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European regulation on hydrogen and CCS.

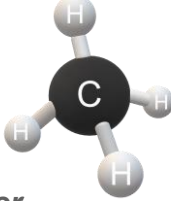
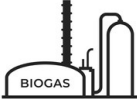

Prof. Catherine Banet
Head of Department of Energy and Resources Law
CERRE Academic Fellow
catherine.banet@jus.uio.no



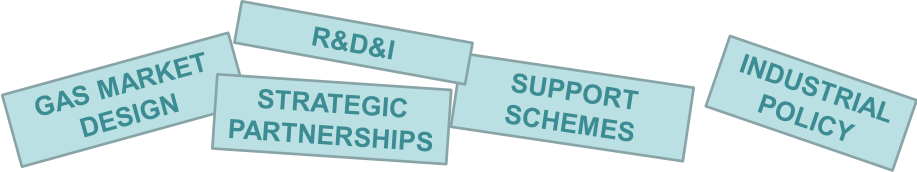
French-Norwegian Decarbonization Forum
Paris, 12 September 2022



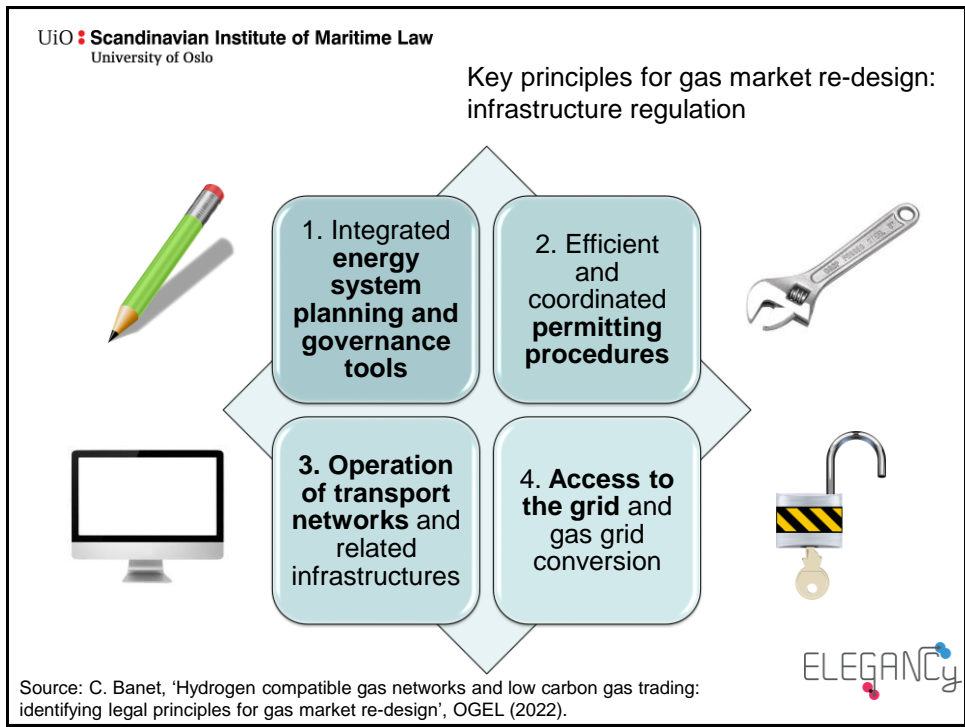
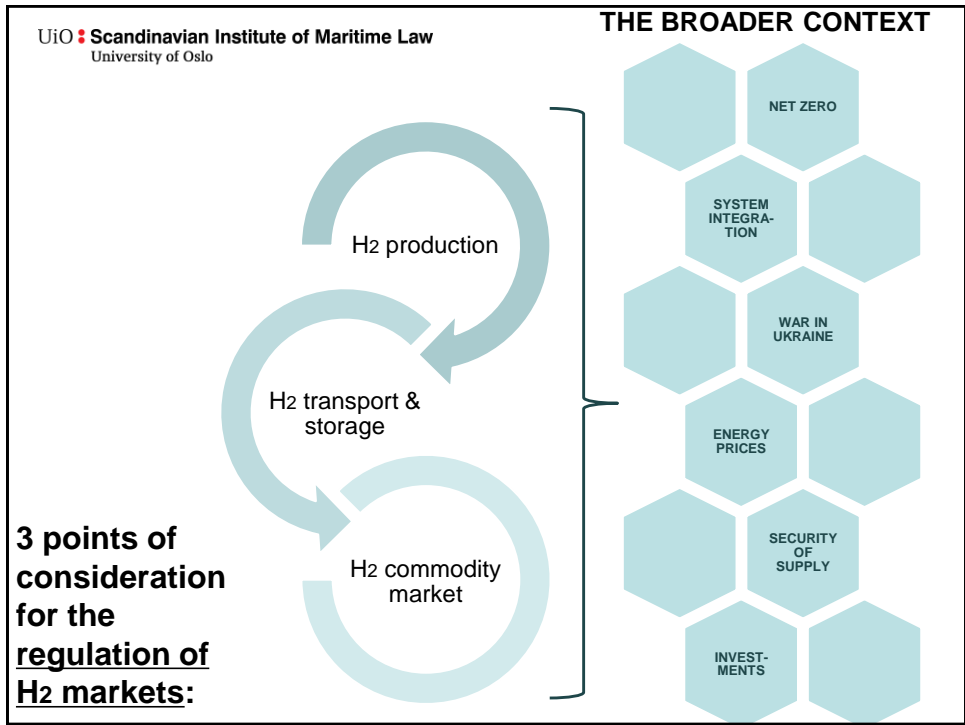
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The challenge of scaling-up production and integrating a larger share of low carbon hydrogen and renewable gases into the EU energy system through regulation.



