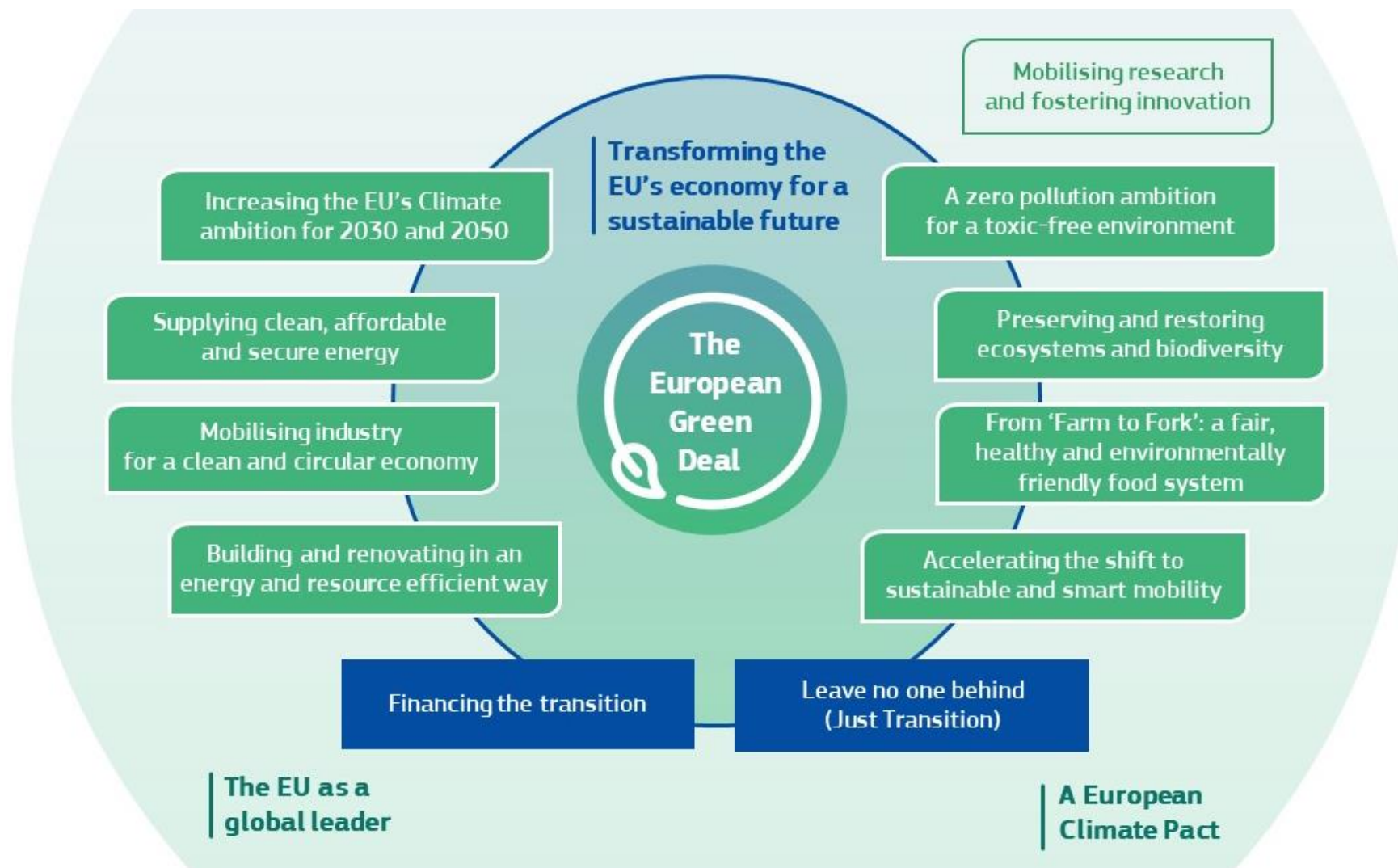




EU Research and Innovation Policy for renewable fuels and bioenergy

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The European Green Deal



European Climate and Energy Policy

An EU Strategy for Energy System Integration COM(2020)299 final

- ✓ sustainable biomass & biofuels, green hydrogen, synthetic fuels

A Hydrogen strategy for a climate-neutral Europe COM(2020)301 final

- ✓ industrial chain, demand in industry and mobility, clean hydrogen R&I

EU Biodiversity Strategy for 2030 COM(2020)380 final

- ✓ restoring forests, soils and wetlands, green spaces in cities

Sustainable and Smart Mobility Strategy – putting European transport on track for the future COM(2020) 789 final

- ✓ zero-emission vehicles, vessels and aircrafts, automatic mobility

European Climate Law Regulation of 30 June 2021 REG (EU) 2021/1119

- ✓ At **least 55% net** GHG emissions reduction in 2030 and EU climate-neutrality in 2050

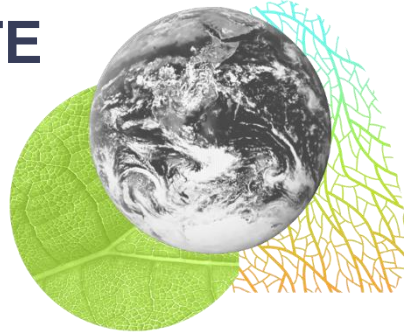
Delivering the European Green Deal

Fit for 55

- A set of interconnected legislative proposals to deliver on the ambitious target and make key sectors of its economy fit for 2030
