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# **ERA THEMATIC DOSSIER ON CLIMATE ACTION IN HORIZON 2020**

## IMPRINT

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## CONTENT

# ERA THEMATIC DOSSIER ON CLIMATE ACTION IN HORIZON 2020

<b>1</b>	<b>INTRODUCTION AND OBJECTIVES</b>	<b>4</b>	<b>5</b>	<b>AUSTRIA'S PERFORMANCE</b>	<b>38</b>
			5.1	Call results in climate-relevant research 2014-2017	39
<b>2</b>	<b>EXECUTIVE SUMMARY</b>	<b>8</b>	5.2	Austrian performance in climate-relevant projects	43
<b>3</b>	<b>POLICY CONTEXT</b>	<b>12</b>			
3.1	The global perspective	13	<b>6</b>	<b>CONCLUSIONS AND OUTLOOK</b>	<b>48</b>
3.2	The European perspective	16	6.1	Conclusions	49
3.3	The Horizon 2020 perspective	18	6.2	Recommendations	51
3.4	The Austrian perspective	20			
			<b>7</b>	<b>LIST OF ABBREVIATIONS</b>	<b>54</b>
<b>4</b>	<b>CLIMATE ACTION IN HORIZON 2020</b>	<b>24</b>			
4.1	Which research fields are funded in Horizon 2020, and where?	27			
4.2	Climate research as a bottom-up priority action	30			
4.3	Complementarity with relevant partnership initiatives	31			



# 1 INTRODUCTION AND OBJECTIVES

**Climate change<sup>1</sup> is one of the major challenges currently facing humanity. It is a global, complex challenge with not only global but also regional and local implications, and thus simultaneously demands both global cooperation and local action.**

**C**limate action, i.e. the strategies, plans and activities undertaken at international, national and local level to mitigate, adapt to and understand climate change, is one of the central policies of the European Union (EU) with its highly ambitious targets for 2020 and 2030 as adopted by the EU leaders in 2014.

It is obvious that research and innovation must play a major role in order to achieve such transformations. This is one reason why the European Commission (EC) has set the goal of spending at least 20% of the entire EU budget on climate action<sup>2</sup>. Horizon 2020, the European Framework Programme for Research and Innovation for the years 2014 to 2020, also includes a target of at least 35% of the total Horizon 2020 budget for climate action<sup>3</sup>.

This Thematic Dossier takes a closer look at the budget committed to climate action in Horizon 2020 to date (i.e. calls for proposals in 2014-2017). More importantly, it reviews the thematic areas of climate action and climate change research supported by the work programmes within Horizon 2020, predominantly Pillar 3, "Societal Challenges". Furthermore, we look at the complementarity of Horizon 2020 funding with related Partnership Initiatives, such as Joint Programming Initiatives (JPI).

**Horizon 2020 should spend at least 35% of its budget on climate action.** 

**The observations in this Thematic Dossier are steered by the following guiding questions:**

- To what extent has the Horizon 2020 objective, namely to spend 35% of the total budget on climate action, been achieved?
- Which national and international research priorities are covered by Horizon 2020?
- How do Austrian institutions perform in this regard?
- What recommended courses of action for the relevant work steps at the European and national level can be derived from this stocktaking?

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1 "Climate change" refers to any long-term change in Earth's climate, or in the climate of a region or city. This includes warming, cooling and changes besides temperature. In contrast, "Global warming" refers to the long-term increase in Earth's average temperature. We use the term Climate Change in this document to refer to the phenomenon, and the term "Climate Action" to refer to the effort to mitigate, adapt and understand Climate Change.

2 [https://ec.europa.eu/clima/policies/budget\\_en](https://ec.europa.eu/clima/policies/budget_en)

3 Regulation 1291/2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020), p.2 §10, <http://tinyurl.com/h2020-reg>

**Climate action includes:**

- Mitigating climate change (helping to cut greenhouse gas emissions)
- Adapting to the impact of climate change by building resilience to phenomena such as flooding, droughts and other extreme weather events
- Contributing to understanding the causes of climate change

**Activities contributing to climate action are varied and can include any of the following:**

- Energy efficiency, energy savings or energy recovery in any sector;
- Renewable non-fossil energy (e.g. wind, solar, aero-thermal, geothermal, hydrothermal, ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas, biogases) & related infrastructure including energy storage and 'smart grids';
- Low-carbon technologies, manufacturing processes, goods & services;
- Carbon capture & storage;
- Reducing road & air traffic emissions; encouraging cycling, walking & use of public transport systems, inland waterways & short sea shipping;
- Biological sequestration/conservation of CO<sub>2</sub> emissions (e.g. afforestation, re-vegetation, forest/cropland management, reduced tillage, soil maintenance/remediation), including sinks & reservoirs of greenhouse gases (e.g. soil, peatlands, wetlands, forests);
- Eliminating or substantially reducing emissions of other greenhouse gases such as methane, N<sub>2</sub>O, PFCs, HFCs, SF<sub>6</sub> & NF<sub>3</sub>;
- Building resilience & reducing vulnerability to climate-related disasters (heatwaves, floods, extreme weather events, etc.), covering any sector including transport, energy, supply chains, communication networks & other infrastructure, planning, insurance; risk prevention & risk/disaster management, ICT for early warning systems;
- Combating heat effects &/or adapting to drought, including water efficiency measures;
- Strengthening coastal defences against erosion, storm surges & sea level rises;
- Taking advantage of any opportunities that may arise as a result of climate change;
- Integrating climate change concerns in specific policy activities, developing capacity, strengthening the regulatory & policy framework;
- Socioeconomic issues associated with climate change options, such as behavioural patterns, societal acceptance & barriers to uptake of policies or technologies;
- Understanding climate change processes &/or effects, including sea ice/ice sheet/glaciers, permafrost, air and sea surface temperatures, precipitation, biodiversity loss, movement or distribution of plant/fish/animal species, ocean acidity, crop yields, hydropower potential, seasonal tourism patterns, habitats for disease vectors, etc.

SOURCE\*: PARTICIPANT PORTAL H2020 ONLINE MANUAL

\* Texts in boxes in this Thematic Dossier are complete quotes from the sources mentioned. The sources were visited and quoted as of February 2018.



This Thematic Dossier  
takes a closer look at the  
budget committed to  
climate action in Horizon  
2020 to date (2014 – 2017).



# 2 EXECUTIVE SUMMARY





**C**limate change is undoubtedly a complex global challenge. Immediate action is needed at global, regional and local level to address and minimise its impact as far as possible.

Many global and EU policy initiatives have been established to combat climate change. The United Nations Framework Convention on Climate Change (UNFCCC) provides the foundation for multilateral action on a global scale. These global endeavours have gained new impetus with the adoption of the 2015 Paris Agreement which, for the first time, brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, offering enhanced support to assist developing countries to do so.

Tackling climate change and fostering sustainable development are two mutually reinforcing sides of the same coin; sustainable development cannot be achieved without climate action. This is why many of the 17 Sustainable Development Goals, which pursue the general objectives of eradicating poverty, protecting the planet and ensuring prosperity for all, also address the core drivers of climate change.

The European Union has been a very active player in international climate negotiations, both with respect to adopting the UNFCCC but most importantly the Paris Agreement. The European Union has a comprehensive legislative framework and an ambitious strategic plan in place for progressively reducing its greenhouse gas emissions up to 2050. The key EU climate and energy targets are set out in the 2020 climate and energy package, and the 2030 climate and energy framework.

In the process of adopting these internationally agreed measures to combat climate change, science and research are a key player and represented at the global level by the Intergovernmental Panel on Climate Change (IPCC). The significance of the IPCC in the global climate change governance framework is made apparent by the fact that it preceded even the UNFCCC. IPCC assessments provide a scientific basis for governments at all levels to develop climate-related policies, and they underlie negotiations at UNFCCC.

The European Union has also recognised the important role research and innovation plays in climate action by defining a cross-cutting target for “climate-related expenditure [to] exceed 35% of the overall Horizon 2020 budget, including mutually compatible measures improving resource efficiency” in the Regulation establishing Horizon 2020, the Framework Programme for Research and Innovation (2014-2020). The Directorate-General for Research and Innovation (DG RTD) has taken on the task of monitoring this target and providing information on climate-related expenditure under Horizon 2020.

### Research and innovation plays an important role in climate action.

In order to do so, DG RTD has developed a methodology which builds on the so-called „Rio markers“ developed by the OECD which are used for tracking climate-related expenditure across all the EU’s funding programmes.

For those parts of Horizon 2020 with a thematic focus (e.g. Societal Challenges), the Rio marker was assigned at the level of the work programme’s topics. Each topic is assigned a 0%, 40% or 100% coefficient that matches the corresponding qualitative Rio marker category. This is then applied to the EC contribution to the individual projects in such topics in order to achieve a quantitative result. For bottom-up actions (e.g. European Research Council, Marie Skłodowska-Curie) the coefficients have been allocated at individual project level.

The European Commission has provided the FFG with the raw data for all funded projects with the coefficients for climate protection. These raw data were combined with the H2020 participation data (eCorda, dataset October 2017) and jointly analysed.

## CLIMATE ACTION RESEARCH IN HORIZON 2020

The broad thematic approach of the Climate Change Centre Austria (CCCA), ranging from “classic” climate research in the natural sciences to looking into the causes and effects of climate change from socio-economic perspectives, as well as from the point of view of the humanities, was the basis for developing its interdisciplinary, national Science Plan for climate research. In this Thematic Dossier the CCCA’s Science Plan, which follows the structure of the IPCC’S Assessment Reports, is understood as a proxy for an Austrian climate research agenda and was used to correlate activities in Horizon 2020 with priorities identified in the Science Plan.

## The Societal Challenges provide most of the funding in climate-relevant projects.

The analysis shows that even though half of Horizon 2020 is already over, and more than €26 billion in EU funding is contractually bound, the climate-relevant expenditures reach only 29.8%. The set goal has not yet been reached.

Most of the climate-related funding comes from Pillar 3 of Societal Challenges, and in particular from Bio-economy (SC2), Energy (SC3), Transport (SC4) and the Environment (SC5). In key Horizon 2020 programmes, such as the European Research Council (15%) or basic and industrial technologies (18.6%), climate-related expenditure is still far off its target.

Most projects are funded under the themes of mitigation and adaptation (notably in Energy and Transport). The research into factors influencing the impact of climate change on the environment and society is promoted only in individual programme lines and with little money (in particular in Societal Challenge 5, ‘Environment’ and in the European Research Council). Research topics V „Social Transformation Processes” of the CCCA Science Plan and Research Area VI „Interdisciplinary and Transdisciplinary Subject Areas” are barely supported.

## AUSTRIAN PERFORMANCE

Austria is involved in 552 projects related to climate action, while coordinating 120 of those with 883 participations. There is around €243 million of climate-relevant funding flowing to Austria, with the bulk of the funding coming from climate-relevant projects originating in the Societal Challenges, and especially in SC3 ‘Energy’ (every third euro received comes from this programme line), SC4 ‘Transport’, and to a lesser extent from SC5 ‘Environment’ and SC2 ‘Food’. Significant amounts are also coming from the ERC and the Marie-Sklodowska-Curie actions, as well as from ICT and ‘Advanced Manufacturing’.

Austrian organisations are performing better, with the projects and topics being increasingly climate-relevant. A considerably larger part of the overall budget goes to Austrian participants in climate-focused projects than it does in general. Furthermore, organisations from Austria more often choose to take on the coordinator role in climate-focused topics compared to projects in general.

It can be concluded that the Austrian climate action community participating in Horizon 2020 is really strong; not only compared to that of other countries (ranked 7th in number of coordinators in climate-focused topics in the Societal Challenges) but also compared to the overall participants from Austria (3.36% of all coordinators from Austria in climate-focused topics compared to 2.46% in H2020 in general).

Five recommendations have been formulated following the insights from the analysis.



The Austrian climate action community participating in Horizon 2020 is really strong, performing better with increasing climate-relevance of topics and projects.

# 3 POLICY CONTEXT



**Research funding and priority setting for climate research and climate action are embedded in a multifaceted landscape of legislation, policies, agreements, commitments and agendas. To understand and analyse the thematic areas being funded under Horizon 2020 and nationally, we need to summarise this policy context.**

## 3.1 THE GLOBAL PERSPECTIVE

**T**he planetary nature of climate change demands a global approach to understanding the phenomenon and agreeing on actions to combat its impacts. There is a set of legislative instruments in place at United Nations level for the global governance of climate change. Research plays a major role in this governance framework, through the Intergovernmental Panel on Climate Change (IPCC).

The three main global legal instruments are the 1992 United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the Paris Agreement which was adopted in Paris on 12 December 2015.

### UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

The UNFCCC provides the foundation for multilateral action to combat climate change and its impacts on humanity and ecosystems. The 1997 Kyoto Protocol and the 2015 Paris Agreement were negotiated under the UNFCCC and build on it.

The objective of the UNFCCC is to “stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”<sup>4</sup>. The UNFCCC sets out a framework and a process for agreeing specific actions over time—a starting point for further action in the future. It establishes a framework of general principles and institutions, and sets up a process through which governments meet regularly to discuss climate change action.

### KYOTO PROTOCOL

The Kyoto Protocol, adopted on 11 December 1997, operationalises the UNFCCC by committing industrialised countries to limiting and reducing GHG emissions in accordance with agreed individual targets. The Kyoto Protocol is based on the principles and provisions of the UNFCCC and follows its annex-based structure. It only binds developed countries, and places a heavier burden on them under the principle of “common but differentiated responsibility and respective capabilities”, because it recognises that they are largely responsible for the current high levels of GHG emissions in the atmosphere. Many countries were allowed to increase pollution, including all those in the developing world. Most controversially, Kyoto introduced mechanisms such as carbon trading to help countries meet their targets in „flexible“ ways (often in other countries) rather than by making cuts at home.

The Protocol’s first commitment period started in 2008 and ended in 2012. A second commitment period was agreed in 2012, known as the Doha Amendment to the Protocol, in which 37 countries have binding targets, including the 28 Member States (MS) of the EU. However, as of February 2018, the Doha Amendment has still not entered into force as only 109 out of a needed 144 quorum of countries that are parties to the Kyoto Protocol have ratified it.

This stalling of the Kyoto Protocol process, together with widespread criticism of the Protocol, paved the way for the Paris Agreement. Interestingly enough, the Kyoto Protocol has been criticised from both sides<sup>5</sup>, as being too ambitious and “growth impeding” while putting too much burden on developed countries on the one hand,

<sup>4</sup> <http://newsroom.unfccc.int/>

<sup>5</sup> Gupta, S.; et al. (2007), “13.3.1 Evaluations of existing climate change agreements.”, [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg3/en/ch13s13-3-1.html](http://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch13s13-3-1.html)

and as not ambitious enough, and offering a way for developing countries to “buy their way out” of greenhouse gases (GHG) emissions reductions through its market-based mechanisms<sup>6</sup> on the other.

## PARIS AGREEMENT

Mounting public pressure, as well as recognition of the severity of the problem by major national governments including the United States and China, and with the leadership of the EU, the Paris Agreement was adopted on 12 December 2015. For the first time the Paris Agreement unifies all nations in a common cause, to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries in doing so.

The Paris Agreement’s central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase even further to 1.5°C. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change. To reach these ambitious goals, appropriate financial flows, a new technology framework and an enhanced capacity-building framework will be put in place, thus supporting action by developing countries and the most vulnerable countries, in line with their own national objectives. The Agreement also provides for enhanced transparency of action and support through a more robust transparency framework<sup>7</sup>.

