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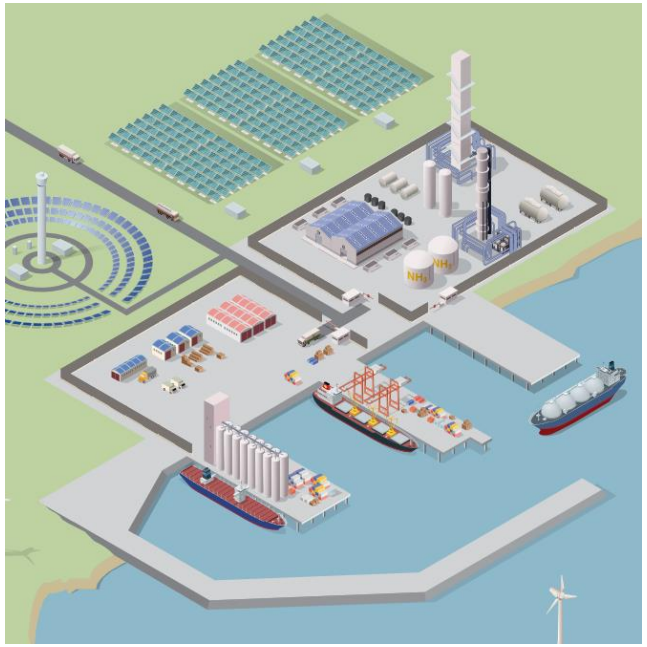

Innovation Observatory:
Policy support tool to reduce industrial emissions

3 February 2022

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Agenda

1- Overview of innovation on Industrial Emission Directive

2- Lessons from Observatory pilot test (2017-19)

3- Options for greater role in **revised IED** (2019-21)

4- Future: **Larger ETV contribution** to IED

1- Overview of Innovation on IED

2010
- IED adopted

2011
- First BREFs reviewed under IED with legally binding BAT-AELs

2012

2013

2014

2015
- EU study to identify opportunities of industrial innovation for emission reductions