- A policy mix that respects a balance between pricing, targets, taxes, standards and support measures

Delivering on the “Fit for 55” commitment

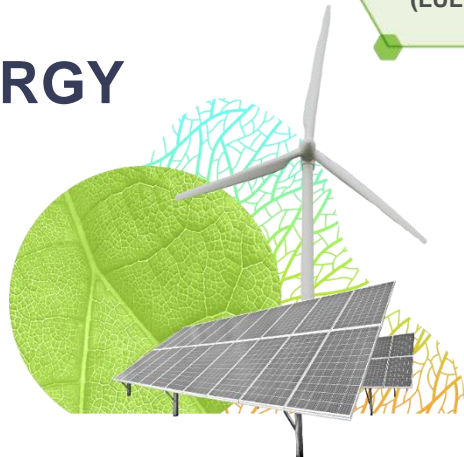
CLIMATE



TRANSPORT



ENERGY



TAXATION AND TRADE



Not legally binding

Revision of Renewable Energy Directive II

- ✓ Collective binding target of renewables in EU's energy mix to **40%** by 2030
- ✓ **Advanced biofuels** and **biogas** produced from Annex IX Part A feedstock in energy supplied to transport at least 0,2 % in 2022, 0,5 % in 2025 and **2,2 %** in 2030, renewable fuels of non-biological origin at least **2,6 %** in 2030
- ✓ GHG intensity reduction at least **13 %** in 2030 by all renewable fuels and renewable electricity supplied to transport
- ✓ Stronger **bioenergy sustainability**

New ReFuelEU Aviation legislative proposal

- ✓ In **2030** SAF at least **5%** of which synthetic aviation fuels share at least **0.7%**
- ✓ In **2050** SAF at least **63%** of which synthetic aviation fuels at least **28%**

New FuelEU Maritime legislative proposal

- ✓ Biofuels, biogas, renewable fuels of non-biological origin and recycled carbon fuels are taken into account to reduce the GHG content of the energy in ships by **-6% in 2030 and -75% in 2050** from the 2020 average

