Project no.: 226824

AdvanceETV

"Coordination action on Environmental Technology Verification ETV - Building a framework for international cooperation"

Coordination action

Area 6.3.3.3
Environmental technologies verification and testing

D 5.3.1 AdvanceETV proceedings

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Accelerating eco-innovation through environmental technologies verification

12-13 October 2009

Conference and Parliamentarian Evening

at the Representation of the State of Baden-Württemberg to the European Union Brussels/Belgium

AIRTV ETV www.airtv.eu

AdvanceETV ETV www.eu-etv-strategy.eu

funded within the Sixth and Seventh Framework Programme of the EC

1.1 Introduction to AdvanceETV

Dr. Thomas Track, Dipl.-Ing. Dennis Kraemer, DECHEMA e.V., Frankfurt am Main, Germany

Innovative environmental technologies have the potential to decrease pollutant emission, improve the environment and, at the same time, increase the market position of companies. But many of those technologies do not find the way to gain acceptance in the market because the majority of buyers do not trust unproven technologies and therefore choose established products. In order to overcome this hurdles the European Commission is preparing an environmental technology verification (ETV) system. The purpose of ETV is to prove technology performance data by an authorized 3rd party using pre-defined protocols and procedures in order to provide purchasers with information about performance. So, a successful verification should deliver an independent proof that technology performance claims of technology providers is correct and results ease the diffusion of new Environmental sound Technologies (EsT) into the market.

Countries like USA, Canada, South Korea, Japan, and the Philippines have already established ETV systems while Europe is still in the process of development. Hence, the EC has funded several projects that aim to support the development of a EU ETV system for EsT's. Each project is scoped to a specific environmental technology application range.

Since globalisation becomes more and more important for vendors and purchaser, mutual recognition and international harmonization of ETV schemes would bring huge advantages for all sides. Therefore the European Commission is funding the coordination action AdvanceETV to increase the acceptance between the systems and create mutual recognition within and beyond Europe. AdvanceETV aims to demonstrate that the proposed schemes and protocols for Environmental Technology verification systems have the potential to be recognized internationally. Thus the main objective is to develop an international framework for cooperation and mutual recognition by supporting the cooperation of international ETV activities, e.g. the International Working Group (IWG) on ETV. This requires support by joint coordination activities: (1) Providing a European basis for mutual recognition (2) Coordinating requirements for co-verification and joint verification (3) Developing a framework for international harmonization. The European basis will be elaborated through

integrating previous and on-going European research. This is done by bringing together protocols / verification reports out of the FP6 projects, consolidating stakeholder feedback and by integrating experiences out of the CEN workshop agreement (CWA) elaboration and use. To raise awareness on gaps and overlaps of international cooperation a case study workshop on co- and joint verification will be initiated together with U.S. and Canadian partners. To foster recognition by harmonization a standardization framework will be identified to prepare the initiation of a standardization procedure. Cross cutting issue workshops ensure feedback and exchange between these different areas. A confirmed expert board with ETV system representatives from Canada, U.S., South Korea, Japan, and others provides the direct link here. This concept supports the working structure of the CA: focused on a series of conferences, coordinated with international ETV activities, serving as a platform for incremental consolidation of the international framework.

The coordination action is running since January 15th, 2009.