The Paris Agreement requires all parties to put forward their best efforts through “nationally determined contributions” (NDCs) and to strengthen these efforts in the years ahead. This includes requirements that all parties report regularly on their emissions and on their implementation efforts<sup>8</sup>.

## INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)<sup>9</sup>

Science and research are regarded as a key player by the Intergovernmental Panel on Climate Change (IPCC) in the process of adopting internationally-agreed measures to combat climate change. The significance of the IPCC in the global climate change governance framework is made apparent by the fact that it preceded even the UNFCCC.

The IPCC is the international body for assessing the science related to climate change. It was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) to provide policymakers with regular assessments of the scientific basis for climate change, its impacts and future risks, and options for adaptation and mitigation.

The IPCC embodies a unique opportunity to provide rigorous and balanced scientific information to decision-makers because of its scientific and inter-governmental nature. IPCC assessments provide a scientific basis for governments at all levels to develop climate-related policies, and they underlie negotiations at the UNFCCC. IPCC assessments are written by hundreds of leading scientists who volunteer their time and expertise. They undergo multiple rounds of drafting and review to ensure they are comprehensive and objective and produced in an open and transparent way.

The IPCC works by assessing published literature. It does not conduct its own scientific research, which makes funding for climate research nationally and internationally even more pertinent.

The authors producing the reports are currently grouped in three working groups:

- Working Group I: Physical Science Basis;
- Working Group II: Impacts, Adaptation and Vulnerability;
- Working Group III: Mitigation of Climate Change;
- and the Task Force on National Greenhouse Gas Inventories (TFI)

IPCC Assessment Reports<sup>10</sup> cover the full scientific, technical and socioeconomic assessment of climate change, generally in four parts – one for each of the Working Groups plus a Synthesis Report. The IPCC is currently in its Sixth Assessment cycle. During this cycle, the Panel will produce three Special Reports, a Methodology Report on national greenhouse gas inventories and the Sixth Assessment Report (AR6). The AR6 Synthesis Report will be finalised in 2022 in time for the first UNFCCC global stocktake when countries will review progress towards their goal of keeping global

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6 Under the Protocol, countries must meet their targets primarily through national measures. However, the Protocol offers them an additional means to meet their targets by way of three market-based mechanisms:

- International Emissions Trading
- Clean Development Mechanism (CDM)
- Joint implementation (JI)

See: [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php)

7 Further information on key aspects of the Agreement can be found on <http://bigpicture.unfccc.int/#content-the-paris-agreement>.

8 Further information on NDCs can be found on [http://unfccc.int/focus/ndc\\_registry/items/9433.php](http://unfccc.int/focus/ndc_registry/items/9433.php).

9 Source: “IPCC Factsheet: What is the IPCC?”, [http://www.ipcc.ch/news\\_and\\_events/docs/factsheets/FS\\_what\\_ipcc.pdf](http://www.ipcc.ch/news_and_events/docs/factsheets/FS_what_ipcc.pdf)

10 Access the full reports of the 5th cycle under: <http://www.ipcc.ch/report/ar5/>

warming to well below 2°C while pursuing efforts to limit it to 1.5°C. The three Working Group contributions to AR6 will be finalised in 2021.

### SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs) are the common name for the seventeen goals set by the UN Member States and included in the 2030 Agenda. This agenda was adopted by the UN in September 2015 after two years of negotiations including both governments and civil society. It defines targets for each SDG to be reached by 2030. There are 169 targets, common to all committed countries. They pursue the general objectives of eradicating poverty, protecting the planet and ensuring prosperity for all.

The 2030 Agenda also establishes an international review process, whereby states are expected to report on their progress toward the targets. Set up at individual state level, implementation of the SDGs calls for the active involvement not only of governments but all relevant actors (companies, civil society, academia, etc.).

The 17 Sustainable Development Goals have been assigned short names for ease of communication. The targets assigned to each SDG help to be more specific about their purpose. The short titles of the 17 SDGs adopted by the United Nations are shown in Figure 3.1 below.

**SDG13 'Climate Action' is, of course, the dedicated global goal for combating climate change, however SDG11 and SDG7 are also highly relevant.**

- Goal 13 'Take urgent action to combat climate change and its impacts' involves five targets including
- Strengthening resilience and adaptive capacity against natural disasters and hazards,
- Integrating climate change measures into national policies, strategies and planning,
- Improving education, awareness-raising and human and institutional capacity on climate action,
- Implementing the commitment to operationalise the Green Climate Fund by mobilising USD 100 billion annually by 2020 to address the needs of developing countries, and
- Promoting mechanisms for raising capacity for effective climate change-related planning and management in the least developed countries<sup>11</sup>.



Figure 3.1 – Sustainable Development Goals | Source: United Nations, <http://www.un.org/sustainabledevelopment/news/communications-material/>

<sup>11</sup> <http://www.un.org/sustainabledevelopment/climate-change-2/>

The definition of Goal 13 acknowledges that the UNFCCC is the primary international, intergovernmental forum for negotiating the global response to climate change.

Goal 11 to 'Make cities inclusive, safe, resilient and sustainable' also includes a climate action-relevant target, namely to "substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels"<sup>12</sup>, by 2020.

Similarly, Goal 7 to 'Ensure access to affordable, reliable, sustainable and modern energy for all' aims, amongst others, to a) increase substantially the share of renewable energy in the global energy mix, and b) double the global rate of improvement in energy efficiency, by 2030<sup>13</sup>.

Tackling climate change and fostering sustainable development are two mutually reinforcing sides of the same coin; sustainable development cannot be achieved without climate action. This is why many of the SDGs address the core drivers of climate change.

## 3.2 THE EUROPEAN PERSPECTIVE

The European Union has been a very active player in the international climate negotiations, both towards the adoption of the UNFCCC but most importantly for the recently adopted Paris Agreement<sup>14</sup>.

The European Union has a comprehensive legislative framework and an ambitious strategic plan in place for progressively reducing its greenhouse gas emissions up to 2050. The key EU climate and energy targets are set out in the:

- 2020 climate and energy package, and the
- 2030 climate and energy framework

These targets are defined in order to put the EU on its path to achieving the transformation towards a low-carbon economy as detailed in its 2050 low-carbon roadmap.

### 2020 CLIMATE & ENERGY PACKAGE<sup>15</sup>

As early as 2007 EU leaders agreed on a set of targets to reduce GHG emissions and increase renewable ener-

gy use and energy efficiency by 2020, the so-called 2020 climate & energy package. The 2020 package was then enacted in the form of binding legislation in 2009.

The package sets out three key targets:

- 20% cut in greenhouse gas emissions (from 1990 levels)
- 20% of EU energy from renewables
- 20% improvement in energy efficiency

In 2010 the targets were also chosen **as headline targets of the Europe 2020 strategy**<sup>16</sup> for smart, sustainable and inclusive growth, and represent one of the overall targets for the European Union and its programmes as a whole.

As the 2020 package was originally part of the EU's commitment to the Kyoto Protocol<sup>17</sup>, a major tool for achieving the targets is the EU emissions trading system (ETS), used to cut greenhouse gas emissions from large-scale facilities in the power and industry sectors, as well as the aviation sector. The ETS was intended to cover around 45% of the EU's greenhouse gas emissions.

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12 <http://www.un.org/sustainabledevelopment/cities/>

13 <http://www.un.org/sustainabledevelopment/energy/>

14 Gupta J. & Grubb M.J. (eds); "Climate Change and European Leadership: A Sustainable Role for Europe?", Volume 27 of Environment & Policy, 2013

15 Source: [https://ec.europa.eu/clima/policies/strategies/2020\\_en](https://ec.europa.eu/clima/policies/strategies/2020_en)

16 See: <https://publications.europa.eu/s/c2jg>

17 The Kyoto targets differ from the EU's own 2020 targets – they:

- cover different sectors – for instance, land use, land use change & forestry (LULUCF) but not international aviation
- measure against different years (base years) – not always 1990

- require the EU to keep its emissions at an average of 20% below base-year levels over the whole second period (2013-2020), not only by 2020



For the remaining 55%, the Member States have taken on binding annual targets to 2020 under the „effort-sharing decision“<sup>18</sup> for cutting emissions in sectors including:

- housing
- agriculture
- waste
- transport (excluding aviation)

The targets differ according to national wealth – from a 20% cut for the richest countries to a maximum 20% increase for the least wealthy (although it was still projected that they would need to make efforts to limit emissions). Progress is monitored annually by the Commission<sup>19</sup>, with each country required to report its emissions.

In 2015, the EU was responsible for 10% of global greenhouse gas emissions. Emissions in the EU were reduced by 22% between 1990 and 2015 while the economy grew by 50% over the same period.

#### 2030 CLIMATE & ENERGY FRAMEWORK<sup>20</sup>

Building on the momentum of the 2020 climate and energy package and paving the way for a positive outcome at the 21st Conference of the Parties (COP21) of the UNFCCC in Paris, in October 2014 EU leaders adopted a renewed and more ambitious set of climate and energy targets.

The 2030 climate and energy framework sets three key targets for the year 2030:

- A minimum 40% cut in greenhouse gas emissions (from 1990 levels)
- A minimum 27% share for renewable energy
- A minimum 27% improvement in energy efficiency

The framework contains a binding target to cut emissions in EU territory by at least 40% below 1990 levels by 2030.

This will enable the EU to:

- Take cost-effective steps towards its long-term objective of cutting emissions by 80-95% by 2050 in the context of necessary reductions by developed countries as a group,
- Make a fair and ambitious contribution to the new international climate agreement which takes effect in 2020.

To achieve the minimum target of 40%:

- EU emissions trading system (ETS) sectors will have to cut emissions by 43% (compared to 2005) – to this end, the ETS will be reformed and strengthened
- Non-ETS sectors will need to cut emissions by 30% (compared to 2005) – this needs to be translated into individual binding targets for Member States.

The 2030 framework is also in line with the longer-term perspective set out in the Roadmap for moving to a competitive low-carbon economy in 2050, the Energy Roadmap 2050<sup>21</sup> and the Transport White Paper<sup>22</sup>.

#### 2050 LOW-CARBON ECONOMY<sup>23</sup>

Achieving these deep emission cuts will require a transition to a climate-friendly, low-carbon economy. The EU has now started working on long-term strategies to move beyond this up to 2050. The Roadmap for moving to a competitive low-carbon economy in 2050 (COM/2011/0112/FIN)<sup>24</sup> provides guidance on the most cost-effective way of achieving this transition. It gives insights into the type of technologies and actions which need to be implemented, and the types of policies the EU will need to develop over the next 10 years and beyond.

The roadmap suggests that, by 2050, the EU should cut its emissions to 80% below 1990 levels through domestic reductions alone (i.e. rather than relying on international credits). To get there, Europe's emissions should be:

- 40% below 1990 levels by 2030 (this target was already endorsed as part of the 2030 framework)
- 60% below by 2040

Reducing emissions by 80% by mid-century will require further substantial innovation in existing technologies but does not rely on new 'breakthrough' technologies such as nuclear fusion. Technologies addressed in the Strategic Energy Technology Plan<sup>25</sup> – solar, wind and bio-energy, smart grids, carbon capture and storage, low or zero energy homes, smart cities – will form the backbone of the low-carbon economy in 2050.

18 [https://ec.europa.eu/clima/policies/effort\\_en](https://ec.europa.eu/clima/policies/effort_en)

19 [https://ec.europa.eu/clima/policies/strategies/progress\\_en](https://ec.europa.eu/clima/policies/strategies/progress_en)

20 Source: [https://ec.europa.eu/clima/policies/strategies/2030\\_en](https://ec.europa.eu/clima/policies/strategies/2030_en)

21 <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2050-energy-strategy>

22 [http://ec.europa.eu/transport/themes/strategies/2011\\_white\\_paper\\_en.htm](http://ec.europa.eu/transport/themes/strategies/2011_white_paper_en.htm)

23 Source: [https://ec.europa.eu/clima/policies/strategies/2050\\_en](https://ec.europa.eu/clima/policies/strategies/2050_en)

24 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011DC0112>

25 <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2050-energy-strategy>

## 3.3 THE HORIZON 2020 PERSPECTIVE

**R**esearch and innovation will make a crucial contribution to achieving substantial cuts in greenhouse gas emissions, and to fighting and adapting to climate change. In parallel with cutting emissions, Europe and the rest of the world also need to adapt to the current and future changes in the climate. Adaptation measures will increase society's resilience to climate change and reduce its impacts and costs.

The innovation and investment in green technologies is also expected to boost the economy, create jobs and strengthen Europe's competitiveness. For this reason, the European institutions<sup>26</sup> set a cross-cutting target for "climate-related expenditure [to] exceed 35% of the overall Horizon 2020 budget, including mutually compatible measures improving resource efficiency" in Regulation 1291/2013, establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014–2020). In addition, the Regulation asks the European Commission (EC) to track and provide information on climate-related expenditure under Horizon 2020.

### EC METHODOLOGY FOR TRACKING HORIZON 2020 EXPENDITURE FOR CLIMATE ACTION

In order to comply with the Horizon 2020 requirements the EC has developed a methodology which builds on the so-called Rio markers developed by the OECD<sup>27</sup> and is used to track climate-related expenditure across all the EU's funding programmes.

As is explained in the short description of the methodology in Box 2, there is a considerable lag in data collection and therefore the EC has reported the first results in the interim evaluation of Horizon 2020. Directorate I "Climate Action and Resource Efficiency" of the Directorate-General for Research and Innovation (DG RTD) was kind enough to provide us with the raw data underlying the climate relevance classification, together with an internal guidance document issued by DG RTD

on "Tracking Horizon 2020 expenditure for climate action, sustainable development and biodiversity" (Version of 01/04/2017). These data were used in the analyses in the following chapters.

### ON THE ROAD TO FP9

At the time this Thematic Dossier was written, preparations for drafting the 9th Framework Programme for Research and Innovation of the EU (FP9) were well underway. Although the official initial proposal of the European Commission is not expected before June 2018, there are several policy documents contracted by the EC that offer fruitful insights into how FP9 might look. A valuable overview of important input papers, national positions and the process steps towards FP9 is given in the ERA Portal Austria<sup>28</sup>.

The starting shot for the design of FP9 was the interim evaluation of the Horizon 2020 report. Eight major lessons were learnt from the evaluation which will undoubtedly influence discussions on shaping the next framework programme<sup>29</sup>:

- Invest more ambitiously
- Continue simplification
- Support breakthrough innovation
- Create more impact through mission-orientation and citizen involvement
- Increase synergies with other EU funding programmes and EU policies
- Strengthen international cooperation
- Reinforce openness
- Rationalise the funding landscape

<sup>26</sup> i.e. European Parliament, the Council of the European Union and European Commission

<sup>27</sup> The "Rio Markers" are based on a scoring system with three values (See: OECD (2011) Handbook on the OECD-DAC Climate Markers. Paris: OECD):

- principal objective (score 100%),
- significant objective (score 40%), and
- not targeted (score 0).