2016

2017
- Launch of Innovation Observatory pilot test

2018

2019
- Final report with Lessons learnt from test

2020
- Evaluation of IED

2021
- Impact assessment of the IED including larger role for Innovation

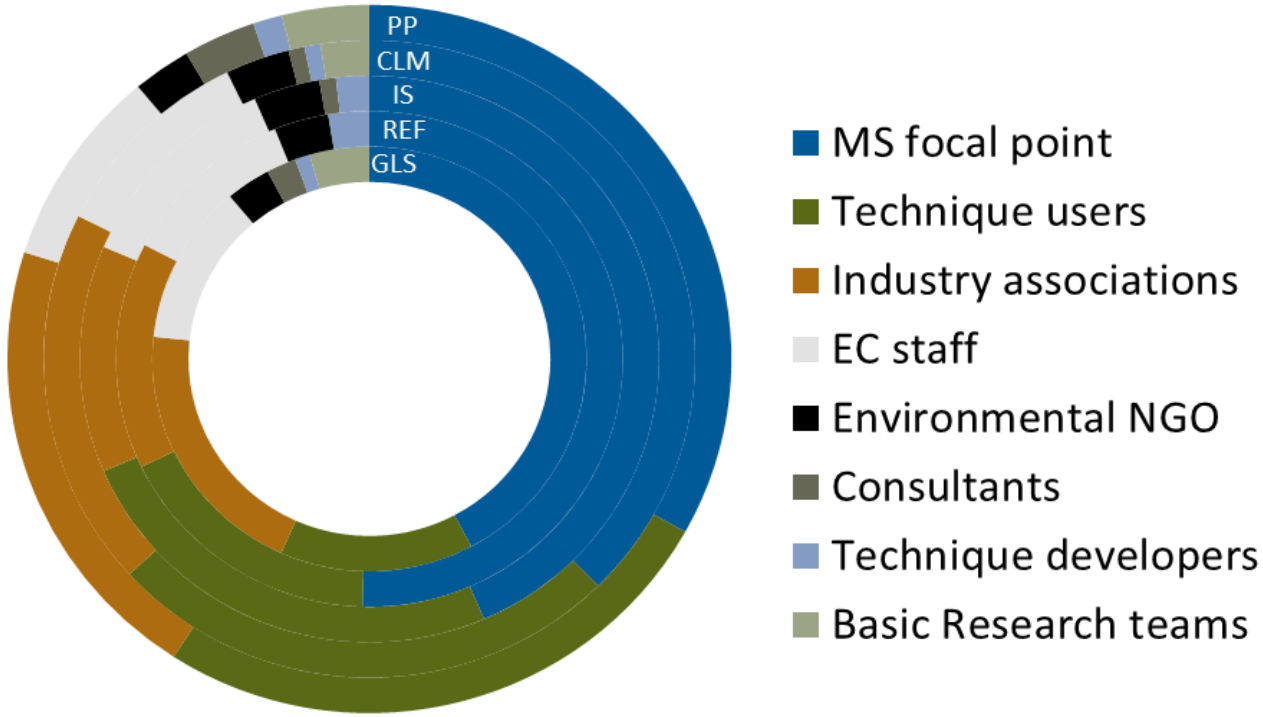
2022

1- Overview of Innovation on IED:

The study carried out on 2015 revealed that there were several opportunities to improve the impact of industrial innovation on emission reduction work of the BREF (and IED):

- Limited number of industrial technology developers (and suppliers) participating on BREF development

- Few techniques developed from ET to candidate BAT
- Limited resources to do research of novel or emerging techniques. Indirect sources of information to validate maturity (TRL) of Emerging Techniques
- Emerging technique sections of BREF were not a priority in the context of high workload



Novel Techniques	**Emerging Techniques**	Not proven at commercial scale	TRL 7-8
	Candidate BATs (cutting edge techniques")	Used at commercial scale	TRL 9

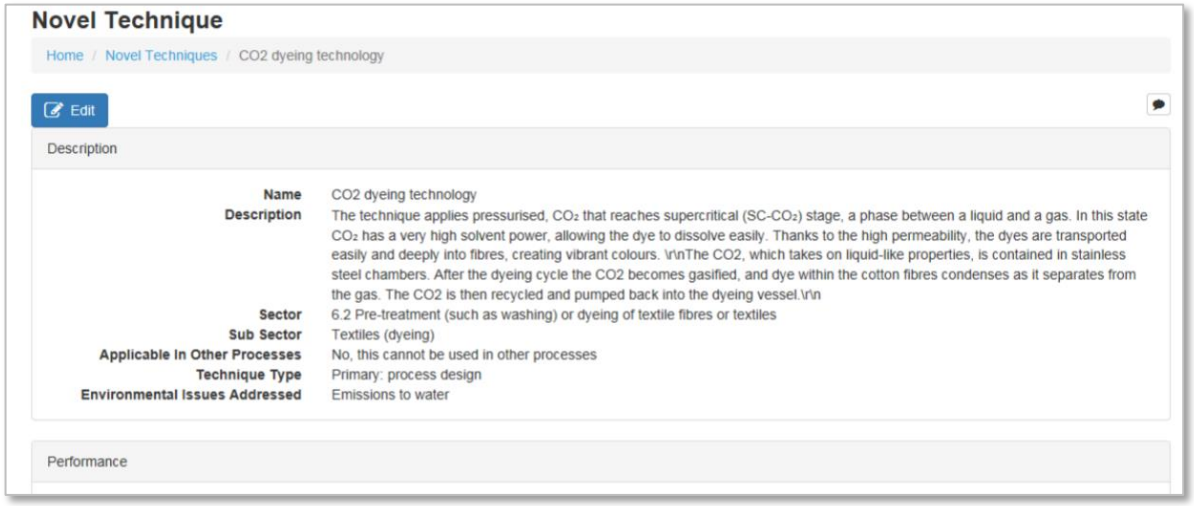
2- Lessons learnt from Observatory Pilot test