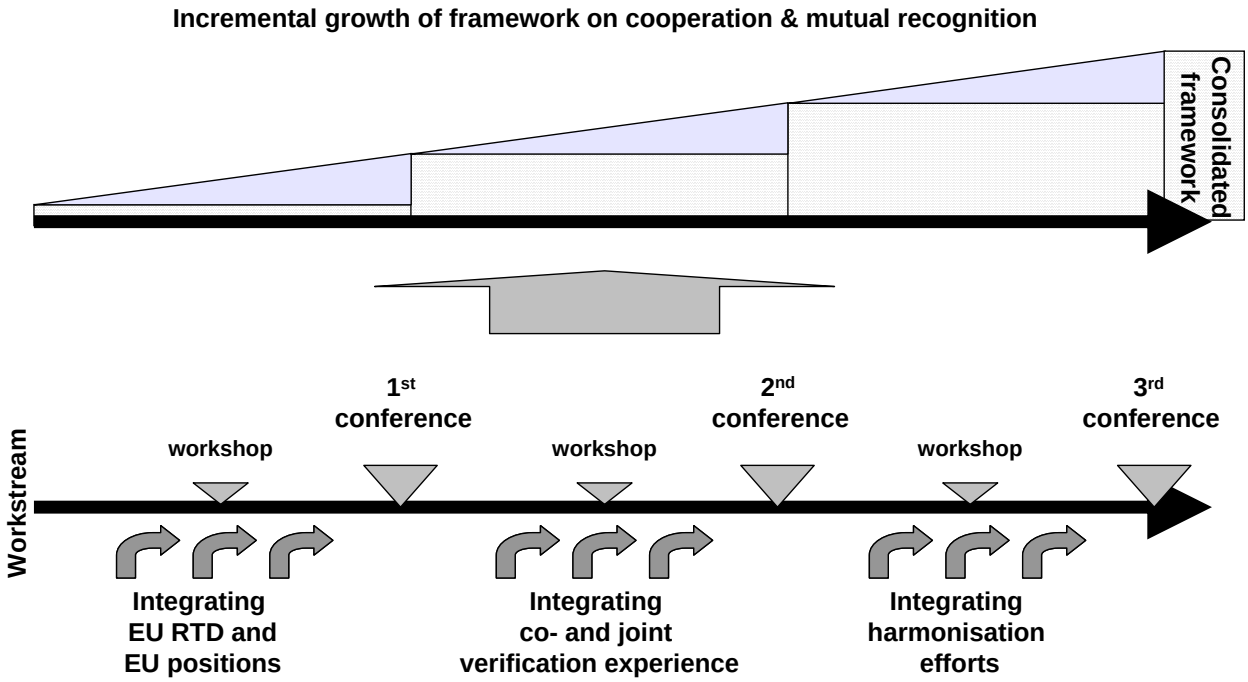

Figure 1: Concept to elaborate a framework on international cooperation and mutual recognition

1.2 The role of CEN Workshop Agreements (CWAs) and standardisation within ETV

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The role of standards

This presentation describes the likely role that standards will have in supporting an international, harmonised ETV scheme, and how a type of standard known as a CEN Workshop Agreement (CWA) can provide a rapid solution when ETV programmes need new standards very quickly. Over 100 years ago, engineers developed the first technical standards to create a harmonised set of specifications for manufacturers and users of products. These specifications encouraged trade by creating a unified framework for engineering. Over time, standards evolved to cover many other areas such as quality assurance and testing. Standards can support ETV programmes by providing the framework for harmonised testing and quality assurance; without these two activities, mutual recognition would be difficult, if not impossible.

However, the process of developing standards can involve many different organisations, and it can take many years to develop a standard. In any developing scheme such as ETV, long timeframes are a problem if standards are required very rapidly. Fortunately, the Committee for European Normalisation (CEN), the European standards body, has a procedure to develop a type of standard quickly; this type of standard is known as the CWA. During the pilot programme for the ETV scheme, the teams within the project developed two CWAs to support ETV, whilst it is likely that the project teams will develop more.

Types of standards

In simple terms, there are four types of standard within the hierarchy of CEN standards (Figure 1):

- **EN standards:** These are true standards, are prescriptive, and have the highest status. However, the procedures for developing them are necessarily complex and standards can take several years to develop – typically between five and ten years. National standards-bodies which are members of CEN must adopt CEN standards.
- **EN Technical Specifications:** These can also be prescriptive like true standards, but do not require the same procedures for their development and acceptance, and therefore do

not carry the same status as EN standards. However, they do not take as long to develop – typically three to five years. At the same time, Technical Specifications can evolve into standards over time.

- **Technical Reports:** These are not prescriptive and provide guidance only, usually supporting a specific standard or technical specification. Technical Reports usually take between one and three years to develop.
- **CEN Workshop Agreements:** These are lowest on the hierarchy of standards but do not have to follow the same procedures for development and approval. Hence a group can produce a CWA within a year. Moreover, CWAs can be prescriptive and can evolve into true Standards or Technical Specifications over time. CWAs are ideal for pilot projects and evolving schemes under development, such as the new ETV scheme.

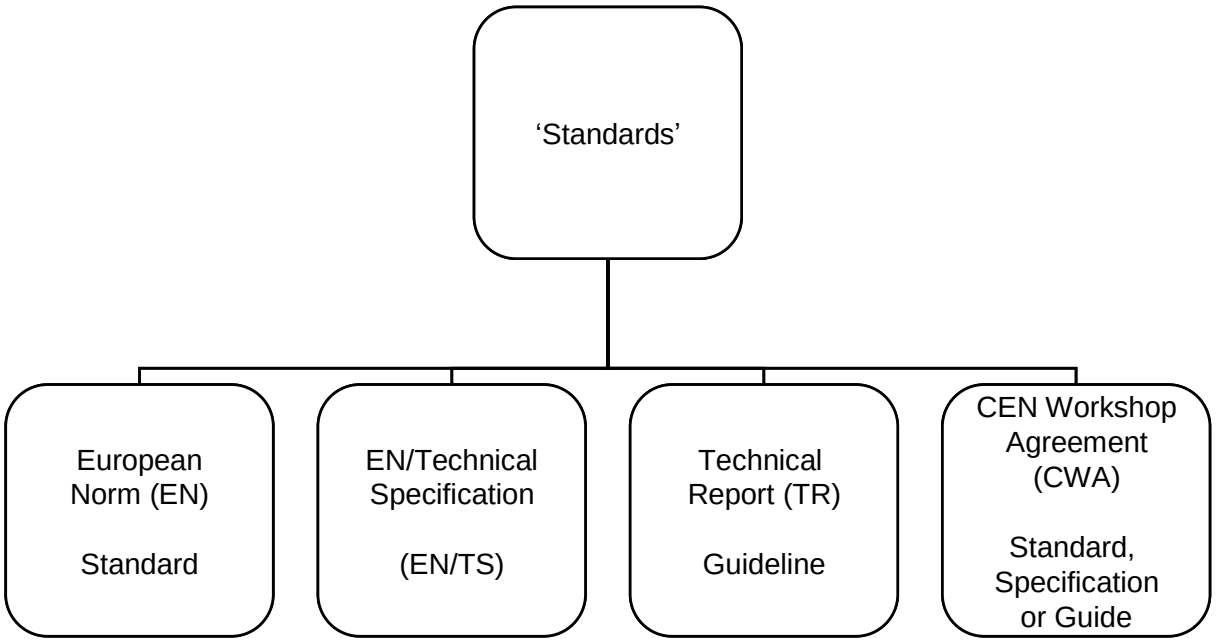

Figure 1: The types of CEN standard

Many national standards-bodies and the International Standards Organisation (ISO) have and equivalent standard to the CWA, known as a Publicly Available Specification (PAS).