<sup>28</sup> See: <https://era.gv.at/directory/262>

<sup>29</sup> <https://publications.europa.eu/s/fD8e>

## Box 2. Implementing the EC methodology for tracking Horizon 2020 expenditure

### The contribution of Horizon 2020 to these objectives is assessed:

- For those parts of Horizon 2020 with a thematic focus (“programmable actions”), at the level of the Work Programme’s topics. Each topic is assigned a 0%, 40% or 100% coefficient, corresponding to the relevant qualitative “Rio Marker” category, which is then applied to the EU budget contribution to the individual projects that derive from such topics in order to achieve a quantitative result;
- For bottom-up actions (e.g. European Research Council, Marie Skłodowska-Curie), the coefficients were assigned individually at the level of individual projects for 2014 actions. For subsequent years, proxies based on the 2014 results of the thematic evaluation panels have been used;
- For some parts of the programme (e.g. Financial Instruments, EIT, Article 185 initiatives) reporting is done on an ad hoc basis.

The Commission services in charge of this cross-cutting issue (DG RTD, Directorate “Climate action and resource efficiency”) prepare an annual forecast based on the indicative budgets published in the Work Programme. Then, when all evaluations related to a Work Programme year are concluded, the total expenditure in support of climate action and sustainable development respectively is calculated on the basis of the actual EC budget contribution to the projects selected. Final data for the whole of Horizon 2020 per year are therefore only available with a considerable time lag after the publication of the calls.

SOURCE: Interim evaluation of Horizon 2020 – Annex 1, pp. 205, SWD(2017) 221 final

Moreover, Commissioner Moedas was also instrumental in showing the direction towards which FP9 should go; in a speech<sup>30</sup> given back in October 2016 he proclaimed the three core values for FP9 as **Excellence, Openness and Impact**. The Commissioner also mandated a High Level Group chaired by Mr Pascal Lamy, President Emeritus of the Jacques Delors Institute, to come up with a vision and strategic recommendations for FP9.

The so called Lamy Report<sup>31</sup> contains eleven recommendations, including a doubling of the framework programme budget to a minimum of €120 billion; further simplifying FP9 to privilege impact over process; better aligning EU and national R&I investment; mobilising and involving citizens; and adopting a mission-oriented, impact-focused approach to addressing global challenges.

With particular regard to the last point, Commissioner Moedas appointed Professor Mariana Mazzucato of

University College London to draft strategic recommendations for mission-oriented research and innovation in the EU. Prof Mazzucato’s Report<sup>32</sup> not only defines in detail what missions are, but also provides five selection criteria that future FP9 missions should fulfil. The report goes as far as to describe three illustrative examples of missions. One is climate-related, namely having “100 carbon-neutral cities by 2030”.

In all the documents noted above there is consensus that efforts should be concentrated on the great challenges of society in line with the Sustainable Development Goals, while adopting a less prescriptive way of funding research and innovation which allows for experimentation and non-technological solutions. These developments play into the hands of the climate action community. It remains to be seen how these recommendations will be implemented in the final legal texts and rules of the future framework programme.

30 [https://ec.europa.eu/commission/commissioners/2014-2019/moedas/announcements/embracing-era-change\\_en](https://ec.europa.eu/commission/commissioners/2014-2019/moedas/announcements/embracing-era-change_en)

31 <https://publications.europa.eu/s/fC5M>

32 ‘Missions: Mission-Oriented Research & Innovation in the European Union’, European Commission, 2018, doi:10.2777/360325

## 3.4 THE AUSTRIAN PERSPECTIVE

### NATIONAL CLIMATE POLICY

According to the Kyoto Protocol, Austria had an emissions reduction target of 13% (compared to 1990) for the period 2008-2012 under the EU's „effort-sharing decision“<sup>33</sup>. Together with the EU, however, Austria is taking this a step further and pursuing a reduction in emissions of 16% compared to 2005 for sectors outside the emissions trade, in accordance with the EU's 2020 climate and energy package. Austria implements these targets through the Climate Protection Act<sup>34</sup>, national action programmes and the “klima:aktiv” (“climate-friendly”) programme which is seen throughout Europe as a success model.

The Climate Protection Act (KSG), adopted in 2011, sets maximum emission levels which must be adhered to for a total of six sectors, and regulates the development and implementation of effective climate protection measures outside the EU emissions trading system. The allocation of the total reduction commitments to the individual sectors took place in 2013 via an amendment to the Climate Protection Act.

The regulated sectors are:

- Energy and industry (outside EU emissions trading),
- Transport,
- Buildings/built environment,
- Agriculture,
- Waste management and
- Fluorinated gases

The act also provides for the establishment of a national climate protection committee and an advisory climate protection advisory council. The two committees are to coordinate the Austrian climate protection policy and to harmonise it with national transport, energy and economic policies. The national climate protection committee comprises delegates from the eight ministries concerned, the nine federal states and the four social partners. Its tasks include the discussion of principle questions and the development of climate protection strategies and planning bases for the allocation of emission levels to the individual sectors from 2013 onwards.

### KLIMA:AKTIV

klima:aktiv is the climate protection initiative of the Austrian Federal Ministry of Sustainability and Tourism (BMNT, former Federal Ministry of Agriculture, Forestry, Environment and Water Management) and an instrument for the energy transition.

It focuses on four theme clusters:

- Building construction and sanitation
- Energy efficiency
- Renewable energy sources, and
- Mobility/transport.

klima:aktiv supports municipalities, households and businesses in their climate protection activities. The Austrian Energy Agency is operationally responsible for implementing the programmes and projects. Established in 2004, the initiative is an innovative governance instrument that adopts an integrative approach, taking up positive ideas and commitment in the federal states, municipalities, businesses and NGOs, and strengthening them at the level of the federal government and nationally. klima:aktiv formulates transparent standards, initiates consultancy and qualification initiatives, implements quality assurance measures through multipliers, and networks stakeholders from business, administration, research, as well as citizens and interest representatives.

A key factor is the conveying of „green skills“ to important multipliers, i.e. training and further education for professionals, energy consultants, craftspeople, planners, architects, etc. In cooperation with education providers, climate partners are trained in seminars to acquire the knowledge needed to use the latest technologies for energy efficiency and renewable energy sources.

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<sup>33</sup> See chapter 3.2 above.

<sup>34</sup> Klimaschutzgesetz (KSG), Version in force: <https://tinyurl.com/KSG-in-force>



### Box 3. Austrian Climate Research Programme (ACRP)

The Austrian Climate Research Programme (ACRP) was created in 2008 under the auspices of the Austrian Climate and Energy Fund and is a broad policy initiative promoting climate and energy-related research in Austria. The ACRP provides a conceptual and institutional framework for supporting climate research in Austria and has the following main objectives:

- Coordinating and strengthening existing climate research in Austria and integrating it into international research networks
- Promoting climate research that produces useful results for Austria's scientific, business and public policy communities

- Identifying research on climate issues with the potential for international recognition and leadership
- Strengthening Austria's capacity for advanced (interdisciplinary) analysis and integrated assessment in areas of relevance for policymaking

In meeting these objectives, the ACRP funds climate research by issuing regular calls for research proposals.

In addition, the ACRP welcomes activities undertaken by the Climate Change Centre Austria (CCCA). The goal of the CCCA is to improve the quality and efficiency of climate research in Austria and to increase its international visibility by strengthening co-operation among Austrian researchers and research institutions.

ACRP activities are guided by an international Steering Committee.

SOURCE: ACRP, 10th Call for Proposals, <https://www.klimafonds.gv.at/assets/Uploads/Downloads-Frderungen/ACRP/LeitfadenACRP10th2017.pdf>

### CLIMATE AND ENERGY FUND

The Climate and Energy Fund was set up in July 2007 by the Climate and Energy Fund Act. It supports the Austrian Federal Government in implementing its sustainable energy supply policy, reducing greenhouse gas emissions and implementing the climate strategy.

With the establishment of the Climate and Energy Fund, the Austrian Federal Government has created a strategically important instrument for advancing development from a centralised, fossil energy supply to a clever regional energy mix in the future. The programmes of the Climate and Energy Fund are designed to cover the entire innovation chain, from research to market launch. With an annual budget of around €150 million, the Fund promotes innovative projects and awards contracts which make a significant contribution to a more environmentally-friendly and energy-conserving future. Its two decisive criteria are efficiency and sustainability.

All funding activities and actions of the Climate and Energy Fund focus on the three programme lines laid down in the Climate and Energy Fund Act:

- **Research**  
The focus of this programme line is research and development in sustainable energy technologies and climate research.
- **Transport**  
The focus of the Transport programme line is on promoting projects in the field of public transport, regional transport, environmentally-friendly freight transport and multimodal transport.
- **Market penetration**  
This programme line supports projects designed to develop awareness, as well as the testing and launch of sustainable energy technologies.

## CLIMATE CHANGE CENTRE AUSTRIA

The Climate Change Centre Austria (CCCA) was founded in Vienna on 18 July 2011. The CCCA is a contact point for researchers, politicians, the media and the public for all questions concerning climate research in Austria. The aim of the CCCA is to promote a sustainable climate discourse.

Three operational CCCA bodies are engaged in achieving the centre's vision to internationally distinguish, and nationally consolidate, intensified, high-quality climate research<sup>35</sup>:

- CCCA Coordination Office
- CCCA Service Centre
- CCCA Data Centre

## We use the CCCA's Science Plan as a proxy for an Austrian research agenda on climate action.

The CCCA undertakes numerous activities in order to achieve its objectives. In addition to the annual Austrian Climate Day, which constitutes the central conference for networking between researchers and the public, the CCCA has established working groups to develop a science plan for Austria as well as a concept for the promotion of young researchers in the field of climate research. In collaboration with partners from various sectors, it also organises networking events which highlight current topics, and supports joint projects in the spirit of the CCCA. Further examples of activities include the development of a competence map<sup>36</sup> and a climate calendar of climate-relevant events.

A project closely linked to CCCA and funded by the ACRP is the **Austrian Assessment Report 2014<sup>37</sup> (AAR14)**, an assessment report on climate change in Austria which follows the model of the IPCC Assessment Reports. The work was coordinated by the Austrian Panel on Climate Change and carried forward over the

course of a three-year process by Austrian scientists working in the field. In this extensive work more than 200 scientists depict the state of knowledge on climate change in Austria and the impacts, mitigation and adaptation strategies, as well as the known associated political, economic and social issues.

In November 2011, the Austrian Federal Ministry of Education, Science and Research commissioned the Climate Change Centre Austria (CCCA) to develop a **science plan** for climate research in Austria. This plan was meant to contribute to consolidating and focusing existing climate research by taking into account the principles and strategies of Austrian research policies, as well as the definition of prioritised fields of research. One of the project aims was to develop the science plan along with, and complementary to, a CCCA strategy for education and further training in climate research.

The CCCA's broad thematic approach, ranging from "classic" climate research in the natural sciences to looking into the causes and effects of climate change from socioeconomic perspectives, as well as from the point of view of the humanities, was the basis for developing this interdisciplinary, national science plan for climate research. The science plan underwent further development, taking into consideration the research needs identified by the Austrian Assessment Report 2014 (AAR14). It was finally approved by the Ordinary General Assembly of the CCCA in its version of March 2017, and is now available online<sup>38</sup>.

**In this Thematic Dossier the CCCA's Science Plan is understood as a proxy for an Austrian research agenda on climate action and will thus be used to correlate activities in Horizon 2020 and its satellite Partnership Initiatives with the priorities identified in the Science Plan.**

35 According to the CCCA's own definition: "The term "climate research" encompasses the scientific examination of climate change, its physical, political, economic, cultural and social causes, the consequences of climate change for society, the economy and the environment, climate mitigation and adaptation strategies and identification of vulnerabilities and capacities."  
Source: <http://www.ccca.ac.at/en/about-ccca/>

36 <http://www.ccca.ac.at/en/ccca-activities/map-of-competences/#c2509>

37 <http://www.ccca.ac.at/en/apcc/austrian-assessment-report-apcc-aar14-information-and-materials/>

38 <https://www.ccca.ac.at/en/climate-knowledge/science-plan/>



Tackling climate change and fostering sustainable development are two mutually reinforcing sides of the same coin; sustainable development cannot be achieved without climate action.



**4**

# **CLIMATE ACTION IN HORIZON 2020**





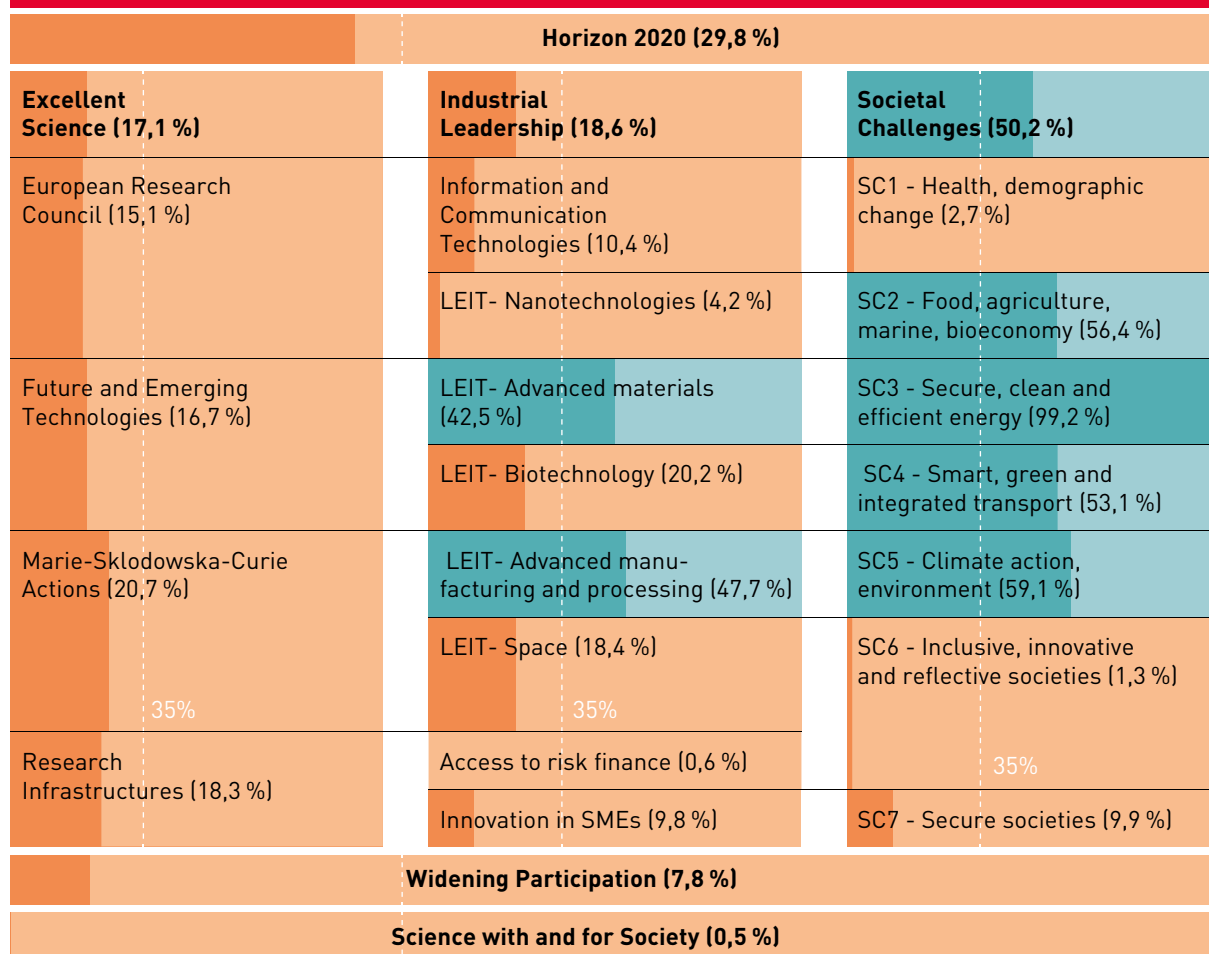
Figure 4.1 below, which presents the results of Horizon 2020 expenditure for climate change in years 2014-2017, shows that Horizon 2020 still falls behind the expected expenditure target of 35% for this objective. However, the programme seems to have considerably increased its financial effort in this field with respect to FP7. The “Cooperation” element of FP7 is estimated to have contributed €2,400 million to projects related to climate action, whereas the equivalent figure (i.e. LEIT and Societal Challenges together) is €6,034 million for only the first four years (2014-2017) of Horizon 2020.

