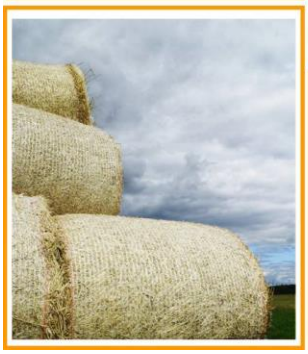





SolidStandards

Enhancing the implementation of quality and sustainability standards and certification schemes for solid biofuels (EIE/11/218)



D1.2

Final publishable report

Co-funded by the Intelligent Energy Europe Programme of the European Union

The SolidStandards project

The SolidStandards project addresses ongoing and recent developments related to solid biofuel quality and sustainability issues, in particular the development of related standards and certification systems. In the SolidStandards project, solid biofuel industry players will be informed and trained in the field of standards and certification and their feedback will be collected and provided to the related standardisation committees and policy makers.

SolidStandards is coordinated by:

WIP Renewable Energies
Sylvensteinstrasse 2
81369 Munich, Germany
Cosette Khawaja & Rainer Janssen
cosette.khawaja@wip-munich.de
rainer.janssen@wip-munich.de
Tel. +49 (0)89 72012 740

About this document

This document corresponds to **Deliverable D1.2** of the SolidStandards project. It is the Final publishable report. This document was prepared in **April 2014** by:

WIP Renewable Energies
Sylvensteinstrasse 2
81369 Munich, Germany
Cosette Khawaja & Rainer Janssen
cosette.khawaja@wip-munich.de
rainer.janssen@wip-munich.de
Tel. +49 (0)89 72012 740

Intelligent Energy Europe

The SolidStandards project is co-funded by the European Union under the Intelligent Energy Europe Programme (Contract No. EIE/11/218).

Co-funded by the Intelligent Energy Europe Programme of the European Union

Content

1. Background

The European solid biofuel industry depends on stable and favourable legal and regulatory frameworks and the harmonisation of these frameworks on EU level is critical for the development of a common European market for solid biofuels. Quality and sustainability of solid biofuels are among the main issues to be addressed on EU level.

The quality of solid biofuels is critical to market development. Solid biofuels are produced from a variety of biomass with different origin, chemical and physical characteristics. Furthermore, production processes and solid biofuel handling largely influence solid biofuel quality. The creation of European quality standards for solid biofuels aims at facilitating the involvement of economic operators in the solid biofuel industry.

Sustainability of solid biofuel supply is necessary to ensure the full utilisation of potential environmental benefits offered by solid biofuel applications and to promote the public acceptance of solid biofuel technologies. At the moment, the sustainability of solid biofuels is addressed in a number of national and/or voluntary certification systems. Sustainability standards for biomass are also being developed in CEN/TC 383 and ISO/PC 248 and the European Commission currently evaluates the introduction of sustainability criteria also for solid biomass in addition to those already existing for liquid biofuels.

These initiatives largely impact on the work of practitioners along the whole biomass supply chain while the underlying processes and their outcomes are complicated and sometimes non-transparent. There is also the risk that the solid biofuel industry is not involved sufficiently in standardisation or legislation procedures.

The SolidStandards project addresses the on-going development of standards and certification systems for the quality and sustainability of solid biofuels. The project aimed at enhancing the uptake of standards within the industry by providing training on standards implementation to solid biofuel producers across Europe. Furthermore, the project aimed at providing input to ongoing standardisation processes and policy decisions by gathering and providing industry feedback to standardisation committees and decision makers.

2. Activities and results

2.1. Training concept development

The core action of the project was the development and testing of a common training concept for the solid biofuel industry on quality and sustainability standards and certification. Therefore the major result of the project was a fully developed and tested training material which enables solid biofuel producers and other solid biofuel industry players to apply standards and to participate in certification systems.

The training material consisted of a set of modules: two general modules and 6 specific modules addressing different solid biofuels.

The general modules (General standardisation and feedback, General sustainability issues related to solid biofuel supply) serve as an overall information for the training participants on the standardisation of quality and sustainability of solid biofuels.