Funding

- Next Generation EU: **€750 billion** temporary recovery instrument
- Multiannual Framework including Horizon Europe: **€1,074 trillion** long-term budget for 2021-2027
- Innovation Fund
 - ✓ With revision of EU ETS the fund is increased to **€47 billion** for 10 years adding **€200 million** allowances for buildings and transport and allowances via the Carbon Border Adjustment Mechanism
 - ✓ Scope to be extended to support projects through carbon contracts for difference.
- InvestEU for Research and Innovation
 - ✓ With an EU budgetary guarantee of **€6.6 billion**, the Research, Innovation and Digitization is expected to leverage an estimated **€90 billion** of R&I investments
 - ✓ Market-based finance for the exploitation and scale-up of European R&I



#HorizonEU

HORIZON EUROPE

THE EU
RESEARCH &
INNOVATION
PROGRAMME 2021 – 27



This presentation is based on the political agreement of 11 December 2020 on the Horizon Europe. Information on some parts is pending revision.

19 March 2021

Our Vision

The EU's key funding programme for research and innovation:

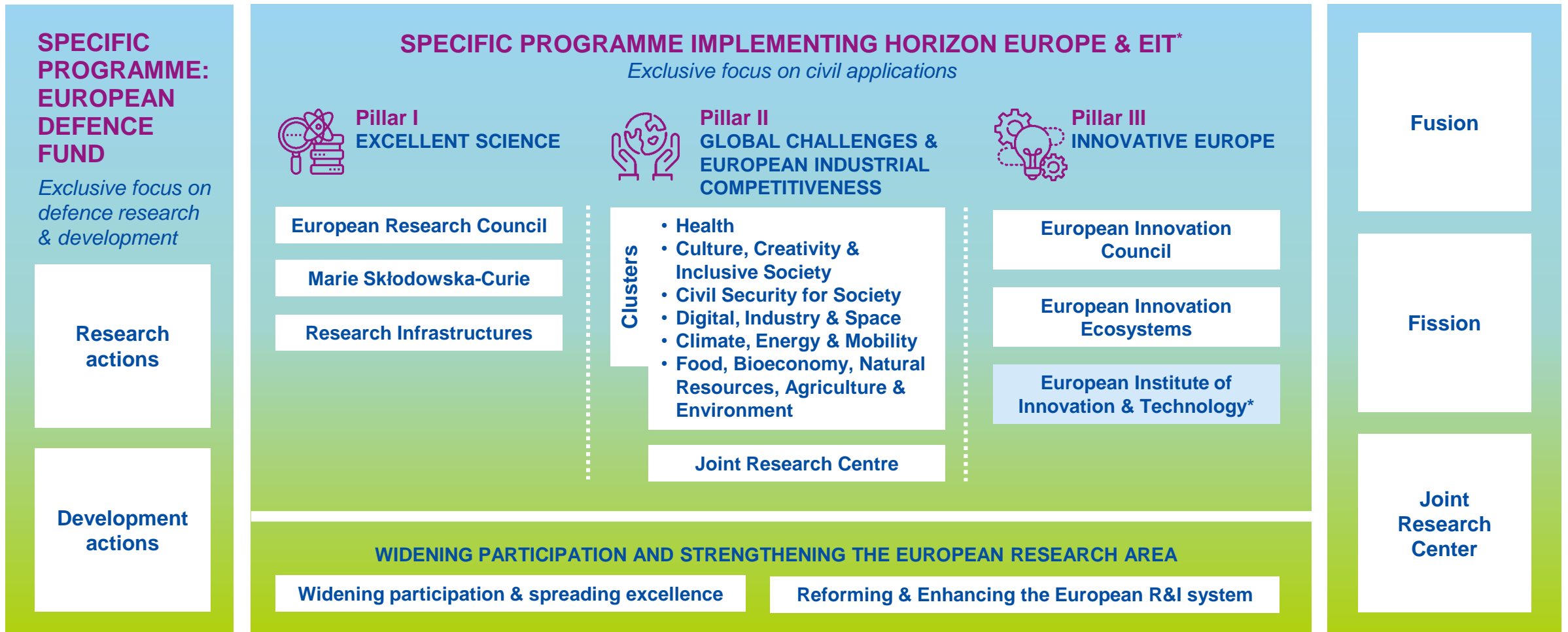
- Tackles climate change
- Helps to achieve the UN's Sustainable Development Goals
- Boosts the EU's competitiveness and growth
- Facilitates collaboration and strengthens the impact of research and innovation in developing, supporting and implementing EU policies while tackling global challenges
- Supports the creation and better diffusion of excellent knowledge and technologies
- Creates jobs, fully engages the EU's talent pool, boosts economic growth, promotes industrial competitiveness and optimises investment impact within a strengthened European Research Area.



