EU R&I policy for renewable energy carriers

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A European Green Deal

Striving to be the first climate-neutral continent

Commission

The EU will:

Become climate-neutral by 2050

Protect human life, animals and plants, by cutting pollution

Help companies become world leaders in clean products and technologies

Help ensure a just and inclusive transition

COM(2019) 640 final . The European Green Deal

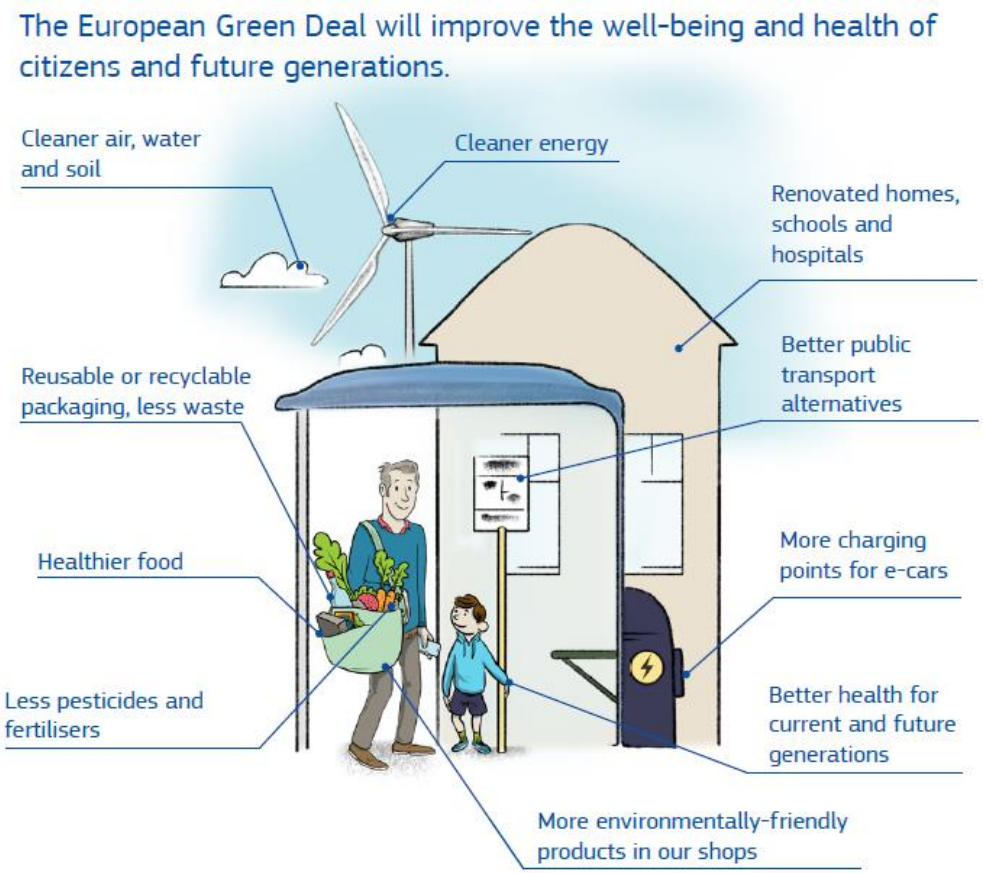
COM(2020) 21 final: Sustainable Europe Investment Plan; European Green Deal Investment Plan

COM(2020) 22 final: Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the Just Transition Fund

"Our commitment to become the words' first climate-neutral continent "

European Commission

European *Green Deal*



The role *of R & I*

- Fulfill the target for at least 55% GHG reduction in 2030
- Stimulate EU competitiveness being central in EU's ambitious new industrial strategy
- Reduce the carbon footprint in transport
  - ✓ **Renewable Fuels**
- Lead international collaboration for global emissions

