HARMONI

INDUSTRIAL COOPERATION ON
REGULATION AND STANDARDISATION

Regulatory bottlenecks and standardisation needs identified by the SPIRE sectors

Deliverable D2.2

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ABBREVIATIONS

CCMC: CEN-CENELEC Management Centre

CWA: CEN Workshop Agreement

DIN: German Institute for Standardization

EN: European Standard

ISO: International Organization for Standardization

LCA: Life Cycle Assessment

TC: Technical Committee

TRL: Techonology Readiness Level

UNE: Spanish Association for Standardization

PARTNERS SHORT NAMES

CIRCE: Fundación CIRCE – Centro de Investigación de Recursos y Consumos Energéticos

CEFIC: Conseil Européen de l'Industrie Chimique

CEMBUREAU: Association Européenne du Ciment

A.SPIRE: SPIRE

DIN: DIN DEUTSCHES INSTITUT FUER NORMUNG E.V.

ECREF: EUROPEAN CENTRE FOR REFRACTORIES gGMBH

ECREF / FGF: Forschungsgemeinschaft Feuerfest e.V.

ECREF / VDFFI: German Refractory Association

FEHS: INSTITUT FUR BAUSTOFF-FORSCHUNG EV

PUBLISHABLE SUMMARY

The deliverable addresses the barriers and challenges identified by both industrial associations and individual companies among the intensive industries at EU level in the field of regulation, non-technological barriers and standardisation opportunities. As a complementary information from the D2.1, which collected a lot of information from EU granted projects involving intensive industries, it is necessary to dig into the available analysis carried out by industrial associations. All the industrial associations develop on a regular basis reference documents that lay the foundation of their positions towards regulation and other related topics. In particular, under the scope of this deliverable, all the SPIRE sectors' position papers have been analysed. Additionally, and in the hope of enlarging the exercise, other 3 intensive industries have been tackled, such as; glass, pulp and paper and refining. This exercise is completed with a thorough mapping evaluation dealing with the main barriers prioritised per sector. To this end, similarities and overlaps among the intensive industries in the field of non-technological barriers and standardisation potential have been identified.

As underlined in D2.1, the aforementioned barriers significantly affect the investment plans in the companies, in many of the cases linked to technological deployments, which ends up reducing the transferability of available or close to the market technical solutions. Thus, the identification and analysis of the challenges all intensive industries face, might facilitate a higher cooperative environment in this very complex area. Furthermore, a more holistic analysis of the on-going regulation environment and the future related discussions will also enable a broader evaluation of the consequences and impacts, both negative and positive of more adapted regulatory and other non-technological frameworks. As a result of the document, the mapping exercise of more than 100 reference documents published by the industrial associations have concluded with a list of both, non-technological and technological challenges that affect several sectors. Those common challenges have been classified in technical and procedural, as both approaches are relevant to improve the development, applicability, implementation and use of those legal documents.

On the other hand, it is instrumental to involve individual companies in the HARMONI project and collect inputs from them. Non-technological barriers influence company´s strategies, then it is invigorated to properly include their challenges in the overall scope of HARMONI. At this stage of the project, two extensive surveys, one dealing with regulation and other non-technological barriers and another one with standardisation have been developed. Those documents have been used to gather individual inputs from the main companies among the intensive industries, covering a wide range of applications, geographical location, size of the companies and products and processes they use and/or develop. Furthermore, this exercise has boosted the engagement of experts that will be linked to the AHRMONI project at different stages along the execution of the project. Therefore, this first exchange of information will be followed by a future actions in conjunction with individual experts from companies.

Lastly, all Technical Committees and related on-going working groups under the umbrella of CEN/CENELEC and other linked bodies have been assessed. This assessment includes an exhaustive list of all related TCs, most relevant activities and related ISO/IEC groups to SPIRE sectors. This will contribute to having an elaborated overview of all elements that are related to the standardisation from an early stage of the project.

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1 INTRODUCTION

The collection of the non-technological barriers and standardisation opportunities characterises the first step of the HARMONI Project. A thorough analysis of the data gathered will lay the foundation of the future solutions to overcome that challenges. WP2 aims at building up a robust and solid list of challenges conducted in conjunction with the industrial associations and individual companies from those sectors. Desk research combined with the views of industrial experts from both, associations and companies is critical to set up the portfolio of most urgent needs to be tackled. Therefore, the outcome of this WP2 will feed into the WP3, 4 and 5, in charge of regulation, standardisation and other non-technological challenges respectively.

Within the WP2, several sources of information are evaluated. The current D2.2 is focusing on the collection of information from the industrial associations and companies. This deliverable enriches the information collected in deliverable 2.1 and will also contribute to forming the deliverable 2.3.

This document describes the analysis of more than 100 public documents from 11 intensive sectors (the 8 SPIRE sectors plus other 3 intensive sectors). This has resulted in a mapping exercise which will also substantiate the D2.3 and the upcoming activities in WP3 and 5. It is especially relevant to oversee what the similarities are in this area so as to enable a larger cooperative framework among the intensive industries. The HARMONI project pursues the collaboration among the intensive industries and strongly addresses a holistic assessment of all critical elements.

Lastly, standardisation is considered as a tool for a larger use of available or close to the market technologies. In this deliverable, an extensive identification of the most relevant standardisation bodies has been accomplished. The result of this analysis will support further discussions and studies in WP3. In addition, this will also enrich the deliverable 2.3 as it complements the regulation and other non-technological barriers in the topics selected.

2 METHODOLOGY

HARMONI's approach to the sectors was two-fold: on the one hand, working directly with the European Industrial Associations in order to identify and gather relevant documentation already produced by them in the regulatory and standardization area, with particular interest on those mentioning innovation. On the other hand, using these European Associations and their national counterparts to collect direct input from the companies not only in the SPIRE sectors, but also Pulp and paper, Refining and Glass sectors.

2.1 Literature Review

In order to facilitate the search of relevant documentation (position papers, responses to public consultations, etc.) developed by the European Industrial Associations, CIRCE mapped the European legislation related to the 9 areas of study. DIN identified the Technical Committees at European and international level that are working on standards in those areas.

2.2 Direct consultation to industry

The identification process was round up by a direct consultation to the European companies from SPIRE sector and other intensive industries. This was particularly important for obtaining the input of SMEs across Europe, which rarely participate in open consultations at European level. The national industrial associations linked to their European counterparts played a key role in reaching this type of stakeholders. An on-line questionnaire was developed and distributed by the industrial associations among companies. This input provided HARMONI with an insight on potential differences in the identification of regulatory barriers and standardization needs depending on the size and type of the company, the country/region where it is located, and the sector the company belongs to.

3 MAPPING AND CLUSTERING OF EXISTING REGULATORY BARRIERS FROM INTENSIVE INDUSTRIES ASSOCIATIONS

The following section includes all the barriers related to regulation and other non-technological barriers identified by the industry associations. All documents (position papers, responses to public consultations, brochures, policy recommendations, etc.) reviewed are public and have been issued over the last 4 years.

CIRCE have analysed more than 100 documents and carried out a mapping exercise addressing the main similar challenges and the most urgent matters for more the intensive sectors. The final document has been validated by the European Industrial Associations involved in the project, after several updates and corrections.

The following table shows the nine topics related to innovation process and market uptake of new technologies indicated in the text of the call. These 9 areas have been used as a reference for the aforementioned analysis:

Priority areas of interest
(1) Re-use of different grades of wastewater for industrial purposes.
(2) Re-use of different types of waste (e.g. through re-classification) as feed for industrial production and/or energy sources.
(3) Recovery of valuable materials, metals and minerals from waste.
(4) Lifecycle Assessment methodologies to allow a harmonised comparison between industries and sectors.
(5) Production of advanced renewable fuels from the use of CO2 as feedstock.
(6) General harmonisation of the European Waste, Water and Energy policies.
(7) Eliminating bottlenecks for the transferability of new technologies across European borders.
(8) Eliminating bottlenecks that prevent the stimulation of investments in new technologies, e.g. within clean and low carbon technologies.
(9) New standardisation methodologies that facilitate continuous production.

Table 1: Main nine priority areas of interest in HARMONI project

For the sake of clarity, the identified challenges have been included in only one of 9 topics, even though there are several cases that could have been included in some areas out of the 9 topics. This facilitates the helicopter view of the exercise and makes the further analysis easier.

3.1 Barriers identified from European Industrial Associations Literature Review

A full description of the main challenges per sector and areas of interest (the 9 areas indicated before) is included in this section. In addition, and as a result of the exercise, several elements have been identified. There are two kinds of challenges, technical and procedural. The former is purely linked to the particular interpretation of a technical challenge, and the latter illustrates challenges resulted from the way regulation is set up regardless of the subject referred. This list is larger than the 9 areas and provide with more details of the scope and consequences of the difficulties in some regulations. Lastly, this exercise sums up the difficulties intensive industries face in the field of regulation. And both approaches are instrumental, on the one hand, the content needs to be reshaped for different reasons, and on the other hand, the process of how those legal documents are developed and implemented.

To conclude, the analysis of the reference documents clearly indicates the need of tackling technical and procedural barriers. This requires a holistic analysis for both, public and private side so as to better shape and launch robust and easy to implement regulation.

Technical

Procedural

Detected issue	CHEMICALS	CERAMICS	CEMENT	WATER	STEEL	MINERALS	ENGINEERING	NON-FERROUS METALS	REFINING	PAPER	GLASS
Waste classification and definition	X		X		X			X	X		
REACH legislation over national limitations	X	X			X						
Waste shipment regulation: transferability			X					X			
Review of the circular economy concept. Recycling. Durability, long-term concept.		X	X	X	X	X				X	
Product vs waste	X	X	X		X	X					
Full supply chain and life-cycle thinking		X	X		X	X		X			
Productivity target based on RMC does not reflect efficiency downstream		X	X		X	X		X			
Data transfer security, IPR, patents, etc.	X						X				
Cost of water use (Water Framework Directive)				X					X		
CO2 market prices uncertainty			X						X	X	X
Competitors abroad EU. Different conditions.		X									X
CO2 conversion technologies are not promoted	X		X		X						
Harmonization EU legislation	X	X	X	X	X		X	X			
Holistic approach	X	X	X	X	X		X	X			
LCA as instrument to measure (not all materials are recyclable in a same way)		X	X		X	X					
Overlapping of legislation. Different targets.	X	X	X		X	X				X	
Subsidiarity should apply down to the relevant local level (?)		X	X		X	X					
Effective and fair taxation			X		X	X	X				

Figure 1: Summary of the barriers identified from 9 European Intensive Industrial Associations Literature Review dealing with technical and procedural challenges

Full information is provided in the next tables which consists of the name of the association, the barriers detected and, in some cases, the solution already proposed by the sector.

3.1.1 Re-use of different grades of wastewater for industrial purposes

Identified by	Detected issue	Proposed solutions
WssTP	The EU water policy should be based on resource efficiency and recovery, pollution source control via full implementation of a polluter-pays principle, and the promotion of sustainable water management as a driver for a circular and green economy stimulating industrial symbiosis.	
	Ensure investment in research, development and market uptake of (a) technologies to reduce the energy use of the water sector, (b) technologies to recover and generate energy from (waste) water and (c) emerging technologies for water-based renewable energies.	
	Promote sustainable water management as a driver for a resource-efficient and circular economy.	
concawe	Implementation of the Water Framework Directive (Directive 2000/60/EC) and the EU Commission's proposed "Blueprint to Safeguard Europe's Water Resources" might increase the cost of water use in future years.	Concawe is planning to conduct a detailed survey of EU refineries to obtain an estimate of this potential water cost increase.

3.1.2 Re-use of different types of waste as feed for industrial production and/or energy sources

Identified by	Detected issue	Proposed solutions
cefic	Establish a level playing field for the use of the same biomass.	
EUROFER The European Steel Association	The Waste Framework Directive should recognize steel industry as one of the largest recyclers in Europe.	
Eurometaux	According to circular economy, GPP criteria and requirements ought to consider the fate of products at end-of-life (Feb' 16).	

	Lack of harmonized implementation of waste legislation.	Combat illicit shipment of waste of end-of-life vehicles. Introduce a risk matrix for controls at borders.
CEMBUREAU The European Cement Association	The benefits of co-processing for non-recyclable waste are not sufficiently recognized, especially the recycling part of co-processing. The legislative framework needs to recognise these new waste management options, such as material recycling in the cement industry, as contributing to the EU and Member State recycling targets (May'16)	Recognise recycling in co-processing
	Ensure a level playing field for the use of biomass waste by removing subsidies that favour one industry over another. Renewables policies are driving biomass towards power generation (Oct' 15).	Check The Renewables Regulation (Directive 2009/28/EC).
	Waste management/recycling/reusing/resources efficiency	
	Renewables policies driving biomass power generation (Oct' 15).	Check The Renewables Regulation (Directive 2009/28/EC).
EURO ALLIAGES	Outdated leaching limit value for molybdenum applied to inert waste in the Waste Acceptance Criteria for landfills (Euroalliages, May' 16).	Need revision in line with the currently available scientific dataset.
	Lack of incentives to divert waste away from landfilling and not a good source of local revenue CE Package – Aug' 15).	Local landfill taxes and shifting the tax burden.
EUROPEAN CENTRE ECREF FOR REFRACTORIES	Durability not addressed in proposed Circular Economy Monitoring Framework: New indicator to be developed to measure durability (ECREF document)	Policy to be designed from full supply chain perspective where-by economics of recycling are weighed against environmental and social impacts.
	REACH authorization is not the appropriate way forward for refractory ceramic fibbers (RCF).	REACH Annex XIV: amendment needed.
	Coal Tar Pitch, high temperature (CTPHT), are of intermediate use for different refractory products.	REACH Annex XIV: amendment needed.

Cerame-Unie	Limit values for pollutants in waste derived-aggregates too strict in some member states & chemical limits may threaten circular economy WFD must be consistently implemented across the EU (member states have own criteria with regards to by-products and end-of-waste status.	EC to create a system or European database that: a) Helps monitoring the current situation in member states. b) Reduces inconsistencies c) Simplifies and harmonizes the administration to transport waste between member states.
IMA Europe	Some raw materials are embedded in products for an extremely long period of time. While still in use they deliver value every day and are not available for recycling.	Long-term beneficial use contributes to resource efficiency and this should be accounted for.
	Some raw materials, used in an apparently dispersive way, return to ecosystems and reconstitute the natural stock.	
concawe	Due to the UVCB (Unknown or Variable Composition Substances) nature of petroleum substances, the interpretation of the REACH regulation has resulted in the need for scientific dialogue with the regulatory authorities, and within ECHA and the competent authorities in Member States. REACH requires actual data to be provided to substantiate each effect, which is challenging for complex substances such as petroleum substances.	Concawe has responded by conducting scientific programmes to provide additional data and improve our understanding.
cepi	Measurement of the recycling rate according to the Waste Framework Directive.	Europe's metals, steel and paper industries renew their call for a harmonised method to measure Member State recycling rates at input into the 'final recycling process'. Measure at input to the final recycling process. Improve traceability capacity.

3.1.3 Recovery of valuable materials, metals and minerals from waste

Identified by	Detected issue	Proposed solutions

Eurometaux	Only 1/3 of EU electronic waste was properly recycled and €4.3 billion of EU base metals scrap was exported without guarantee of quality treatment (Feb' 16).	
	Metal substitution's value should compare alternatives on an equal footing and an exhaustive assessment on a life-cycle basis (Feb' 16).	
cefic	The legislative proposal should have been more ambitious in removing regulatory barriers preventing the chemical industry from reintegrating valuable resources in production processes (Mar' 16).	Classifying valuable materials as waste discourages investments in business practices seeking to optimize the utilization of valuable resources: 1) Production residues which will be further used are not classified as waste. 2) By-products criteria are not open to varying interpretations by national authorities.
CEMBUREAU	Implement a waste policy that recognises and rewards the benefits of co-processing and its close integration with other industries.	
	Implement waste legislation aimed at avoiding landfilling of waste that contains recoverable resources such as a useful mineral content and / or a thermal calorific value	
	In accordance with the Waste Framework Directive, 'recycling' includes any operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. Given the above, material recycling in the cement industry is clearly a recycling operation. The material recycling component of co-processing contributes towards Member States compliance with EU recycling targets and should be recognised as such. (May'2016)	
Eurodalliages	In some Member States, by-products (like slags) are not considered products and they are subject	

	to double regulations, as they must comply with both the waste and the products requirements (Jun' 17)	
IMA Europe	Some raw materials have their mineralogical, physical or chemical properties transformed in their applications. They cannot be recycled as such, but through the recycling of their applications they can be recovered.	This is a valuable contribution to resource efficiency and should not be seen as "downgrading".

3.1.4 LCA methodologies to allow a harmonised comparison between industries and sectors.

Identified by	Detected issue	Proposed solutions
CEMBUREAU The European Cement Association	Recycling is often described as close loop recycling and there is a trend to define recycled content targets. Studies have demonstrated that in the case of concrete, it is appropriate to take a case by-case approach. In this respect, politically-driven recycled content targets for concrete make little sense. (May' 2016) The different options for recycling concrete are looked at in a recent study by the European Cement Research Academy (ECRA) entitled "Closing the loop: What type of concrete re-use is the most sustainable option?" The study uses LCA (lifecycle analysis) to evaluate the impact of producing new concrete with either primary raw materials or recycled concrete aggregates, or using the waste concrete in road construction. A comparison is made to find the most sustainable option. Based on the life-cycle analysis, the study found that it is often preferable to use recycled concrete in road construction, unless there is little or no demand close by. For fresh concrete, the fact that recycled concrete aggregates require additional processing means that using primary	Draft policies that reward use of waste based on the best available way taking into account the entire cycle assessment

	raw materials can in many instances be the more sustainable choice.	
	Product footprint - a whole life cycle approach should be applied to public procurement rather than simply focusing on product foot printing or intermediate product impacts The long life span of construction works increases the importance of durability, cost-effective maintenance and repair compared to the recycling and recovery operations.	
IMA Europe	The functionalities of some raw materials reduce the footprint of the applications they are used in. To account for this, life cycle assessment needs to cover the application's use and end-of-life phases.	
	Life-cycle thinking: resource-efficiency indicators should reflect product life-cycles and proper impact assessments that take into account not only the raw materials mass (and therefore their density), but also the efficient production and use of resources as well as their impact on the environment, the economy and society throughout their whole life in order to thoroughly and equally assess the three pillars of sustainability.	A full supply chain approach should apply: any policy needs to be designed from a full supply chain perspective whereby the economics of recycling need to be weighed against the environmental and societal benefits

3.1.5 Production of advanced renewable fuels from the use of CO2 as feedstock

Identified by	Detected issue	Proposed solutions
cefic	Policy adjustments are needed to incentivize the chemical valorisation of gaseous effluents from industry (May' 16).	
	The chemical industry has started developing CO2 conversion technologies, but the current	An appropriate regulatory framework is needed: valorisation of CO2 as an alternative renewable

	regulatory landscape does not incentivize the deployment of these technologies (May' 16).	carbon source available in abundance in Europe.
	Tendency: to first look at a product's risks rather than its societal benefits. Risks cannot simply be avoided if Europe wishes to remain competitive and at the forefront of innovation (May' 16).	Regulatory environment should promote innovation acceptance rather than focusing on risk avoidance
EUROFER The European Steel Association ESTEP	Investing in CO or CO_2 conversion to renewable fuel status, but lack of acceptance (Mar' 16).	
	Unclear outcome and impact risks until after 2020 for the Low Carbon Fuels and Chemicals (Mar' 16).	Further work out in EU directives and local member state laws to level the playing field with the already existing (also in FQD) low carbon solutions.
	Need of recognizing the environmental benefit of the re-use of waste gases for electricity production by granting full free allocation (Apr' 17).	
CEMBUREAU The European Cement Association	CO2 should be accounted for and reported where it is "physically emitted". Regulatory barriers, such as the one related to the "Transferred CO2" (included in the MRV of the EU-ETS for the period 2013-2020) which only allows the subtraction of the transferred CO2 if it will be "for the purpose of long-term geological storage" should be removed.	
	Research and development on all aspects related to CCS need to be supported and funded to accelerate greenhouse gas reduction in cement manufacture. Finance for new research to develop alternative ways to use the captured carbon emissions. Storage sites would need to be identified and developed with transport solutions, such as a dedicated pipeline network, put in place. Public acceptance of CCS would need to be achieved through concerted information campaigns and dialogue with all stakeholders. CCS/CCU should be put on equal ground for funding taking into account the duration of the storage.	

