Renewable Energy Sources
DG Research & Innovation
EUROPEAN COMMISSION

Paving the way towards clean energy and fuels in Europe, Lisbon, 29 May 2019
Energy and Climate Policy

Paris agreement
Energy Union
Sustainable Development
"Clean Energy for all Europeans"

Paris Agreement
Holding global average temperature to well below 2°C
Accelerating, encouraging and enabling innovation is crucial...

Other EU policy priorities
- Digital Single Market
- Jobs, Growth and Investments
- EU as a strong global actor
- Sustainable Development
- ...

Agreed headline targets

<table>
<thead>
<tr>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20% Greenhouse Gas Emissions</td>
<td>≥ - 40% Greenhouse Gas Emissions</td>
</tr>
<tr>
<td>20% Renewable Energy</td>
<td>≥ 27% Renewable Energy</td>
</tr>
<tr>
<td>20% Energy Efficiency</td>
<td>≥ 27%* Energy Efficiency</td>
</tr>
<tr>
<td>10% Interconnection</td>
<td>15% Interconnection</td>
</tr>
</tbody>
</table>

New governance system + indicators

Adapted from UNFCCC, Synthesis report of INDCs, May 2016

NOT LEGALLY BINDING
Research & Innovation Policy

Horizon 2020
Horizon Europe
SET Plan
Research Policy Framework
Horizon 2020 (2014-2020) €70,2 billion

- H2020-Energy Challenge budget EUR 5,7 billion
- H2020 total Energy budget
- ~ EUR 8.5 billion, 11,4%

✓ Additional energy-related spending in H2020 outside Energy Challenge: ~ 50% of the Energy Challenge budget
Horizon Europe (2021-2027): € 100 billion

Support the creation and diffusion of high-quality knowledge

Strengthen the impact of R&I in supporting EU policies

Foster all forms of innovation and strengthen market deployment

Optimise the Programme’s delivery for impact in a strengthened ERA

Pillar 2
Global Challenges & Industrial Competitiveness:
boosting key technologies and solutions underpinning
EU policies & Sustainable Development Goals

Pillar 1
Open Science
- European Research Council
- Marie Skłodowska-Curie Actions
- Research Infrastructures

Pillar 2
Global Challenges and Industrial Competitiveness
- Health
- Inclusive and Secure Society
- Digital and Industry
- Climate, Energy and Mobility
- Food and natural resources
- Joint Research Centre

Pillar 3
Open Innovation
- European Innovation Council
- European innovation ecosystems
- European Institute of Innovation and Technology

Clustering
implemented through usual calls, missions & partnerships

<table>
<thead>
<tr>
<th>Clusters</th>
<th>Budget (€ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>€ 7.7</td>
</tr>
<tr>
<td>Inclusive and Secure Societies</td>
<td>€ 2.8</td>
</tr>
<tr>
<td>Digital and Industry</td>
<td>€ 15</td>
</tr>
<tr>
<td>Climate, Energy and Mobility</td>
<td>€ 15</td>
</tr>
<tr>
<td>Food and Natural Resources</td>
<td>€ 10</td>
</tr>
<tr>
<td>Joint Research Centre</td>
<td>€ 2.2</td>
</tr>
</tbody>
</table>

Supporting the European Research Area

- Sharing excellence
- Reforming and Enhancing the European R&I system

Joint Research Centre
supports European policies with independent scientific evidence &
technical support throughout the policy cycle
The Implementation Plans by country

SUSTAIN TECHNOLOGICAL LEADERSHIP IN RENEWABLES (1 AND 2)
- Solar Photovoltaics (PV) IP
- Concentrated Solar Power / Solar Thermal Electricity (CSP/STE) IP
- Offshore Wind Energy IP
- Deep Geothermal Energy IP
- Ocean Energy IP

A SMART CONSUMER-CENTRIC ENERGY SYSTEM
- Smart Solutions for Energy Consumers IP (3.1)
- Towards Positive Energy Districts for Sustainable Urbanisation IP (3.2)
- Energy Systems IP (4)

DEVELOP AND STRENGTHEN ENERGY EFFICIENT SYSTEMS
- Energy Efficiency in Buildings IP (5)
- Energy Efficiency in Industry IP (6)

ENERGY OPTIONS FOR SUSTAINABLE TRANSPORT SYSTEMS
- Batteries for E-Mobility and Stationary Storage IP (7)
- Renewable Fuels and Bioenergy IP (8)

CCUS
- Carbon Capture Utilisation and Storage IP (5)

SET Plan delivering results, SET Plan 2018 Edition
National R&I Expenditure

SET Plan Investments

NATIONAL R&D EXPENDITURE PER SET PLAN ACTION (2012-2016) [EUR MILLION]

Set Plan delivering results, Set Plan 2018 Edition

• In 2030 more than EUR 20 billion aggregated investments in R&I
• Part of wider effort to decarbonize EU energy system

EXPECTED VOLUME OF INVESTMENTS IN R&I ACTIVITIES AS IDENTIFIED IN THE IMPLEMENTATION PLANS (EUR MILLION)

Set Plan delivering results, Set Plan 2018 Edition

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Energy Financing in the Energy Union

Investment Plan for Europe
European Structural & Investment Funds
Horizon 2020
Horizon Europe
Digital Europe Programme
Innovation Fund
EU Finance for Innovators
Bioenergy, biofuels & renewable fuels

Opportunities & challenges
R&I strategy
R&I portfolio
Opportunities & Challenges

- Essential for both energy storage and use
- Biofuels deployable solution for aviation and shipping
- Reaching competitiveness via R&I to improve cost, performance and sustainability

R&I Strategy

- Technology improvement and diversification
- Feedstock diversification
- Market up-take and on particular transport needs
- Breakthrough research and market-creating innovation
- International cooperation to tackle global societal challenges
H2020 topics
Secure Clean and Efficient Energy

48 topics from 2014 to 2020
- 20 RIAs,
- 11 IAs
- 7 MuM
- 10 Strategic Actions

68 projects from 2014 to 2018
~350 million

- Next generation technologies for biofuels and sustainable alternative fuels
- Demonstrating advanced biofuel technologies
- Next generation technologies for renewable electricity and heating/cooling
- Renewable energy solutions for energy system implementation
- Market Uptake Support
- Supporting the development of a European research area in the field of energy

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Key messages

A vast portfolio of technologies and value chains
Support at all TRL & value chains including new
Flexibility of installations
Collaboration across EU and internationally
Understanding early innovation potential
Ensuring financing at later stages
Regional approach and clustering of market players
Thank you for your attention!

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