SolidStandards

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

Description of the SolidStandards training concept

INTELLIGENT ENERGY EUROPE

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 standardization committees and policy makers.

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About this document

This document is **Deliverable 2.2** of the SolidStandards project. It is the "description of the training concept and individual modules" and provides background information to the training concept and material. This document was prepared in **April 2012** by:

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1. Introduction

This deliverable shall facilitate the organisation of training events for all those organisations who offer training events. The training concept and all materials developed in the framework of the SolidStandards project can be used by organisations interested in organising similar trainings. This document describes the training concept, the available materials as well as the process in which they were developed.

The main target groups of the trainings are producers and end-users of various solid biofuels. Other participants will be actors involved in trade and logistics and actors involved in standardization and certification.

2. Training events

2.1. General

Trainings aim 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. Regarding the main target groups, the specific aims of the trainings are:

- To enable solid biofuel producers to implement fuel specification standards (EN 14961 series) and quality assurance systems (EN 15234 series or ISO 9000) in their supply chain and to perform internal quality testing and control to confirm the fulfilment of quality requirements to end-users.
- To enable solid biofuel end-users to judge and control the quality of purchased biomass.
- As the whole supply chain is targeted, also issues related to certification and chains of custody from producer to end-users will be addressed.
- To increase the awareness and understanding of sustainability issues related to solid biofuels.

2.2. Concept

The training concept consists of a set of modules. It is foreseen to organise 2-day events. Two general modules can be combined with modules specifically addressing certain solid biofuels.

The **general modules** shall serve as overall information for the training participants on the standardisation of quality and sustainability of solid biofuels.

- General standardisation & feedback
- General sustainability issues related to solid biofuel supply

The **specific modules** for solid biofuels (e.g. for wood chips) on the other hand concentrate on the implementation of quality standards (e.g. EN 14961 Part 1&4, EN 15234 Part 1&4) in the production process of the respective solid biofuel.

- Wood pellet 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 chip module (EN 14961 Parts 1&4, EN 15234 Parts 1&4)
- Firewood module (EN 14961 Parts 1&5, EN 15234 Parts 5)
- Non-wood pellets module (EN 14961 Parts 1&6, EN 15234 Parts 1&6)
- Straw module (Wheat and energy crops) (EN 14961-1, EN 15234-1)

Each training module has to be specifically adapted to the target group's needs.

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

The training concept combines presentations with interactive parts, in which the implementation of standards in practice will be discussed in working groups using case studies and specific consultancy services are offered. Participants are provided with the knowledge necessary to implement standards in their production process.

Therefore the 2 days trainings include e.g. presentations, case studies, practical training of fuel analyses (where possible), one-to one meetings, feedback collection.

2.2.1. Presentations

The presentations combine the theoretical explanation of general and specific standardisation issues and shall be given by experts in the field of solid biofuels. Considering that three presentations are given in a training event, about half a day should be reserved for this part. The SolidStandards project provides presentation slides for each module:

- General standardisation & feedback
- General sustainability issues related to solid biofuel supply
- Specific solid biofuels modules

2.2.2. Case study

The case study should be prepared by each training organizer itself, because the type of case depends on the participating companies and where the focus of the training lies (e.g. on producer or trader, big companies or small, …). Case studies should be part of the practical exercises. The participants are split in smaller groups and for each group a different example was prepared to work out on a flip chart, e.g. different assumptions for the raw material reception or the factory production control. The task for the participants is to elaborate a flow-chart with details of the process step they have to implement a quality control for, including Critical Control Points and a list of the necessary documentation.

2.2.3. Practical training of fuel analyses

It might be helpful for producers to practice fuel analyses (e.g. moisture content, mechanical durability of pellets, bulk density and sampling, …) needed for the production control. Still, not all training organizers can offer the possibility to work in a laboratory or other place, where this could be practiced. If this is the case, there may be the possibility to organize an excursion to some laboratory or production site or to explain the procedure of the tests with the help of step-by-step analyses (see chapter 3.2).

