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*EU Environmental Technology Verification pilot programme Guidance documents*

## **Guidelines for the eligibility assessment of technologies proposed to the EU-ETV scheme**

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*Produced by the EU ETV Technical Working Groups, chaired by the JRC, under the auspices of DG Environment*



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**Abstract**

Environmental Technology Verification (ETV) is a new tool enabling the verification of the performance claims put forward by developers of innovative environmental technologies. The EU-ETV programme, launched in 2011 by DG-ENV, is supported by Technical Working Groups (TWGs), one for each technology area active under the Pilot programme. These TWGs are chaired by the JRC and composed by Commission Invited Experts and by Experts representing the Verification Bodies with the overall aim to harmonise and exchange good practices.

This document summarises the outcome of the discussion of the Technical Working Groups concerning the assessment of eligibility criteria by Verification Bodies. It clarifies and provides guidance to help Verification Bodies evaluate whether a technology proposed for ETV meets the minimum requirements imposed by the programme such as fitting the scope of the programme, presenting innovative features and an environmental added value, being “ready-to-market” and meeting user’s needs and legal requirements.

This document, adopted on the on the 23rd April 2014 by the TWGs, is a guidance document, with the meaning given in the General Verification Protocol of the EU ETV pilot programme (version 1.1), Section A.II.4.3. It has been produced by the EU ETV Technical Working Groups, chaired by the JRC, under the auspices of DG Environment.

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This document is a guidance document, with the meaning given in the General Verification Protocol of the EU ETV pilot programme (version 1.1), Section A.II.4.3. It has been produced by the EU ETV Technical Working Groups, chaired by the JRC, under the auspices of DG Environment.

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<sup>1</sup> Experts who had signed the Declaration of the Expert regarding no conflict of interest and Confidentiality at the moment this document was adopted.

# 1 CONTEXT

## 1.1 The EU ETV Pilot Programme

Environmental Technology Verification (ETV) is a new tool to help innovative environmental technologies reach the market. It consists of the validation of the performance claims put forward by technology manufacturers, on a voluntary basis, by qualified third parties. This should help manufacturers prove the reliability of their claims, and help technology purchasers identify innovations that suit their needs. This is particularly relevant in a context where there are no available standards or labels applicable to the technology. As a result, technological lock-in is overcome while more effective and cheaper environmental protection measures can emerge.

The EU ETV pilot programme, run by the European Commission on an experimental basis, is implemented by Verification Bodies (VBs) specifically accredited for ETV. The technical reference defining ETV procedures and requirements is the General Verification Protocol. It ensures that all verifications made in Europe follow the same process and have the same value. VBs are coordinated by thematic Technical Working Groups, at European level, providing guidance on the implementation of ETV and ensuring the adequate harmonisation of practices.

## 1.2 Purpose and scope of guidelines on eligibility criteria

The eligibility check is the first assessment made by the Verification Body, on the basis of the 'Quick Scan document' provided by the proposer at the beginning of the verification procedure. This is described in the General Verification Protocol (GVP) of the EU ETV pilot programme, Section B.II.1 as follows:

*"The aim of the Quick Scan is to enable the Verification Body to assess the suitability of the technology for verification, and to give a first indication about the complexity and range of costs for a full verification. Where appropriate, the Verification Body first provides advice on the drafting and completeness of the Quick Scan. The Quick Scan is assessed by the Verification Body using the following eligibility criteria (not necessarily in the order indicated):*

- *Is the technology description sufficiently clear? Are the preliminary elements for the performance claim specific to the technology and verifiable?*
- *Does the technology fall within the scope of the EU ETV pilot programme, as provided in Appendix 2 list of technology areas? If the technology falls in the scope of ETV but not in the accreditation scope of the contacted Verification Body, the Verification Body shall refer the proposer to other Verification Bodies whose accreditation scope is likely to include the relevant technology group, where possible.*
- *Is the technology ready for the market?, i.e. is the technology available on the market, or if not, is it available at a stage where no change affecting performance is likely to be implemented before introducing the technology onto the market (e.g. full-scale or prototype scale with direct and clear scale-up instructions)?*
- *Does the technology present an environmental added value?*