Credits: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

HORIZON EUROPE

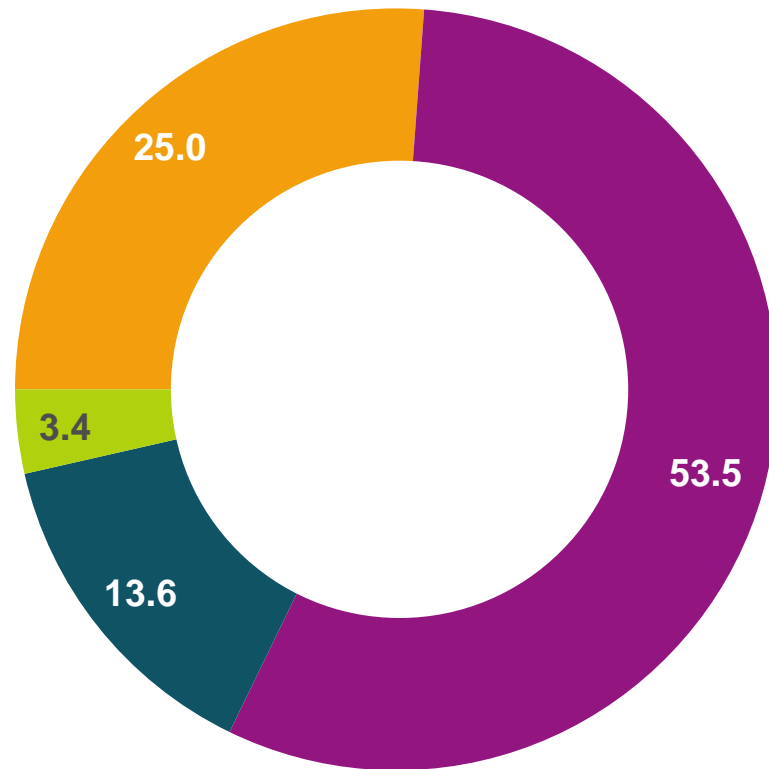
EURATOM



* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

Horizon Europe Budget: €95.5 billion (2021-2027)

(including €5.4 billion from NGEU – Next Generation Europe – programme of EU for Recovery from COVID-19 crisis)