This presentation expands on the four types of CEN standard, illustrating how the ETV group developed a CWA for verifying air-emission abatement-systems. The presentation includes an example of what happens when there is not such a standard for verifying air-emission abatement-systems, and the benefits of applying such a CWA. For example, Figure 2 shows how a standard for assessing the effectiveness of an air-abatement system could work. If there

were not a systematic framework, then it would be impossible to determine exactly how effective and efficient an air-abatement system could be. Therefore the main part of the presentation describes the development of the CWA for air-emission abatement systems.

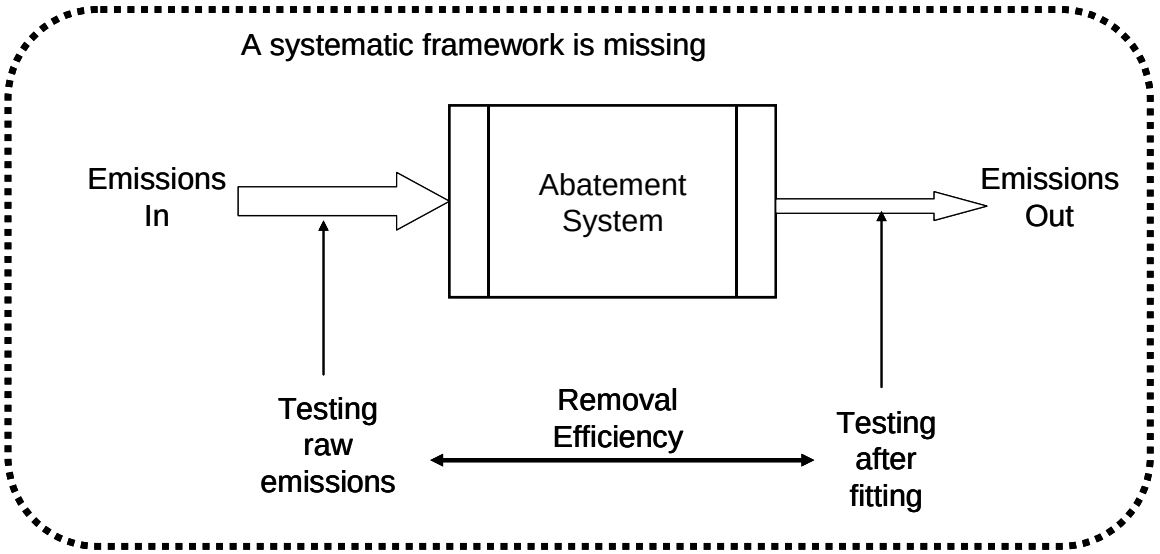

Figure 2: Before the Air-ETV framework for testing, and how the essential elements for testing the effectiveness of air-abatement systems

Developing the CEN Workshop Agreement (CWA) for air-abatement systems

As it might take several years to implement a European ETV with all detailed procedures that are necessary for the application of the ETV, the AIRTV team decided to develop a CWA in parallel with the development of the core procedures for the European ETV scheme. This CWA will then bridge the gap between the end of the AIRTV project and the implementation of a European ETV system.

As introduced above, the CWA is a tool to elaborate a common agreement on specific procedures. For AIRTV, this consensus comprises the establishment of a generic system that gives systematic and documented proof of a technology as being sound in terms of its claims of operation and the environment. So the CWA provides a procedure to prove the performance of a product and not, for example, certify the conformity with certain standards or norms. In other words, the role of this CWA is to prove performance, rather than certify a product under a formal product certification scheme (e.g. product certification to EN 45011 or ISO 17065).

The main advantage of the CWA is its characteristic of having a streamlined process for development. However, the process is still fair and transparent, cost-efficient and fast. The CWA 42 *Environmental technology verification — Air emission abatement technologies* was developed in just 17 months, once the workshop's business plan was developed.

After the kick-off meeting, the development process worked predominantly electronically, i.e. in addition to an exchange by e-mails and document repositories, the group held combined on-line web-based meetings and teleconferences – to ease communication and input and to save considerable time and travel expenses.

CWA 42 provides a guideline for the verification of air-emission abatement-technologies. It specifies a verification process and reporting structure for a verified vendor claim for the performance of a specific air-emission abatement-technology. The technology can comprise hardware (devices, apparatus and tools), software (e. g. for process control and improvement) and physical, chemical and biotechnological processes with their adaptation to site-specific conditions.

Following the procedure (Figure 3) laid down in CWA 42 results into a systematic process and report for a verified product. This report provides standardized key information about an air-emission abatement-technology when applied. The report aims to illustrate the technology's performance and can be used to help all stakeholders (e.g. experts, regulators, administrators, potential customers and investors) for decision making, i.e. to evaluate if a particular technology is suitable for the specific pollutant(s) and conditions for the application that is under consideration.