European Green Deal EU Strategies

- **An EU Strategy for Energy System Integration COM(2020)299 final**
  - unlock the potential of sustainable biomass and biofuels, green hydrogen and synthetic fuels
- **A Hydrogen strategy for a climate-neutral Europe COM(2020)301 final**
  - create an industrial chain, boost demand in industry and mobility and promote R&I in clean hydrogen
- **EU Bioediversity Strategy for 2030 COM(2020)380 final**
  - restoring forests, soils and wetlands and creating green spaces in cities
- **Sustainable and Smart Mobility Strategy – putting European transport on track for the future COM(2020) 789 final**
  - By 2030 at least 30 million zero-emission vehicles in operation, high-speed rail traffic will double, carbon neutral collective travel of under 500 km, automated mobility deployed at large scale, zero-emission vessels ready for market
  - By 2035 zero-emission large aircraft ready for market
  - **FuelEU Maritime, ReFuelEU Aviation**, proposals for Regulation – planned Q1 2021

FuelEU Maritime

- Accelerate **uptake** of sustainable alternative fuels & power in operation and at berth in EU
- Liquid biofuels, e-liquids, decarbonized gas (bio-LNG, e-gas, etc.), decarbonized H2 and decarbonized H2-derived fuels (CH4, NH3,..)
- **Well-to-wake** approach for GHG from production and use of SAF, including CH4 slip
- Stimulate production on a larger scale and reduce the **price gap**
- Boost **demand** from ship operators to bunker alternative fuels or connect to grid at berth
- Avoid **carbon leakage**, imposing obligations on all ships trading in EU and calling EU ports
- Support **measures,** e.g. access to funding, differentiation of port fees, etc.
- Requirements on **blending/share** of SAF and/or shore-side electricity
- **Technology neutral** carbon-intensity of energy used in maritime