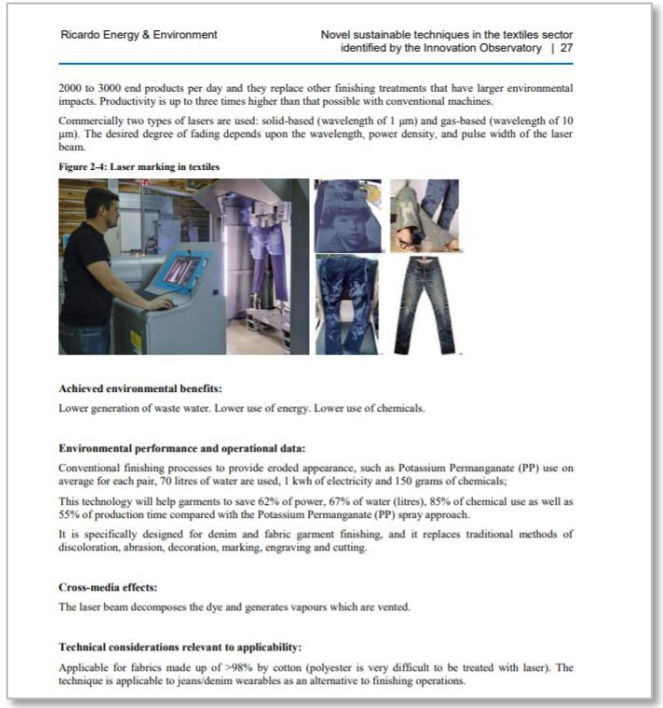
The pilot test lasted 3 years and provided support on novel techniques for development of

- Textile BREF
- Slaughterhouse and animal by-products BREF

Task carried out:

- Stakeholder mapping
- Stakeholder engagement
- Collecting information on NT
- Online data base
- Drafting NT descriptions
- Gathered peer review comments for NT





Ricardo Energy & Environment — Novel sustainable techniques in the textiles sector identified by the Innovation Observatory | 27

2000 to 3000 end products per day and they replace other finishing treatments that have larger environmental impacts. Productivity is up to three times higher than that possible with conventional machines.

Commercially two types of lasers are used: solid-based (wavelength of 1 µm) and gas-based (wavelength of 10 µm). The desired degree of fading depends upon the wavelength, power density, and pulse width of the laser beam.

Figure 2-4: Laser marking in textiles

Achieved environmental benefits:

Lower generation of waste water. Lower use of energy. Lower use of chemicals.

Environmental performance and operational data:

Conventional finishing processes to provide eroded appearance, such as Potassium Permanganate (PP) use on average for each pair, 70 litres of water are used, 1 kwh of electricity and 150 grams of chemicals;

This technology will help garments to save 62% of power, 67% of water (litres), 85% of chemical use as well as 55% of production time compared with the Potassium Permanganate (PP) spray approach.

It is specifically designed for denim and fabric garment finishing, and it replaces traditional methods of discoloration, abrasion, decoration, marking, engraving and cutting.

Cross-media effects:

The laser beam decomposes the dye and generates vapours which are vented.

Technical considerations relevant to applicability:

Applicable for fabrics made up of >98% by cotton (polyester is very difficult to be treated with laser). The technique is applicable to jeans/denim wearables as an alternative to finishing operations.

The output documents containing PEER REVIEWED (validated) draft descriptions of candidate Emerging Techniques and BATs were sent to EIPPCB to be used by the European Commission in the Sevilla Process.

The final assessment of these candidate techniques was carried out by each Technical Working Group.

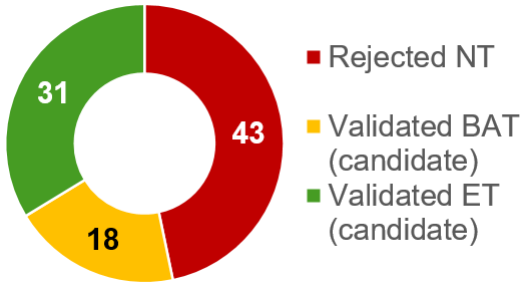
Cooperation with other existing EU activities was also initiated.