IMA Europe	GHG reduction target should be set at a level that can be attained by a sector in a cost-efficient way given the current state of technology or with breakthrough technologies that are expected to become available by 2030. The remaining GHG reduction potential of the major emitting manufacturing sectors may actually be very different and it may be worthwhile examining this in more detail.	The total EU-wide GHG reduction target should be set on the basis of the results of such a bottom-up approach.
	A single EU-wide GHG reduction target should be further split up amongst the different (sub)-sectors according to their remaining potential.	The Commission and the Member States may however consider further action in a number of sectors which are at the moment not covered by the EU ETS, but which could clearly contribute to a reduction of GHG emissions. A good candidate could be the building sector where buildings could be retrofitted or newly built to increase their energy efficiency and reducing their carbon footprint.
concawe	The European carbon trading scheme (EU-ETS, Directive 2009/29/EC) generates a cost through the obligation to purchase permits for a portion of refinery CO2 emissions. The main source of uncertainty is the future CO2 market price.	
cepi	Avoids costly and unnecessary overlapping legislation. The EU-ETS Directive 2009/29/EC and the Market Stability Reserve will lead to a higher price of carbon under the 2030 framework. It is therefore important that new measures do not overlap with ETS, adding an additional layer of obligations for industry, but rather target untapped potential laying in e.g. buildings or mobility sectors.	Enabling better energy performance in those sectors would stimulate our economy and create new jobs and growth opportunities.
Glass Alliance Europe	Carbon leakage protection measures are essential until a global agreement is in place obliging competitors outside the EU to meet the same	To fulfil the Council's asks, the reform of the ETS post 2020 must ensure that free allowances are allocated on the basis of recent

	conditions and requirements as GAE members face.	production levels, that benchmarks are regularly reviewed at levels that provide incentives but yet are ambitious and achievable, and that any criteria artificially reducing free allocations are abandoned. The post 2020 EU ETS must reflect the EU objective of reindustrialisation by introducing a new flexibility mechanism to better take account of industrial growth.
EuLA	The process emissions of lime production, coming from the raw material used (limestone), needs to be recognized and taken into account within the revised Directive. These process emissions are unavoidable due to the intrinsic properties of the raw material. The only possible mitigation measure against these emissions nowadays is Carbon Capture and Storage or Utilization or any other future relevant technology.	Lime installations should therefore receive 100% free allocation at the level of the benchmark, based on a real data collection (not a standard reduction rate). No further cost should apply to the best performers. If the "standard reduction rate" is applied to the benchmark values, it should not apply on the part of emissions that comes from the raw materials, as these emissions cannot be avoided
	Current EU ETS directive does not fully recognise the capture and re-use of CO2, as well as the “carbonation” of lime, where CO2 is naturally re-captured during the use phase of the product containing lime. The overall carbon impact of some products using lime would be less important if carbonation was officially recognised (e.g. lime containing mortars, lime plasters, lime for soil stabilization, etc.) Under the current rules of the EU ETS, and in particular the “Monitoring and Reporting Regulation”, "where CO2 is used in the plant or transferred to another plant for the production of PCC (precipitated calcium carbonate), that amount of CO2 shall be considered emitted by	The inclusion of carbon capture and re-use under the “innovation fund” proposed within the revision of the EU ETS. The recognition of “carbonation” during the life cycle of the product. The promotion of investment in the long term towards solutions allowing the re-use of CO2, and more broadly, of all greenhouse gases. To reinforce the economic attractiveness of these captured greenhouse gases

	the installation producing the CO2" (Annex IV, point 10).	To adapt the monitoring and reporting rules to ensure that the greenhouse gases captured and effectively re-used are not considered as emitted.
	A holistic approach taking into account the risk of carbon leakage In EU ETS language, this means that for sectors subject to carbon leakage, the best performing installations should receive 100% of free allocations according to their benchmarks ("Benchmark principle" of Article 10a paragraph 1 and 12 of EU ETS Directive). Currently the MSR (Market Stability Reserve) proposal does not address this issue.	The application of the benchmark principle implies the suppression of the "cross sectoral correction factor" (Article 10a paragraph 5 of the EU ETS directive).
Cu European Copper Institute Copper Alliance	The European Copper Institute (ECI) understands that certain co-legislators are currently considering the removal of the qualitative aspect from the carbon leakage qualification. This paper seeks to outline to policymakers the "on the ground" impact that the qualitative assessment removal would have both for the non-ferrous metals sector and for the ETS itself (Negligible emissions reductions). It encourages policymakers to take into account the specificities of the copper sector and to recognize that globally priced commodities (i.e. metal price set by London Metal Exchange) cannot pass on their addition carbon costs.	Maintain the option for a qualitative assessment for carbon leakage qualification and protection Incorporate the 'price-taker' market characteristics as a recognition that globally priced commodities cannot pass on their addition carbon costs.

3.1.6 General harmonisation of the European Waste, Water and Energy policies

Identified by	Detected issue	Proposed solution

cefic	Annex 1 of the EPBD only requires evaluating the building's energy produced on site or nearby (May'16).	It could be replaced by a requirement to report the share of primary energy from renewable sources that is generated both on-site or nearby.
	Non-compliant emission values (IED – Directive 2010/75/EU) for water treatment (E4WATER) (May' 16).	
	Reducing energy waste in the building: Annex 1 of the EPBD (Apr' 17).	1) EPBD Annex I: The request for an additional indicator on the energy demand for heating and cooling, as implemented in most Member States. 2) EPBD Annex I: The proposed discounting of both on-site and off-site renewables puts in jeopardy the logic of reducing energy demand first. It could be replaced by a requirement to report the share of primary energy from renewable sources that is generated both on-site or nearby.
	A vision for the EU building stock requires a nearly zero energy level approach (Apr' 17).	1) EPBD Art 2: A definition of a decarbonized building stock should be founded on what is familiar to Member States based on what they already have to deliver post 2020 for new build, and are expected to do via Art 9 for their existing stock. 2) EPBD Art 2A: The clarification of the renovation strategies ambition as being the "decarbonisation of the building stock up to a nearly zero energy standard by 2050".
	Upscaling renovation requires a link between EED target and the contribution of the building sector (Apr' 17).	1) In the EED Art 1 or 3: Complementing the EE target by a clear indication of the contribution expected from building renovation. 2) In the EPBD Art 2A: Requesting to express the 2030 milestones of the

		renovation strategies in final energy demand and to align it with the EE target.
	Overlaps and double regulations (REACH and other legislations) (Dec' 12).	RoHS-Directive 2011/65/EU: Cefic stresses its previous suggestion to merge RoHS into REACH and align the restriction regime only under REACH Annex XVII. Safety of Toys Directive (EC) 2009/48: there are some inconsistencies, like the introduction of different conditions for the use of CMR. (POPs)-Regulation 850/2004: potential overlapping restriction and thus possible double regulation for substances regulated by the POPs convention and REACH.
	Classifying valuable materials as waste (against Circular Economy strategy) (Mar' 16).	
	Confidential business information submitted is disclosed to the public → disincentive for innovation (May' 16).	
	By-products criteria are not open to varying interpretations by national authorities (Mar' 16).	
CEMBUREAU The European Cement Association	Requirement for energy suppliers to inform customers and measures for better practices in urban and projects planning (Jan' 16). Increasing control and quality from public authorities (Jan' 16).	
	Lack of harmonization, tariffs and fostering on renewable energy (Jan' 16).	
	Adopt a holistic industrial policy approach.	

	Article 10a Paragraph 8 – Innovation Fund (May' 16).	Support both CCS & CCU.
	Application of the national end-of-waste criteria established in accordance with the Waste Framework Directive, see further Article 6(4) of the directive (Sep' 15).	Revising the Waste Framework Directive (WFD – Directive 2008/98/EC)
EUROFER The European Steel Association / ESTEP	Available free allowances distributed according to the relevant level of carbon leakage exposure (Oct' 15).	
	Energy losses (carbon losses are ~25% of the total input energy).	Recovery of lost energy from the EAF off-gas by evaporation cooling technology producing saturated steam and transferred for next steps; or in other industries.
	CO_2 emissions are much higher than Commission Decision 2013/448/EU allows (lack of low carbon technologies) (Oct' 15).	This directive is under challenge by several states.
	Possibility of measures under 2030 framework overlapping with ETS	
	GHG ETS suppose considerable costs. Steel producers will see a further loss of business to non-EU competitors (not committed to CO_2 limitations.	
	Need of supporting CO_2 and H_2 as energy source through any legislation (Mar' 16).	
Eurometaux	Only 35% of EU e-waste is properly recycled, despite the potential for recovering valuable metals such as aluminium, copper, gold and cobalt. (Feb' 16).	Information sharing between producers and recyclers can certainly facilitate the proper design and handling of e-waste for a proper recovery of the valuable materials embedded in these waste.

	Banning hazardous substances in the production/recycling cycles of metals would be almost impossible to implement, as the hazardous substances will continue entering the material loop → less recycling in Europe. (Feb' 16).	Proper treatment in respect of the legislation on place and against quality criteria. But legislation should be effective, smart and proportionate.
	Establish mandatory certification schemes for recyclers of certain waste streams (WEEE and portable batteries) (Feb' 16).	Mandatory certification can help to promote quality recycling and level playing field conditions for the waste treatment.
	Recycling and durability of products are important elements that need to be considered at the design stage (Feb' 16)	Besides the mandate to Cenelec and the subsequent technical work, Eurometaux calls for harmonized implementation throughout Member States and for due control of products imported into the EU.
EUROPEAN CENTRE ECREF FOR REFRACTORIES Cerame-Unie	End of Waste criteria (CE Package – Aug' 15)	Harmonization across Europe of the waste or secondary raw material status and same legal treatment as primary raw material.
EuroAlliages	Functioning of EU ETS refined with MSR: Making MSR operational prior to 2021 will undermine predictability of the carbon market for the industry (ECREF document)	MSR to be addressed as part of post-2020 EU ETS reform rather than before
	Post 2020 EU ETS reform which concluded by an agreement ensuring a level playing field between different sectors (ECREF document).	Carbon leakage protection to be extended beyond 2020 for energy-intensive sectors under EU ETS.
	The list of proposed legislation for further analysis include: - Construction Products Regulation (CPR). - EE Directive (EED) - Energy Performance of Buildings Directive (EPBD). Eco-design Directive and Energy Labelling Directive.	Primary energy demand as indicator ensures most cost- and energy-efficient choices for each building
	Clean Energy Package	Holistic approach for calculation energy performance of building & to better value contribution of thermal mass to buildings' energy performance.

		Housing should remain affordable; renovation and construction shall receive same fiscal/financial incentives.
	Differing (inter)national implementation of GHS increases complexity (CLP Regulation).	Harmonized classification to foster innovation with regards to recycling.
	TiO_2 is assumed to be carcinogen due to the particle toxicity (CLP Regulation).	Particle characteristics instead of intrinsic characteristics.
INSTITUT FÜR BAUSTOFF FORSCHUNG FEhS	Legislation should base on a holistic approach that takes all interactions between different policies into account and balances the 3 items: sustainability, resource efficiency and circular economy	Instead of an increasing the number of regulations and more complexity of legislation, we need a better and unified implementation of EU legislation in member states (with regard to regional differences) and a better application of existing legislation instead of increasing the legal jungle.
	Interface between chemical, product and waste legislation needs to be aligned	EU's rules on end-of-waste are not fully harmonised, making it uncertain how waste becomes a new material and product. Rules to decide which wastes and chemicals are hazardous are not well aligned and this affects the use of secondary raw materials.
WssTP	Water needs to be integrated within other EU policies through water-energy-food-land-resources nexuses.	
	Energy policy must be based on water quantity and quality considerations.	Ensure investment in research, development and market uptake of (a) technologies to reduce the energy use of the water sector, (b) technologies to recover and generate energy from (waste) water and (c) emerging technologies for water-based renewable energies.
	Dealing with multiple policy goals and user needs.	It is necessary to address, at the same time, sectorial policies on water, energy, transport and so on,

		which were inspired by different societal challenges of sustainability and of economic competitiveness.
IMA Europe	Revision of the Guidelines on Environmental and Energy State aid for 2014-2020 (EEAG) should not further affect the competitiveness of energy intensive industries by increasing the financial burden of energy bills.	1. The EEAG shall be consistent with the Energy Taxation Directive (ETD). 2. Eligibility criteria for tax exemptions and reductions in line with the ETD criteria. 3. Aid intensity up to 100% to preserve industry's competitiveness and cumulative impact of legislation should be taken into account.

3.1.7 Eliminating bottlenecks for the transferability of new technologies across European borders

Identified by	Detected issue	Proposed solutions
cefic	Not avoiding double legislations, ambiguity in sectoral legislations (Dec' 12).	Stronger links between sectoral legislations, guidance documents to be issued, restrictions.
Eurometaux	Waste codes are not always harmonized and may vary from one MS to the other. The fight against illegal shipments of waste is suffering from the lack of harmonized approaches Neither the quality treatment is guaranteed. (Feb' 16).	
CEMBUREAU The European Cement Association	Considers Waste Shipment Regulation application a cause of regulatory failure or obstacle (Jan' 15).	
	Differing taxes or fees leading to internal or cross border "shopping behaviour" (Jan' 15).	
	Inefficient use of available capacity in recycling or energy recovery in a neighbouring country or within the country itself (Jan' 15).	

	Regulatory barriers that lead to shipments of waste in spite of facilities existing nearer to the source that could treat the waste in an equivalent or better manner (Jan' 15).	
	Development of waste treatment networks leading to local overcapacities or under-capacities for different types of waste treatment (Jan' 15).	
EURO ALLIAGES	Predictability of the outcomes and international collaboration and harmonization (Euroalliages, May' 16).	
	Acute lack of proper controls with the raise of chemical requirements (Euroalliages, May' 16).	
	High costs of standards (Euroalliages, May' 16).	
	Classification requirements for substances and mixtures, chemical labelling and packaging requirements, risk management and inspections and administrative requirements lead to significant costs for companies (Euroalliages, May' 16).	
	The EU chemicals legislation framework contains gaps and missing links, overlaps and is internally inconsistent (Euroalliages, May' 16).	
	CLP Regulation enforcement is not harmonized across most Member States, transition period is too short to implement new or revised classification criteria (Euroalliages, May' 16).	
INSTITUT FÜR BAUSTOFF FORSCHUNG FEhS	Identification of different status of slag in Europe which may lead to problems concerning actions between countries.	
	The uncertain situation concerning the classification of ferrous slag as waste, non-waste, product or by-product results in serious restrictions in the domestic and cross-border shipment of these materials in Europe.	Uniform definition and classification of ferrous slag in Europe
EUnited European Engineering Industries Association	By June 2018, legislators should agree on the free flow of non-personal data proposal and the electronic communications code. The European Council highlights the importance of ensuring adequate rules on data flows with third countries in trade agreements, without	

	prejudice to EU legislation. Furthermore, negotiations on copyright and on the Digital Content Directive should be pursued as a matter of priority.	
	Cybersecurity. Ensuring more proactive security by design in all digital policies, provide adequate security certification of products and services, and increase our capacity to prevent, deter, detect and respond to cyberattacks.	Commission's cybersecurity proposals should be developed in a holistic way, delivered timely and examined without delay, on the basis of an action plan to be set up by the Council.

3.1.8 Eliminating bottlenecks that prevent the stimulation of investments in new technologies

Identified by	Detected issue	Proposed solutions
cefic	Renewable Energy Directive covering deployment of them (GHG reduction).	
	Clarifying the renovation strategies for nearly zero energy standard buildings (Feb' 16).	
	There should be no priority access granted to certain technologies (Feb' 16).	
CEMBUREAU The European Cement Association	Support a shift to waste heat recovery (WHR) and facilitate this through an efficient and speedy permitting process. Adopt a policy that provides WHR with an equivalent support mechanism as Combined Heat and Power (CHP) and renewable energy, such as Energy Efficiency Certificates as already available in a few Member States (e.g. Italy). WHR should not be disincentivised by tax on generated electricity.	
	Provide access to R&D funds to stimulate breakthrough technologies. For example, making grinding more efficient. Integrate access to and development of public and private financing mechanisms in all policy initiatives allowing a faster market delivery of existing and new technologies.	

EUROFER The European Steel Association / ESTEP	Innovation fund should be financed with allowances form the auctioning cap (Oct' 15).	
	Necessity of increasing the field of sustainability (Mar' 16).	Amendment of the EU directive 2015/2013 for the Fuel Quality Directive (FQD) and RED.
	Limited surpluses in renewable electricity, problem of profitability by technologies using them (Mar' 16).	Assurance of RED compliancy for all fuels derived from industrial process gases.
EUnited European Engineering Industries Association	Interpretation of the Machinery Directive (MD) 2006/42/EC regarding modernization of metallurgical machinery/plant (Sep' 15).	
	Interpretation of the Machinery Directive (MD) 2006/42/EC regarding commissioning as part of the process of "putting into service" of metallurgical machinery/plant	
	Support new forms of entrepreneurship, and stimulate and assist the digital transformation of industries and services. The EU should also explore ways to set up the appropriate structures and funding to support breakthrough innovation.	R&D and investment effort. EU instruments such as the EU Framework Programmes, including Horizon 2020, the European Structural and Investment Funds and the European Fund for Strategic Investments can help achieve this objective.
	Address emerging trends: this includes issues such as artificial intelligence and blockchain technologies, while at the same time ensuring a high level of data protection, digital rights and ethical standards.	To put forward a European approach to artificial intelligence by early 2018 and calls on the Commission to put forward the necessary initiatives for strengthening the framework conditions with a view to enable the EU to explore new markets through risk-based radical innovations and to reaffirm the leading role of its industry.

	Effective and fair taxation system fit for the digital era: it is important to ensure that all companies pay their fair share of taxes and to ensure a global level-playing field in line with the work currently underway at the OECD.	The European Council invites the Council to pursue its examination of the Commission communication on this issue and looks forward to appropriate Commission proposals by early 2018.
EURO ALLIAGES	To ensure via the guidance related to Art. 4 of SEVESO that the exclusion opportunity of Art 4 would be granted in relevant cases (massive form of metal, alloys, slags) with relevant criteria based on risks and not on hazard calculation methods (CE Package – Aug' 15).	
WssTP	Speed up the innovation processes and the harmonisation of the legislation within the regions so as to minimize bottlenecks and barriers that often cause problems or slow down investments or initiatives.	
	Enhancing competition avoiding regulatory bottlenecks.	Before a multi-stage IOPP (Innovation Oriented Public Procurement) procedure, policy makers may establish cooperation among public entities facing similar problems.
EUROPEAN CENTRE ECREF FOR REFRACTORIES	CPR shall remain the regulatory framework for construction products.	
	Distortions in China have been identified and will be dealt with in some future	Renew anti-dumping duties on ceramic tiles from China for another period of 5 years.
	EGA: Aims at removing tariffs on several hundreds of products (i.e. 0% import-export duties). Lack of clear definition for "environmental good". Neglecting environmental impact of goods over their full life cycle.	