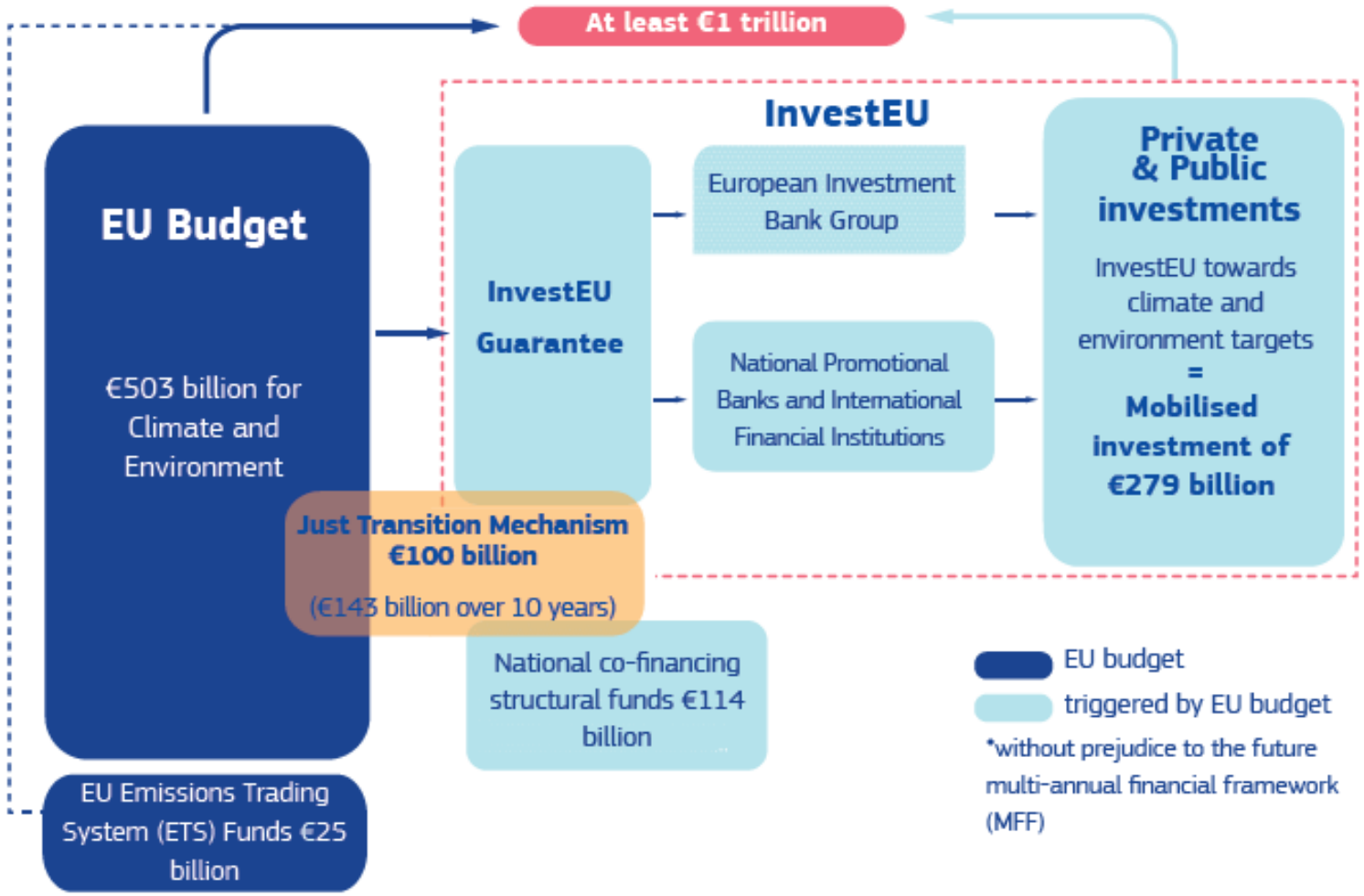
ReFuelEU Aviation

- Boost **supply and demand** for sustainable aviation fuels (advanced biofuels and electro-fuels) in the EU
- SAF **blending mandate** – suppliers and airlines (SAF in EU ~0.05% of total jet fuel)
- Revision of the RED II **multiplier** 1.2
- Central **auctioning mechanism**–producers bid at lowest price to supply a certain volume
- **Funding** mechanism through EU financial instruments
- A degree of prioritization of feedstock for SAF
- **Collaborative platform** to facilitate PAs of producers with airlines
- **Technical facilitation** to accompany producers along approval
- Support **initiatives** – Stakeholders coordination platform
- Monitoring

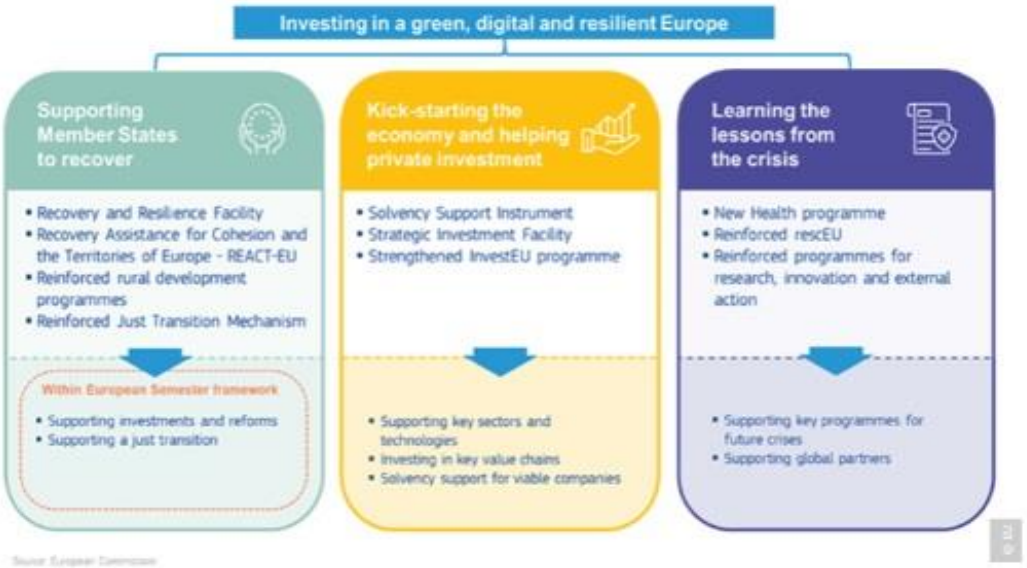
2030 Climate target plan implementation (2021)

