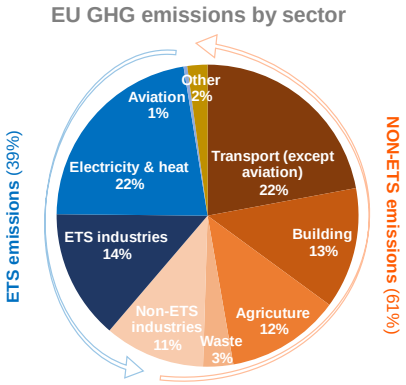
Smart Sector Integration, Industrial Strategy and IPCEI for hydrogen

Main messages

- Smart Sector Integration should be used to **create a level-playing field among all energy carriers to make competition** (as opposed to central planning) **the key driver for decarbonisation**. Hence, it involves integrating energy markets, infrastructures planning, grid access tariffs and taxes & levies design principles. This is a **prerequisite for a least-cost decarbonisation**.
- **Smart Sector Integration and Industrial Strategy are not silos**. The links between industrial and energy policies must be duly considered. The energy-related needs derived from the Industrial Strategy should be considered in the Smart Sector Integration and, at the same time, **the Industrial Strategy should not distort the integration of energy markets / competition between energy carriers**.
- This means that **the Industrial Strategy should not distort the economic signals or mechanisms put in place in order to achieve the decarbonisation objective efficiently**. In terms of the energy-related needs derived from the Industrial Strategy, rather than creating new *ad-hoc* signals or mechanisms for them, they should be integrated into the existing ones (e.g. ETS, RES support schemes or TEN-E Regulation / PCI selection; EEAG). Should these not work appropriately, they should be reviewed.
- Accordingly, it is paramount to make a reference to **hydrogen as an emerging energy carrier with a role in the Industrial Strategy**. In fact, "*Hydrogen technologies and systems*" is among the Strategic Value Chains so far identified and the related projects can apply for **IPCEI status**.
    - Maintaining the option value of technology evolution in different carbon neutral technologies is important at this stage of development to ensure decarbonisation is achieved at minimum cost. When considering areas for investment, it is important to note that though **hydrogen will surely play an important role in the carbon neutral future,** the extent of such role is uncertain as it depends on technology evolution *vis-à-vis* the rest of energy carriers / technologies.
    - In any case, given the anticipated relative competitiveness of renewable electricity sources compared to decarbonised gaseous and liquid fuels (including H2), it seems appropriate to envisage that gaseous and liquid fuels will be mostly **suitable for hard-to-abate niches**, as e.g. feedstock for industry or fuelling high temperature industrial processes.
    - Thus, it would make sense to **first focus efforts on R&D&I / demonstration / FID projects** in the most promising end-uses **and, as technologies mature, ensure that they can effectively compete in the market** by making the market fit for purpose (e.g. by removing regulatory barriers).
- However, the current the IPCEI eligibility criteria would permit inclusion of projects beyond R&D&I / demonstration / FID. This may lead to **IPCEIs including hydrogen projects which are competing for the supply of decarbonised energy rather than truly fostering innovation**. The key aim of Smart Sector Integration is to foster competition between energy carriers, leading to least-cost solutions in the context of current "mainstream" economic signals and mechanisms put in place in order to achieve the decarbonisation objective efficiently, such as the ETS, the RES support scheme or the TEN-E Regulation and PCI selection.
- **IPECIs should concentrate on the need to decarbonise industries for which technological solutions are not currently available on the market**. This will allow that the advantageous route for State Aid that the IPCEI model permits is correctly applied to the decarbonisation of industries without distorting other areas where State Aid should continue to apply under the regime established in the respective guidelines, guaranteeing that it is compliant with the Treaties.
- Under the Communication on IPCEs, the EC is able to amend the IPCEI criteria at any time for reasons associated with competition or other EU policy. Given the new scenario created by the New Green Deal and, more specifically, by the Smart Sector Integration, amendments should be introduced in order to **ensure that IPCEIs are aligned with the "mainstream" economic signals and mechanisms put in place in order to achieve the decarbonisation objective efficiently**.

1. Smart Sector Integration

- Climate neutrality requires clean energy use, energy efficiency measures and responsive consumers across the whole economy, together with decarbonised feedstock and processes for industry. **No energy carrier or sector can be left aside from this effort**.