	Compliance of "non-EU green goods" with REACH, CPR, safety at work and CSRs, environmental rules. Consistency with the EU trade defence instruments (TDI) policy Technical analysis of ceramic goods being considered for inclusion.	
Glass Alliance Europe	Supporting investment in new technologies. Achieving the EU goals transforms societies, economies and industries and requires investments in new technologies, including the ones for energy transition and digitalization.	A bold EU industrial strategy should support the transition of historical sectors to adapt to the new requirements of the evolving policy targets and regulatory environment, e.g. Paris Agreement.
	Achieving a level-playing field globally. A globally level-playing field needs to be established taking into account the developments in other world regions (e.g. financial backing to the state-owned companies). An EU industrial strategy should ensure adequate policy responses to put European companies in the same footing, in particular regarding the support for exporting EU products and technologies.	The EU should support exports by facilitating overseas financing through the EIB and Export Credit Agencies. The EU should also work with other OECD members to ensure that OECD export credit rules are well adapted to the needs of the EU's exporting industries.

3.1.9 New standardisation methodologies that facilitate continuous production

Identified by	Detected issue	Proposed solutions
cefic	More than 11 years to bring a crop protection.	
	Burden reduction targets should be set under the REFIT Program → complexity, stringency and hazard-base requirements of the legislation (May' 16).	
	Lack of standards, lack of a single market, lack of legal certainty (Oct' 15).	EU harmonization on food contact materials, trade

		secrets and materials in contact with drinking water, e.g.
CEMBUREAU	A strong industry focus on innovative cements and concretes has the potential to respond to the requirements of sustainable and resource-efficient production and construction.	
Eurometaux	CEN/TC350 standards should be considered as the valid reference documents for the assessment of the environmental performances of buildings (Jul' 13).	
EUROFER The European Steel Association	Inefficient use of the existing management instruments (CE Package – Aug' 15)	Use and implementation of ISO 14040 and ISO 26000).
EUnited European Engineering Industries Association	Through the European Air Quality Directive 2008/50/EC, cities and municipalities must ensure that emission limit values for fine particles are only exceeded on a limited number of days per year. This directive has required a limit value for the exposure concentration of PM10 since 2005. From the Beginning of 2015, member states have had to ensure that concentrations of PM2,5 in ambient air do not exceed a specific limit value. This limit will be further reduced in 2020. Therefore, more and more customers have asked for a validation of the PM2.5 absorption performance for sweepers in addition to PM10.	The European sweeper manufacturers in EUnited responded to this demand and together began to modify the test procedure and started to test the PM2.5 absorption performance of their sweepers with the target of testing all current sweeper models available on the European market by IFAT 2018.
	The Machinery Directive 2006/42/EC deals with the safety of robots and provides CE marking requirements for their placing on the EU market. The Directive is currently being evaluated in line with better regulation principles, for a possible revision also to adapt its health and safety requirements to autonomous robots and Artificial Intelligence, in the context of the Internet of Things and Industry 4.0.	Existing European harmonised standards for robots are based on international (ISO) specifications ensuring global accessibility while new standardization activities are being carried out for robots. The SPARC programme also strongly supports standardisation, in close cooperation with the relevant committee in ISO. Ethical, legal, societal and economic issues are also studied under the SPARC programme and it is in this framework that safety standards are being developed.

Glass Alliance Europe	Harmonised standards. The Commission Communication on a "Renewed EU Industrial Policy Strategy" does not address the crucial point of harmonised standards as they are key to complete the Single Market.	The references of harmonised standards must be systematically, without unnecessary delay, published in the Official Journal of the EU under their respective Directives.
ORGALIME	"New Approach to technical harmonisation", better known as the "CE marking system" is threatened to become mired in bureaucracy and to no longer act as a driver of competitiveness. European Commission's over-legalistic interpretation of Regulation 1025/2012 (Article 10-6) triggers a lengthy and sometimes unnecessary bureaucratic scrutiny of candidate Standards. The alleged need to match the Commission's self-instated preconditions for the citation of these standards in the Official Journal of the European Union (OJEU) creates unnecessary delays and is depriving all market operators from the benefit of the presumption of conformity beyond what is reasonable.	Orgalime urgently calls on the European Commission, to take steps to restore the confidence that European manufacturers have started to lose in both the New Approach and the European standardisation system. Besides, as stressed in Regulation 1025/2012 (Art.10.5), such an assessment should be conducted jointly between the European Commission and European Standards Organisations
ORGALIME	Manufacturers of radio equipment are facing an unacceptable situation: a few standards (from more than 200) they need to demonstrate compliance with the Radio Equipment Directive (RED) are available – while 89 standards adopted by ETSI are still awaiting the Commission's scrutiny and approval. This delay is due to new procedures established by the Commission, which we consider overly bureaucratic. This situation is incurring unnecessary supplementary certification costs for manufacturers, as to prove conformity with the Directive, they are obliged to consult a notified body in the absence of harmonised standards for the use of the radio spectrum.	Postpone the application of the Directive for two more years (2019), or to urgently devise a solution to reassure radio equipment manufacturers that they will not face any legal uncertainty over the next two years.

4 IDENTIFICATION OF STANDARDISATION TECHNICAL COMMITTEES

An identification of Technical Committees (TCs) relevant for the sectors at European as well as at international level was conducted in order to evaluate on-going standardization activities in the field of interest.

For the analysis of relevant TCs, data of internal databases as well as data delivered while working directly with the European industrial associations were used. Furthermore, the input of a survey sent to company members of the associations was included in the mapping of the relevant Technical Committees.

Subsequent to the analysis, a classification of the TCs by sector was performed to provide the associations with an easy overview of points of contact in terms of standardization in their field of activity. In addition, the on-going standardization activities of the Technical Committees were identified focusing on activities relevant to the process industry. The full list of TCs and their activities can be found in the annex E, including ISO/IEC groups also linked the intensive industries.

The identification of relevant TCs showed, that many committees have been established at European or international level which are relevant for the process industry. Nevertheless, for the individual sector the number of relevant TCs is rather manageable and the effort of participating is practicable. The associations are both, actively monitoring and participating in the standardization process in the Technical Committees that are most relevant for their sector and their members. Also some companies of the process industry are active in the standardization process.

5 CONSULTATION TO THE EUROPEAN INTENSIVE INDUSTRY

A direct consultation to companies have been undertaken by means of two different online surveys distributed via the industrial associations, one about standardization and the second one about regulatory and other non-technological issues.

5.1 Survey about standardization in the process industry

An online survey addressing companies was developed and distributed among members of the intensive industries´ associations. The purpose of the survey was the identification of the current utilization and awareness of standards and the standardization process of companies within the process industry. Therefore, the questionnaire raised questions about current challenges of companies in the context of standardization, the participation of the process industry at the standardization process and the perception of the linkage between standardization and innovation. The survey is listed in the annex A.

The essence of the developed questionnaire is based on the questionnaire which is widely used by the German Standardization Panel (http://projects.inno.tu-berlin.de/DNP/) , and developed by the Technical University Berlin, but is adjusted and extended to the needs of the HARMONI project by DIN in close consultation with CIRCE.

The final online questionnaire was distributed using several channels. A first way to approach companies of the process industry was parallel to the survey about regulation. The survey was sent alongside the regulation survey by the associations to their members. Secondly the survey was distributed by CCMC among the identified TCs to the companies of the process industry in order to get a large number of replies and practical guidance of companies in the sectors. In total 28 Technical Committees were approached by DIN, which consists of several working groups each. A list of the approached TCs by for this exercise can be found in the annex F. Lastly, the survey was also distributed by UNE, the Spanish Standardization Body to their members.

The collected information was used to evaluate the current situation of the process industry in the context of standardization, to identify the main challenges the sectors are facing and to derive the need for further standardization activities.

5.1.1 Information about participants

In total about 70 companies participated the survey in a way that the answers were useful enough to be analysed. These companies represent the European process industry since the companies participating are located in 21 different countries. Nevertheless, the main countries in the survey are the Netherlands, Germany and Spain. These three countries account for 40% of all answers. From some countries only few answers were received. All sectors are represented in the results, but contain an uneven weight. The ratio in which the different sectors are represented in the survey range from 10 % for the cement sector to 26 % for the engineering sector. Small/medium and large

enterprises are equally included in the survey. Most participating companies have high investments in R&D.

The reasons for the high quantity of engineering companies participating in the survey may be the relevance of standardization for the sector. As most engineering companies are developers of machinery it is highly important for the companies to be familiar with standardization and to contribute to the ongoing process. A comparison between the answers of the engineering sector with the other sectors showed that the engineering sector is pretty much in line with the other sectors, not influencing the conclusions. A comparison between high and low investments in R&D also did not add any more findings.

5.1.2 Usage of standardization documents

The companies state, that they use formal standards (e.g. ISO, EN, DIN) the most widely as type of standardization document, followed by company standards. Formal standards show a clear peak for the category “11 to 100 standards”, but many companies use even more than 100 formal standards. In this regard company standards are balanced. Specifications (e.g. CWA) are not widely used within the process industry and still seem to be a niche market. The left shift clearly indicates a low usage of specification in the industry.

5.1.3 Barriers

In order to identify the main bottlenecks, the survey listed several suggestions for bottlenecks to be ranked by the process industry. Furthermore, a possibility for open answers was offered to identify specific challenges of companies representing the industry. The figure illustrating the results can be found in the annex C. The survey states that all suggested bottlenecks are within a similar bandwidth. While the possible answer range was 1 “No barrier” to 5 ”High barrier”, the average differs between 2.6 and 3.2. A clear trend towards specific bottlenecks is not visible in the data. “Lack of resources to utilize standards” was ranked the lowest bottleneck while “Inconsistencies between standards” were ranked the highest bottleneck. Especially these two bottlenecks plus the “limited access to standards” are varying in the industry. Some barriers only exist for specific sectors while others do not perceive this factor as a bottleneck. Thus, the high spread in the average shows disunity in the industry and that some bottlenecks can only be accounted to certain sectors. A further need for standardization activities is not evident. In average Ceramics, Water and Minerals indicate to have high bottlenecks while Cement and Metals perceive the bottlenecks as low.

Generally, the results indicate that the process industry has enough resources to manage standardization but it perceives the content of standards as challenging. On one hand the “application/interpretation problems” as second highest barrier indicate a need for experienced employees in the field of standardization and difficulties in the application of standards. Since a distinction regarding the kind of standards was not made it is assumable that inconsistencies exist between different kinds of standards. Since the process industry is very multilateral it utilizes numerous and heterogeneous standards. Standards as cross-sectorial document aim to cover the industry as a whole. The application for a specific sector might be challenging.

Regarding the size of companies, it is obvious, that SMEs perceive the bottlenecks as higher as large enterprises. The only two aspects where this does not account are the “quantity of standards” and “inconsistencies between standards”. The strongest difference is evident in the “limited access to standards” indicating a deficit of resources to manage standardization and entrance barriers to the standardization process.

The open answers indicated three main groups of additional bottlenecks. First the presence of delays in the announcement and publication of standards at European level, second the lack of qualified employees which are able to manage the quantity of standardization documents and third existence of outdated standards which are not fully applicable anymore. Another mentioned aspect is the discrepancy between the European and American standardization system which represent a strong trade barrier.

5.1.4 Needs of the process industry

The companies were asked to rate standardization needs in seven topics which are taken from HARMONI’s focus areas. The answers ranged from 0 – “no activities required” to 3 – “new activities urgent”. A neutral answer would have been at 1.5, which was not an option in the poll. The average of all answers is 1.3 which lies in the range of the neutral answer. The averages for the categories range from 0.9 for the “re-use of wastewater” to 1.6 for “LCA methodologies”. Thus, the industry generally only foresees a low intend to initiate new standardization activities. The primarily area for further activities are LCA methodologies. It has to be mentioned that the industry does not agree in the need of further activities. The analysis by sector shows a wide spread between the sectors and even within the sectors. The missing consensus of the process industry makes it difficult to identify a specific area for standardization activities.

5.2 Survey about regulation and other non-technological barriers in the process industry

5.2.1 General information about the survey and participants

The purpose of this survey was to identify key regulatory and other non-technical barriers effecting innovation in the companies within the process industry. Therefore, the questionnaire raised questions about potential regulations, policies and other non-technical issues that may affect the intensive industries when trying to adopt new technologies or invest in new innovation processes. In addition, the questionnaire included some pre-defined ideas on what the problems and solutions could be in order to identify the problems that companies find more relevant or urgent and the solutions that could be more effective to solve the existing problems. A multiple-choice option was allowed in most questions.

Furthermore, the questionnaire offered the possibility to add other type of regulations or problems in addition to the predefined ones, and even allowed open answers so that companies could describe in detail real examples of the challenges they face in their business.

The online survey was distributed by the industrial associations to their members in February 2018 with several follows up afterwards so as to motivate additional companies.

In total 53 companies participated the survey. These companies come from 18 different countries. Nevertheless, the main participating countries in the survey are Germany, Italy, Spain and UK. These four countries account for 57% of all answers. From some countries only few answers were received. All sectors are represented in the results, but contain an uneven weight, also depending on the question they contributed to. Most participant companies are large enterprises being SME less than 30%.

The survey was divided into three main parts. One part dealt with regulatory barriers and another part analysed other non-technological barriers, adding eleven questions in total. A third part tackled particular regulatory barriers in specific sectors, which was only devoted to companies from the chemical, steel and cement sector.

The complete survey sent to companies is shown in Annex B. The full analysis of responses can be also found in Annex D.

5.2.2 Regulations that impact innovation processes

Firstly, the survey analysed how a series of directives may be affecting companies regarding the innovation deployment.

Participating companies agree that the REACH regulation is the most stringent of all, followed by the Industrial Emissions Directive and the EU Emissions Trading system. REACH is found to be the most stringent of all by most participants coming from the chemical, minerals and iron/steel industry.

The survey states that the Landfill directive is the one with most diverging national requirements, followed by the following directives, which are ranked in a very similar way:

1. Industrial Emissions Directive (Directive 2010/75/EU)
2. Energy Efficiency Directive (Directive 2012/27/EU14)
3. Renewables Regulation (Directive 2009/28/EC)

70% of the participating companies answered that the less urgent or problematic directive was the Eco-design directive, followed by the Landfill directive and the Machinery directive, as more than 50% of respondents indicated that no change is needed.

The directive in which companies find more inconsistences is the EU Emissions Trading system. Although at a lesser extent, the Carbon Capture Storage Directive is also found to have lack of coherence.

5.2.2.1 Waste

The survey seeks to explore how relevant some aspects would be in unlocking the potential of certain wastes in Europe. Participants ranked these aspects from irrelevant to relevant or very relevant.

The survey states that all suggested aspects are within a similar bandwidth, as 80% of the companies think that all aspects proposed would be relevant or very relevant for the mentioned purpose. However, aspects like “New systems for understanding the value of waste streams” and “Common classification of waste across EU” are believed to be the most relevant aspects according to participants.

The least effective aspects identified by participants are “Distortion in the waste market” and “Lack of specific data considered (such as composition).”

5.2.2.2 Carbon reuse and valorisation

HARMONI suggests that three regulations are hampering the reuse of CO_2 in Europe, which are the Waste, Renewable Energy and Climate Change regulations. The survey suggested several ways to shape these regulations so as to revalorise CO_2 in the process industry in Europe. Most participants think that addressing the lack of incentives in these directives would be the most effective way to allow the reuse/revalorisation of CO_2. For the Renewable Energy directive, participants ranked with the same weight the interest to address the lack of a single market in Europe, as diverging national requirements are found in this directive.

Finally, participants stressed out that it would be very effective to solve the inconsistences in the Renewable Energy directive and the Climate Change Directive. For the latter, the difficulty to comply with its legal requirements is also a relevant problem for one third of the participants.

5.2.2.3 Waste-water reuse

Three policies are considered as main obstacles to wastewater reuse for industrial purposes, which are Water, Chemicals and Industrial Emissions policies (emissions limits associated with BAT). Participants answered that the compliance with legal requirements of all the three directives was

the biggest problem to waste/water reuse and should be a priority to be addressed. The lack of coherence of the Water directive was also pointed out as a priority issue. The survey also states that both Water and Industrial Emissions policies are too stringent regulations according to one third of the participants, who believe that addressing this aspect would facilitate wastewater reuse.

5.2.2.4 Digitizing industry

60% of participating companies answered that the main bottleneck to the development of data sharing economy is that it takes too much time and it is resource-consuming process. All the *Iron/Steel* companies agree on this statement.

5.2.2.5 Electrification and Power-to-X of the intensive industry

The survey presented five potential policies as obstacles to electrification, and implementation of innovative Power-to-X technologies, as follows: Energy Efficiency Directive, Renewable Energy Directive, New Electricity Market Design Regulation, New Electricity Market Design Directive and BAT.

When asking participants about the main problems to be addressed in these policies, answers were diverse. The lack of a single EU market is one of the main concerns for most of the policies identified. A lack of coherence is identified mainly in the New Electricity Market Design regulation and directive, which should be a priority according to companies. Participants pointed out that the Energy Efficiency directive, the Renewable Energy directive and the BAT are the most stringent regulations. However, the main problem detected with regard to the BAT is that it favours incumbents / existing technologies.

5.2.3 Specific regulation problems to innovation in some sectors

A total number of eight questions were asked to the companies belonging to the chemical sector, namely about different areas affecting their sector in particular.

- 66% of the participating chemical companies believe that the Energy Efficiency Directive is an obstacle to electrification, and implementation of innovative Power-to-X technologies, which requires too much time and its fulfilment is a resource consuming process.
- 75% of respondents find that there is a lack of incentives for the implementation of the Renewable Energy directive, which is an obstacle to deploy new technologies making use of CO2.
- 66% of companies indicated that the Products policy is an obstacle to waste reuse and that the main problem is that there is no alignment between legal deadlines and innovation cycle
- 66% of participants believe that the end-of-life vehicles policy is an obstacle to plastic recycling, being the lack of incentives the main problem encountered.
- All participants answered that the main bottleneck to the development of the European Bio economy is the compliance with legal requirements in the area of Water Management.
- 66% of the participating companies think the legal framework on biocides hampers innovation in new technologies, being the main problems to be addressed the too stringent

regulations and the time problem, meaning there is no alignment between legal deadlines and innovation cycles

Specific questions were also raised to companies of the cement and steel sectors, inviting them to describe their experiences on four topics each by means of open answers. This information will be reported in deliverable D2.3.

5.2.4 Other non-technical barriers to innovation

Regarding management and communication issues, 71 % of participants think that new data protection systems is a relevant or very relevant aspect, supported by 100 % of iron/steel companies and 80 % of Minerals sector.

68 % of the participating companies believe that the decision-making structures within companies is a relevant or very relevant obstruction factor for industrial symbiosis.