Revision of the **EU Emissions Trading System** (ETS), including maritime, aviation and CORSIA
Carbon Border Adjustment Mechanism (CBAM)
Effort Sharing Regulation (ESR)
Amendment to the **Renewable Energy Directive** to implement the ambition of the new 2030 climate target
Amendment of the **Energy Efficiency Directive** to implement the ambition of the new 2030 climate target
Revision of the Regulation on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry (**LULUCF**)
Reducing **methane emissions** in the energy sector
Revision of the **Energy Tax Directive**
Revision of the **Directive** on deployment of **alternative fuels infrastructure**
Revision of the Regulation setting **CO2 emission performance standards** for new passenger cars and for new light commercial vehicles
Revision of the energy performance of **Buildings Directive**
Revision of the **Third Energy Package for gas** to regulate competitive decarbonised gas markets

WHERE WILL THE MONEY COME FROM?



Next Generation EU
A €750 billion recovery plan



1st pillar – Supporting Member States

- New Recovery and Resilience Facility
- Cohesion Policy
- Just Transition
- Agricultural Fund for rural development

2nd pillar – Supporting Industry

- Solvency Support Instrument
- InvestEU
- Green & digital transition
- Internal market

3rd pillar – Supporting R&I

- Horizon Europe +€13,5 B for health, resilience and green & digital transitions
- EU4Health
- EU Civil Protection Mechanism

NOT LEGALLY BINDING

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Horizon Europe

(*Political agreement 11 December 2020)*

- Total budget in current prices € 95,5 billion (€ 5,4 billion from NGEU)
- Global challenges €53,8 billion (€ 4,059 billion from NGEU)
- Climate, energy and mobility €15,218 billion (€1,353 billion from NGEU)
- Over 35% of HE for climate objectives

NOT LEGALLY BINDING

Horizon Europe

Cluster 5 'Climate, Energy and Mobility',

Expected Impact Strategic Plan 2021-2024*	Destination Cluster 5 work programme **
Transition to a climate-neutral and resilient society and economy enabled through advanced climate science, pathways and responses to climate change (mitigation and adaptation) and behavioural transformations.	1. Climate sciences and responses for the transformation towards climate neutrality
Clean and sustainable transition of the energy and transport sectors towards climate neutrality facilitated by innovative crosscutting solutions.	2. Cross-sectoral solutions for the climate transition
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.	3. Sustainable, secure and competitive energy supply
Efficient and sustainable use of energy, accessible for all is ensured through a clean energy system and a just transition.	4. Efficient, sustainable and inclusive energy use
Towards climate-neutral and environmental friendly mobility through clean solutions across all transport modes while increasing global competitiveness of the EU transport sector.	5. Clean and competitive solutions for all transport modes
Safe, seamless, smart, inclusive, resilient, climate neutral and sustainable mobility systems for people and goods thanks to user-centric technologies and services including digital technologies and advanced satellite navigation services.	6. Safe Resilient Transport and Smart Mobility services for passengers and goods

* Adoption by EC February 2021
**Adoption by EC April 2021

Horizon Europe

Cluster 5, 'Climate, Energy and Mobility')