The CWA will provide a substantial input to a future European ETV system. The CWA gives guidance on technology verification on a voluntary basis to bridge the gap until a European ETV system is established.

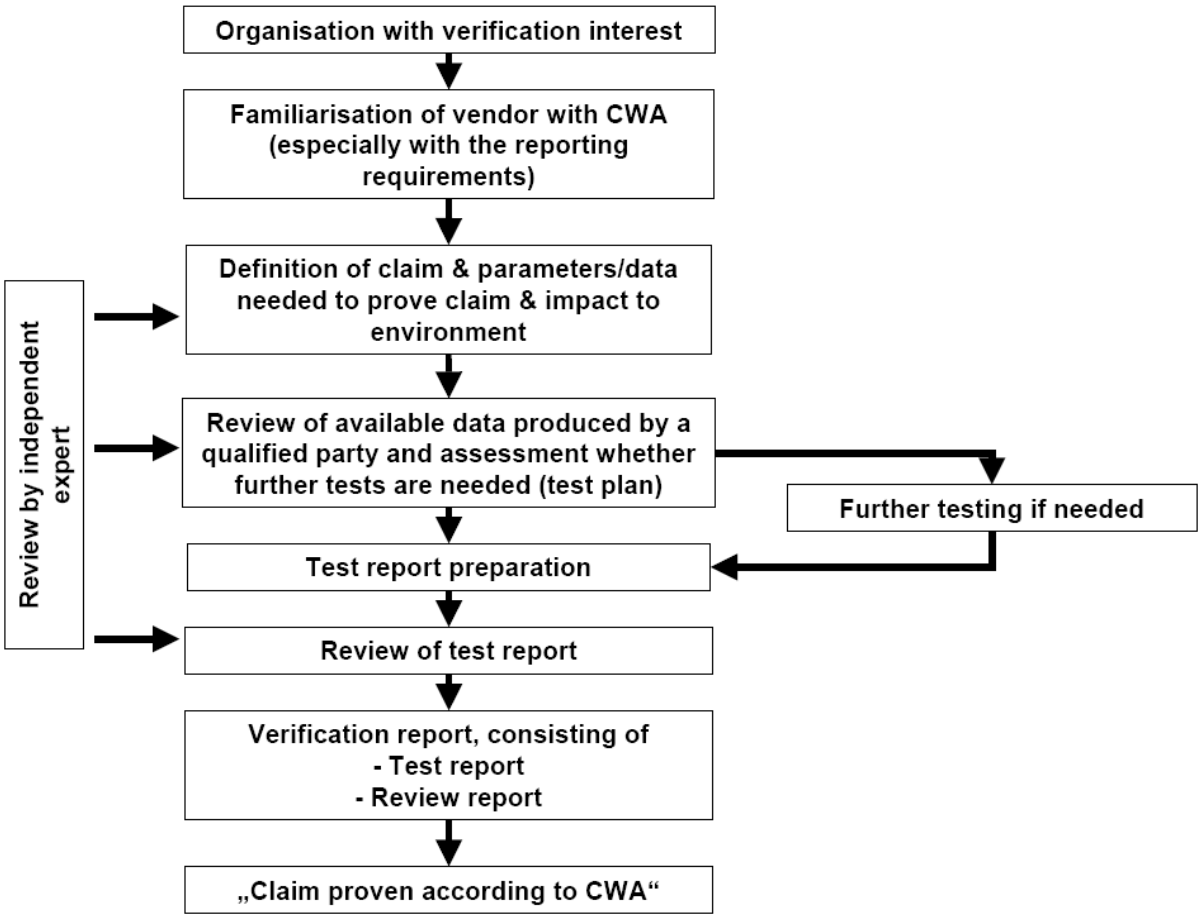

Figure 3: The framework for air-emissions abatement-verification, as described by CWA 42

1.3 Organization of ETV - national, regional and global aspects

Christian Grøn, DHI and DANETV, Hørsholm, Denmark

Environmental technology verification, ETV, is a form of third party assessment providing documentation of performance for innovative environmental technologies or applications. ETV is intended to support technology vendors in accessing the markets with their new technologies, technology buyers in taking the risk with new technologies and authorities in accepting them. If the full benefits of ETV are to be achieved, and the costs and delays in market introduction kept at a minimum, it is essential that ETV done under one verification scheme is accepted by other ETV schemes. Currently, a number of ETV schemes exist and more are being introduced, see Figure 1.