The specific modules for solid biofuels concentrate on the implementation of quality standards in the production process of the respective solid biofuel and include the following:

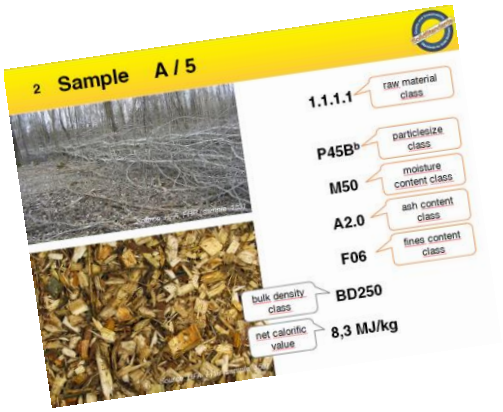
- Wood pellets module (EN 14961 Parts 1&2, EN 15234 Parts 1&2)
- Wood briquette module (EN 14961 Parts 1&3, EN 15234 Parts 1&3)
- Wood chips module (EN 14961 Parts 1&4, EN 15234 Parts 1&4)
- Firewood module (EN 14961 Parts 1&5, EN 15234 Parts 1&5)
- Non-woody pellets module (EN 14961 Parts 1&6, EN 15234 Parts 1&6)
- Straw module (Wheat and energy crops) (EN 14961-1, EN 15234-1)

For each solid biofuel, quality and sustainability issues along the whole supply chain, from raw material sourcing, solid biofuel production and logistics to end-user requirements are described.

Each module consists of a guidebook and a PowerPoint presentation with interactive parts, in which the implementation of standards in practice are discussed in working groups using case studies. For wood chips, additional PowerPoint slides and a video were developed showing the sampling and sample preparation according to the European Standards. Specific consultancy services were also offered. Participants were provided with the knowledge necessary to implement standards in their production process.

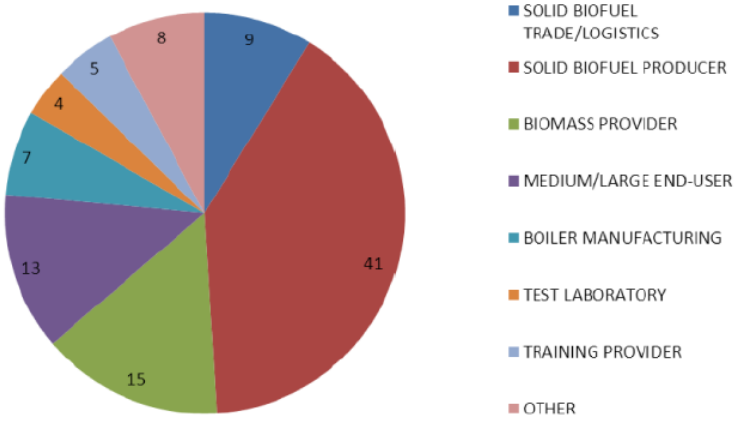
The training materials of the two general modules and the specific modules were translated into the 11 languages of the participating countries as well as to Spanish and Latvian.

The general modules and a summary of the specific modules are publically available on the project website. They can be used as a basis for trainings beyond project duration and beyond the countries targeted in this project.



For the development of the training concept, not only the experts of the project consortium were engaged. A steering committee was set up and consulted for the improvement of the training concept. It consisted of 26 persons from 10 European countries. The members covered a wide range of the solid biofuel supply chain: solid biofuel production and forestry (8), biofuel trade (3), medium/large end-users (2), biomass/biofuel industry associations (3), standardization bodies and test laboratories (5), administration (1), boiler production (1), and potential future training providers (3).

Additionally, more than 100 stakeholders have been also engaged in the development and improvement of the training concept.



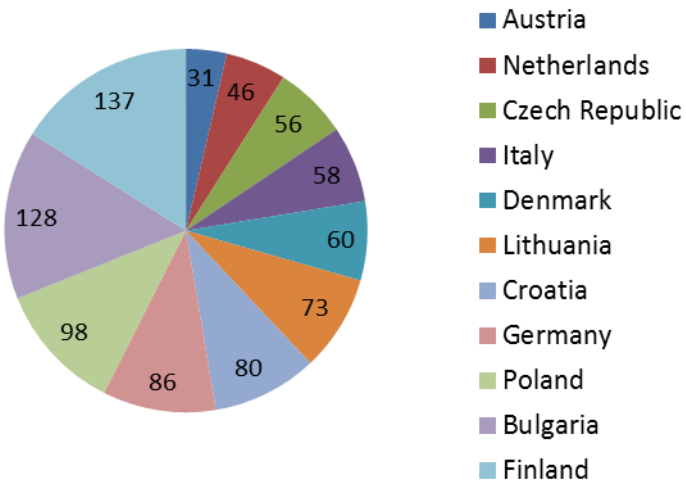
Distribution of consulted stakeholders per target group