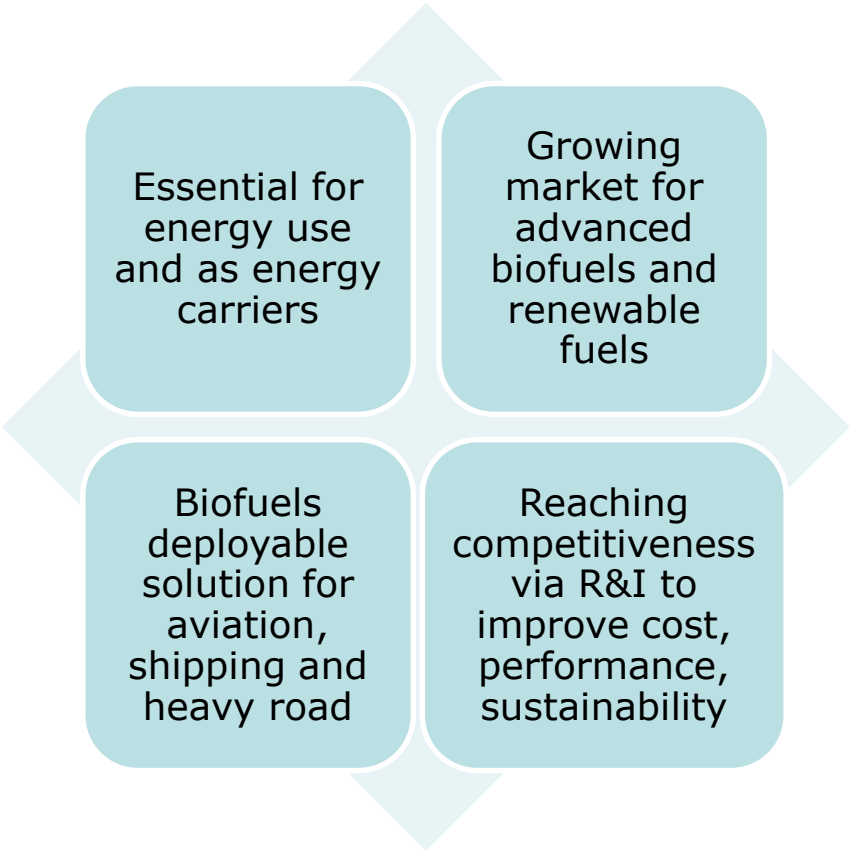
Destination : Sustainable, secure and competitive energy supply

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. *Global leadership in renewable energy technologies*
2. *Energy systems, grids and storage*
3. *Carbon capture, utilization and storage (CCUS)*
4. *Cross-cutting and leveraging more public and private investments in clean energy systems)*

Bioenergy, Biofuels, Renewable fuels



Opportunities & Challenges

R&I Policy

Technology improvement & diversification

International cooperation to tackle global societal challenges

Feedstock diversification

Drop in RF

Coordinated R&I funding / risk-funding needed for market-uptake

Market up-take and on particular transport needs

Breakthrough research and market-creating innovation

Bioenergy Biofuels Renewable fuels

- From wastes and residues (forest, agricultural, organic fraction of municipal and industrial wastes)
- From carbon content in flue gases
- From aquatic biomass
- From renewable energy (power, heat, sunlight) and CO2
- Bio-heat & power, bio CHP,
- Bio-liquids, biogas, bio CH4
- Liquid biofuels, RFNBOs
- Road, marine, aviation biofuels

H2020
WP2014-2020

400 million €

48 topics

- 20 RIAs,
- 11 IAs
- 7 MUM
- 10 Strategic Actions

- Supply chains
- Sustainability
- Market Uptake
- Standards, Public acceptance

Technologies

Thermochemical (pyrolysis, gasification, HTL, combustion)