- Sector integration is about combining all these efforts smartly to maximise efficiency. In other words, sector integration poses the challenge (and opportunity) of **optimising decarbonisation not in each energy carrier or sector in an isolated manner, but taking the whole economy together**.

- Smart Sector Integration is about **creating a level-playing field among all energy carriers to make competition (as opposed to central planning) the key driver for efficient decarbonisation**:

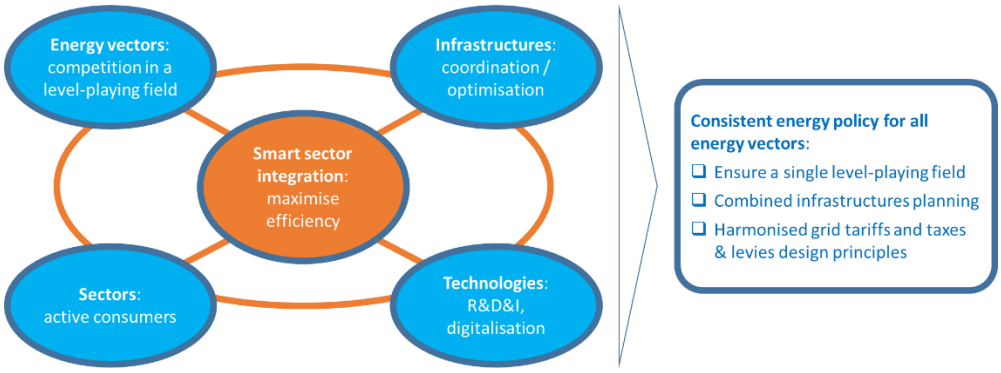
  a) **Integrate energy markets** – make market design fit for all sector coupling technologies.

  b) **Integrate infrastructures planning** – combined optimisation of non-market facilities (grids).

  c) **Integrate grid access tariffs design principles** – in order to align individuals' interest with the system's interest, grid tariffs should reflect actual grid cost levels and structures.

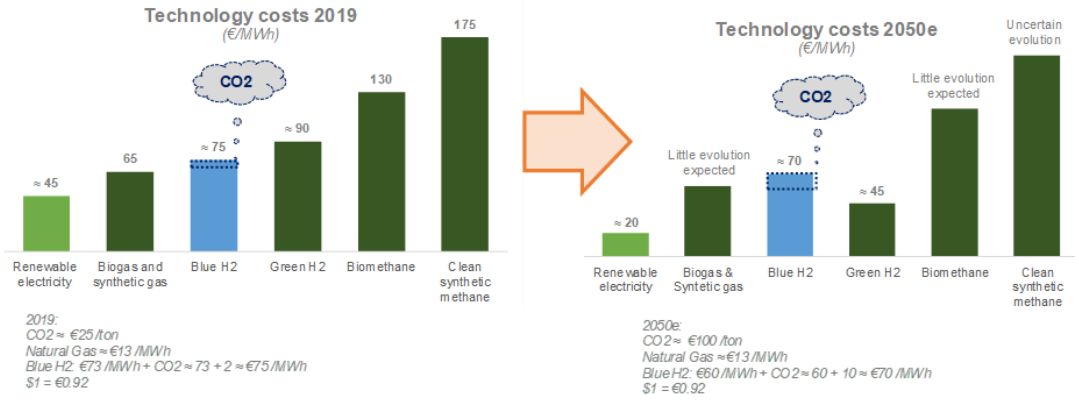
  d) **Integrate taxes & levies design principles** – in particular the polluter pays principle and a fair sharing of the cost of explicit carbon-abatement measures (e.g. as opposed to the current situation where the cost of RES support is mainly born by electricity consumers alone).

- This is a prerequisite for an efficient decarbonisation. **Otherwise, competition distortions would arise** (free-riding, cross-subsidisation, environmental harmful incentives, etc.). A costlier decarbonisation would put at risk the social acceptance of the decarbonisation process itself.



- Competitiveness depend largely on technology evolution. Maintaining the option value of technology evolution in different carbon neutral technologies is important at this stage of development to ensure decarbonisation is achieved at minimum cost. Thus, it is necessary to **first focus efforts on R&D&I / demonstration / FID projects and, as technologies mature, ensure that they can effectively compete in the market** by removing regulatory barriers and ensuring the market design is fit for purpose without introducing discrimination between types of energy carriers.