- *Does the technology meet user needs in terms of functionality, claimed performance and environmental added value?*
- *Does it perform in line with applicable legal requirements?*
- *Does it show a sufficient level of technological innovation?*

*The answer from the Verification Body includes information on the eligibility of the technology and on the corresponding technology area. The Verification Body makes a recommendation on performing a full verification or not and a first indication of the range of costs. The Verification Body shall exclude a technology from verification if it does not fall within the scope of ETV, if it is not ready to market or if its performance, environmental added value and innovation levels are obviously too low and would harm the reputation of the ETV scheme. Apart from these cases, the decision to proceed is made by the proposer, even when the Verification Body does not recommend performing the verification."*

The eligibility check is the step where the criteria to accept environmental technologies for verification defined in the GVP section A.I.1 are assessed:

- *"It is likely to correspond to the definition of an innovative environmental technology provided under Appendix 1 'Glossary of terms and definitions' with a potential to contribute to the efficient use of natural resources and a high level of environmental protection;*
- *It belongs to one of the technology areas contained in the list of technology areas referred to under Appendix 2 'List of technology areas in the EU ETV pilot programme';*
- *It is ready for commercialisation or is already commercially available;*

With the following definitions provided in the glossary (GVP Appendix 1):

*"Environmental technologies are all technologies which provide an environmental added value compared to relevant alternatives."*

**"Environmental added value"** *means the reduction of the environmental pressure or a positive impact on the environment including but not limited to removal, prevention, reduction, mitigation of pollutants released to the environment, restoration of environmental damages or use of natural resources in a more efficient and sustainable manner."*

**"Relevant alternatives"** *are commercially available technologies relevant for comparison with the technology under verification and performing the same or a similar function."*

*"Innovative environmental technologies are environmental technologies presenting a novelty in terms of design, raw materials and energy involved, production process, use, recyclability or final disposal, when compared with relevant alternatives."*

*"Ready to market" means that the technology is available on the market or at least available at a stage where no change affecting its performance will be implemented before introducing the technology on the market."*

This paper focusses on the following issues:

- Quality of the technology description and performance claim

- Readiness to market
- Innovation level and environmental added value
- Potential to meet user needs and perform in line with legal requirements

This document should be considered as a guidance document, with the meaning given in the General Verification Protocol of the EU ETV pilot programme (version 1.1), Section A.II.4.3. The objective is to guide Verification Bodies in reaching a conclusion regarding the technology proposed to verification in relation to these criteria:

- Either to exclude the technology from verification
- Or to recommend not to proceed with verification
- Or to recommend to proceed with verification and to invite the proposer to prepare a complete proposal

It should be noted that, overall, the exclusion possibility exists to protect the reputation of the ETV scheme from abuses, i.e. from proposals which obviously do not fit with the objectives of ETV.

## **2 QUALITY OF THE TECHNOLOGY DESCRIPTION AND PERFORMANCE CLAIM**

The Quick Scan includes a description of the technology by the proposer, including preliminary elements for the performance claim. This description is not definitive, it has to be elaborated in the proposal and fully developed in the specific verification protocol. It is important, however, that this description is of sufficient quality to inform the Verification Body and enable the following steps. In particular:

The technology should be clearly stated – commercial name, purpose, technical principle; this should enable the VB to identify the scope and boundaries of the technology;

The preliminary elements for the performance claim should be specific to the technology and quantifiable; they should consider the main purpose of the technology and its environmental added value (see the definition of performance claim in the GVP Appendix 1);

Ideally, the innovative aspect of the technology should be reflected through the performance claim and parameters used in the description.

When the technology description is too vague or the performance claim is not specific or not quantifiable, there is a danger of misunderstanding by the proposer of the purpose and requirements of ETV. The Verification Body should give at this stage all information needed to avoid problems arising later during the ETV process. The VB may require the proposer to re-draft the description and claim, or complete them in the Quick Scan before the VB can assess it and add its conclusion.

When the technology description enables the VB to assess the suitability of the technology for verification, as required under the eligibility check, but still needs important improvement in view of the verification proposal, this will be clearly indicated in the VB conclusions, for the clear information of the proposer and future reference.



