support there due to a number of international efforts (cross-boarder cooperation). According to Yuri Derbal (FORZA NGO) not only traditional ways to use wood biomass are available for new projects but there is also clear trend of spruce forests getting dried in Eastern part of Transcarpatia. That means that over years the share of low-quality timber will grow providing more possibilities and need in sustainable wood biomass projects.
Implementation of sustainability assessment for wood biomass project proposals in Ukraine

Attachment E

Summary for project developers:

How to develop a project to produce wood biomass/ solid biofuel or energy from it sustainably in Ukraine?

Important note: the steps listed are meant only to use wood biomass of forestry origin and doesn’t cover sustainability risks for wood energy crops; also general investment risks are not included

1. Annual feasible and available biomass resources should be assessed and estimated. Sustainable (legal) origin is a must.

   1.1. Places where (feedstock) biomass may originate and some of its types:
   – local foresteries (wood for fuel and technology purposes, twigs (valuable residues from branches, faggots));
   – wood processing and wood working (mostly sawdust, shavings, slabs);
   – used wood.

   1.2. Legal sourcing. Benefits from using residues

   Biomass must be at least 100% legal origin according to national legislation of Ukraine. If supply to EU is purposed, one must also ensure its sustainable origin in compliance to EU Timber Regulation (aimed to ban timber with uncertain origin from being placed at EU market). In particular the rule applies to following wood biomass:
   – fuel wood, in logs, in billets, in twigs, in faggots or in similar forms;
   – wood in chips or particles;
   – sawdust and wood waste and scrap, whether or not agglomerated in logs, briquettes, pellets or similar forms
   (EU Timber Regulation 995/EC)

   In order to be able apply for feed-in-tariff for biomass energy in Ukraine one is advised to look for wood wastes supply according to the current definition for biomass (status of Nov. 2013) at the law of Ukraine “On Electro-energetics”:

   “At this Law the biomass is non-fossil biologically renewed matter of organic origin in a form of wastes from forestry and agriculture (crop farming and animal farming), fisheries and technology related industries, that is subject to biological decay, and also a part of industrial or household wastes, able for biological decay”
Using wastes also allows to apply for simplified procedure to recognize biomass sustainability according to the standard of Netherlands (and international certification scheme) – the NTA 8080 (www.nta8080.org).

In this case the list of biomass that qualifies for simplified compliance procedure can be found at Annex A of the standard, which provides a detail list for “residual biomass flows” including waste. These residual biomass flows shall only comply with the GHG criteria and the requirement of preservation and improvement of the soil quality.

The soil quality requirement only applies to residual biomass flows that may contribute to the soil quality at the place where they originate, i.e. for primary residual biomass flows released from agriculture and forestry.

Note: the reason why NTA 8080 applies simplified procedure to residues is that residual biomass flows have a low economic value (less than 10%) compared with main product. An organization therefore may not deliberately modify its processes to produce the residual flows.

In addition when undergoing NTA 8080 certification the following general requirements are also to be applied to any type of biomass (including one that originates from residues):

a) traceability (chain of custody: segregation or mass balance approach);

b) general issues (document management and meeting the relevant legislation)

Assessment for this step must be done by field experts on the issues of sustainable wood biomass supply and of wood biomass resources availability (one could find those among relevant Ukrainian or International NGOs, other field experts).

2. Develop project business idea to use the biomass. The idea should be backed by preliminary business-plan or feasibility study. It’s a must to consider possible biomass feedstock cost change (growth) for the whole pay-back period. Feedstock cost should include transportation.

When developing project idea biomass sustainability experts should be approached or proper training should be applied for.

3. Check point if basic feasibility is met.
   If outcomes from both steps 1 and 2 are positive, one may move on to step 4.
   If no, than one should give up the project or consider other location or other possibilities for feedstock supply, getting back to Step 1.

4. Arrange preliminary stakeholder consultations – with representatives of local community, local authorities, and with business entities.
   Purpose for consultation is manifold:
   – inform stakeholders of the project idea;
   – make sure that the project doesn’t violate community interests;
– identify community requirements, that must be considered for project design and implementation (i.e. using local workers also for management under proper working conditions (NTA 8080 requirement));
– identify ways (environmental, social, economic) for local community benefit.

If the community is interested in the project, it should be also identified how the community, authorities and local business may support (successful) project implementation. Win-win situation must be achieved.

To build win-win relationships and to carry on fruitful stakeholder consultation at sustainability principles it is advised to approach NGOs with relevant environmental and developmental experience.

Preliminary consultations are completed with signing multilateral Memorandum of stakeholder sides on mutually beneficial cooperation for project preparation and implementation.

5. Based on the above steps:

5.1. Develop action plan to provide necessary biomass supply volumes (agreements with owners/suppliers, harvesting/collection, transportation, logistics) in sustainable way (forestry certification requirements)

5.2. Come up with technical assignment for wood biomass/energy project design. Project design should consider stakeholder consultation results and the following sustainability requirements:

– improvement or at least maintaining environmental situation (air, water, soil) comparing to baseline scenario (prior to project realization). If that is impossible – applying best practices to minimize and control pollution and wastes (NTA 8080 requirement);
– reaching maximum possible GHG savings (best technology practice, energy- & resource-efficiency, energy-saving);
– best industry practices for working conditions and safety.

6. Project impact assessment. Being assisted by NGO one must run environmental and social impact assessment of the developed project, including final stakeholder consultation.

7. Based on Memorandum and Project Design papers one could facilitate (if needed) negotiations to apply for project (investment) financing, sign relevant contracts (estate rent or purchase, equipment purchase etc).

At this stage one should apply to the relevant local authorities with a proposal to include data on the new biomass facility into the so-called local programs for social-economic development, community development plan and (if appropriate) to the forestry development plan. (Important
for the project to be backed up (protected) and tight with the local community interests in a completely transparent and legal way).

8. Take efforts to get ready to manage the project’s daily operation sustainably, which among other things should include:
   − implementing traceability and mass balance in the biomass chain-of-custody (NTA 8080 requirement);
   − due diligence system in place (EUTR requirement), that in turn has three pillars:
     a) confirmed biomass origin;
     b) sustainability risks assessment;
     c) actions for risk mitigation.

When wood biomass project is in mind, when assessing sustainability risks one should consider both the requirements for legal biomass provision and supply as well as sustainability risks specific for solid biofuels/bioenergies in Ukraine (see risk inventory for Ukraine (Chapter 2 on Public consultation could be referred)).

Since sustainability requirements are not required by Ukrainian legislation, project developer should consider criteria and requirements of the certification scheme that one intends to comply with.

The list (not exhaustive) of sustainability certification schemes is found at Chapter 2.2.1.

Summary developed by:
Gyevorg Gabrielyan (ggevorg@list.ru) and Alexei Stoyanovsky (bioexpert@ukr.net) (both –Ukraine)
Helpful comments from:
Yuri Derbal (derbaly@ukr.net, FORZA NGO (Ukraine))
Jarno Dakhorst (jarno.dakhorst@nen.nl, NEN (Netherlands))
Idea by: Kees Kwant (kees.kwant@agentschapnl.nl, NL Agency (Netherlands))