- Given the anticipated relative competitiveness of renewable electricity sources compared to decarbonised gaseous and liquid fuels (including H2 – see figure below) it seems appropriate to envisage that **gaseous and liquid fuels will be mostly suitable for hard-to-abate niches for which alternative more competitive decarbonisation options are not technically available** (e.g. feedstock for industry, high temperature industrial processes).



- Coupling electricity and gas (P2G / G2P) allows for additional flexibility in the energy system (including additional storage options) and indirect penetration of renewable power into hard-to-abate sectors. In any case, it is necessary to **clearly differentiate energy conversion from renewable energy production, energy storage or energy transmission / distribution**. Conversion is a competitive activity with a very specific value proposal that cannot be "bundled" or "blurred" with other activities. As an example, see the case of G2P (i.e. CCGT, OCGT) which is unanimously deemed a competitive activity. There is no reason for considering P2G differently.

2. Industrial Strategy

- Industry should decarbonise not only by increasing its energy efficiency, but also by consuming decarbonised feedstock and energy, which in some cases requires a new industrial processes. Thus, **industry, feedstock and energy cannot be treated as silos, as they are linked by decarbonisation**.
- In this sense, achieving the decarbonisation objective at minimal cost requires a consistent approach to all of the corresponding sectoral policies, which directly leads to the **Smart Sector Integration**. Hence, the links between industrial and energy policies should also be duly considered in the Industrial Strategy the EC is preparing. Otherwise, such Strategy would be incomplete and uncoordinated, leading to **overall suboptimal results and distortions in the energy market**.
- In light of this, **the Industrial Strategy should follow three basic principles**:

  a) Allowing for fair competition between different energy vectors (electricity, gas, hydrogen, heat) **is the basis for a Smart Sector Integration**. This might require further action on the energy policy side (e.g. full pricing and internalisation of GHG emissions cost; fair sharing of the cost of explicit carbon-abatement measures such as RES support schemes; etc.). The impact of such action on the industrial sector should be anticipated and duly considered in the Industrial Strategy.

  b) Preserve the functioning of the internal energy market. Respect the unbundling principle (TSOs and DSOs not involved in competitive activities) and review the scope of energy infrastructures (limited to natural monopolies; competitive activities not subject to central planning). Progress needed regarding combined planning of infrastructures (i.e. optimisation for all energy carriers).

  c) Do not distort the economic signals and mechanisms put in place to achieve the decarbonisation objective efficiently. ETS is based on fostering competition between all carbon-abatement measures. RES support schemes should progress in the same direction (at least regarding mature

technologies; this is already the case for operating aid to RES-E). TEN-E Regulation and PCI selection are forms of "competition for the market" between infrastructures corresponding to different energy carriers. Thus, rather than creating new *ad-hoc* economic signals and mechanisms, energy-related needs derived from the Industrial Strategy should be duly integrated into the existing economic signals and mechanisms. Should these not work appropriately, they should be reviewed.

IPCEI for hydrogen

- The Industrial Policy Strategy (Sep-2017) announced the creation of a Strategic Forum for IPCEIs. Its aim is to "*provide the Commission with advice and expertise to build a common Union vision on the key value chains for Europe and facilitate agreements to take forward new joint investments in those key value chains"* and *"help cooperation and coordination between public authorities and key stakeholders from several Member States*". More specifically, it should identify (a) **key value chains of strategic importance to Europe** (or SVC), and (b) **joint investments by public authorities and industries from several EU countries which can make value chains more robust**, in particular new IPCEIs.
- Among the six SVCs so far defined is Hydrogen technologies and systems, implying that H2 projects could be deemed IPCEI and be suitable for public aid on that basis. In the Strategic Forum, led by DGGROW, participates basically representatives from MS and some sectoral associations, including HydrogenEurope. **The European electricity industry is not represented** (e.g. Eurelectric, WindEurope or SolarPowerEurope are not members).[1]
- In Nov-2019 the Strategic Forum published a report with recommendations for strengthening the SVC. With regard to the "Hydrogen technologies and systems", **it basically reflects the positions so far put forward by the hydrogen sector**. As examples:

