



**EU Environmental Technology Verification**

**Verification Proposal**

***Purpose:*** *This form intends to collect further information on the technology you would like to propose for verification after the first eligibility check. At this stage, all relevant information is exchanged between the proposer and the Verification Body in order to conclude a verification contract and allow for the preparation of the specific verification protocol. This Proposal is to be completed by the proposer and assessed by the Verification Body. The boxes for responses, in grey, may be extended. Additional information and documents may be attached, with references in the core text for clarity*

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| **Verification Body** | **Proposer** |
| **Name:** **Contact person:** **Address:** **Telephone:** **Email:** **Date Quick Scan:** | National Physical LaboratoryNicola Smith Hampton RoadTeddingtonMiddlesexTW11 0LW(+44) 020 8943 6964 nicola.smith@npl.co.uk8 September 2015 | **Name:** **Contact person:** **Address:** **Code NACE:** **Number of employees:** **Telephone:** **Email:** | Open TRVMark Hill46 ElmsideGuildfordGU2 7SJC.26.40 - Manufacture of consumer electronics707798 500570mark@opentrv.uk  |
| **Previous Verification:** |
| Previous Verification performed: [x]  No [ ]  Yes, date:       |

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| **Remarks out of Quick Scan to be considered (for Verification Body):**  |
| Requires a quantifiable and verifiable claimFinal market product will have significant change which will require further verificationTests do not meet ISO 17025 requirements and do not enable verification of performance claim  |

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| **Technology Description– technical documentation** |
| *The technical documentation shall make it possible to understand the technology, to define the performance claim and to assess the conformity of the technology design with the performance claim. It shall contain at least the following elements:** + - *Unique identifier of the technology, e.g. commercial name,*
		- *a general description of the technology,*
		- *conceptual design and manufacturing drawings and schemes of components, sub-assemblies, circuits, etc.*
		- *descriptions and explanations necessary for the understanding of those drawings and schemes and operation of the technology,*
		- *where relevant, standards or technical specifications applied in full or in part,*
		- *results of design calculations made, examinations carried out, etc.*

**Technology Description:**OpenTRV is a low cost, simple to use, retrofit heating control for radiators with occupancy sensing. Intelligent learning algorithms predict future occupancy and lower the temperature in the room if it predicts no one will be present in the near future. |
| **Intended application of the technology**  |
| *The application of the technology should be defined by describing the matrix and the purpose(s) of the technology. The matrix refers to the type of material which the technology is intended for e.g., soil, drinking water, ground water, cooling water, alkaline degreasing bath, effluent from domestic wastewater treatment plant etc. The purpose(s) is a measurable property that is affected by the technology e.g., reduction of nitrate concentration, separation of volatile organic compounds, reduction of energy use (MW/kg), bacterial removal, monitoring of NOx, improvement of heating value etc. It is important that the purpose describes the claimed effect in quantitative terms, e.g. reduction of nitrate concentration in mg NO3/L.* *For further information on how to define the matrix and the purpose, please refer to the General Verification Protocol, Table 1 in Section B.III.1 or to the Guide for Proposers.***Matrix:** Energy efficient space heating**Purpose:** Carbon savings in MtCO2 through energy usage reduction**Technical conditions:** Household with a typical occupancy pattern for their social environment. |
| **Initial performance claim** |
| *The specifications included in the initial performance claim shall relate to the technology itself and shall be quantitatively verifiable through tests. The initial performance claim shall state the conditions under which the specifications are applicable and mention any relevant assumption made. For further information on how to define a clear initial performance claim, please refer to the Guide for Proposers.***Initial performance claim:** 30% energy savings when using OpenTRV valves: industry-standard kWh/HDD (energy per Heating Degree Day) and reduced kgCO2 footprint per dwelling per year.50% energy savings when using OpenTRV valves + boiler units: industry-standard kWh/HDD (energy per Heating Degree Day) reduced kgCO2 footprint per dwelling per year.Relevant alternative: household with a boiler used to heat water for space heating, a single thermostat to control the boiler and individual mechanical TRVs attached to all radiators, except a single bypass radiator. |
| **Description of tests performed and existing data** |
| *The tests performed on performance parameters shall be described with all necessary details, including the qualification of testing bodies, test methods used (references to standards where appropriate), test plans and test reports. Consult the Verification Body if there are confidentiality issues related to the information on tests.***Are there available test results or other data to back-up the technology's performance?** [ ]  **Yes** **Description of test plan:** **Description of test methods, including reference if standard methods were used:** **Description of existing data:** **Qualification of the test body:**[ ]  **ISO 17025** [ ]  **ISO 9001** [ ]  **none** [ ]  **other:** **Qualification of analytical laboratory:**[ ]  **ISO 17025** [ ]  **none** [ ]  **other:** [x]  **No****Is there a test plan available?** [ ]  **Yes** [x]  **No** [ ]  **Unknown****Is there a test method available?** [x]  **Yes** [ ]  **No** [ ]  **Unknown****Full description:**Inputs:1. Heating Degree Days based on measurements from local weather station
2. Weekly (or more frequent) regular space-heating fuel energy consumption measurements, eg from gas meter, over a minimum of 4 weeks and 8 measurement points, before and after installation/enabling OpenTRV tech.
3. Before and after surveys of occupants of: heating comfort/satisfaction, reported usage patterns (by time, level of interaction with heating system, frugal/other, etc). Also understand any supplimentary heating systems used, eg fan-heaters in addition to gas central heating.
4. If available: previous energy readings, eg from bills.
5. If available: house construction and age, rdSAP for building from public record, boiler type and SEDBUK or equivalent rating.
6. Energy intensity of heating fuel in kgCO2/kWh.

