Green Deal Call
National Online Info Event

Industry, Economy & Buildings

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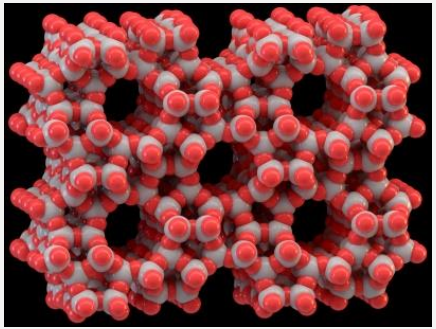
National Contact Point NMBP and Space

Topics covered in this session

- **Green Deal call area 3: industry for a clean and circular economy**
  - Topic 1: Closing the industrial carbon cycle to combat climate change - Industrial feasibility of catalytic routes for sustainable alternatives to fossil resources
  - Topic 2: Demonstration of systemic solutions for the territorial deployment of the circular economy
- **Green Deal call area 4: energy and resource efficient buildings**
  - Topic 1: Building and renovating in an energy and resource efficient way

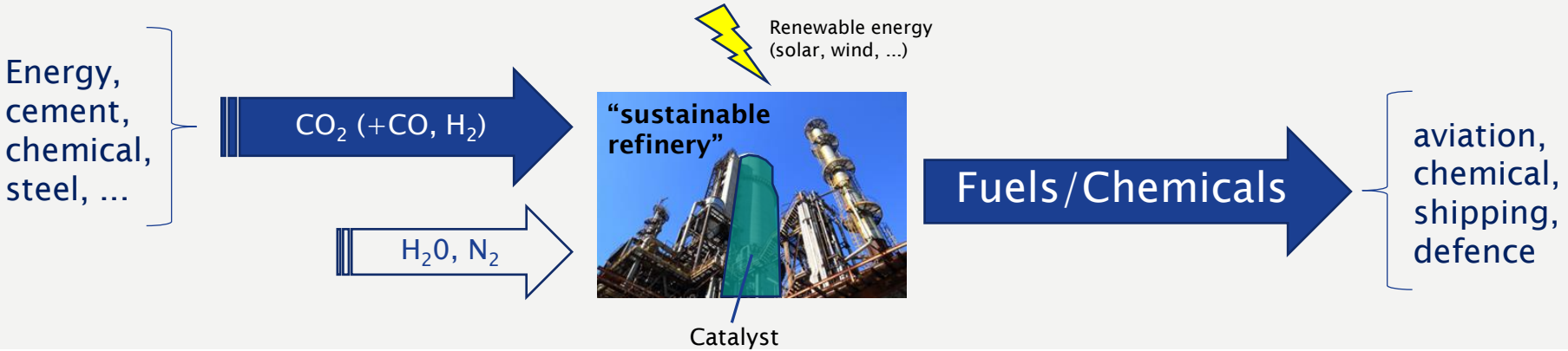
Topic 3.1 Closing the industrial carbon cycle to combat climate change

- Industrial feasibility of catalytic routes for sustainable alternatives to fossil resources



Specific challenge

- Convert CO_2 from industry/energy into fuels/chemicals, using:
  - renewable energy driven processes
  - energy-efficient catalytic systems
- Perform technical/economic validation at industrial scale



Expected Impact

- Pilot plant by 2026, min. output 4000 tons/annum
  - Techno/economic / life-cycle assessment
  - Potential to
    - ⇓⇓⇓ industrial CO_2 emissions (~200Mt p.a. reduction by 2050)
    - ⇓⇓⇓ carbon intensity (below 20g CO_2eq/MJ)
- Synthetic fuels/chemicals as renewable energy storage
- Improved air quality and citizen health through filtering of flue gas emissions from large industrial plants
- Foster a cross-sectorial European innovation eco-system