Figure 4.1 also indicates that only a few programme lines contribute to the 29.8% of the total budget defined as climate-relevant. It is Societal Challenges 2 to 5 on the one hand, and the Leading and Enabling Industrial Technologies of advanced manufacturing and materials on the other, that support the European Commission’s claims.

Then again, nearly every third euro spent during the period 2014-2017 went to research and innovation projects related to climate change. When the methodological difficulties for assessing the so-called bottom-up programme lines (e.g. European Research Council, Marie-Sklodowska-Curie Actions, or the SME Instrument) which could conceal some additional relevant funding are also taken into account, Horizon 2020 is well on its way to achieving the 35% budget target.

Since percentage shares of funding are only half the picture, Table 4.1 also shows the amount of total funding given in the different Horizon 2020 programme lines and the amount attributed (using the methodology presented in Box 2 above) to climate-relevant research and innovation.

Figure 4.1 - Horizon 2020 share of expenditure relating to climate change (2014-2017). Programme lines shown in orange color fail to reach the 35% expenditure target set out in the Regulation establishing H2020, while the programme lines in turquoise color spend more than 35%. The breadth of the bars represents the percentage of spending attributable to climate-relevant research.



Source: eCORDA data as of Source: eCORDA data as of 30/09/2017 combined with EC classification data, visualisation: FFG

Table 4.1 – Horizon 2020 total funding volume and related amounts for climate-relevant projects (2014–2017)

PROGRAMME LINE	Total funding	Climate relevant	% Share
<b>Horizon 2020 (total)</b>	<b>€ 26.385.052.255</b>	<b>€ 7.850.596.275</b>	<b>29,8%</b>
<b>Excellent Science</b>	<b>€ 10.137.816.675</b>	<b>€ 1.736.665.486</b>	<b>17,1%</b>
European Research Council (ERC)	€ 5.410.758.131	€ 815.571.207	15,1%
Future and Emerging Technologies (FET)	€ 793.406.988	€ 132.207.209	16,7%
Marie-Sklodowska-Curie Actions	€ 2.910.234.500	€ 601.219.145	20,7%
Research Infrastructures	€ 1.023.417.057	€ 187.667.925	18,3%
<b>Industrial Leadership</b>	<b>€ 5.569.551.759</b>	<b>€ 1.038.248.410</b>	<b>18,6%</b>
Information and Communication Technologies	€ 3.256.820.396	€ 339.560.413	10,4%
LEIT- Nanotechnologies	€ 422.265.433	€ 17.828.245	4,2%
LEIT- Advanced materials	€ 366.487.748	€ 155.857.783	42,5%
LEIT- Biotechnology	€ 157.105.724	€ 31.742.066	20,2%
LEIT- Advanced manufacturing and processing	€ 861.168.308	€ 411.115.042	47,7%
LEIT- Space	€ 387.354.903	€ 71.310.749	18,4%
Access to risk finance	€ 8.551.174	€ 48.000	0,6%
Innovation in SMEs	€ 109.798.074	€ 10.786.113	9,8%
<b>Societal Challenges</b>	<b>€ 9.960.954.020</b>	<b>€ 4.996.131.097</b>	<b>50,2%</b>
SC1 - Health, demographic change and wellbeing	€ 1.901.102.982	€ 52.171.542	2,7%
SC2 - Food, agriculture, marine, bioeconomy	€ 1.368.870.390	€ 771.608.926	56,4%
SC3 - Secure, clean and efficient energy	€ 2.270.347.556	€ 2.251.128.316	99,2%
SC4 - Smart, green and integrated transport	€ 2.215.388.978	€ 1.176.309.998	53,1%
SC5 - Climate action, environment	€ 1.151.316.590	€ 680.192.655	59,1%
SC6 - Inclusive, innovative and reflective societies	€ 459.919.310	€ 5.778.598	1,3%
SC7 - Secure societies	€ 594.008.213	€ 58.941.062	9,9%
<b>Widening Participation</b>	<b>€ 361.092.674</b>	<b>€ 28.228.293</b>	<b>7,8%</b>
<b>Science with and for Society</b>	<b>€ 155.348.839</b>	<b>€ 799.999</b>	<b>0,5%</b>
<b>Cross-thematic Calls</b>	<b>€ 200.288.289</b>	<b>€ 50.522.990</b>	<b>25,2%</b>

Source: eCORDA data as of Source: eCORDA data as of 30/09/2017 combined with EC classification data, visualisation: FFG

However, both Figure 4.1 and Table 4.1 show several Horizon 2020 programme lines which have inexplicably low budget shares for climate action-relevant projects. For instance, for Societal Challenge 7 “Secure Societies” one would expect that addressing the security aspects of climate change (including migration or climate-related conflicts) would be high on the agenda. Developing new and ground-breaking technologies for energy efficiency and/or a more circular economy is a prerequisite for

achieving the extremely ambitious GHG reduction targets for 2050 and beyond, but obviously such technology development is not funded extensively under the “Future and Emerging Technologies” programme line.

It is this observation that leads to the second guiding question of the Thematic Dossier: Which of the national and international research priorities are covered by Horizon 2020?

## 4.1 WHICH RESEARCH FIELDS ARE FUNDED IN HORIZON 2020, AND WHERE?

### AGGREGATE CLASSIFICATION OF RESEARCH AREAS AND PROJECTS

As described in Box 1 in the Introduction, the notion of climate action includes a wide variety of research and innovation fields. In order to simplify the analysis, we will use the categories of research fields included in CCCA's Science Plan that are comparable to the IPCC Fifth Assessment Reports. The scope of this Thematic Dossier does not allow us to go deeper into more detailed research fields or specific technology areas.

While more or less mirroring the structure of the IPCC's Fifth Assessment Report, the CCCA's Science Plan identifies six research priorities for the strategic development of climate research in Austria. Namely:

- Climate change - influencing factors and characteristics
- Impacts on the environment and society
- Adaptation
- Mitigation
- Societal transformation
- Inter- and transdisciplinary topics

Interestingly, the Science Plan identifies two distinct priorities that are not directly addressed by the IPCC Assessment Report structure. These are 'societal transformation' and 'inter- and transdisciplinary topics'. Generous lip service was paid to these two areas of research during the negotiations for the Horizon 2020 Regulation. Inter- and transdisciplinarity, in particular, have been buzzwords for Horizon 2020, and the results of the interim evaluation seem to confirm that Horizon 2020 promotes "cross-border, cross-sectoral, inter-disciplinary collaboration"<sup>39</sup>. In contrast, to date 'societal transformation' in relation to climate change has been mostly neglected<sup>40</sup>.

It seems thus more interesting to use the CCCA's research priorities rather than those of the IPCC AR5 working groups for the analysis in this Thematic Dossier, in order to shed more light onto inter- and transdisciplinary research efforts. Furthermore, since the CCCA's Science Plan is more or less the strategic research

agenda for climate research in Austria, it would be important to illustrate the priorities that are well served by Horizon 2020, and those that need to be given a stronger focus in the future.

Horizon 2020 programme lines can be divided into two basic categories: the 'programmable' parts in which predefined thematic 'topics' are funded, and 'bottom-up' parts in which the focus lies on the funding instrument and there is no thematic limitation or pre-selection. The

**Funded projects show a strong focus on technological solutions for climate adaptation and mitigation.**

'programmable' parts include the Societal Challenges and Leadership in Enabling and Industrial Technologies (LEITs), while prominent 'bottom-up' programme lines include the European Research Council (ERC) and the Marie-Sklodowska-Curie actions.

Clearly it is easier to approach the coverage of climate change funding more strategically in the programmable parts of Horizon 2020, however, the bottom-up programmes can demonstrate the intrinsic value assigned to climate action by the research and innovation community.

### SOCIETAL CHALLENGES

Looking at the Societal Challenges, and their share of expenditure relating to climate change (see Figure 4.1), we see that they provide the lion's share of climate change topics and projects. So far the thematic coverage in the individual Societal Challenges reveals that many projects are funded in priorities 'III. Adaptation' and 'IV. Mitigation' and fewer in 'II. Impacts'. 'V. Societal transformation' and 'VI. Inter- and transdisciplinary topics' receive the least attention.

<sup>39</sup> Quote from 'Key findings from the Horizon 2020 interim evaluation', European Union, 2017, doi:10.2777/708544

<sup>40</sup> According to a keyword search for 'societal transformation', only a single hit, and this for an ERA-Net COFUND in Societal Challenge 5 which addresses the issue. See: <http://tinyurl.com/societal-transformation>

Figure 4.2 How CCCA Science Plan priorities correspond with funding in Horizon 2020's Societal Challenges

Societal Challenges	CCCA Science Plan Priorities					
	I. Climate change science	II. Impacts	III. Adaptation	IV. Mitigation	V. Societal transformation	VI. Inter- and trans-disciplinary topics
SC1 - Health, demographic change and wellbeing						
SC2 - Food security, sustainable agriculture, marine and maritime and inland water research and the bioeconomy						
SC3 - Secure, clean and efficient energy						
SC4 - Smart, green and integrated transport						
SC5 - Climate action, environment, resource efficiency and raw materials						
SC6 - Europe in a changing world - Inclusive, innovative and reflective societies						
SC7 - Secure societies - protecting freedom and security of Europe and its citizens						

■ Focus in topics published and/or projects selected
 ■ Occasionally addressed in topics and/or projects

Source: eCORDA data as of 30/09/2017, visualisation: FFG

### IN MORE DETAIL:

- Societal Challenge 1, 'Health, demographic change and wellbeing', is mainly funding research in priority 'II. Impacts', with actions addressing areas such as the health risks posed by extreme weather events due to their increased incidence and intensity (heat waves, cold spells), or the spread of diseases and/or disease vectors following such extreme events.
- Societal Challenge 2, 'Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy', funds a plethora of research topics both in priority 'IV. Mitigation' and 'III. Adaptation'.
  1. Mitigation actions include research which addresses energy efficiency and/or use of renewable energy sources in agricultural practices and installations, the reduction of GHG emissions in agricultural practices, increased biomass production for energy generation, and reducing methane emissions in livestock production.
  2. Adaptation measures include climate-relevant sowing cycles, climate-resilient crops and species, afforestation and forest management to reduce flood risk, increased erosion protection and soil buffering, and addressing climate change hotspots through the maintenance of wetlands and peat lands.
  3. Some topics fund the assessment of related SSH issues such as behaviour patterns, societal acceptance and uptake of relevant policies or technologies, as well as education, skills, knowledge platforms and dissemination measures in related areas that fit within the priority 'V. Societal Transformation'.
- Societal Challenge 3, 'Secure, clean and efficient energy', is entirely devoted to climate action research and innovation (see Table 4.1). This primarily takes the form of funding for mitigation technology development and research into areas such as energy efficiency in buildings and grids, new or advanced technologies for renewable energy sources, and increased urban green

space. Research and innovation is also funded for 'III. Adaptation', as in climate-resilient energy networks and other infrastructures. Priority 'V. Societal transformation' is less prominent, but still funds topics covering education, skills, knowledge platforms, dissemination measures in related areas, and the assessment of related SSH issues.

- Societal Challenge 4, 'Smart, green and integrated transport', primarily funds both Mitigation and Adaptation, also funding the occasional education, skills or SSH issues assessment topics. Mitigation actions take the form of more sustainable modes of transport including improved vehicles and systems for public transport and measures to discourage car use. Adaptation topics include climate-resilient transport networks and other infrastructures.

- Societal Challenge 5, 'Climate action, environment, resource efficiency and raw materials', is the programme line in Horizon 2020 that funds the greatest variety of topics related to climate action.

1. It is the only Societal Challenge that funds topics in priority 'I. Climate change - influencing factors and characteristics', progressing our scientific knowledge on how climate works and providing advanced models and scenarios.
2. It also funds research on the impacts of climate change on biodiversity and ecosystem services, as well as the study of tipping points and advanced earth-system models (SC5-01-2014).
3. In Adaptation there is a focus on nature-based solutions both for urban and rural areas to increase resilience to climate change, as well as risk prevention and risk management for climate-related natural disasters.
4. Mitigation actions include the transition towards a circular economy, and several topics fund the goal of decarbonising the European economy.

- Societal Challenge 6, 'Europe in a changing world - Inclusive, innovative and reflective societies', has not yet paid much attention to climate action. Obviously the term "changing world" in the challenge's title does not refer to the changing climate. The few topics funded that could be relevant to climate action include the 2015 topic "The young as a driver of social change" and a call for an ERANET on "Smart Urban Futures".

- Societal Challenge 7, 'Secure societies - Protecting freedom and security of Europe and its citizens' is funding actions related to risk reduction and management including natural hazards exacerbated by climate change, and has gone as far as investigating the "impact of climate change in third countries on Europe's security" (DRS-22-2015). SC7 therefore focuses on Impact, but has also funded the occasional topic in Adaptation and Vulnerability assessment.

## Topics and projects on societal transformation are rare.

### LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES (LEITS)

Most of the funding associated with climate action in the LEIT programme lines is related to Mitigation technologies, primarily energy efficiency in industrial processes and novel materials for energy efficiency.

- In 'Information and Communication Technologies' (ICT) these are actions such as energy efficiency in electronics, the optimisation of value chains (also through the Internet of Things), and environmental sensing.
- In 'Nanotechnologies' it is technologies for novel coatings for better isolation, energy efficiency in industrial processes, and more efficient batteries.
- In 'Advanced materials' it is mainly new batteries and technologies for renewable energy sources that receive funding.
- In 'Biotechnology' the majority of the few projects that are classified as marginally relevant come from the SME Instrument, and are active in the field of process efficiency in the biochemical and pharmaceutical industries.
- In 'Advanced manufacturing and processing' nearly 60% of projects are seen as climate action-relevant. The areas of research covered include energy efficiency, especially in buildings and the construction sector, but also in processing industries, as well as recycling and carbon dioxide utilisation.
- In 'Space' strangely only a handful of projects are considered relevant and these deal with earth observation systems and their applications, or the fidelity of climate-related EO data.

## 4.2 CLIMATE RESEARCH AS A BOTTOM-UP PRIORITY ACTION

### EUROPEAN RESEARCH COUNCIL

There is an inherent difficulty in attributing basic research projects to the research priorities of the CCCA's Science Plan unless this attribution is explicitly noted by the principal investigators themselves. Very often the impact or applications of basic research are medium-term to long-term, and cannot be anticipated or even envisaged. Thus, estimates of their relevance to climate action, as well as classification with regard to relevant science priorities, can easily be underestimated. On the other hand, well-established goals and the anticipated impact of fundamental research towards climate action targets can also be overestimated if the basic scientific hypotheses are subsequently overthrown.

Nevertheless, the European Commission has been at pains to individually classify the ERC-funded proposals (at least for the years 2014-2015), and the insights into the data are interesting: Of the 3,446 ERC-funded projects, 302 were seen as 100% relevant to climate action and a further 387 were classified as 40% relevant. That means that almost every fifth ERC grant is climate action-relevant.