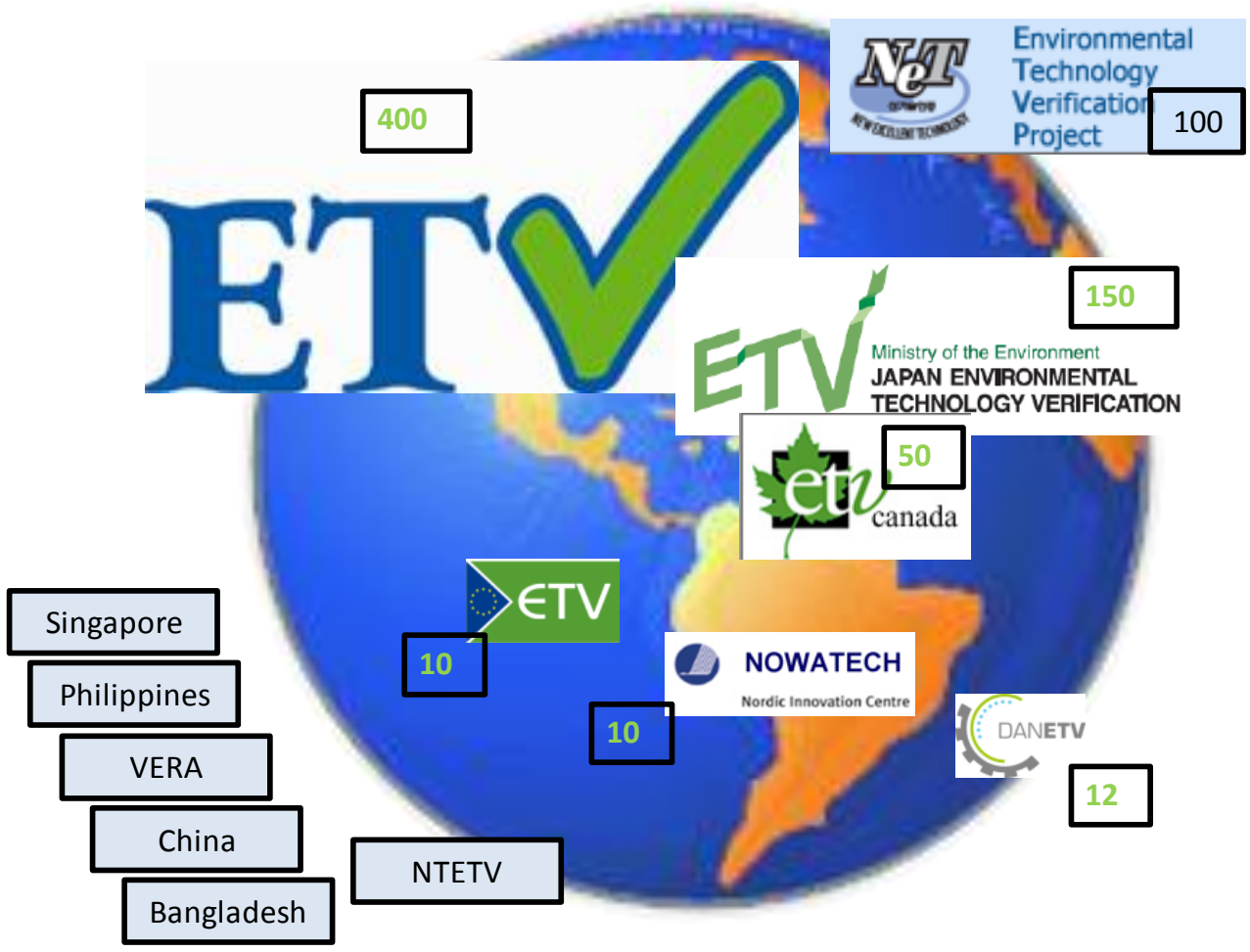

Figure 1: Existing ETV schemes with number of verifications done and new ETV initiatives inserted

Whereas the growing number of ETV schemes may be seen as recognition of the need for ETV and accordingly as a success for the principles behind, it may ultimately jeopardize the idea of:

Verified once, verified everywhere

It is therefore essential for achieving the overall objective of faster use of smarter environmental technologies, that an internationalization process of ETV towards coordination, cooperation and ultimately mutual recognition is initiated. A process from national and regional ETV schemes over cooperating schemes to full mutual recognition between ETV schemes is illustrated in Figure 2.