2- Lessons learnt from Observatory Pilot test

Example of Observatory achievements

NT research work

92 candidate NT identified



NT characterisation

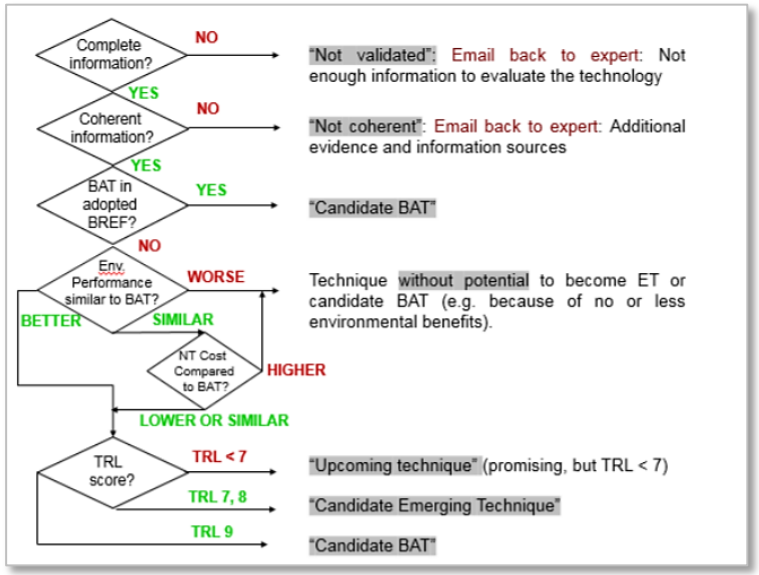
18 Candidate BAT described
31 Candidate ET described
Draft description has peer review feedback including TRL score assessment

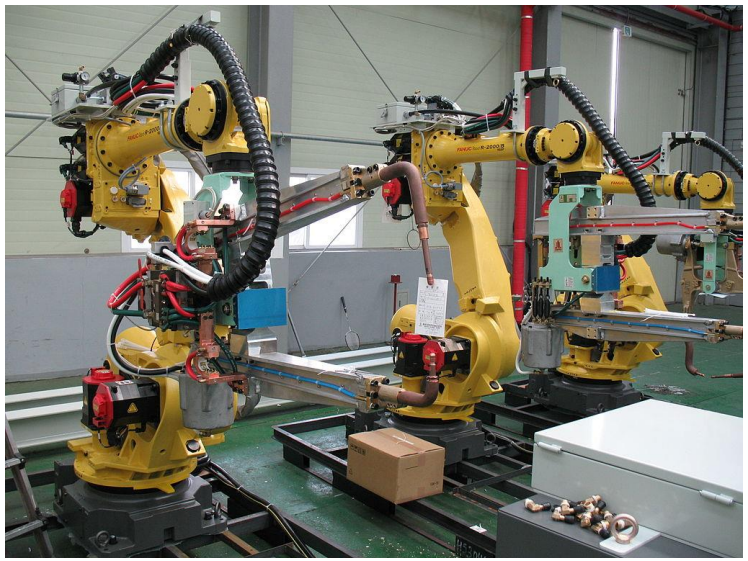
Stakeholder engagement

300 stakeholders identified
50 stakeholders participated (in online tool)