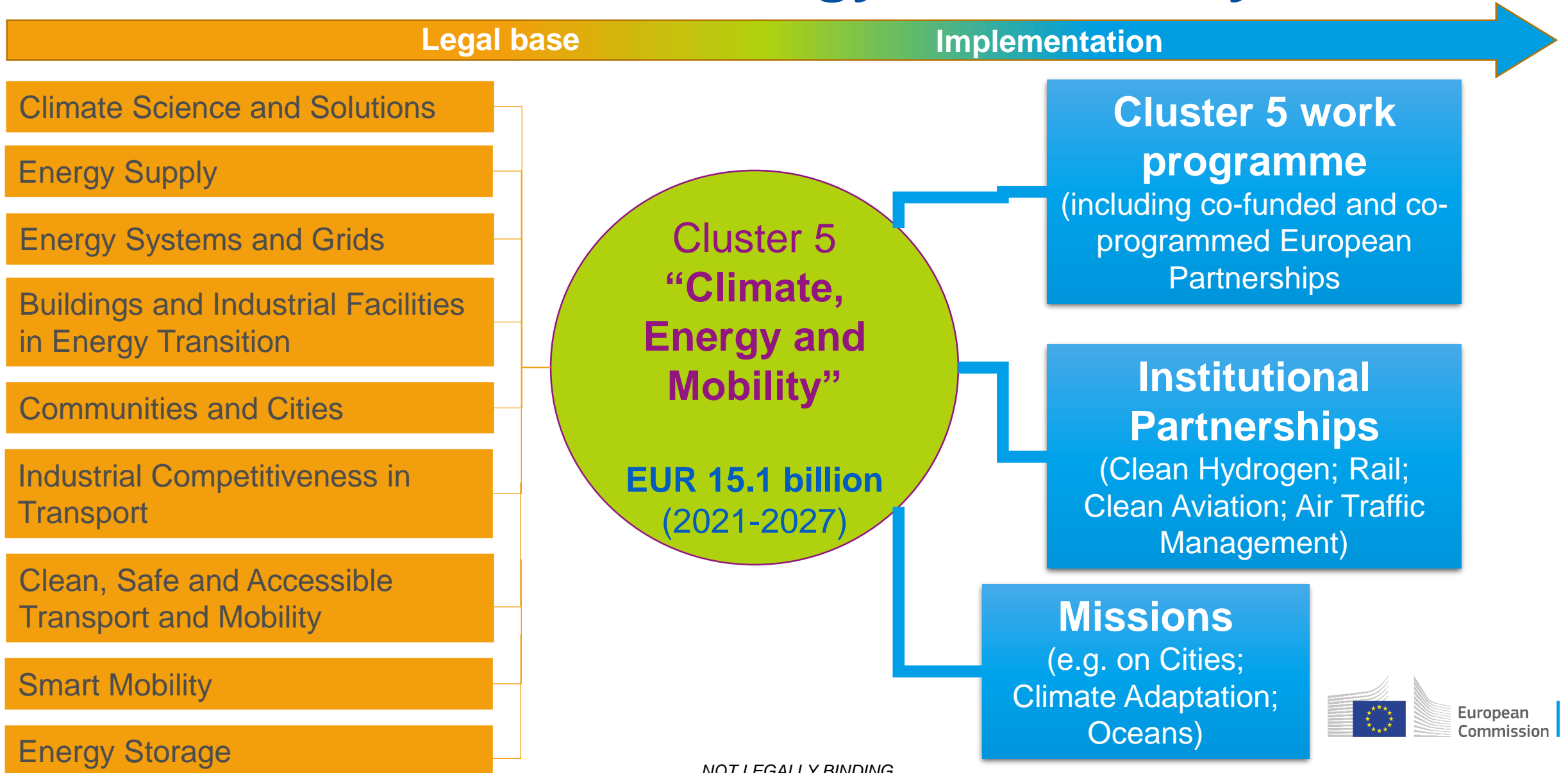
Political agreement December 2020
€ billion in current prices

- Excellent Science
- Global challenges and European ind. comp.
- Innovative Europe
- Widening Part and ERA

Novelties

- **European Innovation Council** : Support to innovations with breakthrough and disruptive nature and scale up potential that are too risky for private investors (70% of the budget earmarked for SMEs)
- **EU Missions** : Relating EU's research and innovation better to society and citizens' needs; with strong visibility and impact
- **European Partnerships** : Co-programmed, Co-funded, Institutionalised
- **International Cooperation**: Extended association possibilities, strengthened support to multilateral cooperation, openness to international participation balanced with the promotion of EU strategic autonomy

Cluster 5 - Climate, Energy and Mobility



Horizon Europe

Cluster 5, 'Climate, Energy and Mobility'

Destination - Sustainable, secure and competitive energy supply

Expected Impact:

“More efficient, clean, sustainable, secure and competitive energy supply through new solutions for smart grids and energy systems based on more performant renewable energy solutions”

