

## Checking list of the evaluation of technical and economical aspects for selecting the best RTD&D results

This set of criteria aims at assessing the best RTD&D results in order to classify the ones more relevant to implementing a pre feasibility studies in the project participant countries: Bulgaria, China, Denmark, Greece, France & Italy. Using this set of criteria will allow you to assess the expected market penetration potential of these technologies and/or demo cases in each the 6 participant countries.

The market penetration potential could be estimated by the qualitative evaluation of the following points. This checking list, however, is not exhaustive, and some of the factors omitted from this list may be of great relevance to the evaluation of the penetration potential of a specific RTD&D technology. Thus, we encourage you to see this list as a basic framework upon which to build your own investigation.

### 1 Expected local market penetration potential of the results of the RT&D technology in the participant countries

#### 1.1 The adoptability of the RTD&D technology in the energy context of the country.

Due to the various natures of the energies involved, the penetration potential is first limited to the availability of the energy sources. For example, a very good and innovative gas condensation boiler is not applicable in an area where gas is not easily available and the major source of energy is coal, for example. In this area, efficient coal boilers could have a much better market penetration potential.

Does the application of RTD&D technology require any connection to a specific energy source?      Yes      No  

If yes, is such a connection easily available in the local / national context?      Yes      No  

Is there any obligation for being connected to a specific energy source?      Yes      No  

For example, in a populous city there can be an obligation that the heating system of houses shall be connected to the district heating.

If yes, is it possible to obtain an exemption from this obligation?      Yes      No  

For example, houses with a low energy consumption that lies in an area where there is an obligation to be connected to the district heating. Is it possible to get dispensation from the rule.

Is the natural energy source widely available in the local / national context in case of renewable energy use (enough sun radiation for PV, wind resource for wind power, water for hydro etc.)?      Yes      No  

#### 1.2 The adoptability of the RTD&D technology in the style of building in the specific country

This point should check how the technology can be implemented at an international level. In fact, not all technologies can be implemented in all countries. Each country has either its specific building sector actor's knowledge level/specific skills, or its style of architecture based on its culture.

For example, a complex technology can not easily be exported in a country where there is little knowledge on how to follow it during its whole life-cycle.

## Checking list for selecting RTD&D results

### Manpower

- Does the engineering of the RTD&D technology require experts to have specific expertise? Yes  No
- If yes, are such experts available in the country? Yes  No
- Does the installation of the RTD&D technology require specific skilled workers? Yes  No
- If yes, are such skilled workers available in the country? Yes  No
- Does the installation of the RTD&D technology require cooperation among project participants with different professional backgrounds? Yes  No
- Does the RTD&D technology call for end-users to take part in the maintenance? Yes  No
- If yes, does the maintenance of the RTD&D technology require specific skilled workers? Yes  No
- Does the dismantling of the RTD&D technology require specific skilled experts? Yes  No

### Materials

- Are the materials for producing the RTD&D technology available in the country where the RTD&D technology is adoptable? Yes  No

### Integration in the architecture

- Is the RTD&D technology easy to be integrated into architectures of your country? Yes  No
- For example does the RTD&D technology require a specific placement in order to function properly? Does it need a storeroom? Or should there be showed any regards for pips etc.

## 2 Elements of cost-effectiveness relevant to the up-take of results of the RTD&D technology

This section intends to make a first approach of the RTD&D technologies financial analysis, mainly dependent of the following parameters:

### Is the investment cost of the technology affordable for the project developers who are supposed to adopt the RTD&D technology considered?

Yes  No

This can be considered by looking at the difference between the cost of investing in the common technology and the RTD&D technology.

Percentage of the investment cost increase for RTD&D technology, compared to the common technology:  %

The price of the RTD&D technology:

€/u.

u. = is the proper measure unit (i.e. if power, PV, thermal, ... technology, the price should be expressed in € per kW installed, if thermal – proofing materials the price should be expressed in € per m<sup>2</sup> of wall surface, etc.)

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**Are the ordinary and extraordinary maintenance costs reasonable for the project developers and/or the end-users who are supposed to run the RTD&D technology?**

To determine this, the RTD&D technology must be compared to the common technology.

Yes  No

The RTD&D technology's lifetime:

Years

Energy efficiency in operation:

%

If possible, indicate the % of gain of the energy efficiency in operation compared to the standard operation:

%

Energy saved, or generated in case of renewable energy use (potentially):

kWh/y

**Is the RTD&D technology a cost-effective solution?**

The cost-effectiveness of the RTD&D technology may vary from country to country.

When answering this consider energy prices, subsidy etc. in a local/national context.

Yes  No

In some of the countries there are in the building regulations guidelines for how to determine if a solution is considered cost-effective. Fore example is a RTD&D technology considered cost-effective in Denmark if:

$((\text{energy cost saved} \pm \text{maintenance cost}) \times \text{lifetime}) / \text{Investment} < 1,33.$

**Pay Back Time (PBT):**

Years

Could we determine, even in a first approach, the time necessary to pay the over-investment of the RTD&D technology considered respect to a traditional technology.

As mentioned in the previous chapter, the evaluation on these parameters can be only qualitative at this stage of the project, and may be followed more deeply in the pre feasibility studies themselves. But these parameters can be used as first guidelines to compare the various technologies and give elements of decision to find the expected more promising technologies.

### 3 Environmental impacts potentially deriving from the market deployment of those new European RTD&D results

This section points out the expected environmental impacts of the RTD&D technologies, that can be listed out through the following points:

#### 3.1 Reduction in the environmental impact of the RTD&D technology

The following questions are posed in order to get an insight in the impact of the RTD&D technology on the environment.

##### Green House Gasses (GHG) emission reduction.

This reduction is directly correlated to the energy consumption reduction, renewable energy (RE) production or fuel switching. The more the saving (or RE production) potential is high, and the more the conventional source of energy is polluting, the more the GHG potential reduction is high.

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Low  Medium  High

**Local pollution reduction.**

Some energy's produce not only GHG emissions but also an intense local pollution as PPM10 (very little carbon dust affecting skin and lungs), sulphur dioxide (SO<sub>2</sub>) creating acid rains, nitrogen dioxide (NO<sub>2</sub>), etc. For example, a solar heater that avoid burning coal in the centre of the huge cities decreases not only GHG emissions but only the very problematic local pollution that is affecting the health of million of habitants.

Low  Medium  High

**Reduction of dangerous / toxic wastes:**

For example, the fuel switching between coal and solar energy reduces not only GHG, PPM10, SO<sub>2</sub>, NO<sub>2</sub> but also the production of delicate wastes that are the ashes resulting form the coal combustion and are often charged in sulphur and heavy metals.

Low  Medium  High

**Reduction of ground / water pollution:**

Low  Medium  High

**Other environmental impact not mentioned?**

If yes, please include a brief description of the environmental impact observed.

**3.2 Environmental impact of the materials used for producing RTD&D technology**

**If possible, please fill out the following questions.**

Does the fabrication of the RTD&D technology demand a greater amount of energy compared to the exiting technology? Yes  No

Recycle percentage of the materials used for producing RTD&D technology after their ended cycle:  %

Percentage of the materials used for producing RTD&D technology that require disposal:  %