2.2.4. One-to one meetings

In one-to-one meetings single companies get the opportunity to discuss standard implementation with respect to their individual company situation with an expert of the training organizer. These one-to-one meetings should be organized in advance for the second day of the training to give other participants, who don´t want to make use of this offer, the possibility to already leave the training after the first day.

An alternative procedure could be to invite the training participants to prepare all documents, which are necessary for a quality assurance according to EN 15234 series, and send them to the training organizers. The expert of the training organizer will then comment these documents and give advice per telephone or email.

2.2.5. Feedback collection

As part of the “general standardisation & feedback” module a questionnaire was elaborated to get the feedback of the training participants to the European standardisation (in general and specifically of the solid biofuel, which is addressed in the training).

It is part of the training to hand out this questionnaire and collect the filled in sheets again. The answers have to be typed into the online-questionnaire on the SolidStandards website by the training organizer to make the data available for evaluation.

3. Training material

3.1. General

The structure and the content of the general modules “general standardisation & feedback” and “sustainability” was elaborated by the responsible project partners.

For the specific modules describing the particular solid biofuels a common structure was elaborated by HFA to explain the respective parts of the standards EN 14961 and EN 15234. This template was first filled in for “wood chips” (by HFA & VTT) and then sent out as an example to the other project partners, who then elaborated the other specific modules according to the solid biofuels needs: wood pellets (DBFZ), wood briquettes (HFA), firewood (VTT), wheat and energy crops (FORCE) and non-woody pellets (BAPE). There was a template provided for the textbook as well as for the slides and examples were given for additional material, like step-by-step instructions of different property analyses.

The content of the training material for the specific solid biofuels is based on two questions:

- How to specify a certain solid biofuel?
- How to guarantee a specific quality of a certain solid biofuel?

In the training those two questions shall be answered...

- theoretically - in the presentations from experts by an explanation of the contents of the standards EN 14961-1, EN 15234-1 and the respective parts for the addressed biofuels,
- practically orientated - by case studies, practical training of quality tests, one-to-one meetings...

Copyright!

To explain the standard-based quality implementation process it is inevitable to cite parts of those standards. To avoid problems with the national standardisation bodies, who own the copyright for the standards, it was agreed on with CEN that training material must be handed out to the training participants in printed form only, including the following text.

“This document is provided with the permission of CEN within the context of the training, to highlight the standards for solid biomass to the users. This document cannot be used for any personal / commercial purpose other than this training.”

In addition to that the textbooks for the specific modules contain the following paragraph.

“This document serves as a guideline to facilitate the implementation of quality standards in the production and the transportation of “biofuel” according to the respective standards of the EN 14961 / EN 15234 series. For the application of this system the acquisition of in this document mentioned standards is indispensable. For further information please contact the national standardization institutes.”

3.2. Types of training material

3.2.1. Textbooks

In the textbooks detailed information is given on the topic of the respective module. They serve the organisers of a training event as background information to the slides and is handed out to the training participants for information (general modules) and, in the case of the specific modules, as a guideline “how to implement the new European solid biofuels standards”.

3.2.2. Annex

The Annex belongs to the textbook. Just as the textbook it is handed out to the training participants. In the Annex of the general standardisation module a list of all national standardisation institutes of Europe can be found. For some of the specific modules the Annex contains simple descriptions of fuel analyses (step-by-step). In this case the idea is that this description can be used by a company as info-leaflet in the production or serves as template for their own work instructions. The content of the Annex can vary depending on the module.

3.2.3. Additional material

Matching exercise (“wood chips” module)
HFA created a matching exercise as an active task for the training participants. Pictures of different raw material and pictures of wood chips/hog fuel, produced out of this raw material, shall be presented to the training participants. The participants have to match the wood chips/hog fuel with their original raw material and estimate certain quality parameters like particle size of the biofuels. In addition 10 samples of the chip material of the matching exercise were packed by HFA in transparent boxes to be sent to other project partners for use in their trainings. This exercise is especially important for wood chips where the knowledge of the type of raw material is important for a proper wood chip declaration. For other solid biofuels, like wood pellets or briquettes an exercise like this is not necessary because usually the same or similar material is continually used for production. For those cases a general exercise to get used to the new raw material classification system (described in “Sample collection” is more useful.