2.2. Training implementation

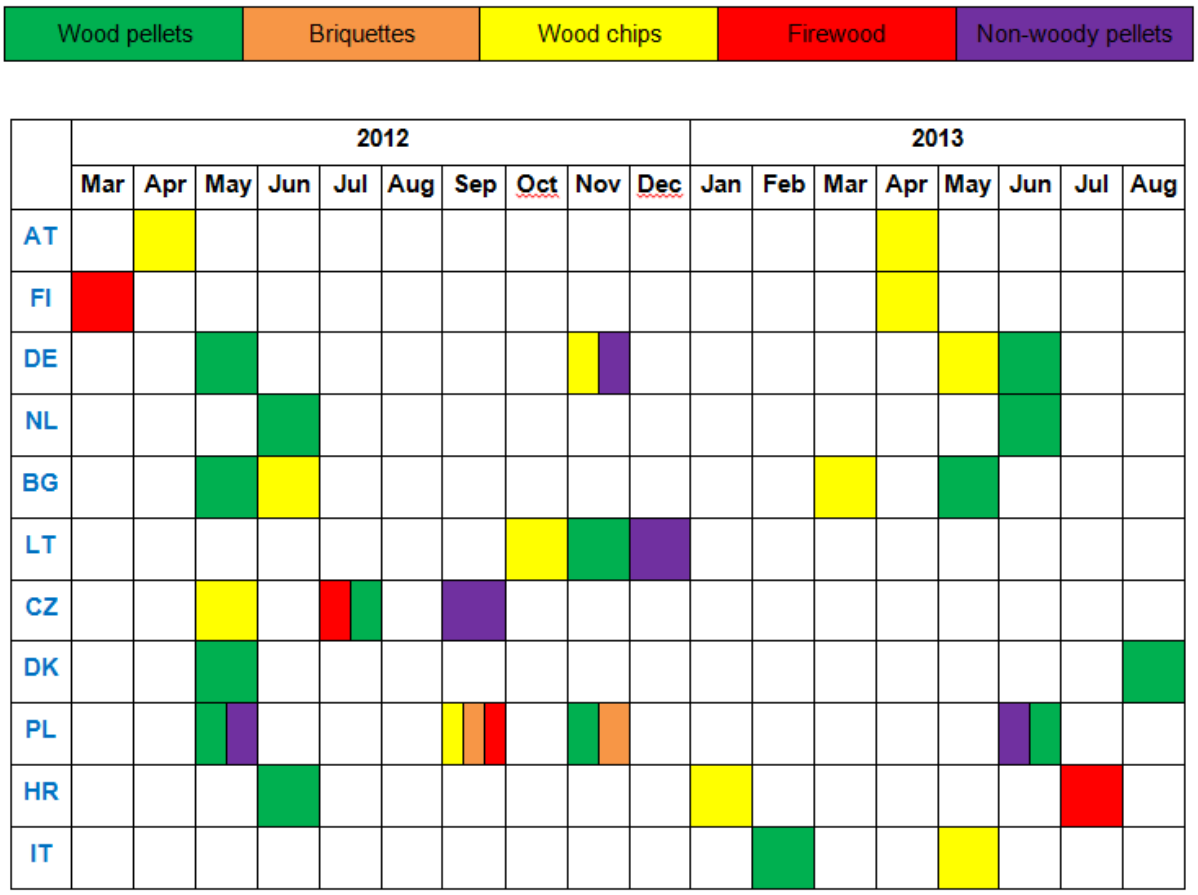
The main activity within the proposed action is the organisation of trainings on solid biofuel quality and sustainability standardisation and certification. The goal of these events was to generally increase awareness for quality and sustainability issues and to enable companies to apply standards and to participate in certification systems. As the addressed topics are relevant for the whole supply chain, the target groups included solid biofuel producers, companies active in solid biofuel trade and logistics, and solid biofuel end-users (mainly medium to large scale). Furthermore, organisations involved in solid biofuel testing and certification, as well as combustion equipment manufacturers and heat and power producers also benefited from the trainings.