Biochemical Chemical

Electro chemical

Photo chemical

Hydrothermal Liquefaction

Project Acronym	Project Title	Topic	Type	Subject area	Feedstock	End-product	Foreseen end-use in the project	EU Contribution €	Coordinator	Starting date	End date
Nr 727531 4REFINERY	Scenarios for integration of bio-liquids in existing REFINERY processes	LCE-08 2016	RIA	Biofuel	Lignocellulosic biomass	green gasoline and green diesel	road fuels	5965473,71	STIFTELSEN SINTEF, NO	01-05-2017	30-04-2021
Nr 764734 HyFlexFuel	Hydrothermal liquefaction: Enhanced performance and feedstock flexibility for efficient biofuel production	LCE-08 2017	RIA	Biofuel	miscanthus, algae, sewage sludge	biojet	aviation fuel	5038343,75	BAUHAUS LUFTFAHRT EV, DE	01-10-2017	30-09-2021
Nr 764675 Heat-To-Fuel	Biorefinery combining HTL and FT to convert wet and solid organic, industrial wastes into 2nd generation biofuels with highest efficiency	LCE-08 2017	RIA	Biofuel	agricultural, forest residues	biojet, biodiesel	aviation, road	4000000	GUSSING ENERGY TECHNOLOGIES GMBH, AT	01-09-2017	31-08-2021
Nr 818120 WASTE2ROAD	Biofuels from WASTE TO ROAD transport	RES-21 2018	RIA	Biofuel	organic fraction of municipal waste	biodiesel, biogasoline	road	4996155	SINTEF AS, NO	01-10-2018	30-09-2022
Nr 818413 NextGenRoadFuels	Sustainable Drop-In Transport fuels from Hydrothermal Liquefaction of Low Value Urban Feedstocks	RES-21 2018	RIA	Biofuel	urban feedstock	drop-in diesel and gasoline fuels	Road fuel	5074876,25	AALBORG UNIVERSITET	01-11-2018	31-10-2022
Nr 884111 BL2F	Black Liquor to Fuel by Efficient HydroThermal Application integrated to Pulp Mill	RES-23 2019	RIA	Biofuel	black liquor		Aviation, maritime	4999623,75	TAMPEREEN KORKEAKOULUSAATIO SR	01-04-2020	31-03-2023
Nr 884226 F-CUBED	Future Feedstock Flexible Carbon Upgrading to Bio Energy Dispatchable carriers	RES-16 2019	RIA	Bioenergy carriers	biogenic residues	intermediate bioenergy carriers with fuel characteristics	Balancing the power grid	4059707,5	TNO	01-05-2020	30-04-2023

Looking forward

- **Improving technology** in biofuels, bioenergy and renewable fuels, e.g.,
  - next generation technologies, algal fuels, novel catalysis, artificial photosynthesis, etc.
- **Coupling of renewable electricity and/or renewable hydrogen production and/or CCS** in bioenergy conversion systems with biofuel & renewable fuel production, e.g.,
  - efficient production with negative carbon emissions, renewable energy carriers from renewable electricity surplus and CO2, etc.
- **Bioenergy** solutions and **circular economy** in a value chain approach, e.g.,
  - integration in existing industrial plants, complete value chains, gasification of biogenic residues and wastes, etc.
- Efficient **integration of other RE technologies**, e.g.,
  - hybrid heating systems, renewable energy integration in industrial processing, agriculture, etc.
- Gaseous, liquid and solid **biomass intermediary carriers** are the linking elements for integrating bioenergy in the energy system and all energy consuming sectors, e.g.,
  - biomethane, renewable energy carriers for heating, etc.

Clean Energy Transition CoFund Partnership

- SRIA published November 2020[1]
  - clean and affordable energy production and conversion technologies
  - climate neutral, flexible and robust energy system
  - storage and its integration in the energy system
  - resource and energy efficiency and circular flows in the energy sector
  - a just and inclusive energy transition; sector integration and coupling; and digital transformation
- Pool national and regional resources/funding programs
  - enabling the transition of the built environment, transport, industry and other sectors to clean, low carbon energy
  - implementing annual joint calls for proposals resulting in grants to third parties with EU co-funding

[1] https://eranet-smartenergysystems.eu/global/images/cms/CETP/CETP_SRIA_v1.0_endorsed.pdf

European Commission

Thank you!

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http://ec.europa.eu/research