Sample collection (all modules)
For each training event the organisers try to provide different biomass samples for practical classification of e.g. the raw material in accordance with EN 14961-1.

Calculation of particle size class (“wood chips” module)
For this exercise HFA provided the values of single fractions of different particle size analyses. The participants have to evaluate the correct particle size class out of these results. With this exercise the difficulty for a correct particle size classification and typical problems of different raw material can be discussed. In addition this exercise is a good opportunity to get feedback for the revision of the classification of particle size, which is on the way in ISO standardisation process.

Guide for the determination of energy content (“firewood” module)
VTT has produced a short guide and excel-sheet how firewood producers can determinate the energy content of firewood. Energy content of firewood in kWh depends on a moisture content of firewood, which also effects combustion and emissions. When the moisture content on wet basis and the net calorific value on dry basis are known, the energy content can be calculated. This guide gives instructions how to determine energy content of firewood in a handling unit (e.g. a wire storage cage, a sack) or firewood sold in loose material.

3.2.4. Slides

For all modules the content of the slides resembles the content of the textbook in condensed form. All the background information to the slides, which is necessary to give the presentation, can be found in the textbook of the respective module. For some modules ("sustainability", "wood briquettes", "wood chips") additional, more in-depth information is attached at the end of the slides and can be used during the presentation by clicking an "INFO" button on specific slides.

While in the textbook the quality assurance implementation is illustrated by an example, the slides mainly give the structure of the implementation process. The idea is to give an overview on the process in theory and later discuss a practical case study in more detail in the practical exercise.

Practical training of quality tests: If step-by-step instructions for fuel quality analyses are available for a module, those analyses can be discussed theoretically if practical training of these tests is not possible. Slides are available for the modules "wood briquettes", "wood chips", "fire wood", "wood pellets" and "non-woody pellets".

Matching exercise: Slides are available for the "wood chips" module. With the help of the slides the answer to the matching exercise can be given and problems in the specification of wood chips/hog fuel can be addressed.

4. Comments for each modules

4.1. General Standardisation & feedback

This module lists all solid biofuels and sustainability standards - in total 44 standards. In the beginning of the module different standards types are described and how standards are developed as well as the way stakeholders can participate in this standardization process.

To give the training participants and other stakeholders the opportunity to comment on existing standards a questionnaire was developed. With this questionnaire feedback on the use of standards and the need for revising existing standards or developing new standards should be collected. The first version of the questionnaire was revised based on feedback after the first training sessions and other developments in the course of the ISO standardization process. An online tool is under development to collect feedback from other stakeholders than participants to training events. This online tool should first be tested whether it is user-friendly and practical. Otherwise, the questionnaires (in different languages) will be published as download and stakeholders can complete the questionnaire and return it by e-mail. This online tool is also aimed at processing the information received during training events. In that case the organisers of a training event have to transfer the data into the online tool. All the information received will be used to draft national industry papers that for several countries present the industry point of view on developing and existing standards and provide recommendations for improving the applicability of the standards derived from practical experience.

4.2. Sustainability

This module provides a general description of sustainability issues in the context of solid biofuels, and explains the basic calculation of GHG and energy balances of biomass supply chains. It is complemented with an overview of current legislations focusing on sustainable biomass production, trade and use, and of voluntary certification schemes. The main objective of this module is to make the sustainability concept conceivable to a wider audience from the (solid) biomass community.

4.3. Wood pellets

The focus of the wood pellet training material is on the production and trade of high quality wood pellets for non-industrial use according to EN 14961-2. Nevertheless achieving a defined quality is a very important issue regarding wood pellets for the industrial use in large plants as well. Some industry initiatives are currently working on the development of product specifications for these fuels.

Quality certification schemes offer a way to producers and traders to show their customers that their products match defined quality requirements. Currently several European certification organisations are adopting their schemes to the requirements defined in EN 14961-2 (e.g. DINplus). Other schemes (e.g. ENplus) have newly been developed based on the new European standards.

4.4. Wood briquettes

The example is focused on non-industrial use of wood briquettes. At the moment new certification systems based on EN 14961-3 are under development in Germany and Austria. The updated information on these certification systems (DINplus, ÖNORM) can be found in the Annex of the Training material.