Looking at the different ERC instruments, it is striking that only 5.6% of 'proof of concept' (PoC) projects are seen as climate action-relevant. Of a total of 477 PoC projects, only 2 are categorised as 100% CC-relevant and another 25 are awarded the 40% Rio marker. This could be seen as a further indication of overestimates of the expected impact of basic research on climate action targets.

Thematically, ERC grants come from a plethora of disciplines such as molecular biology, earth sciences, environmental management, and even economics, political sciences, and aeronautics. As already noted, it is difficult to attribute these projects to the climate action research priorities as has been done for the Societal Challenges, but we can conclude that all six priorities are covered to a certain degree, with 'I. Climate change - Influencing factors and characteristics' and 'II. Impacts on the environment and society' being the more common, and priority 'VI. Inter- and transdisciplinary topics' being the least common among the projects classified as 100% relevant.

The primarily disciplinary panels evaluating ERC proposals may be an influencing factor for the limited number of inter- and transdisciplinary projects receiving funding.

### MARIE-SKŁODOWSKA-CURIE ACTIONS

The chief aim of the project instruments employed in the Marie-Skłodowska-Curie actions is to promote career development and the international mobility of researchers. However, the collaborative projects (e.g. in the Innovative Training Networks scheme) or fellowships mostly have a clear thematic focus. The European Commission has gone to great lengths to categorise all these funded projects as either climate action-relevant or not.

Of the approximately 4,750 projects funded in the Marie-Skłodowska-Curie actions to date, some 13% are considered to have climate action as their primary target, another 15% as a secondary target, and around 72% as having no climate action relevance. These statistics are rather disappointing. The majority of projects with a climate focus are, of course, Individual Fellowships but this reflects the overall pattern of funding in this programme line.

It should be noted that actions such as the MSCA CO-FUNDS (co-funding to open up new or existing regional, national, and international programmes) cannot be categorised thematically, however, the fellowships awarded by the funded programmes may very well be climate related.

Thematically, all six categories of the CCCA's Science Plan are addressed either by individual fellowships or collaborative projects (ITN or RISE). 'Interdisciplinary' research is mentioned in roughly every 6th project abstract with a primary focus on climate action. Adaptation is mentioned in every 10th project, while 'society' is mentioned in 1 in 15 projects.

The limitations of a text-mining analysis such as this are, however, obvious as only one third of all climate action-focused projects contain the word 'climate' in their abstracts. A more in-depth analysis of the 1,300 projects classified as climate action-relevant was not possible within the framework of this report.



## 4.3 COMPLEMENTARITY WITH RELEVANT PARTNERSHIP INITIATIVES

### WHAT ARE PARTNERSHIP INITIATIVES?

The European Commission not only directly funds research projects in Horizon 2020, it also invests a considerable amount of the budget in leveraging the effects of national research budgets and private investments in R&D via a series of international public-private and public-to-public initiatives. Amongst these initiatives are those which primarily support policy debate and the setting of research agendas (e.g. the European Technology Platforms<sup>41</sup>, or the European Innovation Partnerships<sup>42</sup>), and those that combine national and EU funding, or public and private funding, to issue their own calls for proposals with Horizon 2020 co-funding (e.g. Joint Programming Initiatives<sup>43</sup>, Joint Technology Initiatives<sup>44</sup>, or ERA-Nets<sup>45</sup>).

### CLIMATE ACTION-RELATED PARTNERSHIP INITIATIVES

There are a swarm of multilateral programmes and initiatives related to climate action. While we provide a list of these initiatives, with links to further information below, we cannot examine each of them in depth. Instead, the Thematic Dossier will showcase some of the Joint Programming Initiatives, as they are also aimed at aligning national research agendas and funding conditions, and the Climate KIC, as this elusive initiative has recently intensified its activities in Austria and this information might still not be widely known.

### EUROPEAN INNOVATION PARTNERSHIPS (EIPS)

- EIP Agricultural Productivity and Sustainability (EIP Agri) <https://ec.europa.eu/eip/agriculture/en/european-innovation-partnership-agricultural>
- EIP Smart Cities and Communities (EIP SCC) <http://ec.europa.eu/eip/smartcities/>
- EIP Water <https://www.eip-water.eu/>

### JOINT PROGRAMMING INITIATIVES (JPIS)

- JPI Urban Europe (JPI UE) <https://jpi-urbaneurope.eu/>
- JPI Connecting Climate Knowledge for Europe (JPI CLIMATE) <http://www.jpi-climate.eu>
- JPI Water Challenges for a Changing World (Water JPI) <http://www.waterjpi.eu/>
- JPI Agriculture, Food Security and Climate Change (FACCE JPI) <https://www.faccejpi.com/>

### JOINT TECHNOLOGY INITIATIVES (JTIS)

- JTI Bio-Based Industries (BBi) <https://www.bbi-europe.eu/>
- JTI Clean Sky2 <http://www.cleansky.eu/>
- JTI Fuel Cells and Hydrogen 2 (FCH2) <http://www.fch.europa.eu/>
- JTI Shift2Rail <https://shift2rail.org/>

### CONTRACTUAL PUBLIC PRIVATE PARTNERSHIPS (CPPP)

- PPP Energy-efficient Buildings (PPP EeB) [http://ec.europa.eu/research/industrial\\_technologies/energy-efficient-buildings\\_en.html](http://ec.europa.eu/research/industrial_technologies/energy-efficient-buildings_en.html)
- PPP European Green Vehicle Initiative (PPP EGVI) <https://www.egvi.eu/>
- PPP Factories of the Future (PPP FoF) [http://ec.europa.eu/research/industrial\\_technologies/factories-of-the-future\\_en.html](http://ec.europa.eu/research/industrial_technologies/factories-of-the-future_en.html)

<sup>41</sup> [http://ec.europa.eu/research/innovation-union/index\\_en.cfm?pg=etp](http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=etp)

<sup>42</sup> [http://ec.europa.eu/research/innovation-union/index\\_en.cfm?pg=eip](http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=eip)

<sup>43</sup> [http://ec.europa.eu/research/era/joint-programming-initiatives\\_en.html](http://ec.europa.eu/research/era/joint-programming-initiatives_en.html)

<sup>44</sup> [http://ec.europa.eu/research/jti/index\\_en.cfm](http://ec.europa.eu/research/jti/index_en.cfm)

<sup>45</sup> <https://www.era-learn.eu/>

## EUROPEAN INSTITUTE OF INNOVATION AND TECHNOLOGY (EIT) – KNOWLEDGE AND INNOVATION COMMUNITIES (KICS)

- Climate-KIC <http://www.climate-kic.org/>
- KIC Inno-Energy <http://www.innoenergy.com/>

## ERA-NETS

- There are a great number of climate-related ERA-Nets that have been funded and/or are still active, some of them connected to JPIs but others operating individually. A complete list of related ERA-Nets can be found on the ERA-Learn website: <https://www.era-learn.eu/network-information/thematic-clustering>

## JOINT PROGRAMMING INITIATIVE ‘CONNECTING CLIMATE KNOWLEDGE FOR EUROPE’

The Strategic Research and Innovation Agenda (SRIA) of JPI Climate sets out three overarching challenges and one strategic mechanism that, together, are designed to develop and support excellent, innovative, relevant and informative climate research. The framing – especially the emphasis on connectivity and synergy – reflects the priorities and approaches of researchers, funders and practitioners in the countries participating in JPI Climate.

The three overarching challenges are:

- Understanding the processes and consequences of climate change
- Improving knowledge of climate-related decision-making processes and measures
- Researching sustainable societal transformation in the context of climate change

and the strategic mechanism is:

- Connecting people, problems and solutions in a systemic approach.

Austria, represented by the BMBWF, was, and still is, actively involved in the JPI Climate coordination and was one of the leading Member States in the development of an open access and open knowledge, as well as climate-friendly climate research (CFCR) strategy (Irene Gabriel, Martin Schmidt, Sebastian Helgenberger, Alexis Sancho Reinoso, Elisabeth Worliczek). Austria is represented in strategic JPI working groups, being particularly active in the area of societal transformation, as well as being involved in the preparatory work for the ERA4CS project, with the CCCA (Matthias Themessl) representing the Austrian research community.

So far JPI Climate has opened three Joint Calls:

- In 2013 it published its first Joint Call, funding nine transnational collaborative research projects aiming to provide support for top-quality research on two topics:

- Societal Transformation in the Face of Climate Change;
- Russian Arctic & Boreal Systems

- The second Joint Call was published in 2015 in cooperation with the Belmont Forum, and aimed at contributing to the overall challenge of developing climate services with a focus on the role of interregional linkages in climate variability and predictability. Eight multinational projects were selected for funding related to three topics:

- Understanding past and current variability and trends of regional extremes;
- Predictability and prediction skills for near-future variability and trends of regional extremes;
- Co-construction of near-term forecast products with users

- The third JPI Climate Call in 2016 focused on Climate Services and was co-funded by the European Commission through the ERA4CS ERA-Net. The ERA-Net was split into two parts:

- Advanced co-development with users, supported with cash from 13 national research funding organisations (RFOs);
- Institutional integration between 30 predetermined research performing organisations (RPOs)

A fourth transnational Joint Call on the “assessment of cross-sectoral climate impacts and pathways for sustainable transformation” is currently being prepared<sup>46</sup> by the ERA-Net Project AXIS.

Austria has participated in all three calls and is also participating in the AXIS project. Since 2017, FFG has been mandated to also implement the ERA-Nets of JPI Climate, building on its extensive know-how and established processes for realising transnational calls.

While two projects (one with Austrian coordination) were funded in the first call, and while no Austrian participation was funded in the call with Belmont Forum, Austrian research institutions were involved in a total of 11 proposals in the ERA4CS Call. 6 of these proposals were finally selected for funding with a budget of approximately €1.3 million, which is a remarkable success rate.

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<sup>46</sup> <http://www.jpi-climate.eu/AXIS/news/10892463/Pre-announcement-for-a-large-Joint-Transnational-Call>

### JPI URBAN EUROPE

JPI Urban Europe is committed to addressing the complexity of urban transitions by funding strategic research and innovation, improving and aligning R&I instruments, moderating science-policy processes, and supporting transnational collaboration for local capacity building. JPI Urban Europe connects public authorities, civil society, scientists, innovators, business and industry to provide an environment for urban research and innovation. The mission is to develop tools, knowledge and platforms for dialogue on urban transitions.

Complementary to the central concern of supporting transitions to sustainable and liveable urban futures, in 2015 the JPI Urban Europe Strategic Research and Innovation Agenda published five thematic priorities to be tackled:

- Vibrancy in changing urban economies
- Welfare and finance
- Environmental sustainability and resilience
- Accessibility and connectivity
- Urban governance and participation

For its implementation, members from governments and funding organisations from 20 European countries are joining forces in several joint actions based on the portfolio of urban-related programmes and activities of each of the countries. In this sense the JPI Urban Europe functions as a platform for connecting and building upon these various programmes, benefitting from experiences and competences across borders. Its ambition is to go beyond the state-of-the-art of more conventional R&I programmes in order to provide experimental zones – for researchers, cities, policy makers and research funders.

Five calls have been realised so far with a total budget of approximately €90 million, €75 million of which comes from Member States, and resulting in 67 projects funded. International cooperation is starting with the Belmont Forum, as well as in a joint call of JPI Urban Europe partners with China (NSFC). In addition to calls for research projects, an innovation action is being carried out which puts city administration and urban stakeholders at the core. Many of these projects apply living lab formats for co-creation and stakeholder involvement as a means of developing local solutions. Additional activities regarding strategic programme management, dissemination of research results as well as a regular dialogue with stakeholders on pressing urban issues are implemented.

JPI Urban Europe was launched by a joint Austrian-Dutch initiative in 2010. Since that time, Austrian representatives have contributed significantly to its development and implementation. Until recently the

initiative was chaired by Ingolf Schädler (BMVIT), now replaced by Michael Paula (BMVIT) as Vice-Chair. The management team is led by Margit Noll (FFG) and FFG also provides the call secretariat for most of the joint calls or ERANET Cofunds. Austria has participated in all the calls so far and therefore Austrian organisations have succeeded in making a substantial contribution to the transnational projects.

### FACCE JPI

The Joint Programming Initiative Agriculture, Food Security and Climate Change is the longest running of the four climate action relevant JPIs. Its aim is to build the European Research Area tackling the challenges at the intersection of agriculture, food security and climate through working together to address the challenge of ensuring a secure food supply to an ever-increasing global population in the context of climate change.

For the implementation members from governments and funding organisations from 22 European countries are joining forces in several joint actions. In the first years Austria was represented in the Governing Board by both ministries, BMBWF and BMLFUW (Elfriede Fuhrmann, Sebastian Helgenberger), later only BML-FUW (respectively BMNT, Anita Silmbrod) was engaged in this JPI.

FACCE is concentrating on five core research themes:

- Sustainable food security under climate change
- Environmentally sustainable intensification of agriculture
- Developing synergies and reducing trade-offs: food supply, biodiversity and ecosystem services
- Adaptation to climate change
- Mitigation of climate change

For this FACCE JPI has initiated several ERA-Net projects, knowledge hubs and other activities. In addition exploratory workshops for identifying topics for future FACCE JPI activities take place. In the first six years FACCE has already mobilised approximately €120 million of funding for transnational research activities.

FACCE has been the driver for implementing a European Joint Programme (EJP Cofund) on Agricultural Soil Management in 2019 with a total budget foreseen around €80 million.

Partnership and alignment with other European initiatives is also within the portfolio of FACCEs' activities. So far joint activities with other JPIs, include on with JPI Water (joint call Water Works), as well as joint activities with JPI 'Healthy Diet for a Healthy Living' (HDHL) and JPI Oceans and joint calls with the BiodivERsA ERA-Net. Further joint international calls include a transnational

multi-partner Call on Agricultural Greenhouse Gas Mitigation (involving 11 FACCE partner countries plus USA, Canada and New Zealand) and a collaborative research action with the Belmont Forum on Food Security and Land Use Change

Due to the limited national budget available, Austria could only contribute to a few of these actions (Knowledge Hub MACSUR, SusAn, SusCrop and a joint call with BiodivERsA).

## **WATER JPI**

Launched in 2010, the Joint Programming Initiative Water Challenges for a Changing World tackles the ambitious challenge of achieving sustainable water systems for a sustainable economy in Europe and abroad. The Water JPI deals with research in the field of water and hydrological sciences. The availability of water in sufficient quantities and adequate quality is indeed a public issue of high priority and addresses a pan-European and global environmental challenge.

To date, five Joint Calls have been launched (2013, 2015, 2016 and 2017) including three calls with support of the European Commission as part of the Horizon 2020 ERA-NETs Cofund WaterWorks2014, WaterWorks2015 & WaterWorks2017 and two calls implemented within the Coordination and Support Actions WatEur and IC4Water<sup>47</sup>.