Regarding sustainability assessments, around 90% of participants answered that the following aspects are relevant or very relevant in a very similar way:

- Development of LCA software tools and databases to simplify uncertainty analysis
- Low data availability of emissions or several sources of feedstock production.
- Lack of agreements on how to elaborate sustainability assessments for specific product categories within certain sector but the cross-sectorial conformity

The most irrelevant aspect of all is the standardisation need for LCA and LCC, same way as LCA, supported by 28% of participating companies.

Looking into financing area, almost all companies agreed that the most interesting solutions could be to promote grants for end users to trial new technologies, and in the same way, to support in bringing solutions to the highest Technology Readiness Level, meaning the products get launched to the market and operationalized (e.g. financial de-risking for SME/institutes). The less effective solution seems to be the post-project support of demonstrators to support roll-out.

The most attractive idea for companies to improve energy management in their processes is to implement systematic energy management systems. In a second position, around 80% agreed that relevant aspects could be to develop platforms through which sectors could learn from each other as well as to apply ISO 50001 for establishing, implementing and maintaining an energy management system. Instead, the ISO 50002 for energy audits was found the less irrelevant aspect of all.

Finally, 89% of respondents agree that promoting social acceptance of innovations and supporting such innovations from lab to application is a relevant or very relevant aspect to be considered in HARMONI.

6 CONCLUSIONS

The intensive industries face a vast number of regulatory barriers and other non-technological issues. All the industrial associations conduct on a regular basis deep analysis of their challenges towards regulation. Then, the analysis of the most recent documents issued by them is instrumental to develop a clear overview of what the intensive industries confront with in this domain. The outcome of this exercise sets up a mapping analysis of what the main priorities and concerns of the intensive industries are, including overlaps and main messages. Mainly, the following two different elements will be further considered in the next steps of the HARMONI Project:

- The importance of analysing at the same time regulatory frameworks from both approaches, content-wise (technical descriptions) and procedural-wise (methodology used to develop the official documents). It is instrumental to analyse the regulatory environment from a more holistic way, trying to improve the procedure of those documents at the same time that specific technical requirements are more clear and adapted to the industrial requirements. Both aspects will be covered in subsequent tasks and WPs within the HARMONI project, and recommendations will be proposed to overcome those barriers.
- The number of similar challenges illustrates the need of a holistic analysis of the consequences in several sectors at the same time. This urges a broader life-cycle thinking about regulation and other non-technological barriers.

Furthermore, the interaction with companies coming from the intensive industries also shows a very diverse number of barriers. The responses of the two detailed surveys have revealed scattered opinions about regulation and other technological barriers. In this exercise, the answers came from individuals, experts from the companies which were not necessarily so familiar with regulation and standardisation matters, as those that are part of legal teams. In most of the cases, the contacted and involved experts in this exercise are mainly innovation managers with more technical oriented profiles. Definitively, as already underlined in D2.1, there is a clear gap between the technical experts and the regulatory managers, which might explain the diversity of responses due to the different interpretation of the regulatory consequences in their respective companies. Moreover, the number of responses do not allow a common position per sector. This fact also exemplifies the difficulty of evaluating and quantifying the impacts of regulatory and other non-technological barriers.

Lastly, the standardisation environment seems to be rather well known in view to the responses collected but still not fully used. Therefore, there is room for improvement in the awareness of the benefit standards might bring to companies. Additionally, it is encouraged to promote some new approaches which could boost a larger use of standards. Both, how to maximise this very useful tool for innovation and the best ways to improve the standardisation process are invigorated. To this end, the TCs and their activities have been scanned, including other ISO/IEC bodies. This work will be further developed, mainly, in WP4.

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8 ANNEXES

ANNEX A: Standardisation Survey for companies

Name

E-mail address

Company's name

Company information – Country

Please indicate the type of your company

- SME - Small and Medium Enterprise
- Large Enterprise

We might need to contact you to clarify some of your answers. Please state your preference below:

- Yes. I am available to be contacted.
- No. I would rather not to be contacted.

How much of your budget did you dedicate to R&D and innovation activities?

0 – 0.75%.

0.76 – 1.25%.

1.26 – 2.00%.

2.01 – 2.75%

2.76 – 3.5%

> 3.5%

Sector

Cement, Ceramics, Chemical, Engineering, Minerals, Non-Ferrous metals, Iron / Steel, Water, Copper, Petrochemicals, Glass, Pulp & Paper, Other.

Chemicals

Do you see a standardization need for sustainable chemicals from primary and secondary raw materials?

- Feedstock [yes/no]
- Production [yes/no]
- Products / Labelling [yes/no]
- Recycling [yes/no]

If you answered yes, some activity is required: please, specify which standardization need.

Comment:

RESULT-driven: Status quo and challenges

Which specific area of activities or department in your company do you work in?

Comment:

Please indicate how aware you are of relevant standardization documents in your field of activity?

0 (not aware)	1	2	3	4 (fully aware)

How many standards did your company use in 2017? - If some does not apply to your company, you can skip the point.

	–1-10	–11-100	101-1000	>1000
Formal standards (e.g. DIN, EN, ISO, IEC, ETSI ES)				
Specifications (e.g. DIN SPEC or CWA)				
Company standards				

Please rate the following barriers or bottlenecks you observed while using standards [1= 1 = No barrier; 5 = A high barrier]

Topic not covered by standards	
Surplus of standards	
Inconsistencies between standards	

Inaccurate standards	
Unaware of existing standards	
Limited access to standards	
Lack of resources to utilize standards	
Application/Interpretation problems	
Other	

Other barriers or bottlenecks

Comment:

Which areas require more standardization activities?

	0 (No activities required)	1	2	3	4 (New activities urgent)
Re-use of wastewater for industry					
Re-use of waste for industrial/energy purpose					
Recovery of valuable materials, metals and minerals					
LCA methodologies to compare different production routes					
LCA methodologies for cradle-to-cradle/crave of materials					
Production of renewable fuels from CO2					
Other: _____					

Other areas.

Comment:

PROCESS-driven: Participation

Please indicate the way you have been involved in the standardization process.

Technical Committee: e.g. Development of standards	

Coordination Group: e.g. strategic standardization issues	
Other way of participation	
No participation	

If you signed some of the options above, please describe it / them briefly and how many committees your company was active in:

Comment:

Please indicate in how many committees of the following institutions your area of activities was active in 2017:

	1	2 - 5	6 – 10	>10
National standardisation bodies (DIN, BSI, AFNOR, etc.)				
CENELEC (European Committee for Electrotechnical Standardization)				
ETSI (European Telecommunications Standards Institute)				
ISO (International Organization for Standardization)				
IEC (International Electrotechnical Commission)				

Please indicate your advantages from participating in the standardization process.

Comment:

If you participated in the development of standards, please rate the following barriers or bottlenecks you observed in the standardisation process [1 = No barrier; 5 = A high barrier].

Time to market / velocity of process	
Missing resources to participate	
Participation costs too high	
Missing information about the process	
No access to the standardization process	
Benefits of participation unclear	
Irrelevant for my organisation	
Too complex decision-making process	

IPR (intellectual property right) issues / drainage of know how	

Please name suggestions for improvement or new ideas for the standardisation process that could support your organization.

Comment:

Which skills are important for you for successfully dealing with the standardization process?

	0 (not important)	1	2	3	4 (Very important)
Knowing standardisation processes					
Experience in the industry (5+ years)					
Academic background					
(Project-) Management					
Leadership skills and methods					
Digital skills					
Other: _____					

Do you agree on standardization being a facilitator for your innovation process?

-3 (Strongly disagree)	-2	-1	0 (Neutral)	+1	+2	+3 (Strongly agree)

ANNEX B: Regulation and other non-technological barriers survey for companies

IMPORTANT NOTE: Please be aware that all the information provided by the survey participants is treated at the highest level of confidentiality. Thus, company names (not mandatory to be filled in) and exploitable results that will be gathered in the survey will remain hidden in any of the reporting documents.

This survey aims at collecting information from a maximum number of EU industrial stakeholders. We appreciate your interest and encourage you to provide us information on:

a) Key regulatory and other non-technological issues affecting innovation.
b) How you suggest to successfully deal with them.

The survey is divided into three parts:

1. Specific problems in your sector.
2. Regulatory issues that may affect (or not) the whole set of intensive industries (not only affecting your sector).
3. Other non-technological barriers.

When you finish, please push “Send” and your very valuable input will be received. It is not mandatory to fill all the questions in. However, we would be grateful if you could share as much as possible.

We express our gratitude for your time, your expert views and efforts.

HARMONI Team.

E-mail address

Name

Company's name

Country

Please indicate the type of the company:

- SME – Small and Medium Enterprise
- Large Enterprise

We might need to contact you to clarify some of your answers. Please state your preference below:

- Yes. I am available to be contacted.
- No. I would rather not to be contacted.

How much of your budget did you dedicate to R&D and innovation activities?

0 – 0.75%

0.76 - 1.25%

1.26 - 2.00%

2.01 – 2.75%

2.76 – 3.5%

> 3.5%

Please select the industrial sector of your company

Cement, Ceramics, Chemical, Iron / Steel, Non-Ferrous metals, Minerals, Engineering, Water, Copper, Pulp&Paper, Glass, Refining, Other.

1. SECTOR

Attending to the sector the repliers pick, they will be addressed to some specific questions that their IA or representative prepared for them:

1.1. CEMENT

Do procedures for access to public funding and combination of national and EU funding create impediments for your innovation projects? Why?

Is public acceptance or citizen concerns an issue that negatively impacts your innovation project?

Do national permitting procedures pose barriers? Why?

Is European or national waste legislation sufficiently adapted to accommodate industrial symbiosis in your sector and does it sufficiently promote the uptake of alternative fuels/raw materials? Why?

1.2. CHEMICAL

1. Electrification and Power-to-X of the chemical industry

Do you consider the following policies as obstacles to electrification, and implementation of innovative Power-to-X technologies?

- Energy Efficiency Directive
- Renewable Energy Directive
- New Electricity Market Design regulation
- New Electricity Market Design Directive
- ETS
- BAT
- Other Please specify [….]

If so, what type of problems did you encounter?

- Compliance with legal requirements
- Too stringent regulations
- Time: no alignment between legal deadlines and innovation cycle
- The regulations favors incumbents/existing technologies
- Diverging national requirements / lack of EU single market
- Inconsistencies /lack of coherence
- Lack of incentives
- Lack of information/information gaps
- Time: too much time/resource consuming process
- Overall EU long-term strategy w.r.t. to renewable energies
- Other

Please, explain the most remarkable case:

If you marked "Other" above, please provide us which regulation/s you refer to.

2. CO2/CO as feedstock – And other industrial streams for production of advanced fuels and/or chemicals, materials.

Do you consider the following policies as obstacles to deploying new technologies making use of CO_2?

- Waste [yes/no]
- Renewable Energy [yes/no]
- Climate Change (e.g. ETS) [yes/no]
- Other [yes/no]

If so, what type of problems did you encounter?

- Compliance with legal requirements [yes/no]
- Too stringent regulations [yes/no]
- Time: no alignment between legal deadlines and innovation cycle [yes/no]
- The regulations favors incumbents/existing technologies
- Diverging national requirements / lack of EU single market [yes/no]
- Inconsistencies /lack of coherence [yes/no]
- Lack of incentives [yes/no]
- Lack of information/information gaps [yes/no]
- Time: too much time/resource consuming process [yes/no]
- Other [yes/no] Please specify [….]

Please, explain the most remarkable case:

If you marked "Other" above, please provide us which regulation/s you refer to.

3. Reuse / Recovery of Waste for industrial production and / or energy use (consumer and / or industrial waste)

Do you consider the following policies as obstacles to waste re-use and/or recovery?

- Waste [yes/no]
- Chemicals [yes/no]
- Products [yes/no]
- Energy [yes/no]
- Other [yes/no]

If so, what type of problems did you encounter?

- Compliance with legal requirements [yes/no]
- Too stringent regulations [yes/no]
- Time: no alignment between legal deadlines and innovation cycle [yes/no]
- The regulations favors incumbents/existing technologies
- Diverging national requirements / lack of EU single market [yes/no]
- Inconsistencies /lack of coherence [yes/no]
- Lack of incentives [yes/no]
- Lack of information/information gaps [yes/no]
- Time: too much time/resource consuming process [yes/no]
- Other [yes/no] Please specify [….]

Please, explain the most remarkable case:

If you marked "Other" above, please provide us which regulation/s you refer to.

4. Recycling of Plastic containing materials

Do you consider the following policies as obstacles to plastic recycling?

- End-of-waste criteria[yes/no]
- Other requirements under Waste legislation [yes/no] Please specify [….]
- End-of-life vehicles [yes/no]
- Other [yes/no]

If so, what type of problems did you encounter?

- Compliance with legal requirements [yes/no]
- Too stringent regulations [yes/no]
- Time: no alignment between legal deadlines and innovation cycle [yes/no]
- The regulations favors incumbents/existing technologies
- Diverging national requirements / lack of EU single market [yes/no]
- Inconsistencies /lack of coherence [yes/no]
- Lack of incentives [yes/no]
- Lack of information/information gaps [yes/no]
- Time: too much time/resource consuming process [yes/no]
- Other [yes/no]

Please, explain the most remarkable case:

If you marked "Other" above, please provide us which regulation/s you refer to.

5. Reuse of different grades of Wastewater for industrial purposes

Fostering the production of renewable biological resources and the conversion of these resources, residues, by-products and side streams into value added products.

Do you consider the following regulatory areas as bottlenecks to the development of the European bioeconomy?

- Water [yes/no]
- Chemicals [yes/no]
- Industrial Emissions / Emissions limits associated with BAT [yes/no]
- Other [yes/no]

If so, what type of problems did you encounter?

- Compliance with legal requirements [yes/no]
- Too stringent regulations [yes/no]
- Time: no alignment between legal deadlines and innovation cycle [yes/no]
- The regulations favors incumbents/existing technologies
- Diverging national requirements / lack of EU single market [yes/no]
- Inconsistencies /lack of coherence [yes/no]
- Lack of incentives [yes/no]
- Lack of information/information gaps [yes/no]

- Time: too much time/resource consuming process [yes/no]
- Other [yes/no]

Please, explain the most remarkable case:

If you marked "Other" above, please provide us which regulation/s you refer to.

6. Bioeconomy - fostering the production of renewable biological resources and the conversion of these resources, residues, by-products and side streams into value added products

Do you consider the following regulatory areas as bottlenecks to the development of the European bioeconomy?

- End-of-waste criteria
- Collection of bio-waste
- Other requirements under Waste legislation: Please specify [….]
- Renewable Energy [yes/no]
- Climate Change (e.g. ETS)
- Plastics
- Water Management
- Nature Directives (e.g. Habitats, Birds)
- Other

If so, what type of problems did you encounter?

- Compliance with legal requirements
- Too stringent regulations
- Time: no alignment between legal deadlines and innovation cycle
- The regulations favors incumbents/existing technologies
- Diverging national requirements / lack of EU single market
- Inconsistencies /lack of coherence
- Lack of incentives
- Lack of information/information gaps
- Time: too much time/resource consuming process
- Other

Please, explain the most remarkable case:

If you marked "Other" above, please provide us which regulation/s you refer to.

7. Digitizing industry

Sharing data, openness of data, data search, data security.

Which regulatory/standardization areas could you identify as bottlenecks to the development of a data sharing economy?

- Designing the certification measures
- Defining and implementing standards
- Text and data mining rules
- Copyright legislation
- Lack of information/information gaps [yes/no]
- Time: too much time/resource consuming process [yes/no]
- Other [yes/no] Please specify [….]

Please, explain the most remarkable case:

If you marked "Other" above, please provide us which regulation/s you refer to.

8. Biocides - eliminating bottlenecks that prevent the stimulation of investments in new technologies

Do you consider the legal framework on biocides hampers innovation in new technologies? If so, what type of problems did you encounter?

- Compliance with legal requirements
- Too stringent regulations
- Time: no alignment between legal deadlines and innovation cycle
- The regulations favors incumbents/existing technologies
- Diverging national requirements / lack of EU single market
- Inconsistencies /lack of coherence
- Lack of incentives
- Time: too much time/resource consuming process

- Other. Please specify [….]

Please, explain the most remarkable case:

If you marked "Other" above, please provide us which regulation/s you refer to.

1.3. STEEL

What aspects of REACH are most problematic for you (e.g. in registering your products, etc.)?

Do you have problems defining the calculation point of recycling?

Is landfill space an issue for your company? If yes, please explain why:

What is your current water reuse level?

9. REGULATION

9.1. Regulations that impact innovation processes

Please, indicate how these Directives affect your company regarding the innovation deployment

Landfill Directive (Council Directive 99/31/EC)	☐ No change is needed ☐ Too stringent regulations ☐ Diverging natural requirements ☐ Inconsistencies and lack of coherence
EU Emissions Trading System (Directive 2003/87/EC)	See as above
Renewables Regulation (Directive 2009/28/EC)	See as above
Industrial Emissions Directive (Directive 2010/75/EU)	See as above
Machinery Directive (2006/42/EC)	See as above
Ecodesign Directive (Directive 2009/125/EC)	See as above
Energy Efficiency Directive (Directive 2012/27/EU14)	See as above
REACH Regulation	See as above
Water Framework Directive (Directive 2000/60/EC)	See as above
Internal Energy Market (Regulation 714/2009 and Driective 2009/72/ED)	See as above
Carbon Capture Storage Directive (2009/31/EC)	See as above
Other	

Did you try to expand your business on national or international scale(e.g. increasing the number of products and services, buying new machinery, building…)? If yes, what regulatory barriers did you deal with while doing so (market regulation, directives implemented differently on inter/national level, BREFs….)?

If you marked “Other” above, please provide us which regulation/s you refer to.

9.2. WASTE REGULATION

Please, estimate how relevant the following aspects would be in unlocking the potential of certain wastes in the EU in regards of your company / sector.

	IRRELEVANT	RELEVANT	VERY RELEVANT
Distortion in the waste market			
Establish mandatory certification schemes for recyclers of certain waste streams			
Recycling and durability of products: harmonized implementation throughout Member States			
New systems for understanding the value of waste streams			
Common classification of waste across EU			
Regulatory barriers that lead to shipments of waste in spite of solutions existing closer to the source.			
Lack of specific data considered (such as composition)			

What is your greatest challenge when trying to recycle materials?

9.3. Carbon (CO_2/CO and other industrial steams) as feedstock

How would you shape the following policies so as to reuse/revalorize CO2? More than one may apply:

Do you consider the following policies as obstacles to deploying new technologies making use of CO_2? Please, select all the desired options

- Waste [yes/no]
- Renewable Energy [yes/no]
- Climate Change (e.g. ETS) [yes/no]
- Other [yes/no] Please specify [….]

If so, what type of problems did you encounter?

2. Compliance with legal requirements [yes/no]
3. Too stringent regulations [yes/no]
4. The regulations favours incumbents / Existing technologies

5. Diverging national requirements / Lack of EU single market [yes/no]
6. Inconsistencies / Lack of coherence [yes/no]
7. Lack of incentives [yes/no]

Please indicate your most remarkable example

If you marked “other” above, please provide us which regulation/s you refer to

9.4. Reuse of different grades of wastewater for industrial purposes

Do you consider the following policies as obstacles to waste-water reuse?

- Water [yes/no]
- Chemicals [yes/no]
- Industrial Emissions / emissions limits associated with BAT [yes/no]
- Other [yes/no] Please specify [….]

If so, what type of problems did you encounter?