The trainings aimed at providing a common meeting and discussion platform for actors along solid biofuel supply chains and to increase the general awareness of quality and sustainability issues. 1 or 2-day events for each training were organised including presentations, case studies, practical training of fuel analyses (where possible), one-to one meetings and feedback collection. In total, 34 training events were organised and more than 880 stakeholders were trained throughout the project duration in the following countries: Germany, Austria, Italy, Finland, the Netherlands, Bulgaria, Lithuania, the Czech Republic, Denmark, Poland, and Croatia.

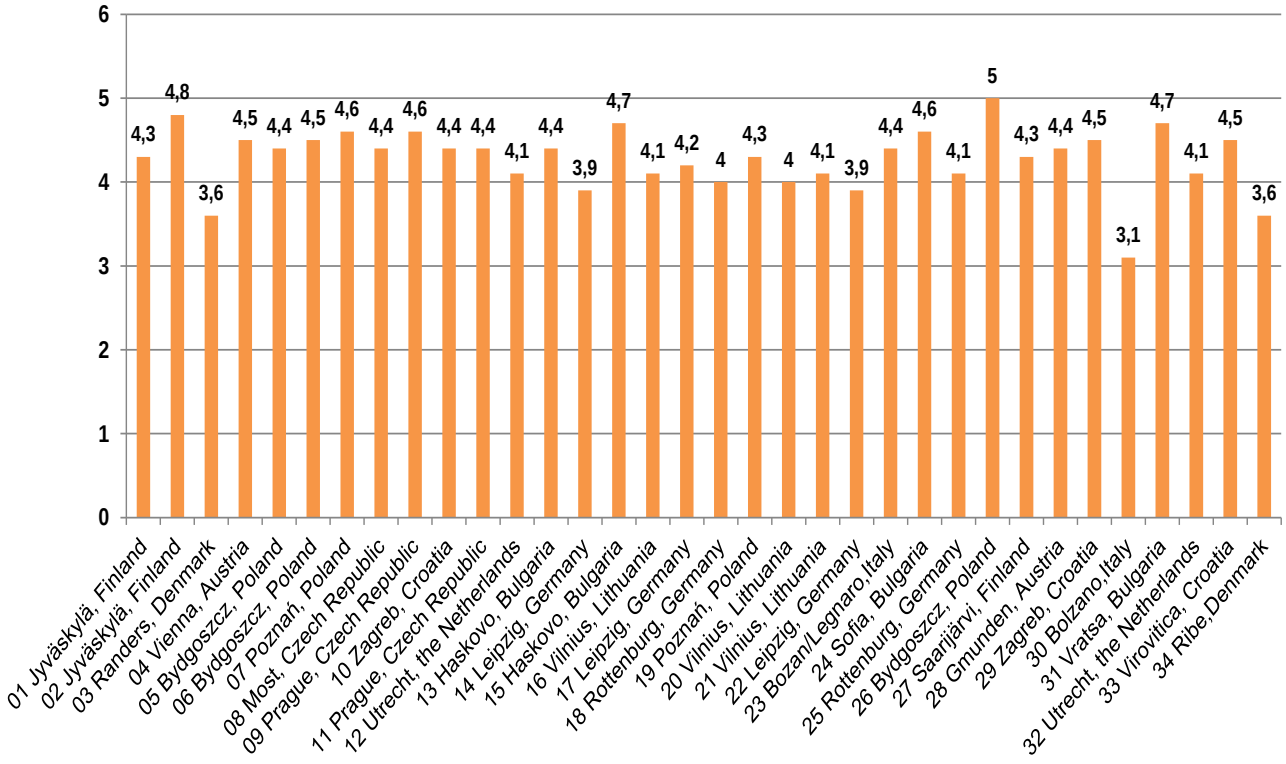
On average, 39% of the trainees were solid biomass producers, 14% end-users and 17% stakeholders involved in trading and logistics.



Number of participants trained per country



Training schedule in the participating countries throughout the project duration



Evaluation of participants in the different training events (5 being the best)

Other training events from outside the targeted countries have been organised during the project period in Spain by CIRCE and in Latvia by Forest and Wood Products Research and Development Institute.