1. *Fostering the European global leadership in affordable, secure and sustainable renewable energy technologies*
2. *Energy systems, grids and storage*
3. *Carbon capture, utilization and storage (CCUS)*
4. *Cross-cutting (ETIPs, SET Plan) and leveraging more public and private investments in clean energy systems (CET P)*

Global leadership in renewable energy technologies

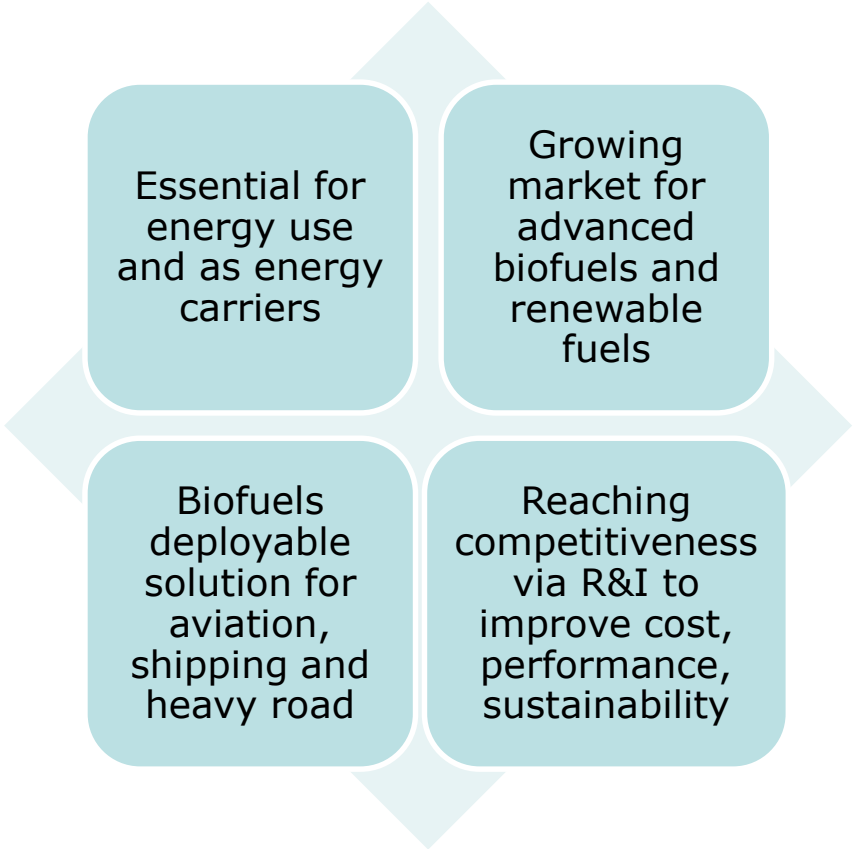
Climate,
Energy &
Mobility

- ❑ **Renewable energy technologies** provide major opportunities to replace or substitute carbon from fossil origin in the power sector, in heating/cooling, transportation, agriculture and industry
- ❑ **Advanced renewable fuels**, including synthetic and sustainable advanced biofuels, needed to provide long-term carbon-neutral solutions for the transport and energy-intensive industrial sectors