- 2013 Pilot Call: Emerging Water Contaminants (budget: €9.7 million; 7 projects funded)
- 2015 Joint Call: Developing technological solutions for services for water distribution and measurement, wastewater treatment and reuse, desalination, floods and droughts (budget: €15.2 million, 16 projects funded)
- 2016 Joint Call with the FACCE JPI: Improving water use efficiency and reducing soil and water pollution for a sustainable agriculture (budget €18 million, 21 projects funded)
- 2017 Joint Call : Water resource management in support of the United Nations Sustainable Development Goals (UN SDGs) – launched on 11 October 2017 – expected budget: €8.55 million; pre-proposals under evaluation
- 2018 Joint Call: Closing the water cycle gap - improving sustainable water resources management as part of the ERA-NET Cofund WaterWorks2017 – launched on 19 February 2018 – expected budget: €19.3 million; call open

Austria is acting as partner within the JPI Water, so far only participating at governing board meetings. Austria organised the 9th Water JPI governing board meeting in Vienna end of November 2016 and will be actively participating in knowledge hubs.

A Water Platform was launched by the Ministry of Education, Science and Research for the alignment of national water research in Austria in July 2017. The platform has just initiated the alignment and a first evaluation will only be possible by the end of 2018.

As there is no Austrian investment in the Water JPI calls to date the success for Austrian researchers is low, but a stronger commitment is planned for future Water JPI activities (e.g. participation in thematic programmes and knowledge hubs).

## **CLIMATE-KIC<sup>48</sup> IN AUSTRIA: AN EXAMPLE OF PARTNERSHIP ACTIVITIES OTHER THAN JOINT CALLS**

EIT Climate-KIC's mission is to bring together, inspire and empower a dynamic community to build a zero carbon economy and climate-resilient society<sup>49</sup>. EIT Climate-KIC has an integrated community of 190 partners in six geographies:

- Mediterranean: France, Italy, Spain
- North-Eastern: Germany & Poland
- Benelux: the Netherlands & Belgium
- Alpine & Hungary: Austria, Switzerland,
- Nordic: Denmark, Sweden & Finland
- UK & Ireland

The Climate-KIC has three formal partners in Austria: brainbows informations-management gmbh, WWF Austria and Montanuniversität Leoben, with two more currently in the partnership process (AIT – Austrian Institute of Technology, and the CCCA). These partners are still associated to the co-location centre in Switzerland (Zurich).

One of Climate-KIC's late stage projects is run by WWF Austria in partnership with several Swiss partners. The Landscape Finance Lab<sup>50</sup> aims at raising over €1.5 billion to protect high-risk landscapes across the globe, notably through the Green Climate Fund.

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<sup>47</sup> Source: <http://www.waterjpi.eu>

<sup>48</sup> <https://eit.europa.eu/eit-community/eit-climate-kic>

<sup>49</sup> <http://www.landscapefinancelab.org/about/>

<sup>50</sup> <http://www.landscapefinancelab.org/about/>

Climate-KIC has also been running its accelerator programme<sup>51</sup> in Austria since November 2016 (which is functionally linked to the co-location centre in Switzerland). Its activities involve programme managers in Austria who are heavily involved in accelerator activities in the DACH region, and are focused on supporting early to later stage start-ups. Twenty-two start-ups have been supported through the programme since 2015<sup>52</sup>.

Furthermore, the Climate-Launchpad<sup>53</sup> is already in its fourth year in Austria, with Austrian start-up Vienna Textile Lab<sup>54</sup> having ranked 3rd in the international finals in November 2016. Education programmes<sup>55</sup> have been launched in 2018: two legs of the Journey<sup>56</sup> programme will stop in Leoben at the Montanuniversität. In addition, the Swiss and Austrian teams are in close discussions with the cities of Graz and Vienna about running at least two Climathons<sup>57</sup> in October 2018.

In general, Climate-KIC has been significantly intensifying its activities in Austria, particularly in light of the Austrian EU Presidency in the second half of 2018.

#### RESEARCH TOPICS COVERED BY PARTNERSHIP INITIATIVES

The Joint Programming Initiatives presented above, together with the Climate KIC, cover a wider range of research topics stretching from the physical science of climate change itself (corresponding to CCCA's Priority I) in the case of JPI Climate and partly in JPI FACCE, to challenges demanding societal transformation as in JPI Urban Europe and the first Joint Call of JPI Climate. As seen in Figure 4.3, all illustrated initiatives fund actions in the fields of Adaptation, Mitigation and Societal Transformation, while actively promoting inter-, transdisciplinary and trans-sectoral research and innovation.

It appears that these partnership initiatives are more capable of breaking out of disciplinary and sectoral silos than the Horizon 2020 programme lines.

#### THE FUTURE OF PARTNERSHIP INITIATIVES IN FP9

Both the Member States and the European Commission are increasingly unhappy with the complex, to some even confusing, landscape of multilateral partnership initiatives. Their intention, for the public-to-public partnerships (P2Ps) in particular, is to unify the different schemes (JPIs, ERA-Nets, Art. 185, EJPs, ...) under a

single co-funding instrument in FP9, with the possible additional support of coordination costs without co-funding joint activities for other existing initiatives<sup>58</sup>.

The preferred scenario suggests the expansion of the European Joint Programme (EJP) COFUND scheme. The EJPs which are currently active are dealing with significant overall budgets (around €40 million - €800 million) and consist of large consortia (30 – 200 partners/linked third parties). In contrast to the JPI and ERA-Net schemes, the main actors are not R&I funding agencies but specialised public R&D organisations. In this respect they aim to bring together national public mission organisations involved inter alia in R&D activities, where R&D is not necessarily the core function of the participating national organisations.

**Partnership initiatives are more capable of breaking out of disciplinary and sectoral silos.**

The benefits of such a future approach include the long-term financial commitments of Member States, the strategic involvement of national policy authorities (possibly bypassing the budget shortcomings of science/research ministries), and the direct participation of key research performing organisations from the Member States. Nevertheless, all EJPs currently running are purely “in-kind”, with joint activities (and EU co-funding) open only to participating RPOs<sup>59</sup>.

If the EJP scheme is to be expanded in FP9 it must avoid creating large but still closed clubs of public RPOs, in which vast amounts of money are diverted from the open calls for FP9 proposals. Two of the most pressing shortcomings in the current P2P schemes are their limited leverage on national funding, and the poor representation of EU13 countries in the partnerships. Possible future concentration in ‘in-kind’ partnerships would only exacerbate both these shortcomings.

<sup>51</sup> <http://www.climate-kic.org/programmes/entrepreneurship/accelerator/>

<sup>52</sup> Austrian start-ups were able to apply to the accelerator in Zurich before the start of the Austrian accelerator

<sup>53</sup> <https://climatelaunchpad.org/>

<sup>54</sup> <http://www.viennatextilelab.at/>

<sup>55</sup> <http://www.climate-kic.org/programmes/education/>

<sup>56</sup> <https://journey.climate-kic.org/>

<sup>57</sup> <https://climathon.climate-kic.org>

<sup>58</sup> <https://www.era-learn.eu/events/annual-conference-on-public-public-partnerships-7-8-nov-2017>

<sup>59</sup> There are indications that new EJPs such as the Rare Diseases, and Soil EJP which are currently in preparation will include “normal” co-funded calls open to all.

Figure 4.3 Correspondence of CCCA's Science Plan priorities to funding in the selected partnership initiatives

Joint Programming Initiatives	CCCA Science Plan Priorities					
	I. Climate change science	II. Impacts	III. Adaptation	IV. Mitigation	V. Societal transformation	VI. Inter- and trans-disciplinary topics
JPI Climate	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected
JPI Urban Europe		Occasionally addressed in topics and/or projects	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected
FACCE JPI	Occasionally addressed in topics and/or projects	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected
Water JPI	Occasionally addressed in topics and/or projects	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Occasionally addressed in topics and/or projects	Occasionally addressed in topics and/or projects	Focus in topics published and/or projects selected
Climate KIC		Occasionally addressed in topics and/or projects	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected	Focus in topics published and/or projects selected

■ Focus in topics published and/or projects selected
 ■ Occasionally addressed in topics and/or projects

Source: Own analysis using data from the websites and SRIAs of the illustrated initiatives





Criticism aside,  
to date Horizon 2020  
has contributed almost  
€8 billion to climate-  
related research and  
innovation projects.  
That in itself is  
a huge success.

# 5 AUSTRIA'S PERFORMANCE

# 5.1 CALL RESULTS IN CLIMATE-RELEVANT RESEARCH 2014-2017

## GENERAL STATISTICS FOR FUNDED PROJECTS IN HORIZON 2020

Horizon 2020 has a budget envelope of €77.2 billion for the entire period between 2014 and 2020. As of November 2017, €26.3 billion have been allocated, which is 34% of the total available budget. In other words, to date only a third of Horizon 2020 funds have been allocated to projects.

Nevertheless, in the years 2014-2017 a total of more than 15,000 projects were funded, involving some 67,000 participants (see Table 5.1 below). Austria has been involved in 1,281 projects within Horizon 2020 so far, with 1,873 participations, accounting for some €747 million of EU funding.

## CATEGORIES OF CLIMATE RELEVANCE IN THE DATA

We use three categories in the analysis to compare data:

- All projects: all the funded projects and participations, either throughout Horizon 2020 or the relevant programme lines in the focus of the particular analysis;

- Climate-relevant: those projects assigned by the EC with either the 40%<sup>61</sup> or 100% coefficient of the adapted Rio markers as described in part 3.3 above; and

- Climate-focused: only those projects assigned the 100% coefficient, thus with climate as their principal objective.

One third of the 15,000 projects funded by Horizon 2020 so far have been classified as climate-relevant (see Table 5.1). These 5,004 projects incorporate 28,845 participations from all over the world, amounting to a total of €7,849 million in climate action-related funding from the framework programme. Austria is involved in 552 projects related to climate action, coordinating 120 of these projects, with a total of 883 participations. Half of the 5,004 proposals classified as climate action-relevant have climate action as their primary goal, (i.e. they are assigned a score of 100%). Of these 2,532 projects, Austria is involved in 299, coordinating 85, with a total of 462 participations. Interestingly, roughly every fourth collaborative 'climate-focused' project in which Austria takes part is coordinated by an Austrian organisation, compared to roughly one in five when looking at 'all projects'.

Table 5.1 – Participation data according to the eCorda database update of October 2017 for projects in which climate action-relevance has been attributed.

Participation data		Projects	Participants	EC contribution in €	Coordinators
<b>all projects</b>	all countries	15.056	67.069	26.385.052.255	15.056
	Austria	1.281	1.873	746.707.839	370
	share of Austria	8,51%	2,79%	2,83%	2,46%
<b>climate-relevant</b>	all countries	5.004	28.845	7.850.596.275	5.004
	Austria	552	883	242.898.560	120
	share of Austria	11,03%	3,06%	3,09%	2,40%
<b>climate-focused</b>	all countries	2.532	13.708	5.677.823.027	2.532
	Austria	299	462	190.853.553	85
	share of Austria	11,81%	3,37%	3,36%	3,36%

Source: eCORDA data as of 30/09/2017, visualisation: FFG

<sup>60</sup> Not all project data from the 2017 calls for proposals have been incorporated in the eCorda database update of October 2017.

<sup>61</sup> Here it should be noted that of those projects classified as 'climate relevant' and assigned the 40% coefficient, only 40% of their budget is attributed towards achieving the Horizon 2020 goal of spending 35% of the total budget in climate action-related projects.

As is also apparent from Table 5.1, Austria's performance is positively related to the intensity of climate relevance, enjoying a bigger share of the total pie in highly climate-relevant projects than in general. This is an indicator of Austria's strong research community in the field of climate action.

Due to the very limited contribution made by the 'Science with and for Society' and 'Spreading Excellence and Widening Participation' programmes to climate-relevant topics and funding, the analysis will concentrate on the three main pillars of Horizon 2020.

### DISTRIBUTION OF PROJECTS AND FUNDING AMONG THE HORIZON 2020 PILLARS

Looking at the 5,000 climate-relevant projects, we see that half are funded under Pillar 3, Societal Challenges, and another 42% in Pillar 1, Excellence, with only 8% of the projects funded under Pillar 2, Industrial Leadership. There is a significant difference in the distribution of projects compared with the overall picture in Horizon 2020, where Pillar 1 accounts for 57% of all projects and Societal Challenges only 26% (see Figure 5.1).

The strong representation of the Societal Challenges is even more significant when we look at the funding. As seen in Figure 5.2, the share of funding for climate action-relevant topics coming from the Societal Challenges is 64%, compared to 39% in Horizon 2020 overall. When looking only at the projects in which climate action is the primary goal, this share goes as high as 73%.

This comes as no surprise, of course, because, as already discussed in the previous chapter (see Figure 4.1 for example), the bulk of the funding and projects deemed climate-relevant comes primarily from four of the Societal Challenges (Food; Energy; Transport; Environment) and two Industrial Leadership sub-programmes (Advanced Materials; Advanced Manufacturing and Processing). Figure 5.3 shows in particular that Societal Challenge 3, 'Secure, clean and efficient energy' skews the data towards the third pillar, as nearly all of the projects and funding are classified as 'climate-focused'. This dominance of the 'Energy' challenge also partly explains the differentiated distribution of organisation types presented next.

### ORGANISATION TYPES IN CLIMATE-RELEVANT PROJECTS

The EC uses five major categories to characterise the types of organisations taking part in the framework programme<sup>62</sup>. In Horizon 2020 overall:

- Private for profit companies (PRC) make up 35% of participations,
- Secondary and higher education establishments (HES) a count for 33%,
- Research organisations (REC) a further 21%, while
- Public bodies (PUB) are involved in 6% of participations, and
- Other entities (OTH) in 5%.

When looking at all countries, the only significant difference between the organisational distributions in 'all projects' compared to 'climate-relevant' is a higher participation of private companies in climate-relevant projects at the expense of universities and higher education institutions. However, this is only partly attributed to the predominance of the 'Energy' Societal Challenge as explained above, as there is a stronger participation of private companies in climate-relevant projects both in Pillar 1, 'Excellence' (24.2% of participations coming from PRCs in climate-relevant topics versus 19.3% in all projects) and Pillar 2, 'Industrial Leadership' where PRC participation is already very strong to start with (56.1% in climate-relevant versus 51.4% in all projects).

This increase in the influence of private companies is even higher for Austrian participations, where nearly every second participation in climate-relevant projects comes from an enterprise (46.4%). This of course means that the academic sector is represented less frequently in climate-relevant projects than in general. The share of participation of universities and higher education institutions from Austria falls from 28% in all projects to 21.3% in climate-relevant projects, and is as low as 18.2% in climate-focused projects, while the share of non-university research organisations (REC) remains stable at around 21%.

<sup>62</sup> Definitions of types of organisations:

**Private for profit companies (PRC):** Private, for-profit entities, including small or medium-sized enterprises and excluding Universities and Higher or Secondary Education Establishments.

**Public bodies (excluding research and education) (PUB):** Any legal entity established as a public body by national law or an international organisation. Excludes Research Organisations and Higher or Secondary Education Establishments.