Furthermore, the trainings were recommended by the following National standardisation bodies: the Austrian standardisation institute ASI, the Finnish standardisation body and solid biofuel standardisation body Kemesta ry and Finnish Forest Industries Federation (until end of 2012), the German DIN committee NA 062-05-AA “Feste Biobrennstoffe”, the Netherlands standardisation institute NEN, the Bulgarian institute for standardisation BDS, the Danish institute Dansk Standard, the Polish committee for standardisation PKN, the Croatian standardisation institute and the Czech research institute providing testing of solid biofuels (VÚZT).

The consortium members have plans for the implementation of trainings after the project ends. There are also plans to organise trainings in other European countries.

2.3. Implementation of quality standards in selected companies

The European standards on solid biofuel quality (EN 14961 series – solid biofuel specification and classes and EN 15234 series – quality assurance for solid biofuels) were planned to be implemented in 7 companies from 7 countries: Austria, Finland, Germany, Denmark, Poland, Bulgaria and Croatia. The 7 companies were selected according to company size, experience, state-of-the-art-equipment, raw material, references and eligibility.

Partner	Country	Pilot case
DBFZ	Germany	Production of wood pellets
VTT	Finland	Wood chips supply chain
REGEA	Croatia	Production of wood pellets
BAPE	Poland	Production of non-woody pellets
HFA	Austria	Production, trade & logistics of wood chips
ERATO	Bulgaria	Trade & Logistics of wood pellets & wood chips
FORCE	Denmark	End-use of wood chips in power generation

For each company, a feasibility study including the necessary measures, testing equipment and services, and related costs was made. The solid biofuel product testing for compliance with appropriate parts of EN 14961 series has been implemented in all the 7 companies, but problems occurred when implementing the quality assurance standards following EN 15234 series in some of the selected companies which were mainly related to the type of solid biofuel.

With wood pellets, no problems were faced since the requirement for the standard implementation according to EN 15234-2 is the same requirement for wood pellet certification schemes such as ENplus, DINplus or others which are widely used in Europe. In this term, DBFZ (Germany) and REGEA (Croatia) had successfully supported two partnering companies to implement the EN 15234-2.

Wood chips classification and certification were more difficult. During the project it turned out that the product-standard EN 14961-1, basis for the quality assurance standard EN 15234-1, contains several unsuitable requirements especially for particle size. These discrepancies are changed in the ISO 17225-1 standard which will supersede the EN product-standard. The main problem is the high inhomogeneity of the material. Even generating a representative sample to analyse wood chip properties is far too expensive for most market actors. Usually contracts are bilateral and products are not promoted for small scale users. Contracts include instructions on storage and fuel specification requirements e.g. moisture content, impurities and particle size. Due to these reasons the EN standards were not implemented in the Austrian company. In Austria the recently published ÖNORM C 4005 for the specification of forest chips helps to support the classification of wood chips which is one of the key factors for the EN quality assurance.

In Finland, on basis of the upcoming ISO product standard EN ISO 17225-1 or 4 VTT was able to support the implementation of quality certification according to EN 15234-1 or EN 15234-4 along the wood chips supply chain for 700 kW district heating plant except for the requirement of cross sectional area of oversized particle which could not be met in all cases. VTT have even made a quality guidebook in Finnish for the selected company. In EN ISO 17225-1 the cross sectional area is removed and only in EN ISO 17225-4 (for boilers less than 500 kW) it is still mandatory and values are even higher.

In Denmark, the project partner supported successfully the implementation of the quality assurance standards EN 15234 at the end-user stage of a wood chip supply chain. The principles and parts of the tools were adapted at the plant.

BAPE (Poland) showed that the production and quality measurement for non-woody pellets according to the standards are possible, but despite promising approaches the quality assurance standard EN 15234-6 could not be fully implemented. An important barrier has been the costs of testing equipment and great uncertainty in the market due to yet unresolved national legislations. Nevertheless, the partner company is taking further measures towards implementation of quality assurance system in coming years.

In Bulgaria, the partner could not support the quality assurance standards implementation EN 15234 at the selected company due to external problems.

The process of standard implementation was documented and will serve as an example or best practice that can be followed by other European solid biofuel companies.

In order to spread the experience gained, each partner organised a workshop showing and discussing the experiences gained with the active involvement and participation of the companies who have benefited from the support in the implementation of the standards.

A recommendation paper on the development of certification systems for solid biofuels other than pellets has been issued. This paper includes a best practice example of the ENplus certification for wood pellets and the different requirements for the development of a certification scheme stating the different steps of the procedure. The introduction of sustainability criteria is also described. The different certification approaches for wood briquettes, wood chips, firewood and non-woody pellets which constitute an integral part of this paper are investigated.