Outputs:1. Change in kWh/HDD (and gross heat energy use) before and after OpenTRV installed/enabled. (Standard method computing slope and intercept automatically largely excludes baseline usage, eg for domestic hot water on same boiler as central heating.)
2. Change in user satisfaction/comfort/interaction, and other user comments.
3. Record any supplimentary heating systems used.

Apply standard linear regression analysis (<http://www.degreedays.net/regression-analysis>) to energy consumption vs local weather heating degree daysto quantify change in heating efficiency and implied change in carbon footprint (slope kWh/HDD, plus robustness from r-squared). |
| **Environmental added-value** |
| *Please provide as much information as possible on the positive and negative environmental aspects resulting from your technology First, please identify the technologies that constitute relevant alternative(s) to your technology since this may help to identify the environmental added-value of the technology. Then indicate the phases which are most relevant to your technology, in terms of environmental aspects. You may indicate that a particular phase is not relevant to assess the environmental aspects of your technology when:** + - *the technology will lead to environmental pressures/impacts that are not significantly different than those of the relevant alternative(s)*
		- *those environmental pressures/impacts are negligible compared to those of the other phases*
		- *the information cannot be obtained – please provide a short justification in this case. It is expected that for the manufacturing and use stages the proposer will normally possess relevant information, as designer and manufacturer of the technology.*

*For each of the identified phases, and especially for the manufacturing and use phases please indicate as much qualitative information as possible regarding each environmental parameter. When available, support the elements provided with quantitative information. You may present information based on a comparison with the relevant alternative, or you may present absolute values, if you are unable to compare the performance of your technology with the one of a relevant alternative(s).* |
| **Relevant alternatives (if available):** Mechanical TRV |
| *For the phases identified in the Quick Scan as different from the relevant alternative(s), please provide information as detailed as possible on the following environmental parameters:*Indicate relevant phase:   Use phase   Emission of pollutants to air:      *Identify or quantify air pollutants including those listed under the green-house gas emissions* Emission of pollutants to water:      *Identify or quantify water pollutants* Emission of pollutants to soil:      *Identify or quantify soil pollutants*  |
| Consumption of natural resources:      *Identify consumption of natural resources, especially rare raw material required for the process Energy and water consumption will be addressed in the two following points.*Energy consumption:   Significant reduction in carbon footprint consumption (up to 10% for UK, 8% across EU) for domestic space heating.   *Identify energy consumption and energy sources (indicate use of non-renewable or renewable energy)* Water consumption and related processes:      *Identify the consumption or the use of water but also the quality of the water used and the necessary treatment before and after use, the consumption or the use of water. This section includes process water, but also water used in bulk such as cooling water.*Production of non-hazardous waste:      *Identify or quantify non- hazardous waste* Production of hazardous waste:      *Identify or quantify hazardous waste*  |
| *If relevant, additional information on the overall productivity of the technology should also be provided, namely:*Production efficiency – productivity:      *Indicate any significant differences in productivity of the technology vs. the relevant alternative (e.g. for recycling: ratio of substance recycled vs. quantity of substance contained in the waste).*Production efficiency – final quality:      *Indicate the differences in the quality of the final product vs. the relevant alternative (e.g. for recycling: the level of purity of the recovered substance).*Other information (extra information that might be useful for the assessment relating to e.g., economic, social and safety aspects):    Provides social benefits, particularly for those who have problems paying their domestic fuel bills, by improving the impact of their fuel spend and thereby improving health outcomes and reducing respiratory and circulatory dieseases.  *Indicate extra information that could justify or complement the information provided for environmental criteria. For example, a technology might be proposed that has little or none environmental benefits in comparison to the already commercially available alternatives but that provides greater social, economic or safety benefits* |

**Assessment of Proposal (for the Verification Body)**

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| **Assessment of the technology** |  |
| Performances parameters correctly described: Innovative technology: Ready-to-market: If, No, is Prototype at advanced stage of development?  | [ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No |
| **Assessment of environmental aspects** |
| Conclusions:  |
| **Assessment of existing data** |  |
| Tests performed on technology: Comments:       Test body suitably qualified:Comments:      Test plan available:Comments:      Test plan suitable:Comments:      Test method available (standards):Comments:      Test methods described:Comments:      Test methods suitable:Comments:      Test methods reproducible:Comments:      Test methods accurate:Comments:      Test results available:Comments:      Test results in line with performance claim:Comments:      Test results can be used in the verification processComments:       | [ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No[ ]  Yes [ ]  No |
| **Conclusions on the Proposal:**  |
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| **Proposer:**      Name:      Date:      Signature: | **Verification body:**      Name:      Date:      Signature: |