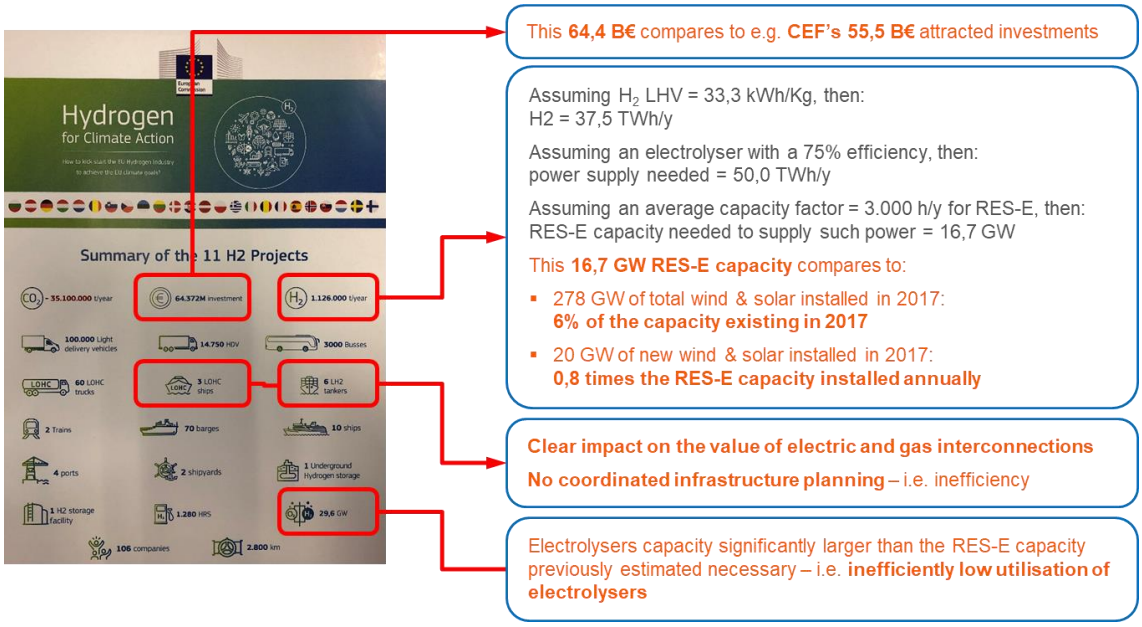
Strategic Forum's Report	**Comment**
"[H2] *still suffers from a supply/demand deadlock that keeps the cost too high"*	Economies of scale (size of facilities & process) explain only part of the lack of competitiveness of carbon-free H2. Other issues are related to basic technological limitations (e.g. low efficiency, safety-related costs, fast wear out) or CO2 pricing (e.g. not all sectors included in the ETS; grey H2 benefiting from carbon leakage measures)
"a level playing field has to be established between fossil and hydrogen-based solutions"	Rather, what needs to be established is a level-playing field between all energy carriers. At present decarbonisation financial burden rests basically on electricity consumers alone
"it is not feasible to expand the [electricity] *grid capacity to cover the transmission of all renewable electricity that will be generated" "Long-term storage of hydrogen becomes an unavoidable functional element for the energy system when the share of renewables increases"*	Electricity grid expansion is an issue in specific cases – i.e. not a generalised concern. Further, grid expansion is not the sole solution to tackle system needs which include: storage technologies, demand response, interconnectors, etc. Need to ensure a level-playing field for all existing and potential / emerging options
"Transmission of energy in a hydrogen pipeline is cheaper and has less losses than transmission via an electrical cable"	Consider the whole supply chain efficiency. E.g.: • Electricity transmission losses: 1-2% • Electrolysis efficiency: 70-75%
"adoption of low carbon hydrogen as the reference [definition under the EU project CertifHy] is a basis for… the introduction of guarantees of origin"	• "Low-carbon hydrogen" according to CertifHy definition is not carbon-neutral • Should current GOs schemes be used, there would be a cross-subsidisation from power consumers to H2 consumers (i.e. electricity consumers financing the RES-E deployment but the corresponding GOs are not cancelled,

[1] See in this respect this recent article.

	leading to a surplus of GOs in the market and, hence, a depressed GOs price)
"ambitious EU-wide targets should be developed for electrolyser manufacturing"	This would breach the technology-neutrality principle (i.e. to avoid this it would be necessary to introduce a target for each emerging technology, e.g. Pumped Heat Electrical Storage, Liquid Air Energy Storage, etc.)
"the [State Aid] *guidelines are reviewed so that electricity produced from a hydrogen energy storage facility would be considered renewable"*	This would be the case if the H2 stored is actually renewable. However, this should not automatically make H2 storage facilities eligible for State Aid (e.g. see the case of a CCGT / OCGT fed with biomethane)