4.5. Wood chips

The example is focused on industrial use of wood chips (especially forest chips). In ISO standardisation the specification of wood chips is discussed again and probably is going to change compared to EN 14961 parts 1&4. This creates a rather confusing situation for participants of the training events. The main focus therefore should lie in general quality control and methods how to determine a certain quality class (e.g. by analysis, by estimation).

4.6. Fire wood

The example is focused on oven-ready firewood production. The producer has also applied energy calculation method in the use of firewood.

4.7. Non-woody pellets

The example is intended for non-industrial use of non-woody pellets. However, as the non-woody pellets market in Poland is still developing (ca. dozen producers) and this solid biofuel is mainly sold to industrial users, the training module is fitted to their needs as well.

4.8. Straw (wheat and energy crops)

The straw module reflects that straw and energy crops are usually handled in more simple ways and over shorter distances than for instance wood pellets. Straw is mainly used locally and regionally and normally it does not undergo other processes than baling. Thus, the structure is maintained and information about the origin likewise. Local utilisation and a generally low price level of straw based fuels mean that less advanced monitoring and control methods are applied to straw than to fuels that are traded as a commodity.

5. Background information: Concept development

The present training concept was developed by the SolidStandards consortium:

- WIP Renewable Energies, Germany
- HFA - Holzforschung Austria
- VTT – Technical Research Centre of Finland
- DBFZ – German Biomass Research Centre
- NEN – Netherlands Standardisation Institute
- Utrecht University, Copernicus Institute (UU), the Netherlands
- AEBIOM – European Biomass Association, plus AEBIOM members LITBIOMA (Lithuania), CZBIOM (Czech Republic), and EUBA (Bulgaria)
- FORCE Technology, Denmark
- BAPE – Baltic Energy Conservation Agency, Poland
- ERATO Holding, Bulgaria
- REGEA – North-West Croatia Regional Energy Agency

As a first step, various industry stakeholders were consulted in order to get a better idea about the needs of the target groups. For the consultation, a questionnaire was developed by WIP and provided to the partners. The questionnaire was partly sent via email to stakeholders to be filled in and sent back, partly used for telephone interviews. The filled-in questionnaires were collected and analyzed by WIP. In total, 104 stakeholders provided feedback during the first stakeholder consultation, at least until end of August 2011. The main conclusions from the first stakeholder consultation are the following:

- The target groups favor shorter events instead of the envisaged 2-day-events. In order to meet these requests and to cover all the requested contents, it was suggested to cover the theoretical part (presentations), the practical part (case studies), and the feedback part in 1 day. 1-to-1 meetings for discussing individual issues would be offered on day 2. This way, participants interested in a 1-to-1 meeting can stay while other participants could have the advantage of short event duration.
- Quality certification should be treated more in depth. This could be done by e.g. inviting certification system owners to present their services. However, since the events are mainly about quality standardization, it must be avoided that certification becomes the main discussion topic.
- The events in general should aim at providing skills and materials that allow participants to implement their own quality management systems in their companies. This will be taken into account while preparing the training materials.

In addition, a Steering Committee was set up and consulted in a similar way, yielding congruent results. More detailed information can be provided upon request.

The main partners involved in the development of the training materials were VTT (General module, wood chips, firewood), UU (Sustainability), DBFZ (wood pellets), HFA (wood chips and wood briquettes), FORCE (straw), BAPE (non-woody pellets), and NEN (feedback). The materials were initially prepared in English and translated subsequently to partner languages. Modules are made available in Finnish, German, Dutch, Czech, Lithuanian, Danish, Polish, Bulgarian, and Croatian.

In order to test these materials and the developed training concept, HFA organized a pilot training from 7 to 8 November 2011 in the HFA premises in Vienna, Austria. On those two

days the partners, responsible for the elaboration of a general or specific module presented their training material to all other partners. The main conclusion was that the materials and the training events as such must be as practical as possible and very close to the daily work of the target groups. A more detailed report on the experiences gathered during the pilot training can be provided upon request.