2.4. Sustainability of solid biofuels

The further development of the European framework for solid biofuel sustainability is unclear. Related decisions by the European Commission are still under development. The SolidStandards project aimed at supporting these policy decisions with an evidence based approach and at assessing the practical applicability of sustainability frameworks developing in the course of the action.

The key activities in the project included the organisation of a workshop for key stakeholders in order to facilitate the discussions on mandatory versus voluntary sustainability criteria for solid biofuels.

There was a general agreement amongst all workshop participants that sustainability criteria are needed. The industry representatives stressed the need for EU-wide harmonized criteria, as differing national systems would effectively create significant market barriers. It was also agreed that the sustainability certification systems should not result in administrative burdens and high costs. It was proposed to use existing legislation for sustainability certification and look at lessons learned in the biofuel industry.

An overview and analysis of sustainability certification initiatives was carried out. Several reports on this study including power point slides for training purposes have been made.

Existing sustainability schemes were reviewed, assessed and tested for their applicability in practical case studies. Four case studies of sustainably certified solid biomass supply chains have been chosen as indicated in the table below.

Country	Company	Product	Scope	Chain
Germany	Westerwälder pellets (TÜV Reinland)	Wood pellets	Analysis of CO_2 footprint	Local supply to small-scale users (households)
Netherlands	RWE-Essent (GreenGoldLabel)	Wood pellets	Analysis of intercontinental supply chain from British Columbia (BC wood pellets) to coal power plant in the Netherlands	A few large producers and one very large end-consumer in the Netherlands
Finland	Kyyjärvi Energy cooperative	Wood chips	Certification system: EKOheat, part of EKOenergy label, managed by the Finnish Association for Nature Conservation	50 small producers and medium consumer (1-1,5 MWth boilers)
Denmark	Nordic Ecolabel	Wood pellets	Certification system: Svanen	Various producers to many small end-users

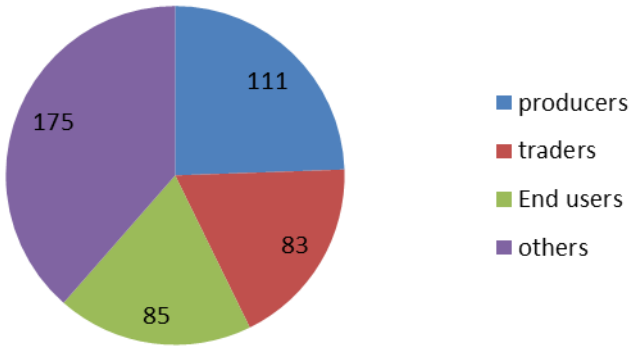
A detailed investigation including all steps from sourcing the raw material, through all pre-processing steps to the end-user was investigated. The reports of the case studies are publically available on the project website.

Furthermore, a study on the impacts of implementing sustainability standards has been made and is also available on the project website.

2.5. Input to standardisation processes

Both standardisation bodies and policy makers depend on industry feedback in order to create supportive administrative and regulatory frameworks for the development of solid biofuel markets.

This feedback which was collected from training participants and via several online tools was analysed and provided to relevant standardisation committees and policy makers. More than 450 feedbacks were gathered from 21 countries from different target groups.



Feedback per target group

In a first step, the outcome of the discussions as well as the feedback collected during the training events were compiled in national industry position papers by the respective national partners. The position papers represented the industry point of view on developing and existing standards and provided recommendations for improving the applicability of the standards derived from practical experience.

The position papers were then presented and discussed with the respective national mirror committee of CEN and ISO solid biofuel standardisation and one final industry position paper summarising the findings was elaborated. It included the following chapters:

- Chapter 1 describes the European solid biofuels market/industry. It is important to mention that it is not possible to provide a general overview for all of Europe. This position paper is limited to a description of 10 countries.
- Chapter 2 gives insight in standardisation activities and developments that are currently taking place for solid biofuels in the 10 countries. Standardisation needs per country are also identified.
- Chapter 3 describes certification activities in the 10 countries. The input by the national mirror committees and/or SolidStandards training sessions is included in this chapter.
- Chapter 4 includes the most significant, general findings and outcomes.