1. Compliance with legal requirements [yes/no]
2. Too stringent regulations [yes/no]
3. The regulations favours incumbents/existing technologies
4. Diverging national requirements / lack of EU single market [yes/no]
5. Inconsistencies /lack of coherence [yes/no]
6. Lack of incentives [yes/no]

Please indicate your most remarkable example

If you marked “other” above, please provide us which regulation/s you refer to

9.5. Digitizing industry

Which regulatory/standardization areas could you identify as bottlenecks to the development of a data sharing economy?

- Designing the certification measures
- Defining and implementing standards
- Text and data mining rules
- Copyright legislation
- Lack of information/information gaps [yes/no]
- Time: too much time/resource consuming process [yes/no]
- Other [yes/no] Please specify [….]

Please indicate your most remarkable example

9.6. Electrification and Power-to-X of the intensive industry

Do you consider the following policies as obstacles to electrification, and implementation of innovative Power-to-X technologies? If so, what type of problems did you encounter? - Scroll right and left to have access to all responses.

Do you consider the following policies as obstacles to electrification, and implementation of innovative Power-to-X technologies?

- Energy Efficiency Directive
- Renewable Energy Directive
- New Electricity Market Design regulation
- New Electricity Market Design Directive
- BAT
- Other Please specify [….]

If so, what type of problems did you encounter?

- Compliance with legal requirements
- Too stringent regulations
- Time: no alignment between legal deadlines and innovation cycle
- The regulations favours incumbents/existing technologies
- Diverging national requirements / lack of EU single market
- Inconsistencies /lack of coherence

- Lack of incentives
- Lack of information/information gaps
- Time: too much time/resource consuming process
- Overall EU long-term strategy w.r.t. to renewable energies
- Other Please specify [….]

Please indicate your most remarkable example

If you marked “other” above, please provide us which regulation/s you refer to

10. OTHER NON-TECHNOLOGICAL BARRIERS

10.1. MANAGEMENT AND COMMUNICATION

Please, estimate how helpful the following management and communication approaches would be in speeding up the uptake of technologies in the sake of your company/sector.

	IRRELEVANT	RELEVANT	VERY RELEVANT
Decision-making structures within companies are an obstruction factor for Industrial Symbiosis			
New data protection systems			
Other			

If you marked "other" above, please provide us which regulation/s you refer to

10.2. SUSTAINABILITY ASSESSMENTS

Please, estimate how helpful the following sustainable assessment approaches would be in speeding up the uptake of technologies in the sake of your company/sector.

	IRRELEVANT	RELEVANT	VERY RELEVANT
Low data availability of emissions or several sources of feedstock production			
Development of LCA software tools and databases to simplify uncertainty analysis.			
Lack of agreements on how to elaborate sustainability assessments for specific product categories within certain sector but the cross-sectorial conformity.			
Standardization need for SLCA and LCC, same way as LCA.			
Other			

If you marked "other" above, please provide us which regulation/s you refer to

10.3. FINANCING

	IRRELEVANT	RELEVANT	VERY RELEVANT
Grants for end users to trial new technologies			
Support in bringing solutions to TRL level 9, e.g. financial de-risking for SME/institutes.			
Post-project support of demonstrators to support roll-out			
Differing taxes or fees leading to internal or cross border "shopping behaviour"			
Other			

If you marked "other" above, please provide us which regulation/s you refer to

10.4. ENERGY MANAGEMENT

	IRRELEVANT	RELEVANT	VERY RELEVANT
Systematic energy management			
To develop platforms through which sectors can learn from each other			
ISO 50001 for establishing, implementing and maintaining an energy management system			
ISO 50002 for energy audits			
Other			

If you marked "other" above, please provide us which regulation/s you refer to

10.5. TRAINING, SKILLS, AND PUBLIC ACCEPTANCE

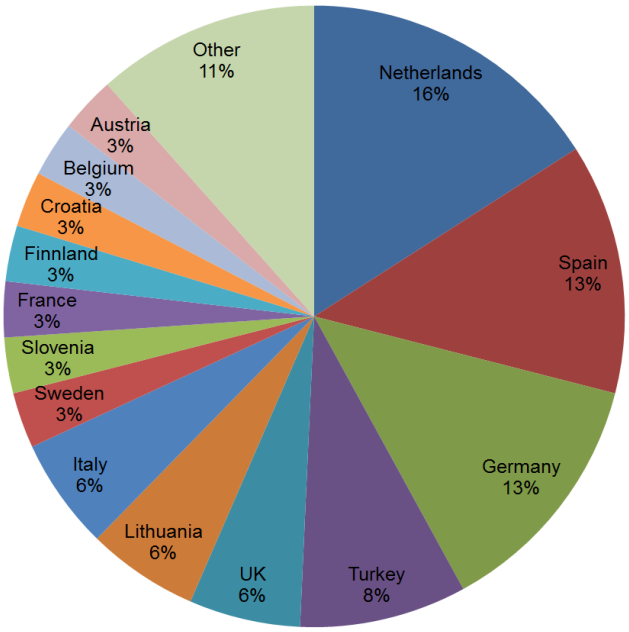
Please, estimate how helpful the following training, skill and public acceptance approaches would be in unlocking potential technologies in the sake of your company/sector.

	IRRELEVANT	RELEVANT	VERY RELEVANT
Promote skills programs to educate early-stage researches with new skill sets and symbiosis of experimental and theoretical research			
Promote social acceptance of innovations and supporting such innovations from lab to application.			
The BREF´s targets are unrealistic and might create misleading messages to the society			
Other			

If you marked “other” above, please provide us which regulation/s you refer to

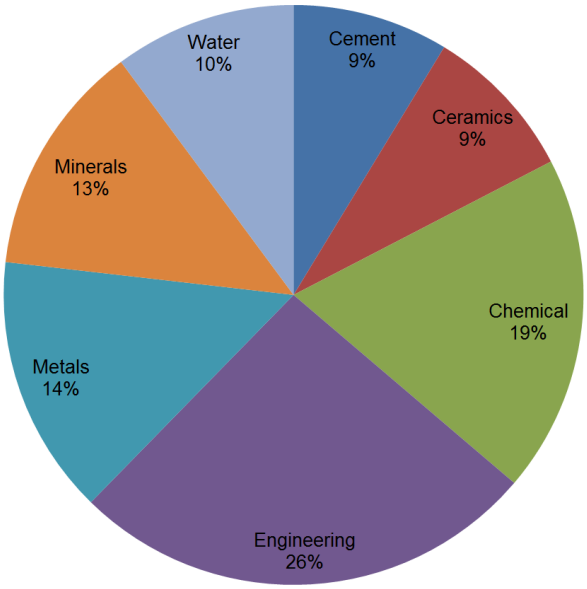
ANNEX C: Results of standardisation survey

Nationality of participants



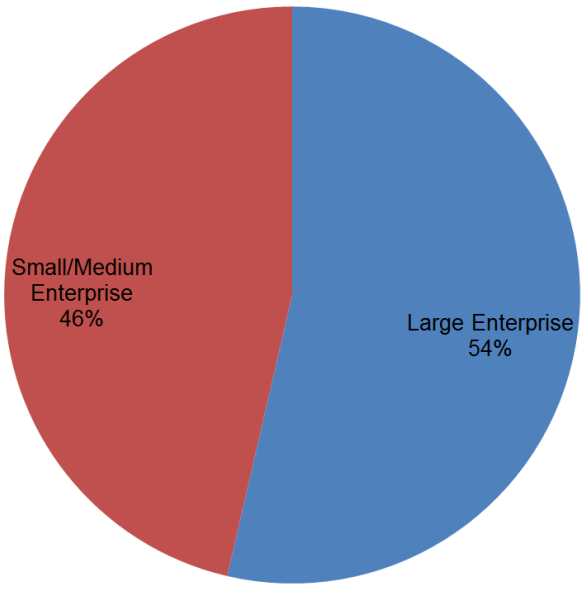
- Total number of participants: 69 companies from 21 countries.
- Many participating companies are from Netherlands, Germany and Spain.
    - Netherlands has relatively to its size the highest answering rate.
    - The three countries account for more than 40% and thereby have a strong influence on the results.
- Many countries are underrepresented by only contributing few answers.
    - An analysis per country is unfeasible due to the imbalance of the answering rate.
- The survey is not representative. It is intended to get a rough picture.

Sector of participants



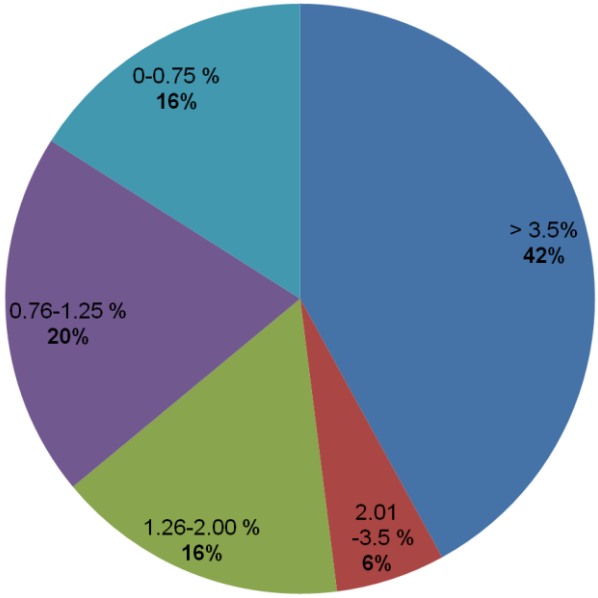
- All sectors of the process industry are incorporated within the survey (Metals includes steel and non-ferrous sector).
- Most participants are from the engineering sector.
- Cement and ceramics each are represented the least with only 9%.
- An analysis per countries is only feasible to a certain extend. For Engineering and Chemical an analysis can make sense but for Cement, Ceramics and Water it is unfeasible due to the low number of participating countries.

Type of participants



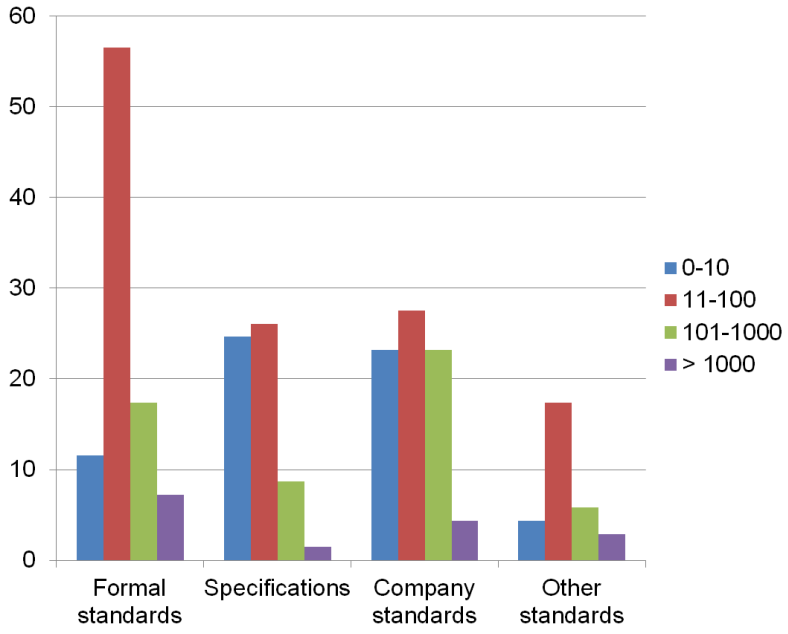
- High equality between large and small/medium sized enterprises answering the survey.
- An analysis by type is feasible due to the high aggregation.

Investments in R&D



- Most of the participated companies have high investments in R&D

Usage of standardization documents

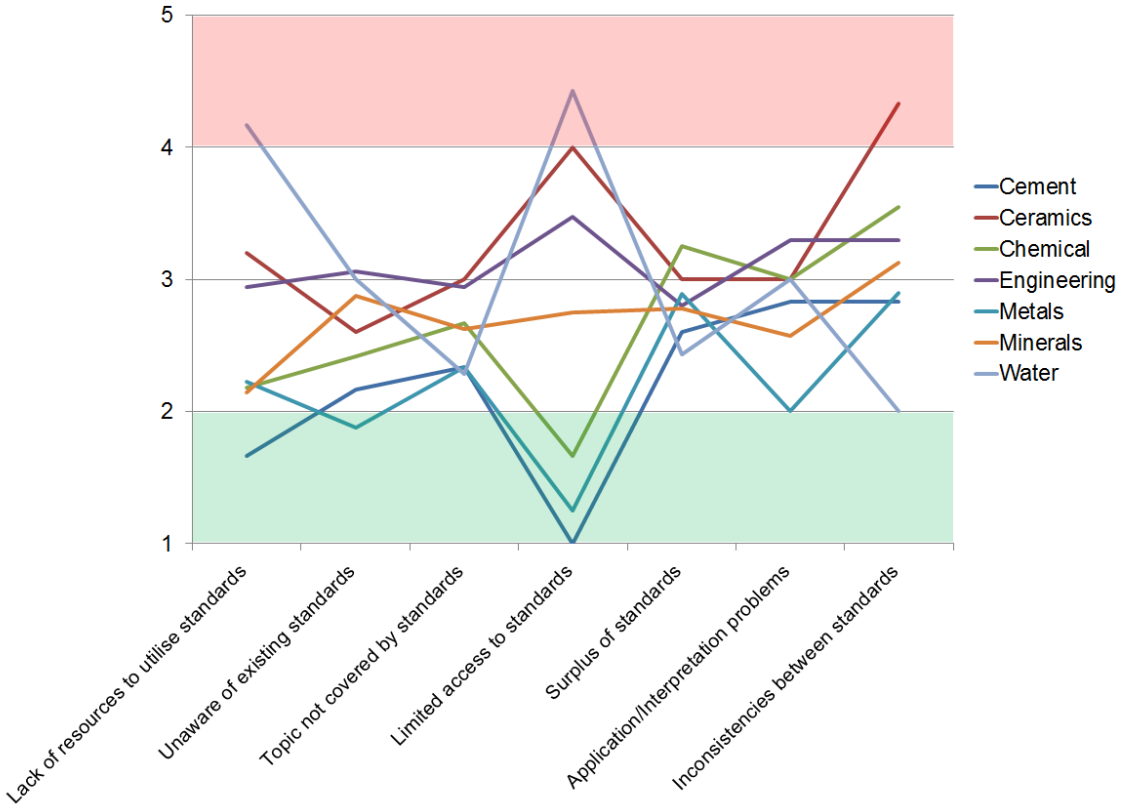


- Ratio of overall participants (y-axis) vs type of standard, divided by number of standards used in company
- Formal standards are used the most widely throughout the process industry.
    - The peak in the middle indicates a high usage of formal standards.

- Most companies use between 11 and 100 standards.

- Company standards are the second highest used type of standardization document.
  - The usage of company standards is very balanced throughout the industry.
  - Company standards are important to the industry but not as widely used as formal standards.
- Specifications still seem to be a niche market.
  - The left shift indicates a low usage of specification in the industry.

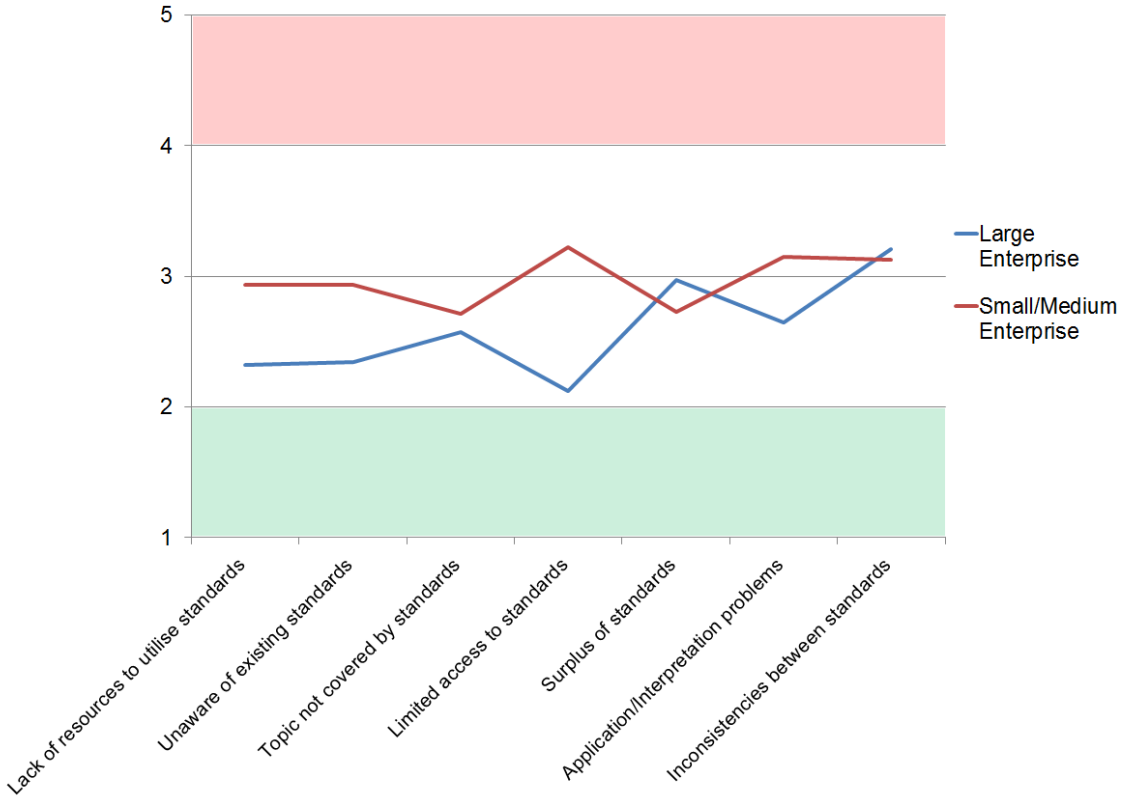
Bottlenecks by sector



- Average rating (y-axis) of the bottlenecks (x-axis), divided by sector
- The answers possible ranged from 1 "No barrier" to 5 "High barrier".
- The spread of the mean between the different bottlenecks is rather small.
  - None of the bottlenecks show a clear importance to the industry.
  - All bottlenecks have a medium mean around 3.
- "Lack of resources to utilize standards" was ranked the lowest bottleneck.
- "Inconsistencies between standards" were ranked the biggest bottleneck.
- "Application/interpretation problems" of standards is the second highest barrier.
- A need for further standards is not identified.

- Analysis by sector shows differences within the industry.
  - Ceramics, Water and Minerals indicate to have high bottlenecks in average.
  - Cement and Metals indicate to have low barriers in average.
- "Limited access to standards", "Lack of resources to utilize standards" and "inconsistencies between standards" are perceived very differently as barriers in the process industry
  - The high spread in average shows disunity.
  - The barriers only exist for specific sectors. Some problems can only be accounted to certain sectors

Bottlenecks by type



- Average rating (y-axis) of the bottlenecks (x-axis), divided by sector
- SMEs indicate to face higher barriers in the application of standards in average.
  - Especially in the awareness of existing standards, the access to standards and resources they have a wide difference to large enterprises.
  - Also in total SMEs indicate higher bottlenecks than large enterprises.