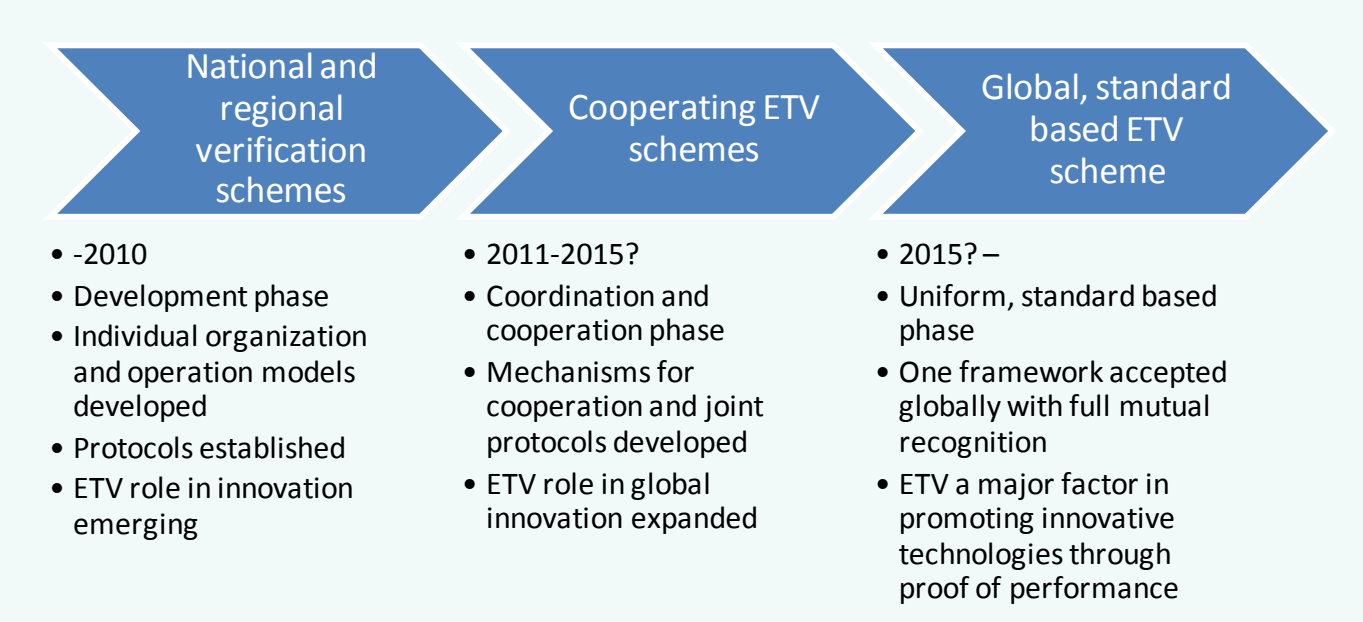

Figure 2: An example of development process from national to global ETV

If a fully recognized global ETV regime shall be possible, it requires development of a coordinating organization (ensuring harmonized performance parameters for verified applications), involvement of the standardization organizations (providing an environmental technology verification standard) and participation of conformity assessment bodies (oversight with verification and tests bodies, and with analytical laboratories) and not the least dedicated cooperation between existing ETV schemes. A suggestion for an organization of a global ETV scheme is shown in Figure 3, combining elements from ETV, standardization and conformity assessment.

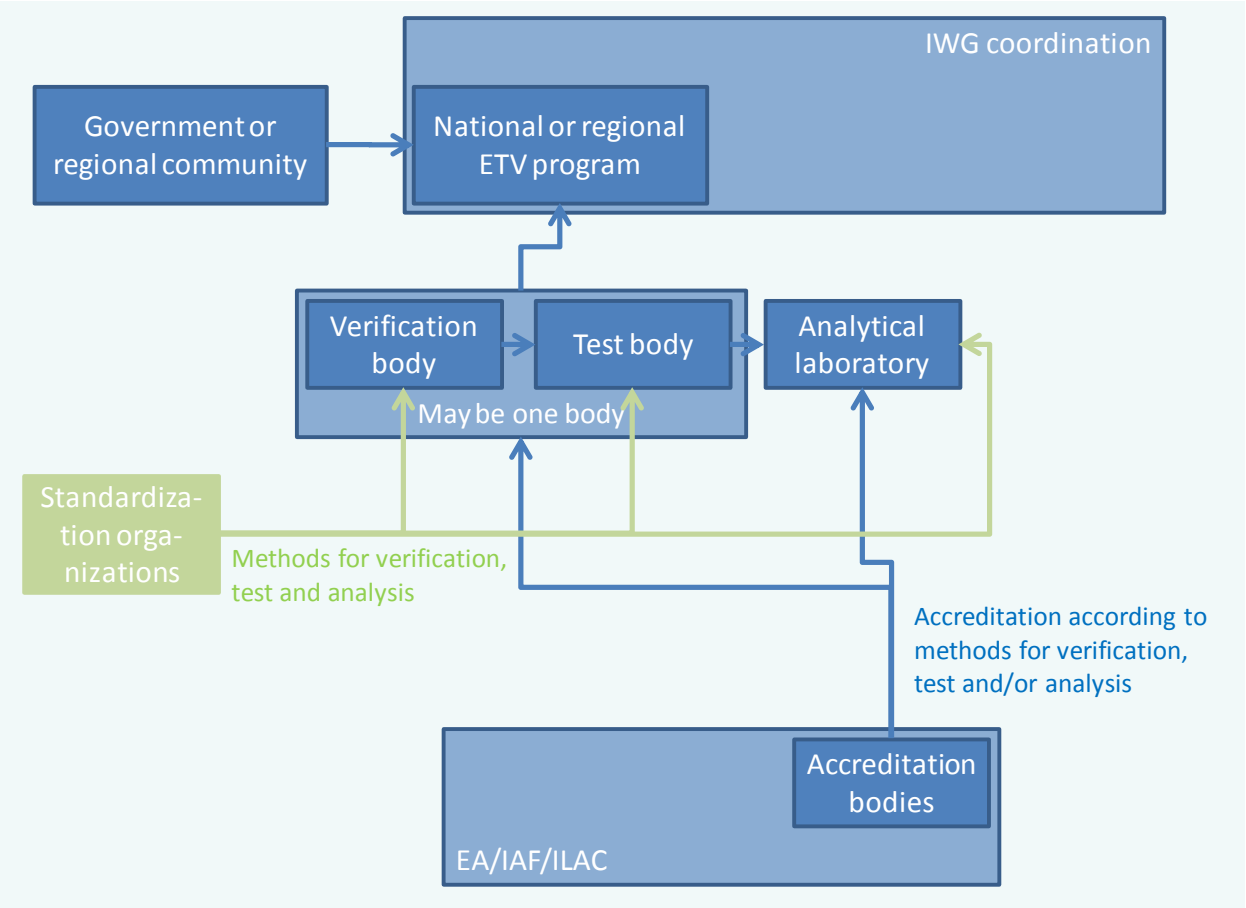

Figure 3: Suggestion for organization of a global ETV scheme

The presentation will provide the background for these statements and will discuss the benefits and draw backs from different approaches to global ETV.