This is in particular the case if the technology description does not seem to cover important environmental pressures/impacts: it is important to state at this stage that these impacts will have to be considered during the next steps – and may have an impact on the estimated cost range for the verification.

### **3 READINESS TO MARKET**

The definition of "ready to market" adopted in the glossary (GVP Appendix 1) and recalled in Section B.II.1 where the eligibility criteria are presented, provides two cases:

- The technology is available on the market,
- The technology is at least available at a stage where no substantial stage affecting the performance will be implemented before introducing the technology on the market; two examples are indicated in Section B.II.1: (i) full-scale; (ii) prototype scale with direct and clear scale-up instructions.

#### ***3.1 Criteria for assessing that a technology is available on the market:***

Building on the 'Guidance Document towards the Mutual Recognition of Environmental Technology Verification (ETV) Programmes' drafted by the International Working Group on ETV, Section 4.4, it is proposed to retain the following criteria:

A technology is considered available on the market if:

At least one full-scale product has been manufactured, and at least two of the three following items are available:

- Product operation and maintenance manual,
- Product listed on the price catalogue of the manufacturer,
- Marketing materials or advertisements.

#### ***3.2 Criteria for assessing technologies ready to market but not available on the market:***

The definition of ready to market already defines that a technology not yet available on the market may be accepted if "no substantial change affecting the performance will be implemented before introducing the technology on the market".

The proposer should be made aware by the Verification Body of the following consequences if the technology proposed is considered 'ready to market' but not 'available on the market':

If, at any stage before publication of the Statement of Verification, a change affecting the performance of the technology is introduced, the Verification Body may stop the verification process, revise the verification protocol and/or require testing to be partially or fully done again, at the cost of the proposer;

The pilot or prototype nature of the technology will be clearly indicated on the Statement of Verification, with all the necessary information on its representativeness of a full-scale unit and condition on scaling-up to the commercial version.

Non-EU ETV programs have different policies in accepting technologies at the pre-commercialisation stage; this may prevent the recognition of the Statement of Verification of this technology by some non-EU ETV programs in future (i.e. when mutual recognition is established in general) or it may be subject to specific acceptance procedures.

### **3.3 Correspondence with Technology Readiness Levels (TRL)**

Some Verification Bodies or proposers may be familiar with the approach of Technology Readiness Assessment (TRA). The table in annex gives a description of the scale of Technology Readiness Levels (TRLs) 0 to 9. Based on this table, unless additional information not reflected by the TRL lead the Verification Body to decide otherwise, it is considered that:

- Technologies responding to the description of TRL 8 and 9 may be considered as available on the market,
- Technologies responding to the description of TRL 7 may be considered as 'ready-to-market' but not 'available on the market'; in general, their stage of development would qualify for verification under ETV as prototype,
- Technologies responding to the description of TRL 6 may be considered as 'ready-to-market' and accepted for verification under ETV as prototype if there is no indication or a low probability of change to the technology likely to be introduced before the technology is on the market and likely to affect its performance. Innovation level and environmental added value.

Building on the definitions of the GVP glossary and on Section A.I.1, a technology eligible for ETV "is likely to correspond to the definition of an innovative environmental technology", which builds on the definitions of *environmental technology*, of *environmental added value* and of *relevant alternative* provided above (c.f. 1.2).

At the stage of eligibility assessment, that is, before agreement on a verification contract with the proposer, one cannot expect Verification Bodies to undertake an extensive investigation and assessment of the technology proposed and of relevant alternatives. The assessment should therefore be mainly based on the information provided by the proposer. The proposer will be asked to further confirm and detail the general information provided at this stage during the Proposal Phase. The Verification Body may need to review or revoke its decision on eligibility criteria if at some stage further, i.e. the Proposal Phase, it is revealed that highly problematic environmental issues have been omitted, especially in the case where a verification of such technology would put the reputation of ETV at risk.