Other bottlenecks (Statements are cited)

EU policy related
• Solve the delay in candidate harmonised standards non-cited in OJEU.
• Delays in harmonisation
• Inadequate or Inappropriate EU Directives
• R&D skills of governmental employees

• Formalistic European market legislation is superseding technical necessary rules for construction safety.
• Inflexibility of EC in allowing flexible interpretation
Information flow
• As association of a sector the standards are especially used by them
• DG GROW holds back the publication of more than 200 EN standards
Discrepancies
• Discrepancies between EU/US and EU-non-EU countries
• stakeholders trust and acceptance
• Misunderstandings and inconsistency between standards (products vs execution or design; selectivity of standards: EC2 vs EC 7 eg)
Resources
• HR problems - not enough specific knowledge.
• There is a surplus of standards with little overview of how they relate to each other
Content of standards
• Outdated (?) standards.
• Links in standards to others standards going in circle.
• Some (new) European standards refer to old techniques, there are not applicable for the Dutch situation anymore.
• Standards are needed for standard material. New innovative products are not fitting in existing standards.
• some standards are contradicting each other
• Often, standards are developed with no clear benefit for a sector
• uncertainty about applicability or evolution of sideward standards (eg quality of welding in rough use of steel in design)
• Some standards are rather old
• Too costly.
• extremely high copy right cost

Areas for further standardization activities

Area	Need for further standards [average]
Re-use of wastewater for industry	0,9
Production of bio-based products	1,2
Re-use of waste for industrial/energy purpose	1,3
Recovery of valuable materials, metals and minerals	1,4

Production of CO2/CO-based products	1,4
LCA methodologies for cradle-to-cradle/crave of materials	1,6
LCA methodologies to compare different production routes	1,6

- The answers possible ranged from 0 “no activities required” to 3 “new activities urgent”.
- The general need for further standardization activities is rather low in average.
- Standardization activities most urgent in LCA methodologies.
- Need for new standardization activities in Re-use of wastewater is the lowest.
- No consensus in areas in process industry.
    - The analysis divided by sector shows a wide spread between the sectors (data not shown).
    - Every sector foresees the importance of further activities in different areas.

ANNEX D: Results of the Regulation and other non-technical barriers survey

General Information about survey and participants

As a whole, the survey consists of 50 questions divided in 6 sections. Sections 1, 5 and 6 are devoted to all sectors whereas sections 2, 3, and 4 were created to include specific questions to the companies from the cement, chemical and steel sectors to address specific problems affecting these sectors. The general structure of the survey is as follows:

1. General information: 6 questions
2. Cement: 4 questions
3. Chemical
    - Electrification and Power-to-x (3 questions)
    - Co_2/CO as feedstock: 3 questions (3 questions)
    - Reuse / Recovery of waste (3 questions)
    - Recycling of Plastics (3 questions)
    - Reuse of different grades of wastewater for industrial purposes (3 questions)
    - Bioeconomy (3 questions)
    - Digitizing Industry (2 questions)
    - Biocides (2 questions)
4. Steel: 4 questions
5. Regulation (applicable to all sectors)
    - Regulations that impact innovation processes (3 questions)
    - Waste regulation (3 questions)
    - Carbon reuse and valorisation (3 questions)
    - Reuse of different grades of wastewater for industrial purposes (3 questions)
    - Digitising Industry (2 questions)
    - Electrification and Power-to-X of the intensive industry (3 questions)
6. Other non-technological barriers (applicable to all sectors)
    - Management and communication (2 questions)
    - Sustainability Assessments (2 questions)
    - Financing (2 questions)
    - Energy Management (2 questions)
    - Training, skills and Public Acceptance (2 questions)

In general, the formula of three questions per topic implies a main question and then the request for an explanation of a related remarkable case and the request for further information in case none of the pre-defined responses applies. The formula of two questions addresses only the first two items described.

Companies participating in this survey are identified by means of four categories.

1. Country

2. Type of company (Large enterprise or SME)
3. Budget dedicated to R&D and innovation
4. Sector

A total number of 53 companies participated in the survey coming from 18 different countries. The following table summarizes the **participation per country**, which concludes that:

- Germany has the highest answering rate with 10 responses (19%), which influences the results.
- Apart from Italy, Spain and UK with 6, 5, 4 responses respectively, only a few answers were received from most of countries (Austria, France, The Netherlands with 3 responses and the rest of countries with just 1 or 2).

Countries	No. companies	Countries	No. companies	Countries	No. companies
Austria	3	Hungary	1	Slovenia	2
Belgium	2	Italy	6	Spain	5
Croatia	1	Lithuania	1	Sweden	1
Finland	2	Luxemburg	1	The Netherlands	3
France	3	Poland*	1	Turkey	2
Germany	11	Slovakia	1	UK	4
Global*	3				

Table 2: Companies participating in the survey per country

Looking at the **size of the participating companies,** more than 70% are large enterprises (38). Less than 30% are SMEs (15).

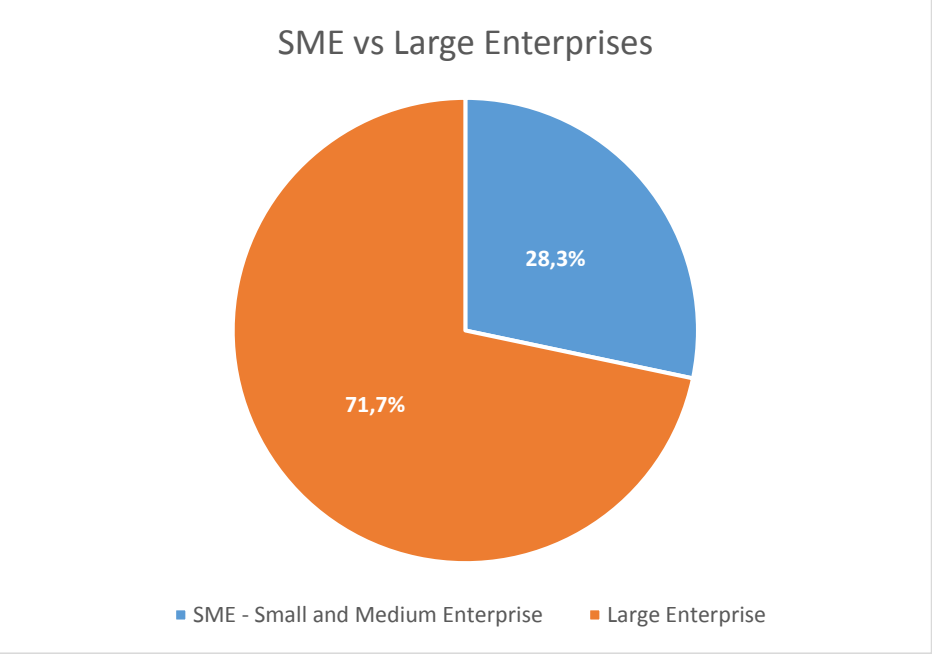


Figure 2: Size of companies participating in the regulation and other non-technological survey

Considering the **budget that these companies dedicate to R&D**, almost 29% of them dedicate more than 3.5% of their budget to R&D and innovation activities. 45% dedicate less than 1,25%.

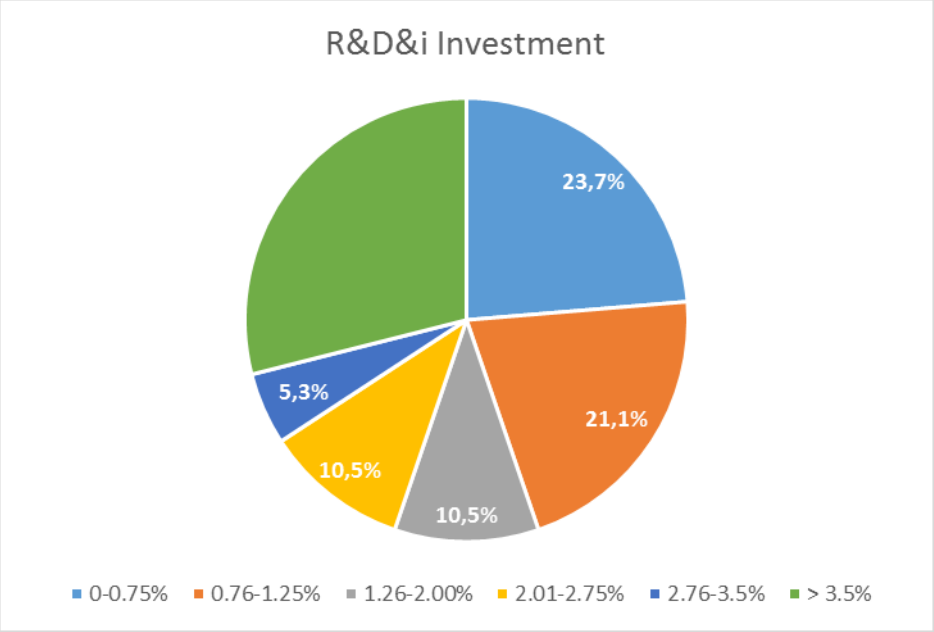


Figure 3: Budget that participating companies dedicate to R&D

Considering the **sectors** of the participating companies, most participants come from the chemical, engineering, and ceramic sector.

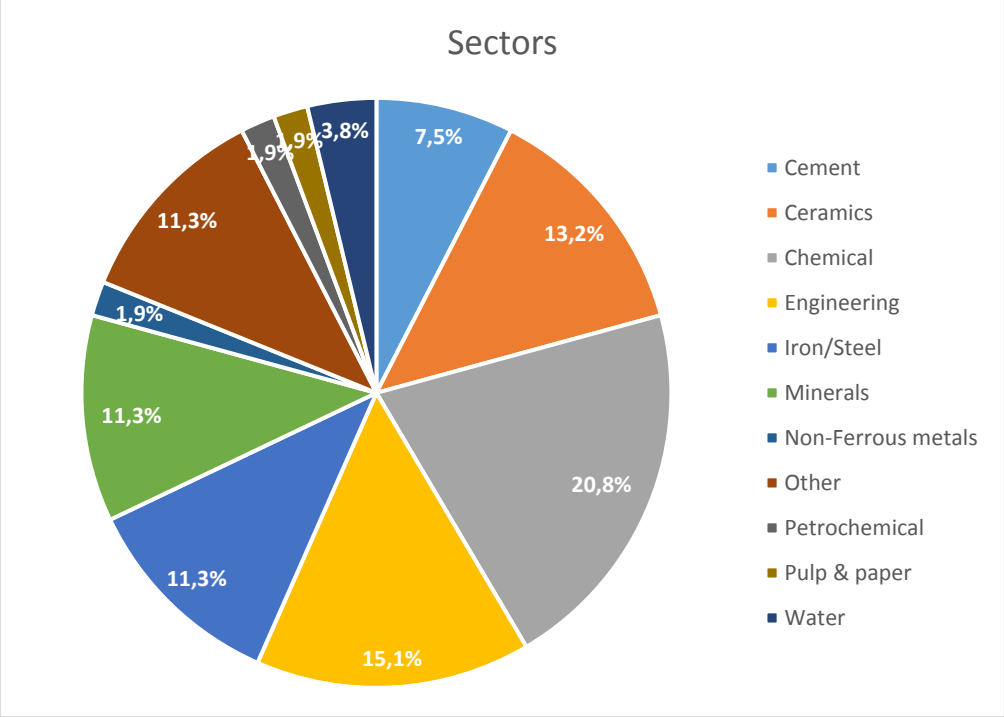


Figure 4: Companies participating in the regulation survey per sector

Sector	No. Companies
Cement	4
Ceramics	7
Chemical	11
Engineering	8
Iron/Steel	6
Minerals	6
Non-Ferrous metals	1
Other	6
Refining	1
Pulp & paper	1
Water	2
Total	**53**

Table 3: Number of participating companies per sector

Regulatory barriers

Regulations that impact innovation processes

How the following directives affect companies regarding the innovation deployment

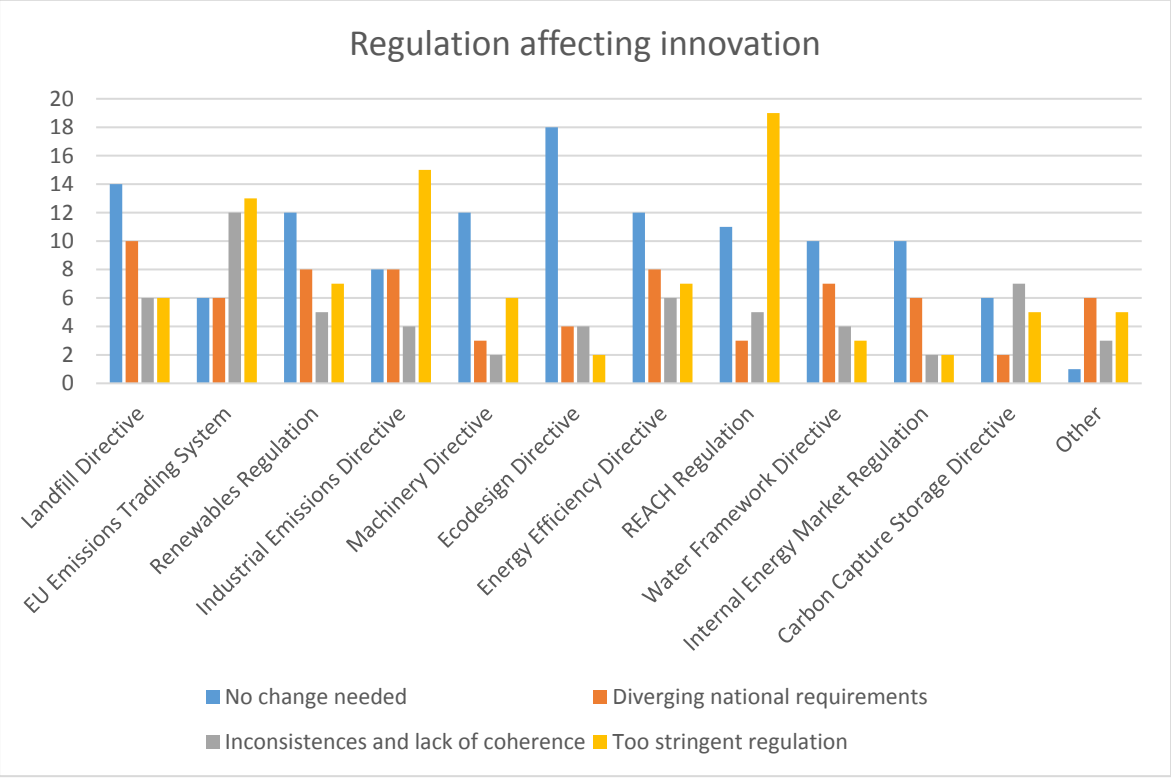


Figure 5: How directives affect companies regarding innovation deployment

The survey states that the Landfill directive is the one with most diverging national requirements, followed by the following directives, which are ranked in a very similar way:

1. Industrial Emissions Directive (Directive 2010/75/EU)
2. Energy Efficiency Directive (Directive 2012/27/EU14)
3. Renewables Regulation (Directive 2009/28/EC)

The directive in which companies find more inconsistences is the EU Emissions Trading system. Although at a lesser extent, the Carbon Capture Storage Directive is also found to have lack of coherence.

Additional conclusions

- Both the Eco-design Directive and the Internal Energy Market Regulation are the less stringent regulations according to the participating companies
- Few inconsistencies and lack of coherence are found in the Machinery directive and the Internal Energy Market Regulation.

- The directives that seem to cause less obstacles to innovation are the Machinery directive and the Eco-design directive, as many companies agree that no change is needed in these directives.
- The REACH regulation seems to be the most stringent regulation according to respondents

Other type of regulations

- *Ceramics and Water:* The Construction Products Directive
- *Ceramics*: Carcinogens and Mutagens at work Directive (CMD)
- *Water*: Biocidal directive
- *Minerals*:
    - Council Directive 2013/59/EURATOM
    - Regulation (EC) No 1272/2008 and harmonised classification dossier on crystalline TiO2
    - NATURA 2000
- *Minerals and Ceramics*: Waste Framework Directive (WFD) 2008/98/EC
- *Engineering*: In Mg recycling we have found out that there are many companies that have internal regulations banning them from recycling Mg because of the flammability risk. Some companies have told us that they have different regulations in terms of recycling in USA than in EU (more strict in the EU).

Waste regulation

How relevant the following aspects would be in unlocking the potential of certain wastes in the EU

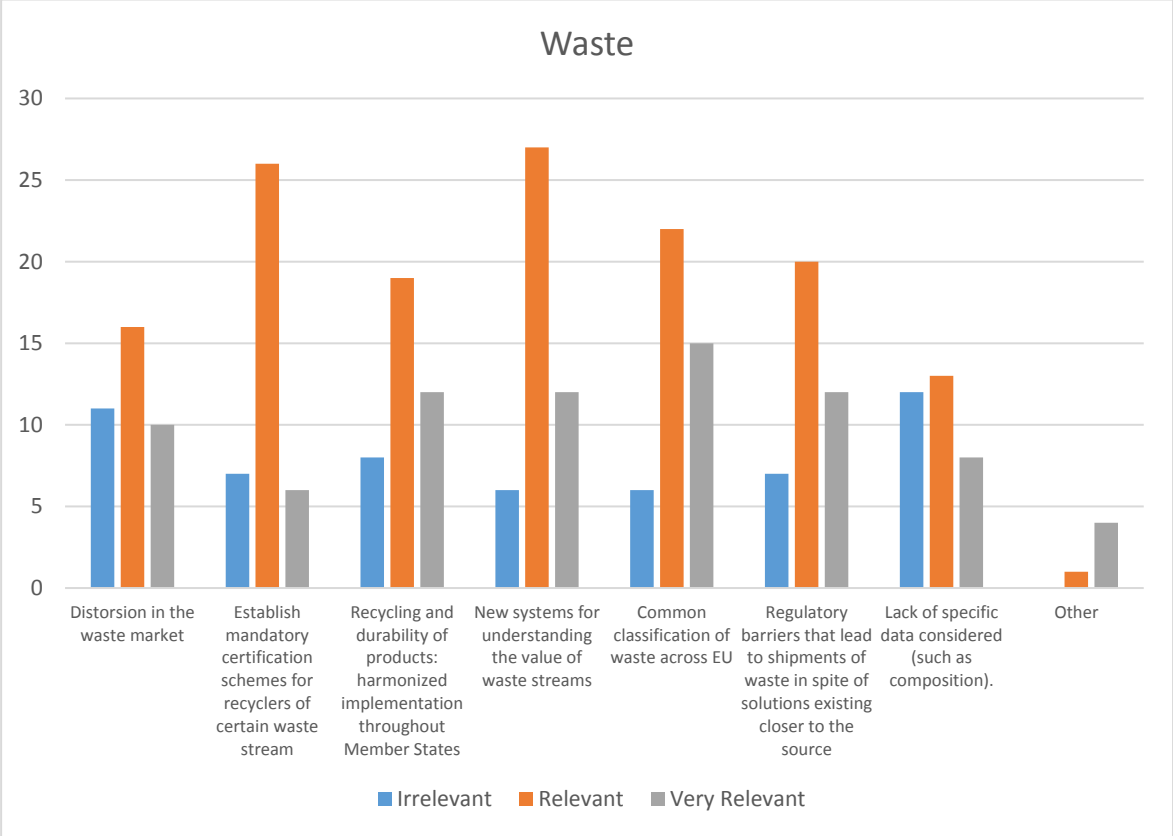


Figure 6: Relevance of different aspects that would potentially unlock certain wastes in the EU.

80% of the companies think that all aspects would be relevant or very relevant for unlocking the potential of certain wastes in their sectors. The following aspects slightly stand out: New systems for understanding the value of waste streams and Common classification of waste across EU.