1.4 International Harmonization - Perspectives of International Working Group on ETV

Raymond Klicius, P.Eng, Environment Canada, Ottawa, Canada

In February 2009, in Plieshauzen, Germany, the International Working Group (IWG) on Environemntal Technology Verification (ETV) commenced discussions on a work plan to resolve 12 key issues that would facilitate progress on international harmonization of verification programs. Today's presentation provides a brief overview of these 12 issues, focussing on their relevance, the controversy about them and actions by the IWG. By working through these issues, the IWG will be developing a coordinated position for input into an International Verification Guidance Document. This document will become the backbone for harmonization of verification programs, leading to mutual recognition among ETV programs.

For this presentation, the 12 issues have been grouped into 6 categories, as follows:

1 - Key definitions

2 - Infrastructure to manage and deliver ETV services

- Organization: Separation of Verification Organization, Testing Organization, Delivery Agent, Verification Entity
- Public sector / governmental oversight
- 3rd party testing and verification

3 – Scope of ETV

- Stakeholder-based versus vendor claims
- Factors to be verified – Sustainability?
- Stage of innovation continuum – commercial ready or earlier

4 – Transparency / Conflict of Interest

-Transparency – release of results

- Conflict of Interest
- Openness – can any vendor apply?

5 – Quality Assurance / Quality Control

- Overall QA/QC system
- Use of ISO for
    - Quality management system
    - Test plans
    - Protocols

6 – How costs covered?

- Leveraged
- Full program funding

As requested by the organizers, the subject of costs, who are the beneficiaries and who is likely to pay for verification services will be discussed in more detail, drawing upon Canada's experience, but applicable to ETV Programs in other countries.

It is recognized that these may not be the only issues requiring discussion among the members of the IWG; however, these represent key points of controversey that are currently being addressed, in the spirit of achieving the IWG moto of „Verifiy Once – Accept Everywhere"

1.5 Charting a Path Forward for International Acceptance of Verified Performance Information - A Review of Current and Proposed Cooperative Initiatives

John Neate, ETV Canada, Ontario, Canada

A number of cooperative initiatives are currently underway and proposed to support international acceptance of verified, quality-assured technology performance data. This information is needed to support informed decision-making, transparency and accountability related to investment, procurement, regulation, and the deployment of innovative technologies.

Joint verification of environmental performance enables a better understanding of the conformity assessment and quality management requirements needed to promote international acceptance of environmentally sound technologies. It is based on performance parameters, test methods and verification processes that are fully disclosed, and the reporting of performance information in a manner that is understandable and useful to the users of this information.

This presentation discusses some of the elements common to most environmental technology verification (ETV) programs and areas where differences exist, including:

- How different programs define priorities and verification objectives;
- The importance and scope of quality management;
- Vendor solicitation, pre-screening and formal application;
- Verification protocol development;
- The roles of stakeholders, technical expert panels and independent verification experts; and
- Disclosure and confidentiality.

The presentation also highlights examples of some interjurisdictional, cooperative performance verification initiatives currently underway within the European Union, the United States and Canada.

1.6 ETV: lessons learned from practice

K. De Sitter, Flemish Institute for Technological Research, B-2400 Mol, Belgium;

B. Lemmens, Flemish Institute for Technological Research, B-2400 Mol, Belgium

VITO, the Flemish Institute for Technological Research, has lots of experience in validating environmental technologies. Validated technologies range from water, soil, air treatment to waste treatment technologies. Regarding ETV, VITO was involved in two projects: AIRTV (for air abatement technologies) and PROMOTE (for soil-groundwater protection and rehabilitation). For this lecture, own experiences and experiences from the AIRTV project are gathered. Looking closer to the experienced problems and hurdles can help to come to a final workable ETV system.

AIRTV: What have we learned from our test cases?

Within AIRTV, a procedure for the verification of air treatment technologies is developed. To be sure the proposed procedure is more than a nice theory, nine different test cases are performed. All different kind of pollutants (ranging from dust, VOC, ammonia to odour) are studied, all with specific points of attention. Although almost all test cases ended with a positive verification result, a lot of problems and hurdles are identified in almost every step of the verification procedure. The most mentioned problems are related to

- the claim;
- the use of existing data;
- the test plan, test location or test lab;
- the results and reliability.

Additional problems occurred when the verification had a negative result. All these problems are discussed (and will be presented during the ETV conference), and for most of the problems a solution is found. Both problems and proposed solutions have lead to a more workable and practical ETV system as end result of the AIRTV project.

Technology validations at VITO: Same or other remarks and problems?

Question is if the problems experienced during the AIRTV test cases were specific for air treatment or some pollutants, or if they are common for all environmental technologies. Therefore, we have taken a look at the experiences VITO had during many years of technology validation and we compared them with the AIRTV experiences.