In the 'Quick Scan' provided in the GVP Appendix 3, the following information is asked to the proposer:

- Introduction or context, main purpose of the technology, relevant alternatives on the market (from the same company or from competitors), focussing on those alternatives that perform an identical or similar function than the technology under verification (it can correspond to different technologies working in sequence, e.g. a sorting procedure including dismantlement can be an alternative to a crusher). It should be a technology that is both current and commercially available; it should be legal and accepted by the end-users on the specific targeted market, it should also be effective in achieving a reasonably high level of protection of the environment.

- Description of the innovation provided by the technology, in terms of design, raw materials involved, production process, use, recyclability or final disposal, when compared with the alternatives identified above;
- Environmental added-value of the proposed technology when compared with the alternatives identified above; to the extent possible, these should be seen in a life-cycle perspective. The following phases of the life-cycle should be envisaged:
  - Natural resources (raw materials, energy) extraction and transformation phase
  - Manufacturing of parts, components, machinery and of products
  - Use and maintenance phase including estimates of its use by the client/end-user
  - End of life of the equipment and of the products issued from the technology including recycling, dismantling, and/or disposal of all components

For each of the above mentioned stages, the proposer indicates:

- Whether this stage is under his direct control? (Yes/ No)
- Whether the proposer has information concerning environmental aspects for this stage? (Yes/ No/Partial)
- Whether in this stage there are significant differences in terms of environmental performance, between his technology and relevant alternatives? (Yes/No)
- What are the major positive and negative environmental aspects, i.e. by providing qualitative or quantitative information on emissions, waste streams, consumption or use of raw materials, energy (quantity and origin (renewable or not)) and water for each phase where this is relevant. The proposer may justify or provide convincing evidence that some phases are not relevant, for instance when:
  - the technology will lead to environmental pressures/impacts that are not significantly different than those of the relevant alternative
  - those environmental pressures/impacts are negligible compared to those of the other phases
  - the information cannot be obtained

As designer and manufacturer of the technology or its representative, it is expected that the proposer should normally possess relevant information related to the technology's environmental performance in the manufacturing and use phases. As a consequence, if for these phases the technology presents significant differences in comparison with the relevant alternatives, sufficient information should be provided.

Based on this information and on the knowledge of the expert undertaking the eligibility assessment, the Verification Body will decide if:

- One or more issues appear highly problematic, to the point that the reputation of the ETV pilot programme is at risk if the technology is verified, in which case the technology shall be excluded from verification.

- The overall assessment is weak, for example if:
  - the environmental advantages are not clearly identified or
  - the novelty is marginal or with no real link with the advantage claimed, or
  - potential environmental impacts have been detected that are more harmful than relevant alternatives and reduce the environmental added value and overall interest of the technology.

In this case a recommendation should be given, not to proceed with verification; if the proposer decides to proceed, then the eventual potential negative aspects of the technology will have to be taken into consideration in the verification process and/or performance claim.

- The overall assessment is reasonably satisfactory, in which case a recommendation should be given to proceed with verification.

## **4 POTENTIAL TO MEET USER NEEDS AND PERFORM IN LINE WITH LEGAL REQUIREMENTS**

### ***4.1 Meeting user's needs***

At first sight, the assessment of the potential to meet user needs can be seen as the continuation of the assessment of the innovation level: the novelty identified by the proposer is useful only if it addresses a need by the technology user, possibly influenced by a specific legal context (for example, planned implementation of new legislation in the technology field); the environmental advantage is more significant if it is likely perceived by the user as adding value to the technology.

Information on the user needs may come from the proposer, together with the information requested to assess the level of innovation and environmental added value (see 4.); it may come from the experience or knowledge of the Verification Body; it may come from the assessment of key environmental factors by the ETV Technology Working Groups or from the advice of stakeholders in the ETV Stakeholder Forum.

The assessment of the potential to meet user needs is unlikely to lead to the exclusion of a technology, but a recommendation, not to proceed with verification, may be given if the need addressed by the technology is not clearly identified.

### ***4.2 Meeting legal requirements***

Regarding the potential to perform in line with legal requirements, this is to be seen in relation to the intended application and to the market(s) targeted by the technology. The proposer should specify what legislation is applicable for this application on the market targeted, whether the legislation is applicable for the technology directly (ex. type approval) or for the intended user of the technology (ex. emissions limits). If different legislations apply to the different markets targeted, the information is to be provided for each market.