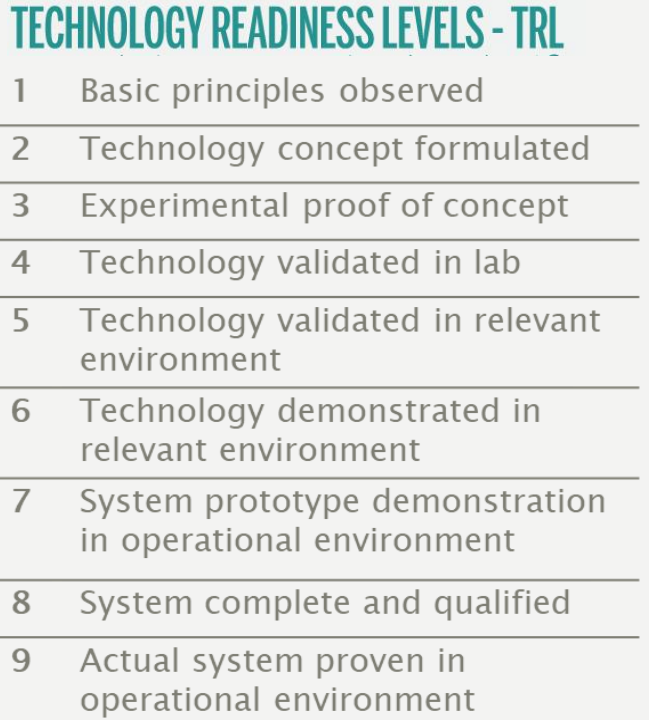
Scope

- Development/deployment of highly innovative catalytic material systems, aiming at 50% increase in the overall efficiency compared to the State-of-the-Art
- Develop innovative, renewable energy driven, catalytic processes, to produce synthetic fuels and chemicals, at a sufficiently large scale to demonstrate its cost effectiveness
- Demonstrate full value chain for production of synthetic fuels and chemicals
- Address financial, regulatory, environmental, land/raw material constraints, public acceptance issues

Further Details

- Type of action: Innovation action (IA)
- Overall budget: 80 M€
- Min. 2 projects funded
- TRL 4-5 → TRL 7
- Duration: up to 5 years
- Cross-cutting priorities

→ International cooperation



Project Example

- Carbon Recycling International
- "World leader in power-to-methanol (CH_3OH) technology"
- Renewable methanol from carbon dioxide, hydrogen and electricity for
  - fuel applications
  - greener chemicals
  - products

George Olah Renewable Methanol Plant
- Located in Svartsengi, Iceland
- World's first industrial scale production of fuel from CO_2
- H_2 from electrolysis + CO_2 from geothermal plant + catalysis
- World's first power-to-liquids output to receive a recognized certification for carbon intensity
- World's first power-to-liquids facility to implement large-scale electrolysis
- **4000 tonnes/annum production**

Useful Contacts

- SUNERGY Initiative
  - Originated from 2 H2020 CSA actions: ENERGY-X & SUNRISE
  - “Fossil-free fuels and chemicals for a circular economy”
  - Lobbying for a public private partnership in Horizon Europe
  - EMPA, UZH are members of the community
  - Get in touch!
- E-refinery @ TU Delft
  - Research programme to accelerate the transition towards sustainable production of chemicals and fuels
  - Get in touch!

Supporting documentation

- **Low carbon energy and feedstock for the European chemical industry (2017, DECHEMA)**
  - Good technical document, going in detail of different options
- **Masterplan for a Competitive Transformation of EU Energy-intensive Industries Enabling a Climate-neutral, Circular Economy by 2050 (2019, High-Level Group on Energy-Intensive Industries)**
  - High-level, strategic document. Addressing the wider scope of "energy-intensive industry"
- **SUNERGY VISION How Fossil-free Fuels and Chemicals Can Contribute to the European Green Deal Bert Weckhuysen - University of Utrecht, SUNERGY Coordinator, 6 February 2020**
- Industrial Value Chain - A Bridge Towards a Carbon Neutral Europe. Europe's Energy Intensive Industries contribution to the EU Strategy for long-term EU greenhouse gas emissions reductions (2018, IES)
- International Energy Agency (IEA) website: www.iea.org
- Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Chapter "Industry"
- Draft proposal for a European Partnership under Horizon Europe "Processes4Planet", Version 17 June 2020
- Fossil-free fuels and chemicals for a climate neutral Europe, SUNERGY kick-off event-Brussels, 5 February 2020
- Nørskov JK, Latimer A & Dickens CF (ed). Research needs towards sustainable production of fuels and chemicals. 2019
- SUNRISE Solar Energy for a Circular Economy Technological Roadmap, November 2019

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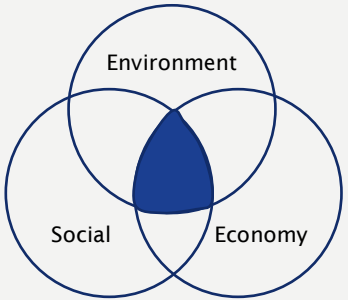
Topic 3.2 Demonstration of systemic solutions for the territorial deployment of the circular economy



