

SET Plan ACTION n°6

Continue efforts to make EU industry less energy intensive and more competitive

Comments from the chemical industry

General comments:

In general, the chemical industry welcomes the initiative of the European Commission to focus strongly on innovation to realise a European Energy System Transformation. This will help companies in Europe to develop the necessary technologies to grasp the full potential of energy efficiency, across all sectors, within the European borders, as well as beyond. Innovation is key for implementation of this plan. Therefore, the development of new cutting-edge technologies has to be accelerated, especially by bringing such cutting-edge technologies to economic viability and commercialisation with the associated necessary investments, taking into account unclear economic feasibility, and uncertain policy and legislative framework. The ambition of the SET-Plan seems justified, provided that the ambition can leverage a similarly ambitious level of support for breakthrough innovation and deployment of more sustainable technologies. Targets to increase energy efficiency have to be significant, yet realistic, especially considering:

- the very significant improvements already realized in the past by the chemical industry (energy intensity in the European chemical industry has been reduced by 47% between 1990 and 2012),
- the requirement for economically viable technologies with payback time significantly below 5 years,
- the current relatively low oil/energy prices which makes it more difficult to achieve a short payback time.

The EC recognizes sectors such as chemicals have already increased energy efficiency and contributes to other sectors efficiency gains. Indeed the chemical sector also provides key innovative technologies enabling more sustainable energy production, storage and usage such as materials for solar and wind energy production, technologies for storage, including power-to-gas (e.g. methane) and power-to-liquid (e.g. methanol) technologies. Lightweight materials from the chemical industry contribute to energy saving in the mobility sector, efficient insulation materials in the housing and construction sector.

In order to address effectively the ambitious objectives of Europe in terms of CO₂ emission reduction, it will be essential to develop this specific SET-Plan action 6 - which focus only on energy efficiency on production sites of energy intensive industries- with a sustainability based approach taking also into account other important parameters such as contribution to and from value chains partners and resource efficiency.

Building on cross-sectoral opportunities and developing cross-sectoral innovation is very much supported by the chemical industry, however the examples of cross-sector activities in the EU draft issue paper are on equipment and components only, cross-sectorial integration of energy and materials (e.g. feedstock) could be an additional factor to foster the industrial symbiosis approach.

I. Specific recommendations on the priorities/targets proposed in the Draft Issue Paper

1. Do you agree with the targets set in the issue paper? Propose amendments where needed.

In general, payback time is a very decisive investment criterion in the chemical industry, however, as energy has become cheaper lately, Energy Efficiency (EE) projects are often less attractive vs. other investment projects. The industry invests preferably in projects with a 2 to 3 year payback. Under current circumstances and without additional support for breakthrough innovation, the industry might not find the necessary conditions to invest and smaller gains in energy efficiency would be reported in the coming years. As a consequence it is proposed that the EE economic potential in table 1: "Industrial sectors metrics" in the SET Plan Action 6 Draft Issue Paper should be changed to include data for a 2 -3 year payback.

2. Do you think that the level of ambition is correct? Please make some suggestions.

At this stage, it is difficult to judge if the proposed targets are achievable or over-ambitious. The levels of ambition in the paper are mainly based on one study, namely ICF's "Study on energy efficiency and energy saving potential in industry and on possible policy mechanisms". Other studies should also be taken into account, e.g., the study of ICCA-Cefic-DECHEMA-IEA "Roadmap on Catalysis" (2013) which highlights the barriers and potential of energy savings of new catalyst technologies. Clearly, future energy cost can be a driver, but it is a variable parameter subject to a wide range of change, and large variations could wipe out new promising technologies, if they become uncompetitive compared with the already existing state-of-the-art.

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

Sufficient financial support will be important for the implementation of any new technologies at the industrial level, a big gap exists between laboratory and industrial up scaling and incentives to bridge that gap (the "valley of death") will always be required.