Main impacts for renewable energy and renewable fuel technologies

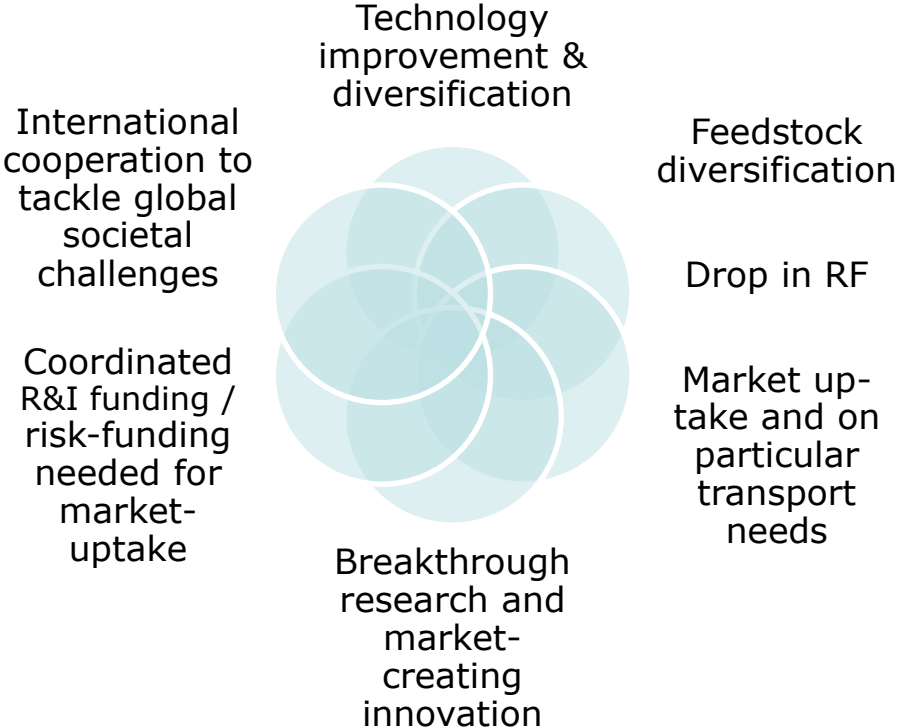
- ✓ Availability of disruptive technologies and systems in 2050
- ✓ Reduced cost and improved efficiency
- ✓ De-risking with a view to commercial exploitation of technologies
- ✓ Better integration in energy consuming sectors
- ✓ Reinforced European scientific basis and European export potential
- ✓ Enhanced sustainability of value chains
- ✓ More effective market uptake

Renewable fuels and intermediate carriers



Opportunities & Challenges

R&I Policy



Horizon Europe - Work Programme 2021-2022

Climate, Energy and Mobility - Renewable Energy

- Six calls for proposals between June 2021 and September 2022
- Improving and scaling up technology in advanced biofuels, synthetic renewable fuels and bioenergy
- Coupling of renewable electricity with biofuel and synthetic renewable fuel production
- Hybridization projects linking biofuels and renewable hydrogen production
- Systemic solutions and circular economy in a value chain approach
- Efficient integration of other RE technologies and CCS in biomass to energy conversion systems
- Gaseous, liquid and solid biomass and renewable energy intermediary carriers as linking elements for integrating renewable energies in the energy system and all energy consuming sectors both for energy use and energy storage
- Zero and negative emissions biofuel production and modern bioenergy

Work Programme 2021-2022 topics

Renewable fuels Topics: Advanced biofuels and renewable fuels of non-biological origin

- ✓ Hybrid catalytic conversion
- ✓ Carbon negative biofuel production
- ✓ Algal and non-biological renewable fuel technologies
- ✓ Biomethane production
- ✓ Viable advanced biofuel production
- ✓ Value chains for renewable fuels
- ✓ International cooperation for scale-up of sustainable biofuels
- ✓ Renewable energy technologies in agriculture and forestry for energy and waste needs
- ✓ Next generation of renewable energy technologies

Work Programme 2021-2022 topics

Bioenergy and Renewable energy carriers Topics

- ✓ Micro-CHP and hybrid heating systems
- ✓ Large-scale CHP technologies from biogenic residues and wastes
- ✓ Industrial and low-emission combustion and gasification from biogenic residues and wastes
- ✓ Renewable energy carriers for heating
- ✓ Renewable energy carriers from variable renewable electricity and carbon emissions
- ✓ Direct integration of renewable energy into chemical process energy
- ✓ Coupling solar fuel technologies to other renewables
- ✓ Artificial photosynthesis technologies

Other actions

- ✓ Studies on development of industrial capacity for drop-in advanced biofuels, pre-commercial procurements for commercial cargo-shipping and aviation advanced biofuels, prizes for development of renewable energy systems