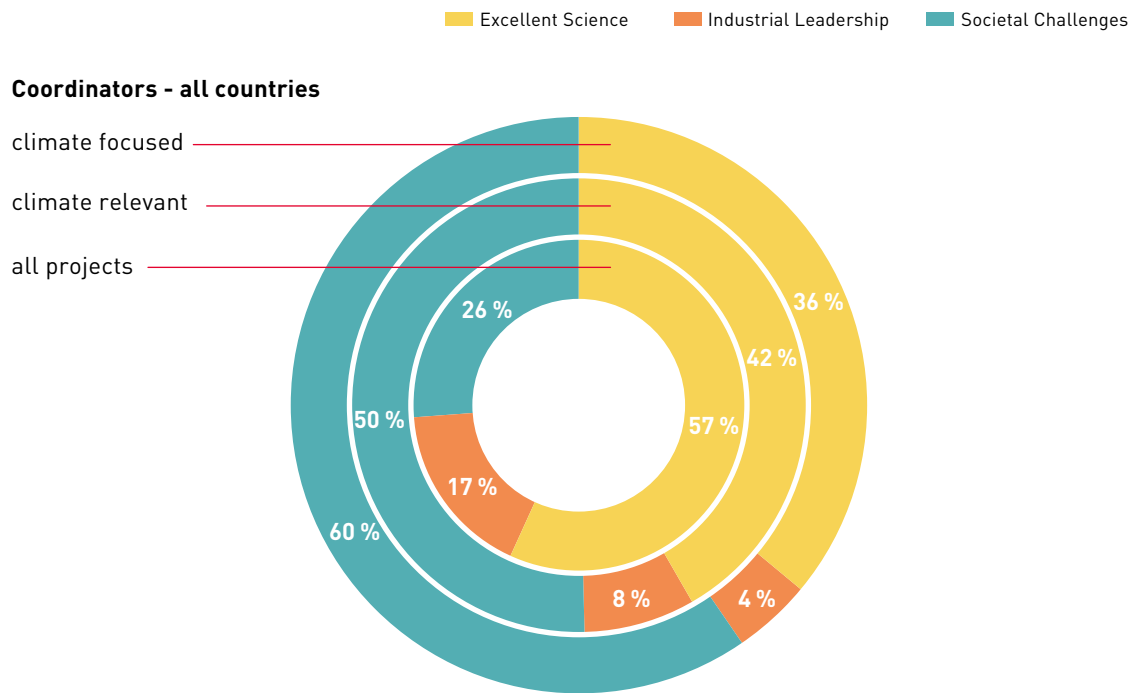
**Research organisations (excluding education) (REC):** A legal entity that is established as a non-profit organisation and whose main objective is carrying out research or technological development.

**Secondary and higher education establishments (HES):** A legal entity that is recognised by its national education system as a University or Higher or Secondary Education Establishment. It can be a public or a private body.

**Other entities (OTH):** Any entity not falling into one of the other four categories

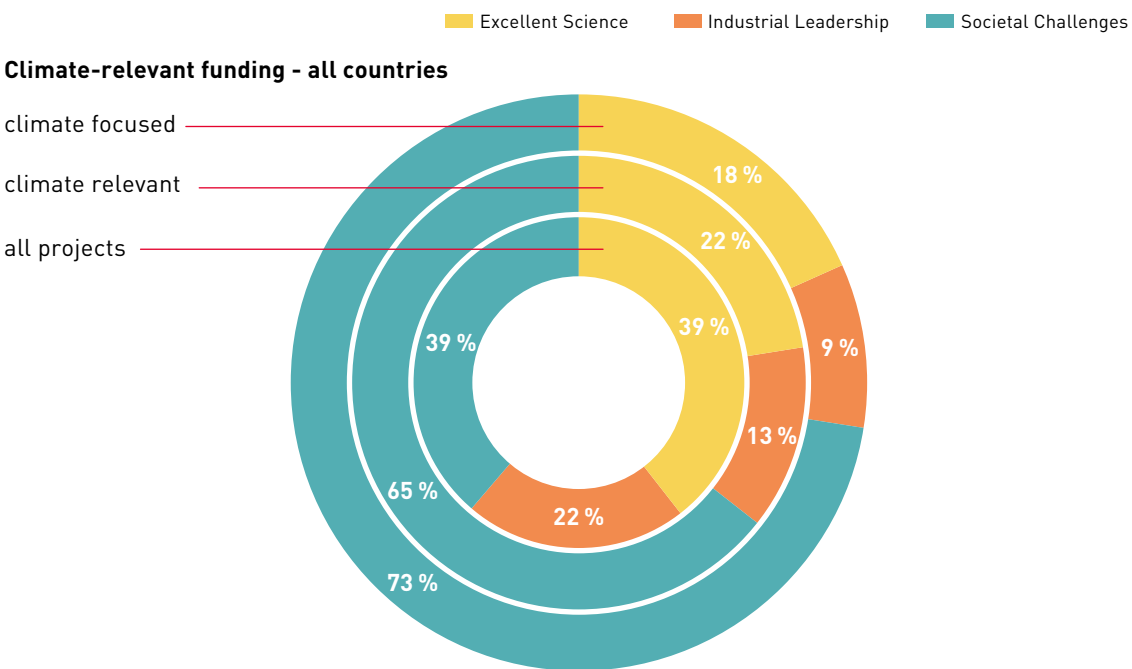
Source: HORIZON 2020 IN FULL SWING - Three Years On - Key facts and figures 2014-2016, EC 2018, <https://tinyurl.com/H2020-threeyearson>

Figure 5.1 – Distribution of projects according to the three H2020 pillars and climate-action relevance.



Source: eCORDA data as of 30/09/2017, visualisation: FFG

Figure 5.2 – Distribution of EC contributions to participants in the three pillars and according to climate-action relevance



Source: eCORDA data as of 30/09/2017, visualisation: FFG

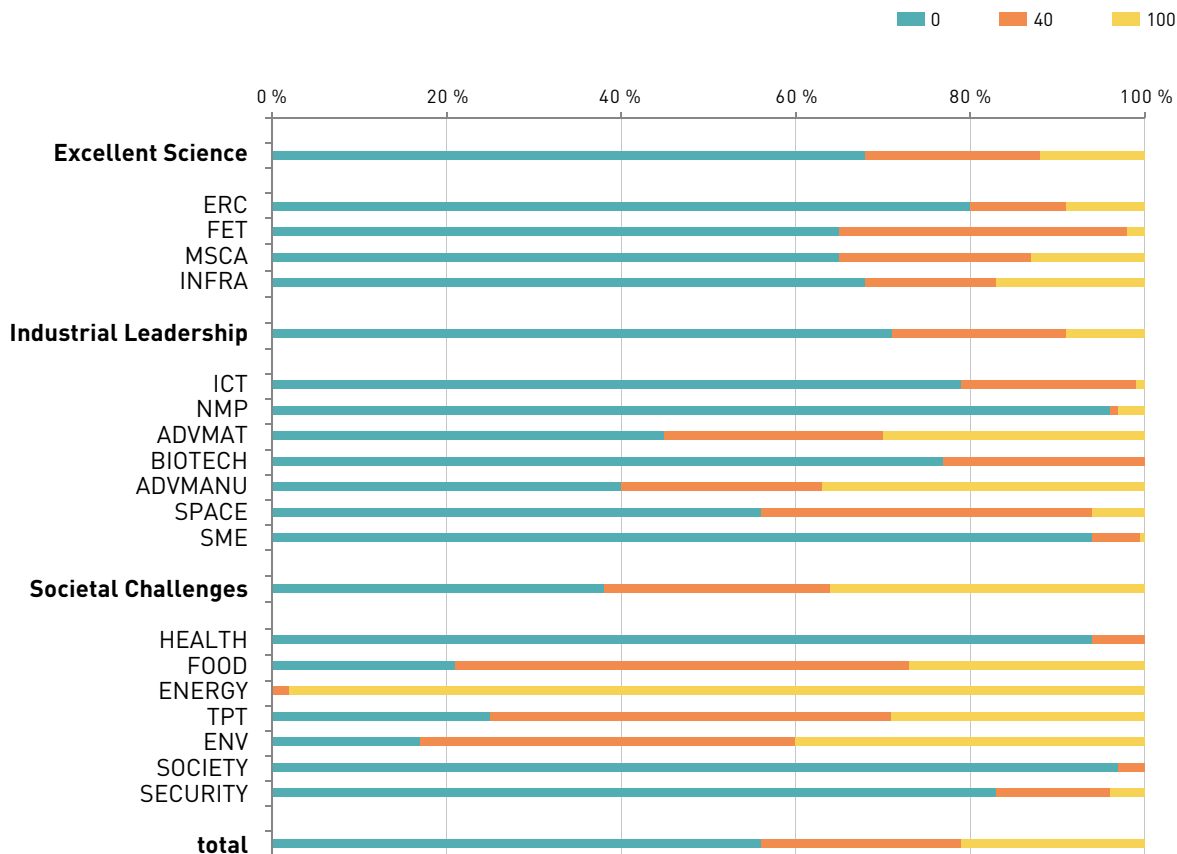


Table 5.2 – Organisation-type distribution of participations in projects according to climate relevance; Austria vs. all countries.

Organisation-type	PRC		HES		REC		PUB		OTH	
all projects										
countries	All	AT	All	AT	All	AT	All	AT	All	AT
Excellent Science	19,33 %	24,39 %	54,98 %	54,82 %	21,80 %	17,96 %	1,76 %	1,13 %	2,12 %	1,70 %
Industrial Leadership	51,44 %	52,60 %	18,82 %	18,18 %	18,99 %	18,83 %	4,98 %	5,84 %	5,78 %	4,55 %
Societal Challenges	39,90 %	43,23 %	22,13 %	16,38 %	21,00 %	24,51 %	9,95 %	8,37 %	7,02 %	7,51 %
Total	35,20 %	40,10 %	33,12 %	28,12 %	20,82 %	21,13 %	5,87 %	5,60 %	4,98 %	5,05 %
climate-relevant										
countries	All	AT	All	AT	All	AT	All	AT	All	AT
Excellent Science	24,19 %	28,81 %	52,18 %	51,41 %	20,65 %	16,95 %	1,59 %	0,56 %	1,40 %	2,26 %
Industrial Leadership	56,12 %	60,12 %	18,13 %	16,18 %	20,02 %	19,65 %	2,58 %	1,73 %	3,14 %	2,31 %
Societal Challenges	44,49 %	47,80 %	17,71 %	12,81 %	20,87 %	22,75 %	9,64 %	8,03 %	7,29 %	8,60 %
Total	40,90 %	46,39 %	26,85 %	21,31 %	20,68 %	20,96 %	6,46 %	5,27 %	5,11 %	6,07 %
climate-focused										
countries	All	AT	All	AT	All	AT	All	AT	All	AT
Excellent Science	18,42 %	19,74 %	51,87 %	55,26 %	25,55 %	22,37 %	2,43 %	0 %	1,73 %	2,63 %
Industrial Leadership	51,31 %	61,29 %	16,84 %	6,45 %	22,00 %	16,13 %	5,16 %	9,68 %	4,69 %	6,45 %
Societal Challenges	47,21 %	48,45 %	16,54 %	11,27 %	19,95 %	21,97 %	8,43 %	8,17 %	7,87 %	10,14
Total	41,61 %	44,59 %	23,91 %	18,18 %	21,31 %	21,65 %	6,88 %	6,93 %	6,30 %	8,66 %

Source: eCORDA data as of 30/09/2017, visualisation: FFG

Figure 5.3 – Distribution of projects according to the Rio marker coefficient assigned to their climate-action relevance



Source: eCORDA data as of 30/09/2017, visualisation: FFG

## 5.2 AUSTRIAN PERFORMANCE IN CLIMATE-RELEVANT PROJECTS

Austrian organisations are performing better with increasing climate relevance of the projects and topics. As can be seen in Table 5.1 above, a considerably larger part of the overall budget is going to Austrian participants in climate-focused projects than it does in general. Furthermore, organisations from Austria more often choose to take the coordinator role in climate-focused topics when compared to all projects.

It can thus be concluded that the Austrian climate action community participating in Horizon 2020 is really strong, not only compared to that of other countries (ranked 7th in number of coordinators in climate-focused topics in the Societal Challenges) but also compared to the overall participants from Austria (3.36% of all coordinators from Austria in climate-focused topics compared to 2.46% overall).

Table 5.3 and Figure 5.4 show that the bulk of the funding coming to Austria for climate-relevant projects originates in the Societal Challenges, and especially in SC3 'Energy' (every third euro received comes from this programme line), SC4 'Transport', and to a lesser extent SC5 'Environment' and SC2 'Food'. Significant amounts are also coming from the ERC and the Marie-Sklodowska-Curie actions, as well as from ICT and 'Advanced Manufacturing'. Although smaller in absolute terms, the contribution of Societal Challenge 6 should be highlighted because Austria receives 6.4% of the total climate-relevant budget available.

### TOP PLAYERS: ORGANISATIONS WITH THE MOST PARTICIPATIONS IN CLIMATE-RELEVANT PROJECTS

In total 372 Austrian organisations are involved in the 883 participations in climate-relevant projects. Of these, 256 (68.8%) are involved in only one project. The 120 projects led by an Austrian partner are coordinated by 63 different organisations. However, it should be noted that of the 120 "Austrian coordinated projects", 13 are Individual Fellowships from the Marie-Sklodowska-Curie actions and a further 14 are ERC Grants, meaning that there is no consortium to coordinate in these cases. In fact there are 6 entities that only lead either ERC or Marie-Sklodowska-Curie grants, as for example the

University of Vienna. It is involved in another seven grants as a partner, making it still one of the top ten Austrian organisations when the number of successful participations in Horizon 2020 climate-relevant projects is considered.

The top 10 Austrian organisations in climate-relevant grants account for 30% of all participations (266 of 883). These ten entities also lead 44% (53 of 120) of all projects coordinated by Austria. Looking at the distribution of the 266 participations of the top 10 organisations, there is a slightly stronger emphasis in the Excellence pillar with 26% of participations, compared to a 20% share for all Austrian participations. This is naturally to be expected as this list of organisations includes some of Austria's most relevant academic institutions.

The top 10 players in climate-relevant research in Austria are shown in Table 5.4 below. They include four universities, four non-profit research organisations, an industrial enterprise and a public body. In Table 5.4 a discrepancy becomes apparent between the ranking of the top 10 entities according to their successful participations and the climate-relevant funding they receive. In fact, three Austrian organisations (namely Cybergrid GmbH, Infineon Technologies Austria AG, and FFG63) receive more climate-relevant funding although they have fewer participations in grants compared to the top 10.

Two things should be noted here: For projects that have been attributed the '40% coefficient' of the adapted Rio markers (i.e. with climate action as one of their objectives but not the primary one) only 40% of the funding received is calculated as 'climate-relevant' and analysed here. Furthermore, as discussed in the previous section and shown in Figure 5.3, Societal Challenge 3 ('Energy') is an outlier when it comes to distribution of the Rio coefficients, with 98% of all projects assigned a 100% coefficient. Hence, a ranking of top entities according to the climate-relevant funding they receive would have significantly biased the selection towards organisations successful in Societal Challenge 3.

63 This is due to the co-funding of several ERA-Nets for which FFG implements the Joint Calls in Austria. This amount, supplemented by the national contribution, naturally returns to the research community.

Table 5.3 – Austrian performance in climate-relevant projects.