Circular Economy @ EU – Background

- First Circular Economy Action Plan (2015→2019)
- All 54 actions now implemented

- New Circular Economy Action Plan, adopted March 2020
- Building upon previous Package
- One of the main building block of the Green Deal

- Annual Sustainable Growth Strategy 2020
- Sustainable Europe Investment Plan
- European Climate Law
- Bioeconomy Strategy
- European Industrial Strategy

Projects - The Past and the Future

- **Large number of Circular Economy projects already been carried out (610 only in Cordis)**
  - Integrated – covering all aspects of CE in a specific territory and target sector/activity
  - Focused – demonstration projects for new technology/service/process in specific sector/territory/value chain
  - Supporting – models, approaches, cataloging, …
- **What's new in Green Deal Call?**
  - Start from what has already been done!
  - Extend to larger geographical and sectorial scale
  - Integrate all sectors of economy
  - Address social dimension and citizen participation
  - Potential to scale up the implemented solutions and guidelines scaling-up/replication

The Green Deal Call – In a Nutshell

Implement and demonstrate concrete systemic solutions for the territorial deployment of the circular economy in at least <u>three</u> territorial clusters:

- Northern-west Europe
- Central and eastern Europe
- Mediterranean Europe

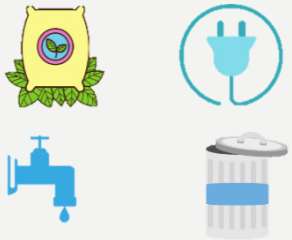
(at least one systemic solution per cluster)

<u>The replicability and scalability potential is essential!</u>

Cluster: socio-economic environmental system composed of relevant and complementary territorial actors (geographically cohesive). Can be local, regional, even cross-border

Systemic: across all relevant sectors and must include all the relevant actors (administrations, industry & SMEs, scientific community, financial intermediaries, non-governmental organizations and civil society)

Which focus?



... and many more!

- Choice of approach/sector/technology must be justified by proper analysis (SWOT, Smart Specialisation Strategies)
- Proposals must be complementary (and not overlapping) with past work and projects!

… Further to deployment

Measure, Analyse, Assess

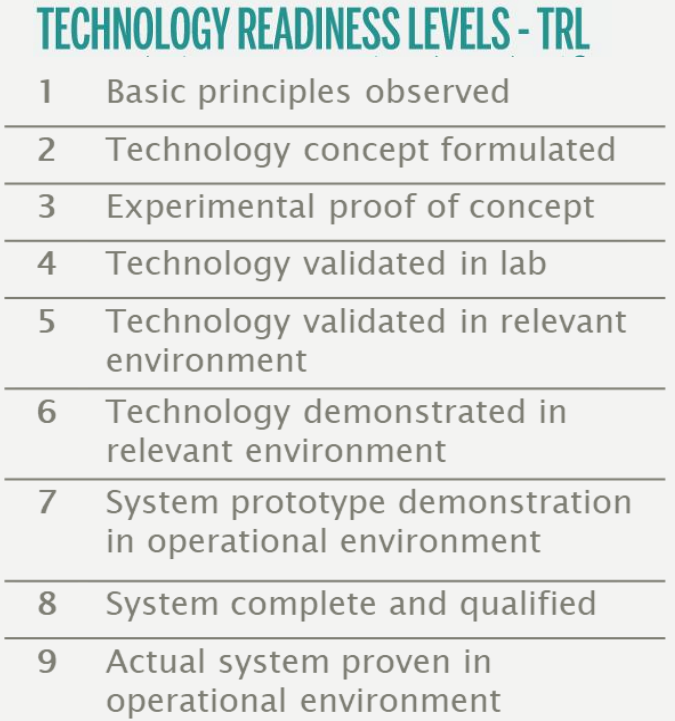
- Circular vs. linear
- LCA
- ±factors affecting success

How to scale-up and replicate, by using:

- Metrics
- Norms / Standards / Certifications / Regulations
- Investments, synergies with other EU funds (Cohesion Policy funds, Just Transition Fund, InvestEU, PDA (EASME))
- Cooperation with the EC's "Circular Cities and Regions Initiative", exchange of best practices between clusters