In addition, policies and the legislative framework alongside access to financing strongly impact the business case for a new technology. It should be realized that additional energy savings would not hamper the global competitiveness only if the economic feasibility of a new technology can be demonstrated. Europe needs a competitive chemical sector in the EU to further invest into innovation ("only competitive companies can innovate, and only innovative companies remain competitive"). Other barriers are a lack of cooperation and/or lack of dissemination of existing initiatives and best-practices.

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

Prioritisation of R&I activities for both sector-specific R&I and cross-sector activities should be done in collaboration with the industry taking into account their potential impact and economic feasibility.

Although further efforts have to be made to complete such a list of priorities some examples are listed below.

A) Examples of sector-specific R&I initiatives

1. Improved distillation column design, e.g., pressure loss reduction resulting in reduction in electricity consumption. Actions should not only be focused on the column design itself (Dividing Wall Columns (DWC), Heat Integrated Distillation columns (HIDiC)), but also on new strategies for distillation (cyclic distillation, process control) as well as alternatives to distillation: hybrid processes (e.g. distillation and pervaporation); membrane processes (separation of organics by nanofiltration); adsorption/chromatographic separation and others
2. Improved reactor design; (batch to continuous, better heat transfer, improving kinetics, process intensification, new PAT technology)
3. Improved batch operation processes; as widely present in specialty chemistry, batch operations are more challenging in terms of heat recovery because having to integrate heat while in operation or shifting heat into a storage) and meeting pay-back time (due to lower operating hours per year)
4. Improved processes by catalysts (see ICCA-Cefic-DECHEMA-IEA Roadmap on Catalysis (2013) on large-volume/high-energy use processes highlighting the barriers and potential of energy savings of new technologies in different chemicals processes ranging from upstream ethylene/propylene cracking, to propylene oxide, methanol, ammonia)
5. Oxygen depolarized cathodes for chlorine production
6. Membrane separation; membrane technology could be favorable to support established production and separation processes

B) Examples of cross-cutting initiatives:

1. Latent or thermal-chemical heat storage for batch (reactor or dryer) operation processes
2. Drying; important target is the recovery of waste heat from dryer exhaust
3. Utilization of low-grade heat and heat recovery; 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.
4. Integrated control systems should include approaches for detailed energy analysis and monitoring
5. Link to solar thermal or photovoltaic systems
6. Heat use to provide cooling energy (e.g. absorption cooling, heat pumps)
7. Cogeneration plants for the supply of steam could be an alternative to boilers

5. Who are the best placed actors to implement the targets/priorities (Industry, EU, Member)

Actions should be accomplished in close collaboration of different players – including PPPs such as SPIRE PPP and ETPs (such as SusChem), as well as universities and RTOs supporting the chemical industry, to develop and finally implement new energy saving technologies. Ideally the SET-Plan should ensure an efficient collaboration between the different actors from private and public sectors (at European, national and regional levels) for deployment of energy efficient technologies in Europe, also ensuring sufficient risk management.

To reach the ambiguous targets set in the plan there is need for further actions:

- Support further coordination between various process industry sectors to fully explore synergies and efficient transfer of new technologies, including industrial symbiosis
- Public financing institutions as well as private investment should collaborate closer with the private sector to bring together the necessary financial resources, while also ensuring sufficient risk management
- Ensure coordination and continuity of support at EU, national and regional levels to fully align and complement initiatives, to progress promising technologies along the TRL levels to reach pilot and finally implementation phase
- Focused financial support of the defined actions within the Horizon 2020 framework (the SPIRE PPP would be the preferred instrument concerning the chemical sector) to foster developments on higher implementation level and bring actors from different industry sectors together
- EU programs should include (more) opportunities for pilots and demonstration units
- Create a long-term policy framework that encourages investments to reinvigorate research and innovation for high-energy-consuming processes, and that incentivizes energy efficiency investments.

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About Cefic

Cefic, the European Chemical Industry Council, founded in 1972, is the voice of 29,000 large, medium and small chemical companies in Europe, which provide 1.2 million jobs and account for 17% of world chemicals production.