At the stage of eligibility, it seems difficult to go beyond checking that the proposer is aware of legal requirements applicable on the targeted market(s) and that the performance claims

presented in the Quick Scan are consistent with these legal requirements where appropriate. If the applicable legal requirements are not known or not clear, the recommendation should be to clarify these aspects before proceeding with verification. Only in the case that the claimed performance is clearly in contradiction with an applicable legal requirement, should the proposal be considered non eligible.

### **4.3 *Applicable standards***

In the same way as for legal requirements, several references are made in the GVP to the recommendation of following specific standards, guidelines or recommendations that may apply to the technology in the verification procedure. Although this is mainly relevant when preparing the Specific Verification Protocol, it could be important to identify the main standards applicable at the Quick Scan level, especially if they relate to the performance of the technology, to the test and measurement methods and to the quantification of relevant environmental impacts.

In the particular case when specific standards cover the entire determination/measurement/testing/verification of performance, then certification according to this standard should be preferred to verification under ETV (the aim of ETV is not to certify a product against a given standard). In this case, discussion should take place to understand the objective of the proposer and eventually to recommend not proceeding with verification under ETV. The same applies when the application of a specific standard has a mandatory character (required by law).

## **5 OTHER ISSUES TO BE CONSIDERED AT THE TIME OF ELIGIBILITY**

The issue of Intellectual Property Rights (IPR) should also be addressed at this point by the Verification Body and proposer, if there is any doubt on the respect of the IPR of third parties in relation with the technology proposed. If any doubt remains after discussion, the issue will have to be revisited and clarified before signing the verification contract. An example of clarification may be that the proposer provides the written consent by the IPR owner to the verification of the technology under ETV.

## 6 SUMMARY

The different steps of the eligibility assessment are summarised as follows:

1. Is the technology included in the 3 areas of EU ETV scope?
  - if no, the technology is not eligible
2. If yes, is the technology included in the scope of accreditation of the VB?
  - if no, refer to another VB
3. If yes, is the technology description precise enough and the performance claim quantifiable and sufficient to assess the eligibility and prepare for the next steps?
  - If no assessment is possible, ask for a re-drafting of the Quick Scan and provide the necessary information on ETV to avoid misunderstanding;
  - If the assessment is possible but the technology description or performance claim need important complements for the next steps, include an explicit mention of this in the conclusions;
  - Otherwise, proceed with the following steps
4. Is the technology available on the market, that is: at least one full-scale product has been manufactured, and at least two of the three following items are available:
  - Product operation and maintenance manual,
  - Product listed on the price catalogue of the manufacturer,
  - Marketing materials or advertisements?
  - If no, is the technology ready for market, i.e., no substantial change affecting the performance will be implemented before introducing the technology on the market?
    - If no, the technology is not eligible
    - if yes, inform the proposer of consequences
5. Based on available information, does the technology present a sufficient level of technological innovation aspects i.e.: it presents a novelty in terms of design, raw materials involved, energy consumed production process, use, recyclability or final disposal, when compared with relevant alternatives;

And does it present an environmental added value that shows a potential to contribute to

- the efficient use of natural resources and:
- a high level of environmental protection, and/or:
- a reduction of the environmental pressure or a positive impact on the environment including but not limited to removal, prevention, reduction, mitigation of pollutants released to the environment, restoration of environmental damages or use of natural resources in a more efficient and sustainable manner.

- If yes, recommend to proceed with verification
  - If no, do one or more issues appear highly problematic, to the point that the reputation of the ETV pilot programme is at risk if the technology is verified?
    - If yes, the proposal shall be excluded;
    - If no, recommend not to proceed with verification and inform the proposer that the technology weaknesses would be taken into consideration in the verification process and/or performance claim.
6. Based on available information, does the technology show potential to meet user needs?
- If no, recommend not to proceed with verification.
7. Based on available information, does the technology show potential to perform in line with legal requirements?
- If legal aspects are not known or not clear, recommend clarifying them before proceeding to verification;
  - if the claimed performance is in contradiction with applicable legal requirements, the technology is not eligible.
8. Possible responses to the proposer:
- Technology not eligible (if appropriate, refer to another VB)
  - Recommendation not to proceed with verification
  - Technology eligible but technology description or performance claim to be revised before verification
  - Recommendation to proceed with verification / invitation to conclude a verification contract and prepare a full proposal