- GAS MARKET DESIGN
- R&D&I
- STRATEGIC PARTNERSHIPS
- SUPPORT SCHEMES
- INDUSTRIAL POLICY



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EU policy goals for low carbon H₂ & renewable gases

Preliminary phase

- **Hydrogen Strategy**, COM/2020/301 final, 8 July 2020 (**3 phases**), and the **European Clean Hydrogen Alliance** (H2 Project Pipeline, Nov 2021 + upcoming 'Electrolyser Partnership')
- **EU Strategy for Energy System Integration**, COM/2020/299 final, 8 July 2020
- **The Hydrogen Energy Network** (since 2019)

New circumstances

- **REpowerEU** Communication
- **REpowerEU** Plan

- Achieving the objectives of REPowerEU relies notably on **scaling up renewable hydrogen and bio-methane**.
- Higher levels of bio-methane (**domestically** produced) and renewable hydrogen (**domestically** produced and **imported**).
- Projects of **different sizes** and different levels (global, national, local)
- Low carbon hydrogen necessary to meet volumes. Accelerated gas and industrial processes decarbonisation = **role of CCS**.

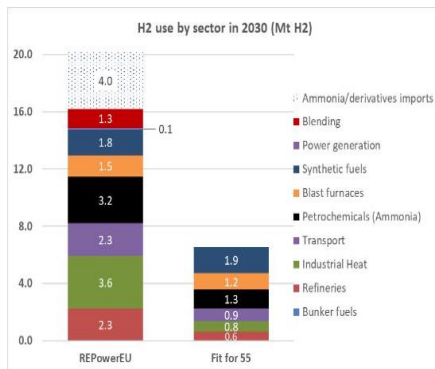
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| | Fit for 55 | REpowerEU | Natural gas reduction by end 2022 (bcm) | Additional natural gas reduction compared to Fit for 55 by end 2030 (bcm) |
|-----------------------------|--|--|---|---|
| Renewable hydrogen | 5.6 million tonnes, saving 9-18.5 bcm (revision REDII) | <p>produce 10 million tonnes and import 10 million tonnes of renewable hydrogen in the EU by 2030</p> <p>Long-term needs: 27 bcm (domestic and import) by 2027 & beyond</p> <p>Renewable hydrogen use reaches 20 Mt by 2030 (of which about 4 Mt as ammonia)</p> | - | 25-50 |
| Sustainable biomethane | 17 bcm by 2030 | Production of 35 bcm by 2030 | 3.5 | 18 |
| Biomass in power generation | 1 bcm in 2030 | | | |
| RFNBOs in industry | 50% of hydrogen consumed in industry is renewable | 78% of hydrogen consumed in industry is renewable | | |

Table 8: Hydrogen use by sector in 2030 (kt hydrogen)

| Sector | RePowerEU | Fit-for-55 | Difference | Diff. due to high prices |
|--------------------------|-----------|------------|------------|--------------------------|
| Bunker fuels | 0 | 0 | 0 | 0 |
| Refineries | 2273 | 613 | 1660 | -32 |
| Industrial Heat | 3629 | 756 | 2873 | 146 |
| Transport | 2319 | 882 | 1437 | 90 |
| Petrochemicals (Ammonia) | 3232 | 1306 | 1925 | -116 |
| Blast furnaces | 1520 | 1152 | 368 | -92 |
| Synthetic fuels | 1788 | 1870 | -82 | -63 |
| Power generation | 105 | 0 | 105 | 0 |
| Blending | 1335 | 0 | 1335 | 0 |
| Total | 16200 | 6579 | 9621 | -67 |

