

General remarks

- Understand the need for prioritisation of only the top 3 energy-intensive industry sectors and this method may have benefits in grasping the lowest hanging fruits. However the disadvantage is missing out on (1) reducing energy focus in other vital industry sectors and (2) benefits from the implementation of industrial symbiosis across sectors, as per the SPIRE roadmap. We should keep strong focus on energy efficiency innovation activities in all sectors as it is the total sum of many big and smaller savings that counts.
- While the priorities set are relevant, we cannot forget the importance of focusing also on the development of breakthrough and cutting edge technologies. We need to drastically accelerate their development to be ready on time to reach the ambitious objectives of CO2 emissions. In many sectors, these technologies have often fallen in the Valley of Death due to:
 - the lack of continuity in the EC support when a technology is progressing along the TRL levels
 - the huge investments needed
 - the lack of viable business models

1. Do you agree with the targets set in the issue paper?

In principle, the targets mentioned are progressive yet realistic while:

- some may present difficulties in defining / being very precise, especially as there is no list with all emerging technologies
- some are related to technologies that, in order to realise their potential, would need implementation facilitation through appropriate market uptake initiatives, regulation, standardization (and therefore hard to guarantee their timely effects)
- some are related to technologies that are in use or in development for some sectors; the issue would be how to release the potential for other sectors or how to make them economically viable
- there may be an issue with the alignment of different concepts: the sectors metrics should fit the payback time (2/3 years, not 5)

It should be clarified that the targets and especially examples provided, e.g. in Table 3 on page 8 for waste heat recovery “(heat exchanger, storage, distribution, and industrial symbiosis)”, are not taxative but just illustrative. This should be made explicit and can be emphasized by adding an “e.g.”, like for the example in the first line of that table.

Therefore, regardless of the targets (which are key drivers of action), it is more important to focus on what brings value in the end: develop the right instruments to support R&I, large scale investments at industrial level, the financing of pilots & demos as well their replication to all industrial players, etc.

2. Do you think that the level of ambition is correct?

It would be very hard to give an exact and exhaustive answer; there seems to be no real analytic quantification / estimation behind it (careful with basing the results on one study e.g. for the chemical industry). We could, in general, agree with the level of ambition as the SPIRE goals are equally ambitious. A stronger focus on integrated approaches / cross sectorial topics (aiming at industrial symbiosis e.g. biofermentation of industrial waste gases, CCU of industrial waste gases with renewable energy, etc) could ensure that the ambitions are more realistically attainable.

Sector-specific comment: in steel making energy intensity and CO₂-intensity do not always evolve in parallel and may even be conflicting targets. Thus, the formula on page 6 – footnote 20, namely “(energy consumption of BF process)*(CO₂ reduction potential in %)“ may be suitable for the four technologies mentioned in this paper, but its applicability to other technologies would need prior corroboration. Also, in table 3, where examples of emerging sector-specific technologies are given, we suggest to remove ULCORED which is giving the lowest impact and to replace it by “High T° heat recovery”. This topic is clearly sectorial and has a huge potential (slags, slabs, coils).

3. Are there any standing issue(s) in the way to reaching the proposed targets/priorities?

The framework (e.g. policies, legislation, finances) around the development of innovative technologies has a significant impact on their uptake and therefore on the economic value of business cases.

Europe needs a strategic direction and continuum for the much needed energy mix (fossil, bio, wind, solar, CO₂, etc) and efficiency. Actions in this area need, not to be only a continuation of the old, but also to allow space for technologies that have evolved since, their integration with the old and also allow for breakthroughs. We need to cluster possibilities (technologically speaking but also in terms of timeline for technology development); this is vital if we want to be able to ensure energy supply security, compatibility and convergence of new technologies / solutions and not duplicate nationally what is / will be done.

Adequate financial support and climate will be essential to the implementation of any breakthrough at the industrial level.

Furthermore, applying any obligatory energy efficiency targets or energy consumption limits on industrial producers has to be carefully aligned with the achieved results of initiatives like the SET-plan in terms of the economic effectiveness of new technologies. If, in case of not yet demonstrated economic feasibility of technologies, such constrictions were applied and, thus, these legal obligations were the only reason why energy consuming technologies were implemented, there is no positive impact on the competitiveness of such companies. On the contrary, additional burdens would arise, because financial means would be extracted without corresponding cost reductions. Such a situation would also be of no benefit to the technology providers, which in effect have to develop respective technologies and may hope to market them globally. However, if such technologies are not intrinsically economically beneficial, there would also be no global market for them.

4. What are your specific recommendations on prioritising R&I activities on these issues (and building where appropriate on relevant existing initiatives)?

- it is advisable to provide that not only projects on final energy consumption are covered by the SET-Plan.
- It could be explicitly stated that these are just non-exclusive examples, which do not exclude other technologies like sensible heat recovery from slag or using chemical/mineralogical reactions for energy storage.
- The process industries are key providers of sustainable materials for:
 - other energy production industries (solar, wind, hydro)
 - batteries; technologies for power-to-gas (hydrogen & methane) / power-to-liquid
 - Smart Cities (housing and mobility)
- Cross-sectoral priorities:
 - Utilization of low-grade heat and heat recovery; the industry has a genuine interest in affordable and effective solutions for waste heat recovery; monitoring of industrial excess heat will be an excellent tool to assess the potential of heat recovery for each site. Not only organic/supercritical rankine cycle (ORC/SRC) machines but also thermoelectric generators (TEG) for stationary applications. Maximizing the economic returns of waste heat recovery - especially important to decrease the capital intensity of heat exchangers for waste heat recovery, develop high performance heat exchangers and efficient turbines for heat pumps, cooling machines etc.
 - Integrated control systems should include approaches for detailed energy analysis and monitoring
 - Heat use to provide cooling energy (e.g. absorption cooling, heat pumps)
 - Latent or thermal-chemical heat storage for batch (reactor or dryer) operation processes
 - Drying; important target is the recovery of waste heat from dryer exhaust

Sector-specific R&I activities will be provided through their respective representatives as noted in the issue paper.

5. Who are the best placed actors to implement the targets/priorities (Industry, EU, Member States, regions, groups of countries/organisations/etc.),?

At technology level and depending on technologies, there may be different actors needed: it can be the specific industries but more and more we are looking at a combination of players, especially when we are talking about implementation of technologies. The PPPs, with the support of the ETPs as well as research networks and alliances, are good facilitators / intermediaries in reaching out to the main implementers which are, in the end, the industries.

However, towards reaching the targets, there is need for much more than this. There is a clear need for coordination between:

- Research, academia and industry actors
- Between private side and the public side as well as financing institutions and private investment companies – at EU level and at national / regional level
- Between industries as there is need for connection between technology providers and users
- Between Member States as the various national priorities can be brought together in a clearly integrated strategy for the energy mix