Carbon reuse and valorisation

How to shape the following policies so as to reuse/revalorise CO2

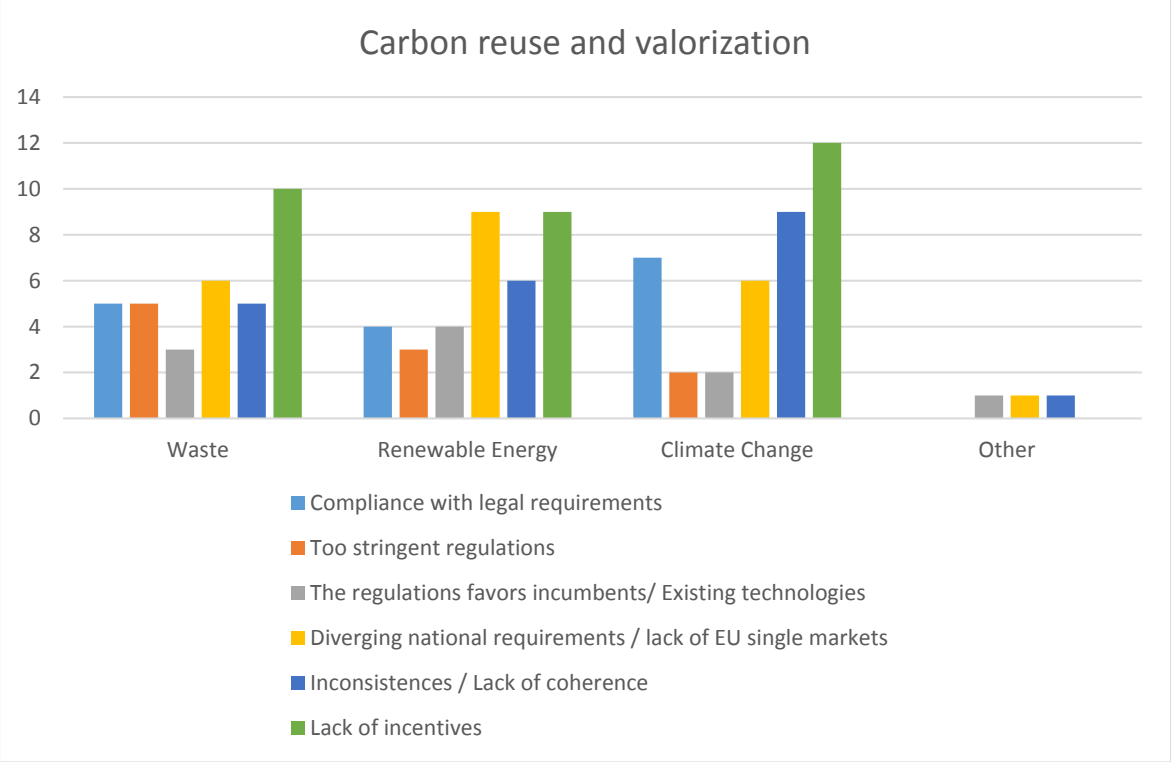


Figure 7: Potential ways to shape policies so as to reuse/revalorise CO2

The survey presents three policies hampering the reuse of CO2 in Europe. Most participants think that addressing the lack of incentives in these directives would be the most effective way to allow the reuse/revalorisation of CO_2. Most participants think that addressing the lack of incentives in these directives would be the most effective way to allow the reuse/revalorisation of CO_2. In overall, all the three policies are seen as challenging barriers facing a diverse number of difficulties.

Reuse of different grades of wastewater for industrial purposes: Policies considered as obstacles to waste-water reuse

Potential policies considered as obstacles to waste-water reuse

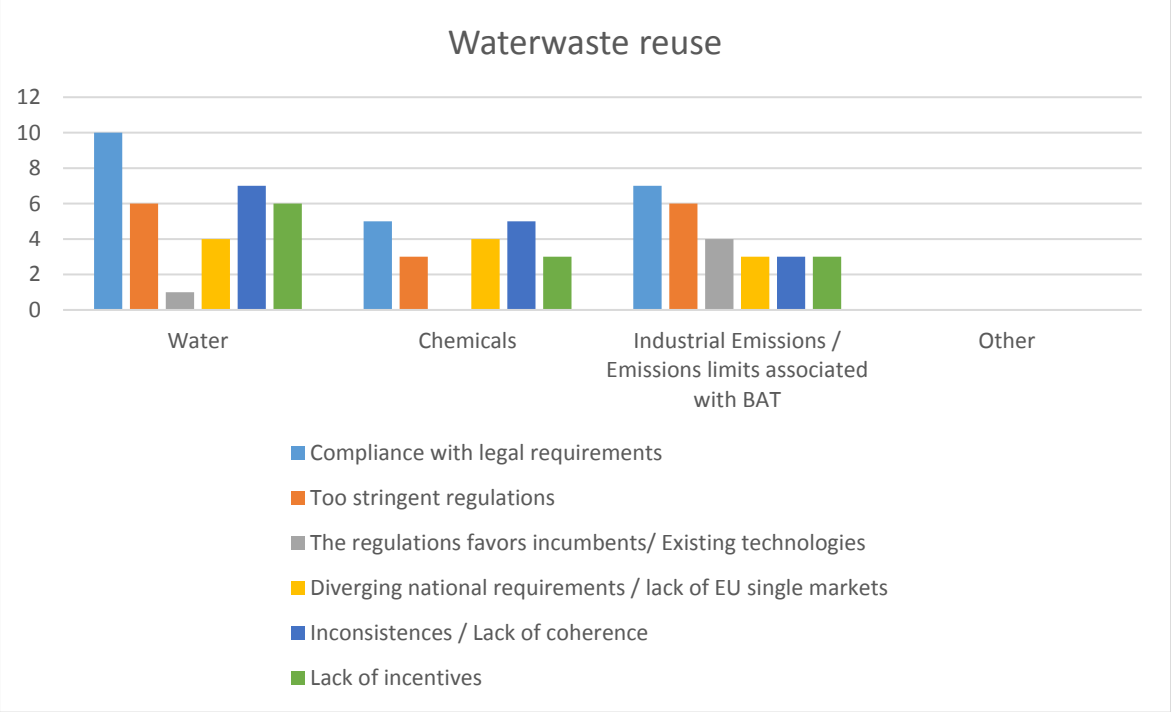


Figure 8: Potential policies considered as obstacles to waste-water reuse

Three policies are considered as main obstacles to wastewater reuse for industrial purposes. Participants answered that the compliance with legal requirements of all the three directives was the biggest problem to waste/water reuse and should be a priority to be addressed.

Digitising Industry

Regulatory/standardisation areas identified as bottlenecks to the development of a data sharing economy

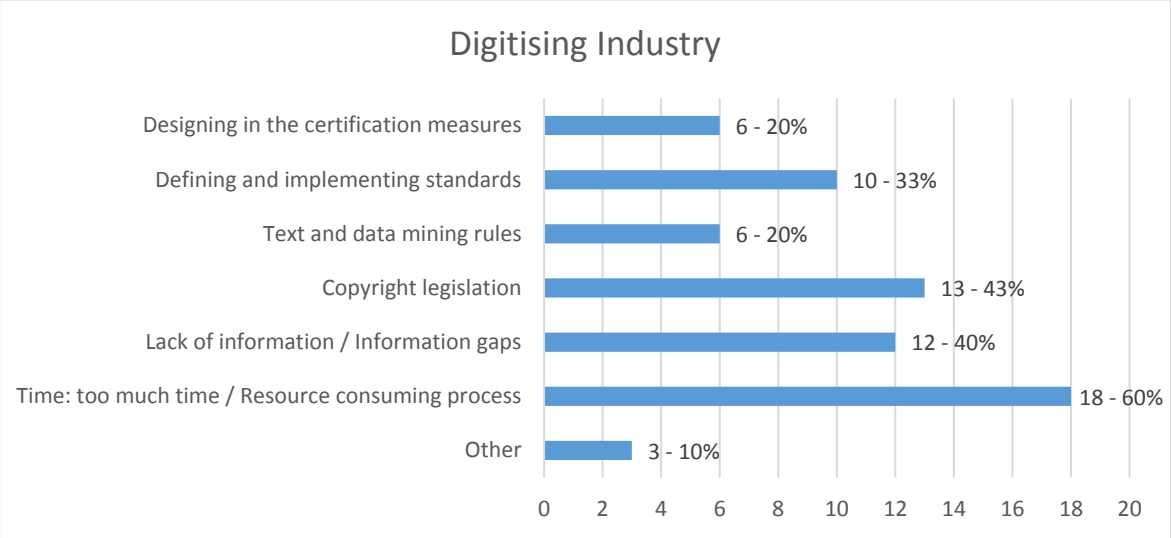


Figure 9: Bottlenecks to the development of a data sharing economy

60% of participating companies mention that the main bottlenecks to the development of data sharing economy is too much time and resource consuming process. All the *Iron/Steel* companies agree on this statement. Other obstacles identified by the companies are: Data protection regulation (ceramic and mineral) and Antitrust rules (Iron/steel)

Electrification and Power-to-X of the intensive industry: Potential Policies as obstacles to electrification, and implementation of innovative Power-to-X technologies and types of problems

Potential Policies as obstacles to electrification, and implementation of innovative Power-to-X technologies and types of problems

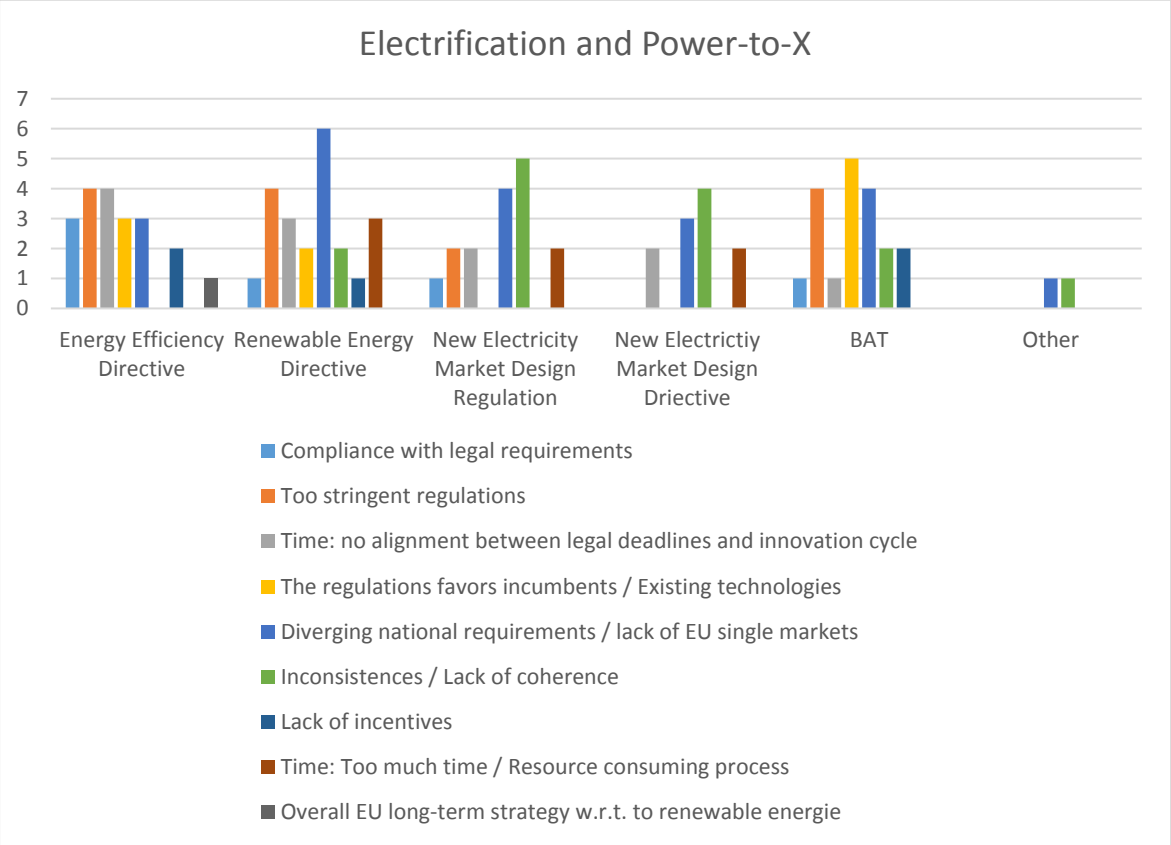


Figure 10: Potential Policies as obstacles to electrification, and implementation of innovative Power-to-X technologies and types of problems

The survey presented five potential policies as obstacles to electrification, and implementation of innovative Power-to-X technologies. The problems that should be tackled in each of them are diverse as far as the responses collected is concerned.

Specific problems in the Chemical sector

Electrification and Power-to-X

Do you consider the following policies as obstacles to electrification, and implementation of innovative Power-to-X technologies?

Most of the participating companies believe that the Energy Efficiency Directive requires too much time and its fulfilment is a resource consuming process. On the other hand, as the ETS has been

constantly questioned and altered since its first establishment (e.g. back loading, MSR), this is undermining trust and thus leads to negative impact on planning security.

CO2/CO as feedstock

Do you consider the following policies as obstacles to deploy new technologies making use of CO2 / CO as carbon feedstock?

In general terms, it is pointed out that EU ETS does not encourage innovation in CarbonDioxide usage – the 'source company' is penalised for emissions regardless of how much they could then spend on capture and re-use.

Reuse/ Recovery of Waste

Do you consider the following policies as obstacles to waste re-use and/or recovery? If so, what type of problems did you encounter?

60% of participants think that the main problem regarding the Waster directive has diverging national requirements and the lack of EU single market, along with no alignment between legal deadlines and innovation cycle with respect to the Products policy

Recycling of Plastics

Do you consider the following policies as obstacles to plastic recycling? If so, what type of problems did you encounter?

The main messages gathered are that regarding End-of-waste criteria, there are inconsistences and lack of coherence as well as in other requirements under Waste legislation. And lastly there is the perception that there is lack of incentives regarding the end-of-life vehicles.

Reuse of different grades of wastewater for industrial purposes

Do you consider the following policies as obstacles to waste-water reuse?

- 40% of companies think that the problems with regard to Water regulation are equally the lack of incentives and the compliance with legal requirements
- 66% of respondents answered that the Emissions limits associated with BAT are too stringent

Bioeconomy

Do you consider the following regulatory areas as bottlenecks to the development of the European Bioeconomy?

- 50% of participants think the bottleneck to the development of the European Bioeconomy is the compliance with legal requirements in the area of collection of bio-waste and with regard to the Renewable Energy Directive
- 100% of participants think that same bottleneck as above applies to the Water Management

Digitizing Industry

Which regulatory/standardisation areas could you identify as bottlenecks to the development of a data sharing economy?

The answers are equally spread between the following areas:

- Defining and implementing standards
- Text and data mining rules
- Copyright legislation
- Lack of information/ information gaps

Biocides

Do you consider the legal framework on biocides hampers innovation in new technologies? If so, what type of problems did you encounter?

66% of the participating companies think that the main problems are:

- Too stringent regulations
- Time: no alignment between legal deadlines and innovation cycles

Specific problems in the Cement Sector

The following questions were asked to the cement participating companies:

1. Do procedures for access to public funding and combination of national and EU funding create impediments for your innovation projects? Why?
2. Is public acceptance or citizen concerns an issue that negatively impact your innovation project?
3. Do national permitting procedures pose barriers? Why?
4. Is European or national waste legislation sufficiently adapted to accommodate industrial symbiosis in your sector and does it sufficiently promote the uptake of alternative fuels/raw materials? Why?

Open answers will be reported in deliverable D2.3.

Specific problems in the Steel Sector

The following questions were asked to the steel participating companies

1. What aspects of REACH are most problematic for you (e.g. in registering your products, etc.)?
2. Do you have problems defining the calculation point of recycling?
3. Is landfill space an issue for your company? If yes, please explain why
4. What is your current water reuse level?

Open answers will be reported in deliverable D2.3.

Other non-technological barriers

Management and Communication

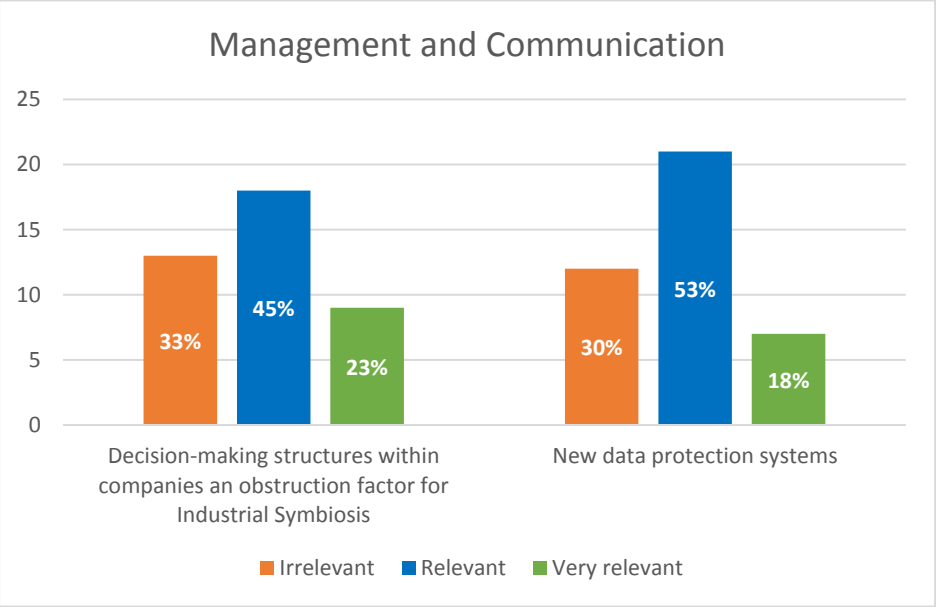


Figure 11: Management and communication

71 % of participants think that new data protection systems is a relevant or very relevant aspect. Also, 68% participating companies think that the decision-making structures within companies is a relevant or very relevant obstruction factor for industrial symbiosis.