Further Details

- Type of action: Innovation action (IA)
- Overall budget: 60 M€
- 3-5 projects funded
- TRL xxx → TRL 6-7



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Topic 4.1 Building and renovating in an energy and resource efficient way

Background

- Built environment → of strategic R&I importance for reaching climate neutrality in 2050
  - Step 1
    - Design/build with ⇩ “embodied” CO_2 emissions and ⇧ efficiencies
    - Renovate to ⇧ efficiencies
  - Step 2
    - Energy positive buildings with renewable energy technologies

- https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en
- https://ec.europa.eu/energy/topics/renewable-energy/renewable-energy-directive/overview_en
- https://ec.europa.eu/energy/topics/energy-efficiency/targets-directive-and-rules/energy-efficiency-directive_en
- https://www.buildup.eu/en
- https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

Scope

Proposals are expected to deliver :

- at least two energy-positive neighbourhoods - real-life demonstrations ("living labs")
- in different regions of Europe
- large-scale (residential/non-residential, new and/or retrofitted)
  → (several buildings, but smaller than a city district)
- implementing both technology and social innovations

Scope – In detail

- Design for scalability
- Construction/renovation workflows
- Sustainable and energy-efficient building designs
- Electricity generation
- Energy storage systems
- Reduced operation costs with digital tech (incl. “Smart home”)
- Citizen awareness-raising activities
- Coordination on standards and regulatory aspects

Scope – Scalability / Replicability

End target is scaling up / replication, for this the project should:

- Carry out a whole value-chain assessment of the “living labs”
- Adapt the value chain to new operation patterns
- Set up (or use existing) innovation clusters in different regions of Europe, in order to:
  - Facilitate the deployment of the “living labs”
  - Foster partnerships with other R&I initiatives
  - Analyse, assess and value chains in other environments/markets with different types of building types
  - → pave the way to scaling-up / replication ...

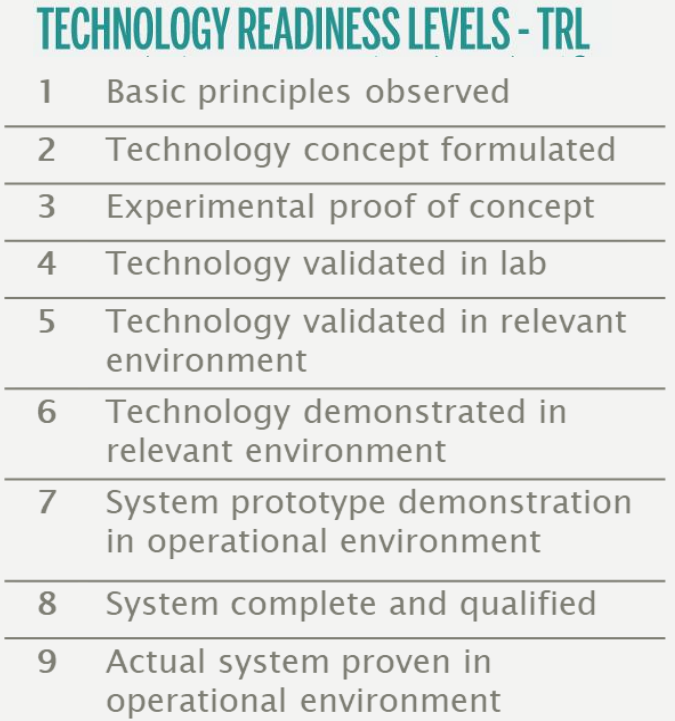
Impact

- Energy savings
- Investments in sustainable energy
- Reduction of greenhouse gas emissions
- Reduction of the embodied energy in buildings
- Reduction of air pollutants

- Demonstration of high potential for replicability

Further Details

- Type of action: Innovation action (IA)
- TRL 5-6 → TRL 7-8
- Overall budget: 60 M€
- 10-20 M€/project



Past Project Examples

- PVSITES: Building-integrated photovoltaic technologies and systems for large-scale market deployment
- Train-to-NZEB: The Building Knowledge Hubs
- OptEEmAL: OptimisedEnergy Efficient Design Platform for Refurbishment at District Level
- FASUDIR Friendly and Affordable Sustainable Urban Districts Retrofitting
- CLIMAWINDA Demonstrating the effectiveness and commercial potential of CLIMAWIN intelligent windows for energy efficiency in retrofit of buildings in Europe

Questions