With the increasing use of solid biofuels in Europe, several issues related to solid biofuel storage have emerged in recent years. A recommendation paper was compiled relating available results from ongoing research and projects in addition to findings from the SolidStandards project. The quality of biofuel storage containers, fire safety and health risks in small to large storage and during transport were also addressed in trainings and discussed with experts and industry representatives. Based on the feedback, this paper has been developed to give recommendations for the development of a common European approach towards ensuring quality, safety, security and health aspects of solid biofuel storage and handling. It includes the following chapters:

- Chapter 1 describes the scope, objective and research methodology.
- Chapter 2 gives an overview and description of available documents about quality, safety, security and health aspects of solid biofuel storage and transport.
- Chapter 3 provides suggestions for topics about the issues that can be standardised.
- Chapter 4 states conclusions and recommendations

Another result within the core of this project was an inventory of future developments and implications of solid biofuel standardisation and certification of sustainability and quality. The report of this inventory includes the following:

- A quantitative assessment of current (and near-future) imports of solid biofuel from outside the EU-27 for energy purposes,
- A qualitative identification of sustainability conflicts/issues,
- A discussion on the developments of using solid biomass for the production of 2nd generation biofuels, and the subsequent arising need to harmonise sustainability criteria for solid and liquid biofuels,
- Qualitative review of additional quality and sustainability issues of pre-treatment technologies such as torrefaction.

2.6. Communication

A professional, attractive and user-friendly project website was developed in the beginning of the project and is accessed under www.solidstandards.eu. In the starting phase, the website gave information about the scope and objectives of the project as well as the activities that were planned to be implemented throughout the project duration. It also informed about the partners involved in the project. Progressively the website contained news and results and informed about the training events, the progress of project activities and the public reports. Various methods were used to increase the visibility of the website by target groups and the general public, like links in the websites of the partners' organisations and relevant projects, and by mentioning it in all relevant publications and articles in the media. More than 90,000 persons have visited the website throughout the project duration.

On the project website, a special section containing a hotline contact list of the members of the consortium has been created. This served as a helpdesk for the consultation regarding the implementation of quality and sustainability standards of solid biofuels. More than 500 questions were answered.

A project introduction flyer and a project brochure summarising the activities and the results of the project have been developed and disseminated on various events.

The members of the consortium have presented the project in different workshops and conferences and disseminated it through publications and articles in different magazines.

3. Lessons learned

Many lessons were learned during the implementation of the different activities of the project. These include mainly the following:

- The basic conditions and the stage of development of the several solid biofuel sectors differ from one country to another in Europe. To be able to create interesting contents to the stakeholders, it is quite important to adapt the course to the respective situation. In some countries, the certification in question is voluntary and the market is still characterised by low awareness while in other countries most solid biofuel producers are already applying the standards.
- There is certainly a need for training and discussion of the new European standards and sustainability criteria of solid biomass. Training courses explaining the content and use of standards in fuel production have been found very useful by participants. Several training organisations (e.g. in Finland) have shown that the training material is useful and will be used as part of the bioenergy training course standards. Few participants want to be deeply involved in the testing and further development, especially when they would need to provide internal information to be published in public reports and workshops.
- Soon after starting to elaborate the training material for wood chips it became evident that the available European standards for the classification and quality assurance of solid biomass (EN 14961 series, EN 15234 series) were especially prepared for industrialized products like wood pellets and wood briquettes and do not help market actors to declare their product in a simple way without analyses. Especially for products like wood chips and straw, this proved to be a major problem in the implementation of these standards. In addition, it became obvious that e.g. the classification of wood chip particle size in the European standards was non-applicable at all.
- The implementation of the complete standards EN 14961-x and the respective quality assurance standard EN 15234-x often is a lot of effort for the company, because they do not gain a direct profit from it – especially if a certification system for this solid biofuel does not exist. As a first step, a success can be considered if a company adapts to the nomenclature of the new European classification system.
- There is significant necessity in connection with the further implementation of standards for solid biofuels in Bulgaria, Romania, Croatia to use financial resources on the EU structural Funds to create conditions for notification of the national authorized standardisation bodies in these countries.
- Standardisation of solid biofuels is not in all countries at a mature stage yet (and, in some countries, a national standardisation committee does not even exist). In some of those instances, project partners were able to get in contact with dedicated delegations of the industry and/or government. This led to a careful conclusion that actual application of the standards (or even their use) is quite limited in some countries. This was slightly confirmed by the fact that during the final workshop and in some local events it was noted that in some countries national documents were still in use. Harmonisation is not universal, but the project has helped its realization a step forward, at least in the countries involved.