- The vendor claim: For the vendor claim the same issues came up in earlier validation experiences at VITO as in the AIRTV project: The vendor always has a clear view on what he wants, but what he wants is not always verifiable. The resulting claim is always a compromise of the objective, the possibilities of the test location, the possibilities of the measuring equipment and last but not least money.
- Use of existing data: Within validation tests at VITO, existing data were only used as background information for setting-up the validation tests. New data were used to do the real validation. Even for setting-up the tests, interpreting existing data was difficult and time-consuming, just as mentioned in the AIRTV project.
- Interpretation of results: The interpretation of results is always difficult because of uncertainties of measurements, special situations occurred during the tests etc. Especially when the results were not as good as expected by the vendor, this was a really big issue. In a lot of these cases, the vendor was really convinced of his technology and positive references were available. Negative results were then blamed on test circumstances, test procedures or measurement faults. Therefore, it is really important to get an approval of the test procedure by the supplier before starting validation tests. So it is necessary to foresee such an approval stage in the verification procedure!
- How to handle a failed verification? Negative results will always occur. In the cases where there was no announcement of the verification no publication was done by the vendor and that was the end of the story. It is important to foresee also this possibility in a verification procedure.
- Role of expert: As identified within AIRTV the role of the experts is very important and very difficult. The expert needs to know the technology, have knowledge on the pollutants, test methods and measurement methods. During the validation tests performed at VITO, often different departments with different knowledge (measurements and technology) were involved to bring the validation tests to a good end.
- Source oriented measures: These measures are always difficult to validate. A good example of a source oriented technology validated at VITO is a method to avoid scale in boilers. Scale formation is a long term process. Therefore, validation of this technology required a good test setup and measurement methods were very difficult

but not impossible. With such validation tests, it is shown that creative thinking is sometimes needed to come to a workable and accurate test setup.

Conclusions

Most of the problems encountered within AIRTV occurred also during validation tests performed by VITO. The added value of AIRTV was that even in a structured verification scheme the same issues remain. The ETV system will not make the verification easier to perform, nor cheaper, nor more expensive as existing validation tests, but will give the results a much broader support. The value of a positive verification report will thus be much higher to the vendor than a single validation test and that without excessive extra cost.

1.7 Recommendations for a EU Verification System

Thomas Track, DECHEMA e.V. Frankfurt/Main, Germany

Introduction

The FP6 funded projects focussing on different sectors of environmental technologies while developing schemes and protocols for technology verification. Tools for communication with stakeholders were workshops, interviews, questionnaires, presentations, personal communication and pilot verifications within the projects. Independent from the technology sector a wide range of recommendations for the implementation of a European Environmental Technology Verification System can be given. The FP7 funded project AdvanceETV is focusing on international cooperation of the different global schemes, first stakeholder feedback on this issue is available.

Generic recommendations

- It has to be pointed out clearly, that ETV aims to verify specific products and not verification of a technology in terms of a class of products.
- Verification has to remain voluntary. In case it becomes mandatory, innovation may be hindered by discriminating non-verified innovative technologies.
- A faster entrance of verified products into new European and international markets would be a great benefit for technology providers.
- International, mutual recognition would increase the attractiveness of a European ETV scheme.
- Language of verification: Besides English national languages of the major target markets of a product, which is prerequisite for acceptance by public administration.
- National contact points are necessary to avoid access barriers to ETV.
- A well traceable ETV logo, with an easily understandable range of validity is essential for acceptance.
- Customer feedback on the usefulness of ETV when applying verified technologies should be possible.
- The benefit of verification has to exceed verification costs to attract vendors and to convince customers.
- Additional funding would be of major benefit for ETV acceptance.

- A lean EU verification organisation that contracts experts on a case specific basis is recommended instead of large technology sector specific verification centres.
- Identifying independent experts for innovative technologies is difficult in many cases.
- Verification will not help if national law regulates technology acceptance and application procedures.

Standardisation and Best Available Technique Reference Documents (BREF)

- Verification should be linked to the BREF Documents. A successful verification should ease the uptake of innovative technologies in the BREF chapter "Emerging Technologies"
- Standardisation of the ETV procedure as such is welcome to ensure a EU-wide comparable handling of the verification procedure. A standardised ETV procedure does not mean the compliance of a technology or technology provider with a standard, e.g. ISO 14000 et seq., but the execution and documentation of the verification according to a predefined procedure.

The verification procedure

- Identifying credible, verifiable claims is the most important task within the verification process. It must be possible to adjust claim according to the test results.
- Verification must allow multiple points of entry: initiation by vendors and regulators.
- A well-balanced approach between the acceptance of existing data and the credibility of the verification system has to be ensured.
- Liability issues have to be clearly defined for a European verification scheme.
- Combination of verification with pilot installation or demonstration - within the client's application - would help to reduce efforts for verification.
- Qualification of laboratories should be based on accreditation or comparable record. Where outstanding qualification is required this has to be proven individually.
- Sampling, handling and transport during technology testing has to comply with related, generally accepted procedures and protocols. Keep shipping time at a minimum.
- Logistics is a crucial point for field scale verification, e.g. sample handling and transportation, on site infrastructure, testing schedule.
- The vendor should be integrated in the selection of test and analytical laboratories.

- Dissemination of verification results must guarantee protection of company internal know-how.

International perspectives

- On international level ETV approaches distinguish between claim and application oriented verification strategies, this has to be considered in mutual recognition and harmonisation.
- Enhancing markets by international acceptance is highly appreciated, but has to cover the international target markets for vendors.
- Recognition by users is most important, as it is independent from the formal recognition of schemes. Harmonising the global stakeholder processes needs to be done as well as their integration is different from scheme to scheme.
- Additional costs induced by mutual recognition will only be accepted in case of an appropriate benefit on the market.