Acceptability from TWG on draft ET

descriptions provided by 3rd party





Lessons Learnt

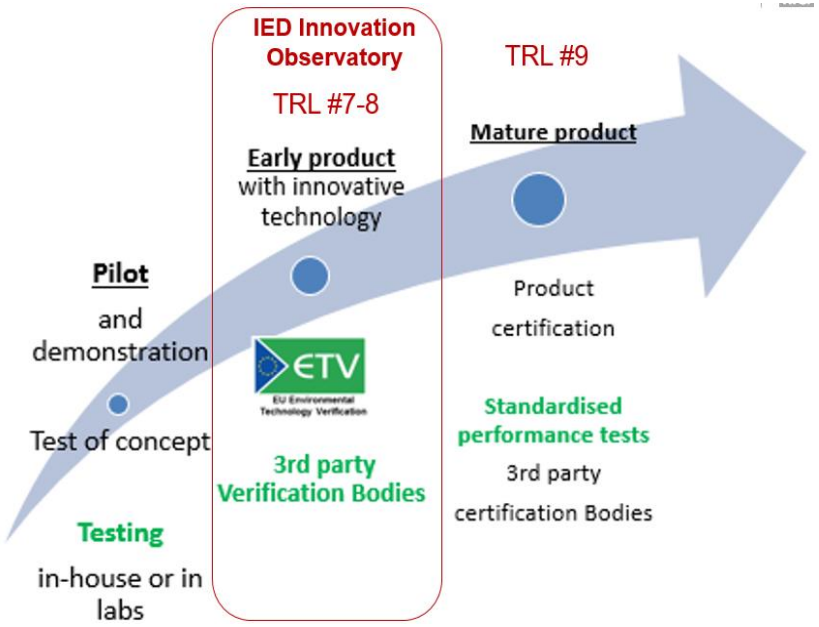
- Need to clearly articulate the benefits for stakeholders to participate in the Observatory
- Better match: The peer review process could be improved by listing innovation stakeholders by technical topic. For example, it may be more effective to group innovation stakeholders
- Technology suppliers or developers are not always aware of the applicability restrictions described in the BREFs (some being legally binding)
- Mainly marginal improvements of existing abatement techniques. Not common disruptive technologies
- Challenging data acquisition for Opex or Capex at lower TRL

3- Options for greater role in revised IED (2019-21)

Code	Options evaluated related con **Innovation Observatory role**
(43)	Establish the Industrial Emissions **Innovation Observatory** to monitor the (TRL) and environmental performance (BAT-AEPLs) of emerging and breakthrough techniques. Recognition by the Observatory of advanced techniques with TRL 8-9 (or improved environmental protection) would suggest an update of BAT conclusions upon approval from the TWG.
(44)	Amend requirements to allow more time (6 to 8 years) for operators to implement **emerging techniques** with Technology Readiness Level (TRL) 8-9 or **stricter long-term Emerging Techniques Associated Emission Levels** (ET-AELs)
(41)	Introduce legislative amendments to facilitate the development and **testing of emerging techniques over a longer period**.
(42)	Establish shorter, up to 5-year BREF cycles focussed on defining stricter BAT-AELs based on recent innovations.
(5)	Require competent authorities to consider under Article 15(3) **setting permit ELVs by default at the lower limit of the BAT-AEL range**.

Code	Options evaluated related with **Climate change and innovation required for transition**
(45)	Amend requirements to provide up to six years to implement BAT conclusions where deep transformation of industrial sectors is required. “Deep ,transformation” would refer to the adoption of completely different process routes and/or primary process techniques that facilitate a significant reduction in the emissions of pollutants and/or the use of energy, raw materials
(33)	review **obligation by 2035** that focusses on the capacity of the installations to operate in accordance with the EU’s general climate objectives; including a requirement for **installations to produce Transformation Plans**

4- Future: Larger ETV contribution to IED



- ETV has now larger scope (compared with Observatory pilot test)
- EIT manufacturing can be relevant to facilitate stakeholder engagement on Observatory (IED)

ETV supporting IED/BREF/Observatory

1- ETV can help provide information on techniques:

- Determine TRL score: determine if ET (#7/8) or BAT (#9)
- Determine/verify environmental performance

2- Identify candidate techniques

- Potential with other ETV programs (Japan, Korea, Canada, USA)
- New entries in European ETV

3- EIT/ETV support on ET development

- Facilitates the market uptake of innovative environmental technologies
- To help address “valley of death”: Challenging first pilot at commercial scale

IED/BREF/Observatory supporting ETV

- Provide visibility in Observatory and/or BREF
- Easier access to IED specific funds: e.g. LIFE
- Identify techniques that need technology verification
- Identify stakeholders related with each candidate emerging technique/BAT