- Furthermore, **this report puts forward an approach for hydrogen deployment which does not seem to be consistent with the EU's carbon neutrality objective**. It says: "*Hydrogen production mainly from renewable sources is a long-term objective, but low-carbon hydrogen from fossil sources and hydrogen produced by low CO2 energy could provide an opportunity for faster large-scale deployment of hydrogen infrastructure and end-use applications, then enabling gradual shift to renewable hydrogen over time*". The problem is threefold:
    a) Supporting H2 production from CO2-emitting sources (e.g. fossil fuels) means paying the polluter. This is incompatible with phasing-out environmental harmful subsidies.
    b) 2050 is just one investment cycle away, hence there is hardly any room for transitory solutions which, in addition, have a long lifespan (i.e. whatever is built now will surely be in use in 2050).
    c) The long-term role for H2 (even from RES) is uncertain, as it depends on its evolution *vis-à-vis* the rest of competing technologies and substitutes. Thus, ambitious investments in H2 facilities now carry a non-negligible risk of future stranded assets.
- As a conclusion, **this report is just an opinion, but it is hardly possible to consider it as the basis for any regulatory action or public intervention**.

- However, a significant number of hydrogen projects are currently struggling to achieve IPCEI status. The figure below gives an idea of the combined ambition of the projects so far presented, which goes beyond R&D&I / demonstration / FID projects.



- IPCEIs are a model introduced in Art. 107(3)b TFUE. It was further defined in an EC communication setting out (a) the eligibility criteria for a project to become an IPCEI, and (b) the criteria to be applied in the analysis of the compatibility of State aid to promote the execution of such projects.[2]
- Regarding eligibility, **it seems that any decarbonisation-related project involving several MS and being sufficiently large in terms of size or technological or financial risk could potentially become an IPCEI**:
    a) Projects must involve several MS and have an "*important contribution to the EU's objectives*".[3]
    b) R&D&I / demonstration / first-industrial-deployment projects can achieve IPCEI status, but also – and more generally – "*Environmental, energy or transport projects*" that are "*of great importance for the… strategy of the Union or contribute significantly to the internal market*", with "great importance" defined as "*particularly large in size or scope and/or imply a very considerable level of technological or financial risk*".[4]
- Once a project has obtained IPCEI status, it may find it easier to access State Aid that would be the case under normal routes.:
    a) "*…the Commission may consider that the presence of a market failure or other important systemic failures, as well as the contribution to a common European interest, is presumed…*".[5]
    b) "*The maximum aid level will be determined with regard to the identified funding gap in relation to the eligible costs. If justified by the funding gap analysis, the aid intensity could reach up to 100 % of the eligible costs*".[6]

[2] Communication from the Commission – Criteria for the analysis of the compatibility with the internal market of State aid to promote the execution of important projects of common European interest (2014/C 188/02)
[3] See par. (15) of the Communication.
[4] See par. (21)-(24) of the Communication.
[5] See par. (27) of the Communication.
[6] See par. (31) of the Communication.

- This may lead to IPCEIs including hydrogen projects which are competing for the supply of decarbonised energy rather than truly fostering innovation which seems to be the case for some of the projects which have already applied for IPCEI status..
- The key aim of Smart Sector Integration is to foster competition between energy carriers, leading to least-cost solutions in the context of current "mainstream" economic signals and mechanisms put in place in order to achieve the decarbonisation objective efficiently, such as the ETS, the RES support scheme or the TEN-E Regulation and PCI selection. **IPECIs should concentrate on the need to decarbonise industry for which technological solutions are not currently available on the market**. This will allow that the advantageous route for State Aid that these projects permit is correctly applied to the decarbonisation of industry without distorting other areas where State Aid should continue to apply under the regime established in the respective guidelines, guaranteeing that it is compliant with the
- Under the Communication on IPCEIs, the EC is able to amend the IPCEIs criteria at any time for reasons associated with competition or other EU policy.[7] Given the new scenario created by the New Green Deal and, as a consequence, the increase need and ambitions for a Smart Sector Integration, amendments should be introduced in order to **ensure that aid IPCEIs is aligned with the "mainstream" economic signals and mechanisms put in place in order to achieve the decarbonisation objective efficiently**.

[7] See par. (53) of the Communication.