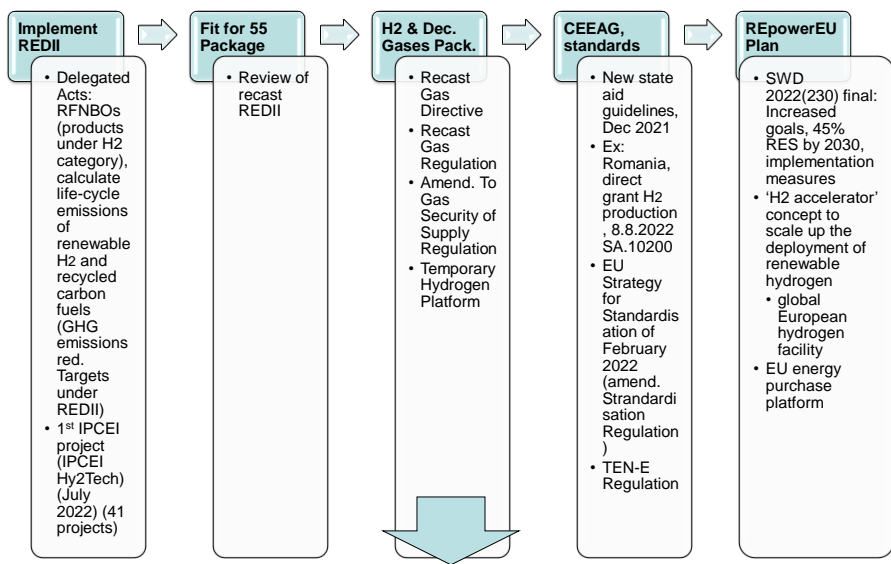
Figure 4: Hydrogen use by sector in 2030



Source: Modelling using PRIMES.

Source: SWD 2022(203) final

Implementation: ongoing EU legislative processes



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EU regulatory approach on market design

- Objective: "create a legislative framework for establishing an EU hydrogen and renewable gases market"
- Enlarged scope of application
- New definitions – *Definitions matters!*
- General rules for the organisation of the markets
- Consumer empowerment and protection and retail markets

Distinction between H₂ blend and H₂ only infrastructures

- Infrastructure regulation

New entity: European Network of Network Operators for Hydrogen (ENNOH)

- Integrated network planning
- Role of regulatory authorities

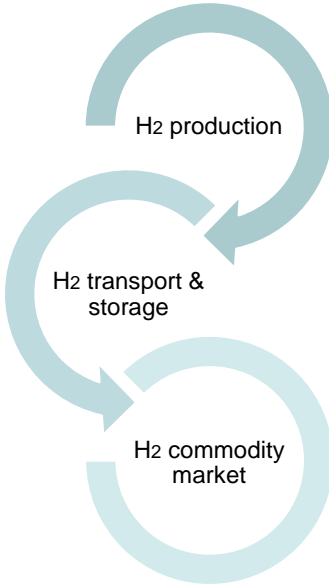
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The external dimension of EU hydrogen policy

- **The EEA dimension**
- **The (real) external dimension:**
 - EU external energy engagement strategy, 18 May 2022
 - Definition of Green Hydrogen Partnerships
 - Proposal to establish a Global European Hydrogen Facility
 - Aims: create investment security, business opportunity, facilitate the promotion of import of RE H₂ from third countries.
 - Regulatory framework for renewable hydrogen partnerships
- **Goal: facilitate the import of 10 million tonnes of renewable hydrogen**
- **Respect of EU's international trade obligations**

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Concluding remarks



- Weak on permitting. Further guidance in soft law?
- Must support industrial policy objective
- Must be supported by rules on support schemes, (CfD).
- Alignment on CEP? Tja.
- Too complex? More dynamic regulation?
- Good on integrated planning
- Infrastructure regulation to be refined (Inter-TSO compensation (ITC mechanism for tariff discounts, financial compensation for cross-border H2 networks (role NRAs), scope of entry-exit systems, capacity allocations, gas quality coordination (5% threshold), etc.
- Ongoing processes: certification initiatives launched; RFNBO; Standardisation, revision REDII
- External dimension clearly reinforced
- Trading and contractual strategy

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Some references

Publications:

- C. Banet, CERRE, "Building Europe's Hydrogen and Renewable Gas Markets", Oct. 2022.
- "Perspective on the hydrogen economy as a pathway to reach net-zero CO₂ emissions in Europe", by M. Van der Spek, C. Banet, C. Bauer, P. Gabrielli, W. Goldthorpe, M. Mazzotti, S. T. Munkejord, N. Røkke, N. Shah, N. Sunny, D. Sutter, J. P. M. Trusler and M. Gazzani, *Energy & Environmental Science*, 2022, [DOI: 10.1039/D1EE02118D](https://doi.org/10.1039/D1EE02118D)
- C. Banet, 'Hydrogen compatible gas networks and low carbon gas trading: identifying legal principles for gas market re-design', OGEL (forthcoming).
- O'Brien, A. and C. Banet, 'De-risking the H₂-CCS value chain through law', *European Energy and Environmental Law Review*, (2021) 30(2).

Online events:

- Eurogas Let's Meet! «Moving forward with Gas Decarbonisation», discussion on the EU Hydrogen and decarbonised gases package, 16. des. 2021: <https://eurogas.org/event/lets-meet-moving-forward-with-gas-decarbonisation/>

Recent projects at UiO:

- [DEVICE](#) - Verdikjeder for karbonfangst og lagring og lavkarbon hydrogen (CLIMIT, 2021-2025).
- [FME HYDROGENi](#) (Forskningsrådet, 2022-2030)

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Thank you for your attention !