**ANNEX – TABLE OF TECHNOLOGY READINESS LEVELS (TRL)**

<b>TRL</b>	<b>Definition</b>	<b>Description</b>	<b>Supporting Information</b>
0	<b>Idea</b>	Unproven idea or concept where no peer reviewed analysis or testing has been performed.	No scientific publication.
1	<b>Basic Research</b>	The initial scientific research has been completed. The basic principles of the idea have been qualitatively postulated and observed. The process outlines have been identified. No experimental proof and detailed analysis are yet available.	Published research that identifies the principles that underlie this technology.
2	<b>Technology formulation</b>	The technology concept, its application and its implementation have been formulated. The development roadmap is outlined. Studies and small experiments provide a "proof of concept" for the technology concepts.	Publications or other references that out-line the application being considered and that provide analysis to support the concept.
3	<b>Applied Research</b>	The first laboratory experiments have been completed. The concept and the processes have been proven at laboratory scale, table-top experiments. Potential of materials and up scaling issues have been identified.	Results of laboratory tests performed to measure parameters of interest.
4	<b>Small Scale Prototype Development Unit (PDU)</b>	The components of the technology have been identified. A PDU has been built in a laboratory and controlled environment. Operations have provided data to identify potential up scaling and operational issues.	Measurements validate analytical predictions of the separate elements of the technology. Simulation of the processes has been validated. Preliminary LCA and economy assessment models have been developed.
5	<b>Large Scale Prototype Development Unit</b>	The technology has been qualified through testing in intended environment, simulated or actual. The new hardware is ready for first use. Process modelling (technical and economic) is refined. LCA and economy assessment models have been validated. Where it is relevant for further up scaling the following issues have been identified: Health & safety, environmental constraints, regulation, and resources availability.	Results from testing in intended environment, simulated or actual. How does this environment differ from the expected operational environment? How do the test results compare with expectations?



6	<b>Prototype System</b>	The components and the process have been up scaled to prove the industrial potential and its integration within the complete system. Most of the issues identified earlier have been resolved. Full commercial scale system has been identified and modelled. LCA and economic assessments have been refined.	Results from laboratory testing of a prototype system that is near the desired configuration in terms of performance, weight, and volume. How did the test environment differ from the operational environment? Who performed the tests? How did the test compare with expectations? What problems, if any, were encountered? What are/were the plans, options, or actions to resolve problems before moving to the next level?
7	<b>Demonstration System</b>	The technology has been proven to work and operate at a pre-commercial scale. Final operational and manufacturing issues have been identified. Minor technology issues have been solved.	Results from testing a prototype system in an operational environment. Who performed the tests? How did the test compare with expectations? What problems, if any, were encountered? What are/were the plans, options, or actions to resolve problems before moving to the next level?
		This is the typical TRL for prototype verification under ETV.	
8	<b>First of the kind commercial System</b>	The technology has been proven to work at a commercial level through a full scale application. All operational and manufacturing issues have been solved.	Results of testing the system in its final configuration under the expected range of environmental conditions in which it will be expected to operate. Assessment of whether it will meet its operational requirements. What problems, if any, were encountered?
		This is the typical TRL for technology verification under ETV.	ETV Statements and reports,
9	<b>Full commercial application.</b>	The technology has been fully developed and is commercially available for any consumers.	Certification and labels where appropriate standards or specifications exist;  Inspection reports of actual installations.

NB: This table has been adapted from a preliminary European Commission definition drafted in the context of Horizon 2020. The descriptions are illustrative only and not necessarily applicable to all technologies. The column 'supporting information' is freely adapted from the 'Technology Readiness Assessment Guidance'<sup>2</sup> of the US Department of Defense. This is also for illustration only.

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<sup>2</sup> <http://www.acq.osd.mil/chieftechnologist/resources.html>

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