EU Partnerships

Clean Energy Transition Partnership

- Co-funded Partnership with indicated budget contribution of MS and ACs ~ **€ 500 million** and of European Commission ~ **€ 210 million** - Calls for proposals under the CETP in 2022
- **Challenge-driven approach**, e.g. Storage, Fuels and CCUs, H&C technologies, Industrial systems

Zero Emission Waterborne Transport Partnership

- Co-Programmed Partnership with EU budget **€ 530 million** for 7 years and **€ 3.3 billion** private
- Zero-emission solutions for all main ship types and services by 2030 to enable zero-emission waterborne transport by 2050, e.g., use of renewable fuels and biofuels on board and bunkering in ports

Clean Aviation Partnership

- Institutionalized Partnership with indicated budget ~ **€ 4,5 billion** and EU contribution of ~ **€ 1,7 billion**
- **By 2030** low-emissions aircraft concepts making accelerated use of **sustainable fuels** and optimized green operations and by **2050** climate neutral aviation, by exploiting future technologies coupled with full deployment of sustainable aviation fuels and alternative energy carriers

EU Missions

- EU Missions are part of Horizon Europe, stemming from research and innovation, co-created by 9 EC services
- Horizon Europe provides initial funding of up to **€1.9 billion** for the first three years
- Missions directly support EU priorities of European Green Deal, the New European Bauhaus, Europe fit for the Digital Age, Europe's Beating Cancer Plan, EU's Long-term Vision for Rural Areas
- Each mission has a clear and concrete goal to be achieved by a fixed date
 - ✓ **Adaptation to Climate Change:** support at least 150 European regions & communities to become climate resilient by 2030, **€368.3 million** in seed funding from Horizon Europe
 - ✓ **Restore our Ocean and Waters by 2030 :** Network of lighthouses at sea and river basin scale, EU-wide 'Blue Parks' initiative, Effective water management, **€500 million** in seed funding from Horizon Europe, European Maritime Fisheries and Aquaculture Fund, Invest EU, other EU Programs
 - ✓ **100 Climate-Neutral and Smart cities by 2030:** Cities will prepare, sign and implement Climate City Contracts, co-created with citizens and local stakeholders, Global Knowledge Exchange Centre, **€320 million** in seed funding from Horizon Europe
 - ✓ **A Soil Deal for Europe:** living labs in regions all over Europe, International research consortium on soil carbon sequestration, Campaign on soil health by the European Innovation Partnership on Agriculture, **€320 million** in seed funding for 2021-23 by HE
 - ✓ **Cancer**

SET Plan Action 8

- SET Plan a **European platform** for aligning efforts with governments, industry and stakeholders to deliver technological innovation and align funding efforts at national and EU level for clean energy solutions to achieve EU energy and climate targets of the European Green Deal
- 14 SET Plan **Implementation Working Groups** under 10 **Actions** have established ambitious research and innovation targets to be reached in the next decade(s) in energy efficiency and low-carbon energy technologies
- **Action 8**, Bioenergy and Renewable Fuels for Sustainable Transport Implementation Plan
 - ✓ 5 strategic target areas – 14 specific targets on production performance, GHG savings and costs
 - ✓ 13 R&I activities covering advanced liquid and gaseous biofuels, other renewable liquid and gaseous fuels, renewable hydrogen production from water electrolysis, high efficiency large scale biomass cogeneration of heat and power, and intermediate solid, liquid and gaseous bioenergy carriers
 - ✓ Several technologies are progressing and lately a number of commercial plants have been built, e.g., pyrolysis bio-oil, lignocellulosic ethanol, electrolytic hydrogen
 - ✓ Challenges for target achievement are the market dependency on policy, demanding and time consuming capacity building, high capital investment cost
 - ✓ Targets will be updated to reflect the ambitions of “Fit for 55”



Thank you!

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