Sustainability Assessments

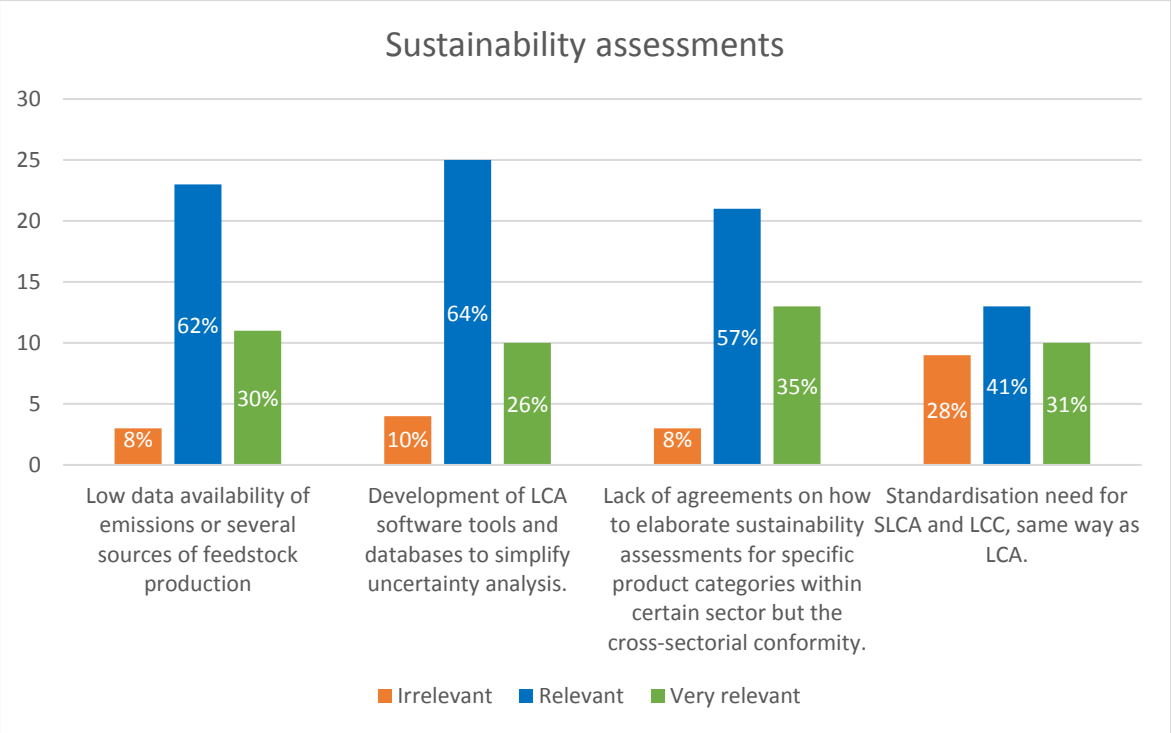


Figure 12: Sustainability assessments.

Around 90% of companies think that the following aspects are relevant or very relevant in a very similar manner. Besides, LCA is a welcome tool, but implementation of technology will not be determined by LCA but rather by business arguments

Financing

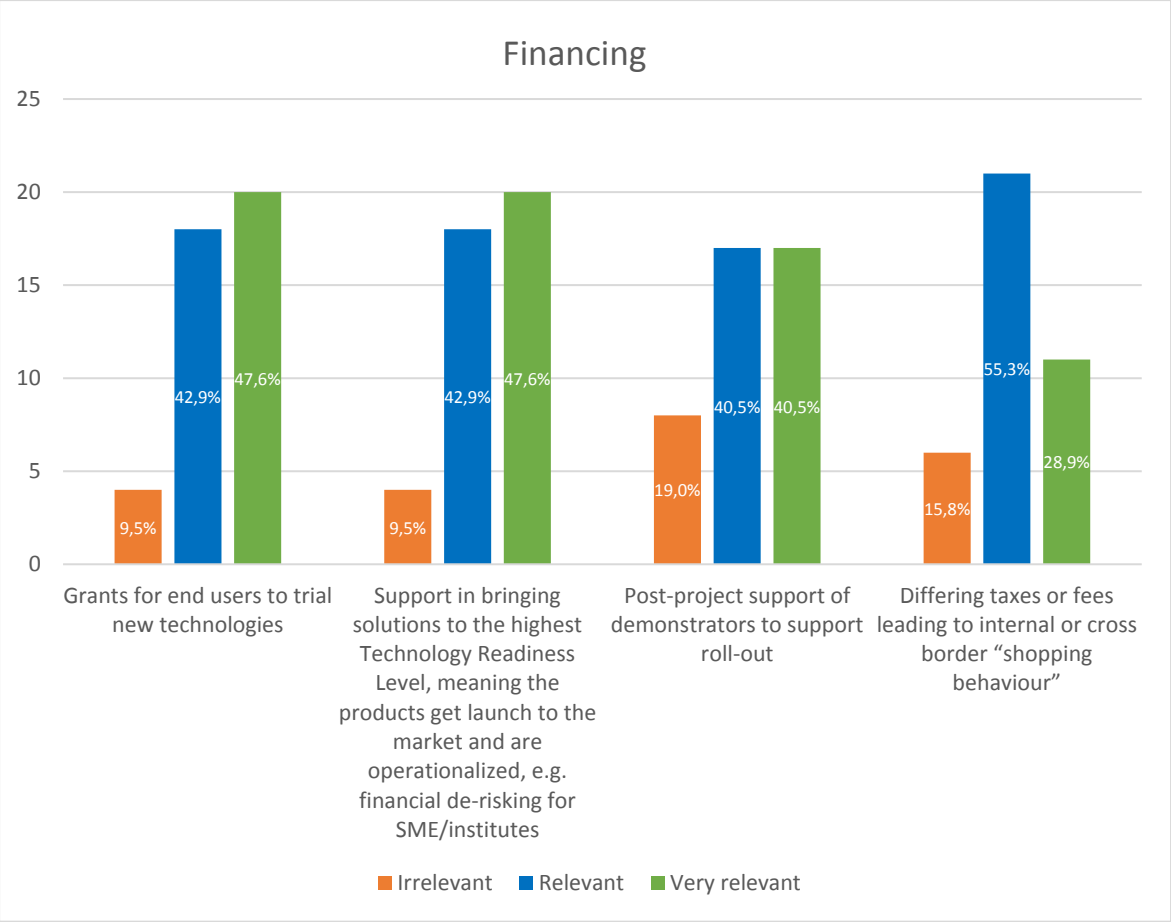


Figure 13: Financing

All the aspects were found relevant or very relevant in a similar way. As a relevant topic, It is underline that developments in Central and Eastern Europe require higher funding intensity compared to Western Europe because innovative markets show worse penetration figures concluding in weaker financial returns. Developments in Central and Eastern Europe require higher funding intensity compared to Western Europe because innovative markets show worse penetration figures concluding in weaker financial returns.

Energy Management

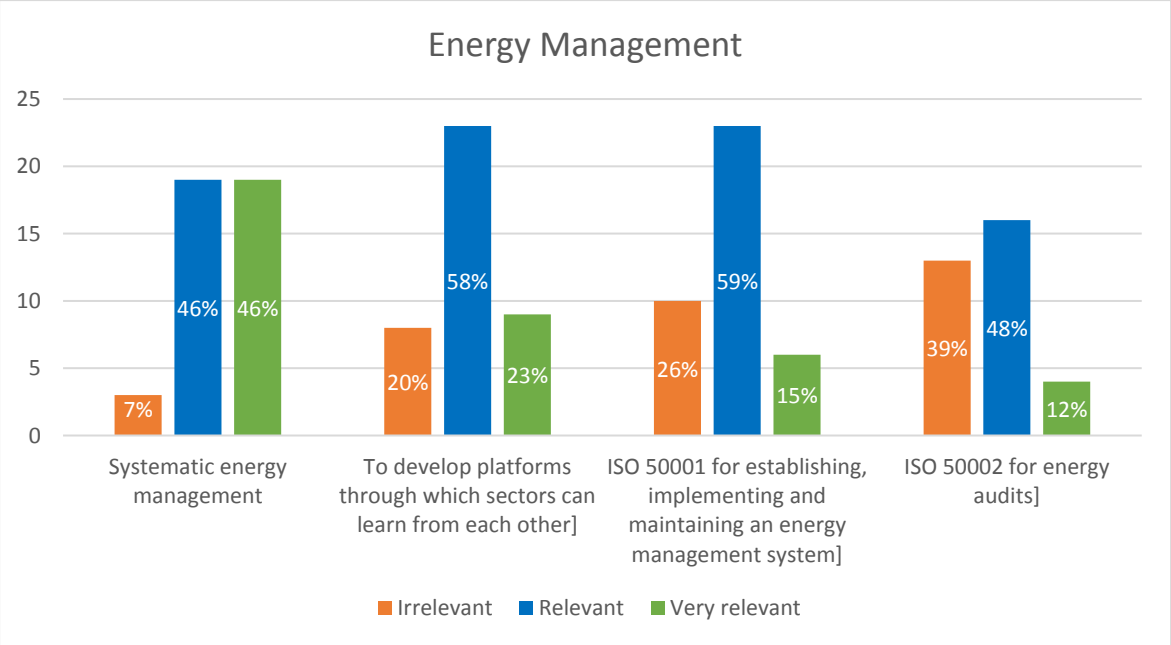


Figure 14: Energy management

The most relevant or very relevant aspect is the systematic energy management.

Training, Skills and Public Acceptance

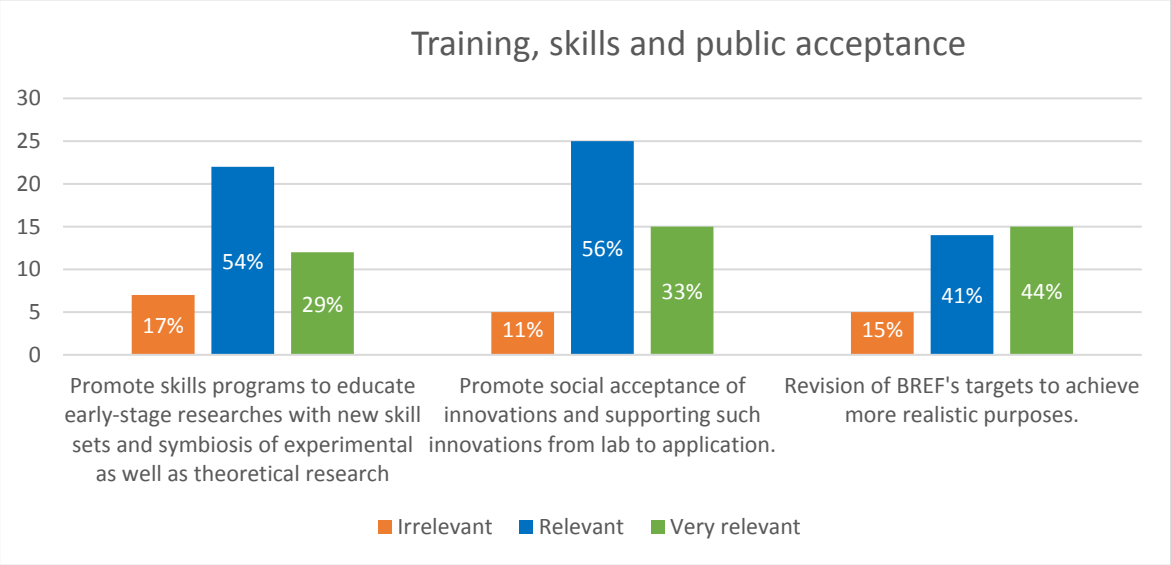


Figure 15: Training, skills and public acceptance

ANNEX E: Technical Committees related to SPIRE sectors

CEN / CENELEC Technical Bodies								
	Cement	Ceramic	Chemicals	Minerals	Non-ferrous	Steel	Water	Engin.
CEN/CLC/JWG 1 "Energy Audits"								
CEN/TC 51 "Cement and building limes"	x							
CEN/TC 67 "Ceramic tiles"		x						
CEN/TC 104 "Concrete and related products"	x			x				
CEN/TC 114 "Safety of machinery"								x
CEN/TC 129 "Glass in building"				x				
CEN/TC 132 "Aluminium and aluminium alloys"					x			
CEN/TC 133 "Copper and copper alloys"					x			
CEN/TC 135 "Execution of steel structures and aluminium structures"					x	x		
CEN/TC 164 "Water supply"							x	
CEN/TC 165 "Waste water engineering"							x	
CEN/TC 183 "Waste management"	x				x	x	x	
CEN/TC 184 "Advanced technical ceramics"		x						
CEN/TC 187 "Refractory products and materials"		x						
CEN/TC 190 "Foundry technology"					x	x		
CEN/TC 229 "Precast concrete products"	x							
CEN/TC 230 "Water analysis"							x	
CEN/TC 249 "Plastics"			x					
CEN/TC 292 "Characterization of Waste"	x	x		x	x	x	x	
CEN/TC 310 "Advanced automation technologies and their applications"								x
CEN/TC 322 "Equipments for making and shaping of metals - Safety requirements"								x

Table 4: CEN / CENELEC Technical Bodies

ISO / IEC Technical Bodies								
	Cement	Ceramic	Chemicals	Minerals	Non-ferrous	Steel	Water	Engin.
ISO/TC 17 "Steel"						x		
ISO/TC 25 "Cast irons and pig irons"					x	x		
ISO/TC 26 "Copper and copper alloys"					x			
ISO/TC 27 "Solid mineral fuels"				x				
ISO/TC 33 "Refractories"		x						
ISO/TC 39 "Machine tools"								x
ISO/TC 47 "Chemistry"			x					
ISO/TC 71 "Concrete, reinforced concrete and pre-stressed concrete"	x							
ISO/TC 74 "Cement and lime"	x							
ISO/TC 77 "Products in fibre reinforced cement"	x							
ISO/TC 79 "Light metals and their alloys"					x			
ISO/TC 102 "Iron ore and direct reduced iron"					x	x		
ISO/TC 105 "Steel wire ropes"						x		
ISO/TC 132 "Ferroalloys"						x		
ISO/TC 147 "Water quality"								x
ISO/TC 155 "Nickel and nickel alloys"					x			
ISO/TC 160 "Glass in building"				x				
ISO/TC 166 "Ceramic ware, glassware and glass ceramic ware in contact with food"		x						
ISO/TC 167 "Steel and aluminium structures"						x		
ISO/TC 183 "Copper, lead, zinc and nickel ores and concentrates"					x			
ISO/TC 189 "Ceramic tile"		x						
ISO/TC 199 "Safety of machinery"								x
ISO/TC 207 "Environmental management"								
ISO/TC 282 "Water reuse"							x	
ISO/TC 297 "Waste management, recycling and road operation service"	x	x			x	x	x	

ISO/TC 301 "Energy management and energy savings"								
ISO/TC 306 "Foundry machinery"					x	x		

Table 5: ISO / IEC Techincal Bodies

CEN TC			Relevant Standard, the CEN TC is working on	
Type	Number	Name	Number	Name
CEN/TC	51	Cement and building limes	prEN 197-1 rev	Cement - Part 1: Composition, specifications and conformity criteria for common cements
		-	prEN 197-2 rev	Cement - Part 2: Conformity evaluation
		-	prEN 413-1	Masonry cement - Part 1: Composition, specifications and conformity criteria
		-	FprEN 196-6	Methods of testing cement - Part 6: Determination of fineness
CEN/TC	67	Ceramic tiles	prEN 17160	Product category rules for ceramic tiles
		-	prEN ISO 10545-2	Ceramic tiles - Part 2: Determination of dimensions and surface quality (ISO/DIS 10545-2:2017)
		-	prEN ISO 10545-15 rev	Ceramic tiles - Part 15: Determination of lead and cadmium given off by glazed tiles
CEN/TC	104	Concrete and related products	prEN 12350-1	Testing fresh concrete - Part 1: Sampling and common apparatus
		-	prEN 206 rev	Concrete - Specification, performance, production and conformity
CEN/TC	114	Safety of machinery	/	/
CEN/TC	129	Glass in building	EN 12150-1:2015/prA1	Glass in building - Thermally toughened soda lime silicate safety glass - Part 1: Definition and description
		-	prEN 1748-1-2	Glass in building - Special basic products - Borosilicate float glass - Part 1-2: Product standard

CEN/TC	132	Aluminium and aluminium alloys	EN 485-2:2016/prA1	Aluminium and aluminium alloys - Sheet, strip and plate - Part 2: Mechanical properties
		-	prEN 14726	Aluminium and aluminium alloys - Determination of the chemical composition of aluminium and aluminium alloys by spark optical emission spectrometry
		-	prEN 1676 rev	Aluminium and aluminium alloys - Alloyed ingots for remelting - Specifications
CEN/TC	133	Copper and copper alloys	prEN 12735-1 rev	Copper and copper alloys - Seamless, round tubes for air conditioning and refrigeration - Part 1: Tubes for piping systems
CEN/TC	135	Execution of steel structures and aluminium structures	EN 1090-2:2018	Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures
CEN/TC	164	Water supply	prEN 17215	Chemicals used for treatment of water intended for human consumption - Iron-based coagulants - Analytical methods
CEN/TC	165	Waste water engineering	prEN 1295-1	Structural design of buried pipelines under various conditions of loading - Part 1: General requirements
CEN/TC	183	Waste management	prEN 14803 rev	Identification and/or determination of the quantity of waste
CEN/TC	184	Advanced technical ceramics	prEN ISO 20504	Fine ceramics (advanced ceramics, advanced technical ceramics) - Mechanical properties of ceramic composites at room temperature - Determination of compressive behaviour (ISO/DIS 20504:2017)
CEN/TC	187	Refractory products and materials	prEN 993-1	Methods of test for dense shaped refractory products - Part 1: Determination of bulk density, apparent porosity and true porosity
CEN/TC	190	Foundry technology	prEN 1562	Founding - Malleable cast irons
		-	prEN 1753	Magnesium and magnesium alloys - Magnesium alloy ingots and castings

CEN/TC	229	Precast concrete products	/	/
CEN/TC	230	Water analysis	EN ISO 11348-1:2008/prA1	Water quality - Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) - Part 1: Method using freshly prepared bacteria - Amendment 1
		-	FprCEN/TR 17244	Water quality - Technical report for the management of diatom barcodes
		-	FprEN 17075	Water quality - General requirements and performance test procedures for water monitoring equipment - Measuring devices
		-	/	/
		-	/	/
CEN/TC	249	Plastics	prEN 14728	Imperfections in thermoplastic welds - Classification
		-	prEN 17228	Plastics - Bio-based polymers, plastics, and plastic products - Terminology, characteristics and communication
		-	prEN ISO 10350-2 rev	Plastics - Acquisition and presentation of comparable single-point data - Part 2: Long-fibre-reinforced plastics
		-	prEN ISO 11833-1 rev	Plastics - Unplasticized poly(vinyl chloride) sheets - Types, dimensions and characteristics - Part 1: Sheets of thickness not less than 1 mm
		-	prEN ISO 11963 rev	Plastics - Polycarbonate sheets - Types, dimensions and characteristics (ISO 11963:2012)
		-	prEN ISO 19062-2	Plastics - Acrylonitrile-butadiene-styrene (ABS) moulding and extrusion materials - Part 2: Preparation of test specimens and determination of properties (ISO/DIS 19062-2:2018)

		-	prEN ISO 21301-1	Plastics - Ethylene/vinyl acetate (E/VAC) moulding and extrusion materials - Part 1: Designation system and basis for specifications (ISO/DIS 21301-1:2017)
		-	prEN ISO 21304-1	Plastics - Ultra-high-molecular-weight polyethylene (PE-UHMW) moulding and extrusion materials - Part 1: Designation system and basis for specifications (ISO/DIS 21304-1:2017)
CEN/TC	292	Characterization of Waste	/	/
CEN/TC	310	Advanced automation technologies and their applications	prEN ISO 10218-1 rev	Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots
CEN/TC	322	Equipments for making and shaping of metals - Safety requirements	/	/

Table 6: Activities of Technical Committees

ANNEX F: Approached Technical Committees for the distribution of the Standardisation Survey

CEN/TC 51	CEN/TC 164	CEN/TC 264
CEN/TC 67	CEN/TC 165	CEN/TC 292
CEN TC 88	CEN/TC 183	CEN/TC 310
CEN TC 89	CEN/TC 184	CEN/TC 322
CEN/TC 104	CEN/TC 187	CEN/TC 343
CEN/TC 114	CEN/TC 190	CEN/TC 350
CEN/TC 129	CEN/TC 229	CEN/TC 351
CEN/TC 132	CEN/TC 230	CEN/TC 389
CEN/TC 133	CEN/TC 249	
CEN/TC 135	CEN/TC 250	

Table 7: Approached Technical Committees

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