4. Success stories

During the elaboration of the training material for wood chips it became obvious that the particle size distribution system according to EN 14961-1 and EN 14961-4 could not be applied to most of the wood chip samples, at least as far as forest chips were concerned (find detailed analyses on that topic in the annex of the Austrian National Industry Position Paper) and was about to be revised in the ISO/TC 238 meeting in the beginning of May 2012. Based on most recent research results HFA had elaborated a proposal for a new particle size classification system. The aim was to discuss this new proposal in the first Austria wood chip training to agree on an Austrian proposal for the ISO meeting. The newly developed system was discussed and accepted by all participants. As a consequence Holzforschung Austria (together with VTT) actively took part in the standardisation process of the new ISO 17225-1 and ISO 17225 4 to modify the classification system for the particle size analysis. The suggestions were finally accepted by the ISO committee and the new particle size classification system is going to be published in April 2014 in EN ISO 17225-1 and EN ISO 17225-4.

Apart from particle size analysis the content of stones in wood chips and hog fuel was a topic, that was regularly discussed in the Austrian wood chip trainings and which led to a new work item proposal, written by HFA, for a method to determine the content of stones in a wood chip/hog fuel sample.

VTT has produced together with Finnish Bioenergy Association, Energy Industries Association and Finnish Forest industry association wood fuel guidelines based on EN and new ISO solid biofuel standards and training material of SolidStandards project.

According to the website statistics, more than 90,000 persons visited the website and publications were downloaded more than 4000 time. This shows that a lot of stakeholders were interested in the project.

It is a great success to be able to hold a large number of trainings with quite many participants.

It should be underlined that the partners have improved their knowledge on the standards along the way and that this helps ensure the sustainability of the project - enabling future trainings and other assistance to the stakeholders.

5. SolidStanards Consortium

Project Coordination

WIP – Renewable Energies
Sylvensteinstr. 2,
81369 Munich Germany
www.wip-munich.de

Cosette Khawaja
Tel. +49 89 720 12 740
Cosette.khawaja@wip-munich.de

Rainer Janssen
Tel. +49 89 720 12 743
Rainer.janssen@wip-munich.de

Project Partners

HFA
Holzforschung Austria
www.holzforschung.at
Monika Steiner
Tel. +43 1 798 2623 912
m.steiner@holzforschung.at

VTT
Technical Research Centre of Finland
www.vtt.fi
Eija Alakangas
Tel. +358 20 722 2550
eija.alakangas@vtt.fi

DBFZ
German Biomass Research Centre
www.dbfz.de
Martin Höft
Tel. +49 341 2434 593
Martin.hoeft@dbfz.de

NEN
Netherlands Standardisation Institute
www.nen.nl
Indra te Ronde
Tel. +31 15 2690 326
energy@nen.nl

Utrecht University - Copernicus Institute
http://www.uu.nl/copernicus
Martin Junginger
Tel. +31 30 253 7613
h.m.junginger@uu.nl

AEBIOM
European Biomass Association
www.aebiom.org
Gilles Gauthier
Tel. +32 24 00 10 55
Gauthier@aebiom.org

FORCE Technology
www.force.dk
Morten Tony Hansen
Tel. +45 72 1577 55
mth@force.dk

BAPE
Baltic Energy Conservation Agency
www.bape.com.pl
Ludmila Wach
Tel. +48 58 347 55 35
lwach@bape.com.pl

ERATO Holding
www.erato.bg
Nikolay Vangelov
Tel. +359 2 978 3990
n_vangelov@erato.bg

REGEA
North-West Croatia Regional Energy Agency
www.regea.org
Velimir Segon
Tel. +38 510 98 315
vsegon@regea.org

In Cooperation with

LITBIOMA
Lithuanian Biomass Association
www.biokuras.lt

CZ-BIOM
Czech Biomass Association
www.czbiom.cz

EUBA
Energy Utilisation Biomass Association
www.euba.bg

Publications produced within this project can be downloaded from

www.solidstandards.eu

Co-funded by the Intelligent Energy Europe
Programme of the European Union

This report has been produced as part of the Project SolidStandards.