PROGRAMME LINE	Austrian Participations	Austrian Coordinators	Climate relevant funding	% of total budget going to Austria	% of total funding
<b>Horizon 2020 (total)</b>	<b>883</b>	<b>120</b>	<b>€ 242.898.560</b>	<b>3,1%</b>	<b>100,0%</b>
<b>Excellent Science</b>	<b>177</b>	<b>38</b>	<b>€ 43.740.194</b>	<b>2,5%</b>	<b>18,0%</b>
European Research Council (ERC)	16	14	€ 18.972.064	2,3%	7,8%
Future and Emerging Technologies (FET)	15	4	€ 3.379.913	2,6%	1,4%
Marie-Sklodowska-Curie Actions	133	17	€ 17.751.063	3,0%	7,3%
Research Infrastructures	13	3	€ 3.637.155	1,9%	1,5%
<b>Industrial Leadership</b>	<b>173</b>	<b>7</b>	<b>€ 32.131.413</b>	<b>3,1%</b>	<b>13,2%</b>
Information and Communication Technologies	93	4	€ 12.573.018	3,7%	5,2%
LEIT- Nanotechnologies	1	0	€ 357.245	2,0%	0,1%
LEIT- Advanced materials	12	1	€ 6.100.943	3,9%	2,5%
LEIT- Biotechnology	5	0	€ 1.131.479	3,6%	0,5%
LEIT- Advanced manufacturing and processing	41	1	€ 10.127.783	2,5%	4,2%
LEIT- Space	19	1	€ 1.690.285	2,4%	0,7%
Innovation in SMEs	2	0	€ 150.660	1,4%	0,1%
<b>Societal Challenges</b>	<b>523</b>	<b>75</b>	<b>€ 166.147.350</b>	<b>3,3%</b>	<b>68,4%</b>
SC1 - Health, demographic change and wellbeing	3	0	€ 528.800	1,0%	0,2%
SC2 - Food, agriculture, marine, bioeconomy	72	8	€ 12.185.791	1,6%	5,0%
SC3 - Secure, clean and efficient energy	197	31	€ 85.184.190	3,8%	35,1%
SC4 - Smart, green and integrated transport	173	30	€ 52.277.399	4,4%	21,5%
SC5 - Climate action, environment	69	6	€ 14.666.648	2,2%	6,0%
SC6 - Inclusive, innovative and reflective societies	2	0	€ 369.147	6,4%	0,2%
SC7 - Secure societies	7	0	€ 935.376	1,6%	0,4%
<b>Widening Participation</b>	<b>8</b>	<b>0</b>	<b>€ 567.599</b>	<b>2,0%</b>	<b>0,2%</b>
<b>Cross-thematic Calls</b>	<b>2</b>	<b>0</b>	<b>€ 312.004</b>	<b>0,6%</b>	<b>0,1%</b>

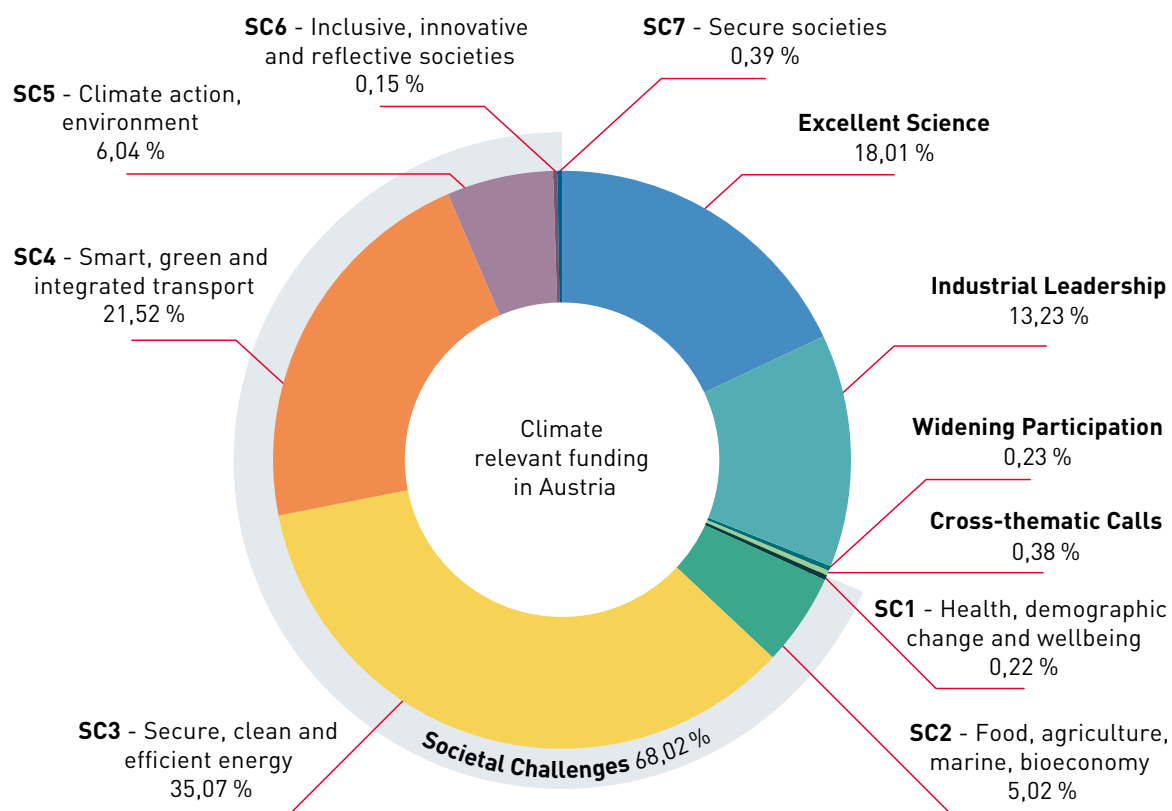
Source: eCORDA data as of 30/09/2017, visualisation: FFG

Table 5.4 – Top 10 players in Austria in climate-relevant projects

ORGANISATION NAME	Type of organisation	Project participations	Climate relevant funding received	Excellent Science	Industrial Leadership	Societal Challenges	Widening	Cross-thematic Calls
Vienna University of Technology (TU Wien)	HES	49	€ 11.416.854	€ 4.352.509	€ 1.276.145	€ 5.647.102		€ 141.098
Austrian Institute of Technology (AIT)	REC	42	€ 18.512.648	€ 2.726.291	€ 1.371.701	€ 14.171.567	€ 243.089	
AVL List GmbH	PRC	35	€ 19.972.620	€ 427.494	€ 1.229.066	€ 18.316.059		
University of Natural Resources and Life Sciences, Vienna (BOKU)	HES	26	€ 5.500.600	€ 1.428.496	€ 427.425	€ 3.644.679		
VIRTUAL VEHICLE competence centre	REC	26	€ 5.712.719	€ 460.681	€ 942.442	€ 4.309.596		
Graz University of Technology (TU Graz)	HES	24	€ 6.383.530	€ 3.618.717	€ 661.275	€ 2.103.539		
Austrian Energy Agency	OTH	18	€ 5.353.532			€ 5.353.532		
University of Vienna	HES	17	€ 9.436.514	€ 9.305.264		€ 131.250		
Joanneum Research	REC	15	€ 4.294.099	€ 410.778	€ 266.874	€ 3.561.197	€ 55.250	
International Institute for Applied Systems Analysis (IIASA)	REC	14	€ 5.911.282	€ 2.688.972		€ 3.222.310		
		<b>266</b>	<b>€ 92.494.398</b>	<b>€ 25.419.202</b>	<b>€ 6.174.929</b>	<b>€ 60.460.831</b>	<b>€ 298.339</b>	<b>€ 141.098</b>

Source: eCORDA data as of 30/09/2017, visualisation: FFG

Figure 5.4 – Distribution of EC funding to Austria in climate-relevant projects according to Horizon 2020 programme line.



Source: eCORDA data as of 30/09/2017, visualisation: FFG



Figure 5.5 – Distribution of top 10 players' participation in Horizon 2020 pillars.

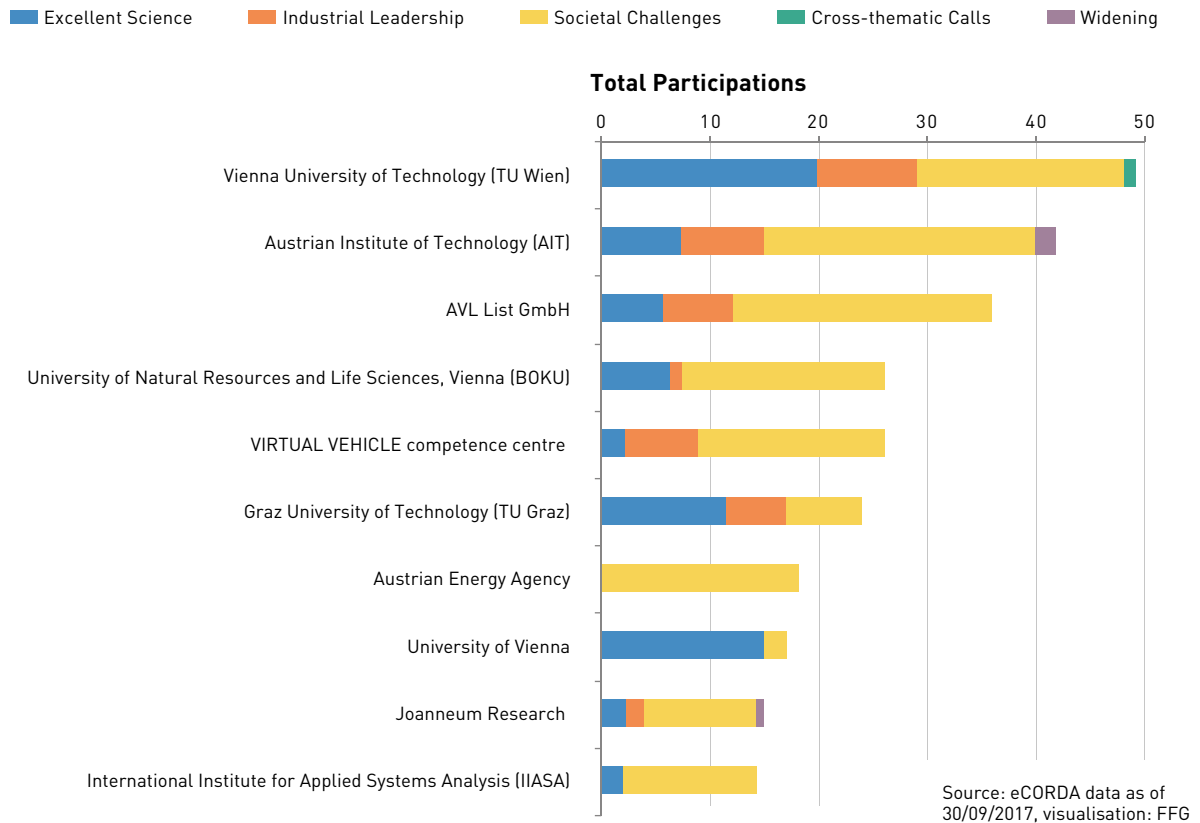
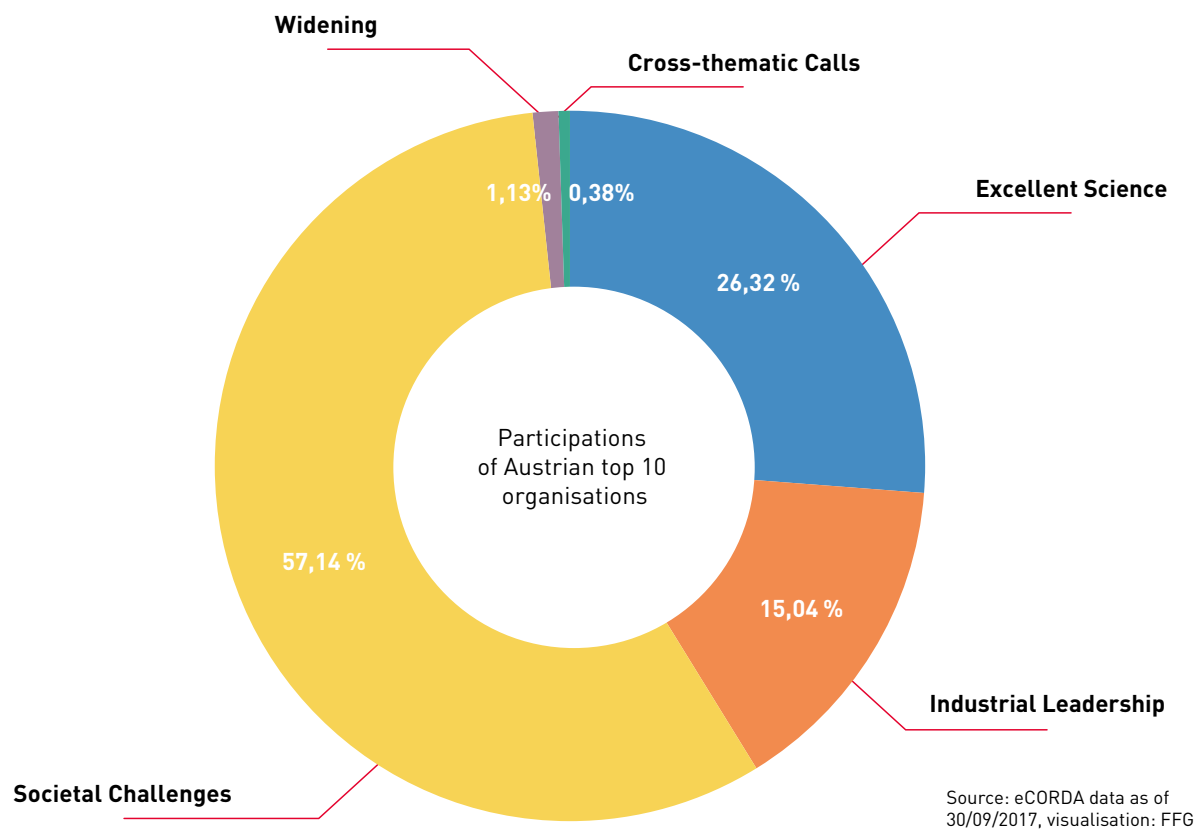


Figure 5.6 – Share of participations of top 10 Austrian organisations according to Horizon 2020 pillar.



# 6 CONCLUSIONS AND OUTLOOK

## 6.1 CONCLUSIONS

### 35% TARGET NOT ACHIEVED

Although with the best of intentions and welcomed, the Horizon 2020 budgetary target of spending 35% of total funding in climate-relevant projects has not been achieved (see Figure 4.1). Moreover, we cannot conclude that there is higher prioritisation of climate action-related research in all Horizon 2020 calls for proposals. The “usual suspects” amongst the Societal Challenges (i.e. Energy, Transport & Environment) are the ones providing the bulk of the funding, while other central instruments and programmes (e.g. ERC or FET) appear not to have been serious in taking up the challenge (see Figure 4.1 and Table 4.1).

Furthermore, the Commission’s monitoring efforts are focused towards the a priori definition of topics as climate action-related or not. This also seems to occasionally involve some “interpretative stretching” of the potential impact of projects, in order to reach the numerical target. Due to limited resources, little is done to analyse how selected proposals actually address the climate issues mentioned in the topics, and what potential impact these projects could have on policies, strategies and society at large.

This observation does not seek to downplay the honest efforts of DG RTD’s Directorate I to shape work programmes and topics across the programme lines in an integrated approach to climate action. On the contrary, these efforts should be acknowledged, and the experiences gained from this exercise should be used to shape the future governance of work programme development in FP9, especially in light of the current debate on missions for FP9.

Criticism aside, to date Horizon 2020 has contributed almost €8 billion to climate-relevant research and innovation projects. That in itself is a huge success.

### EVEN ACHIEVING THE 35% TARGET WOULD NOT SAY MUCH

The act of monitoring a numerical target for climate-relevant funding does not change the way the different programme lines in Horizon 2020 prioritise their topics and choose winning proposals.

To date the thematic coverage in the individual Societal Challenges reveals that while many projects on adaptation to climate change and mitigation are funded, there are fewer funded projects researching into the impacts of climate change in ecosystems, society and the economy; and even these projects mostly focus on conventional technological solutions (see Figure 4.2). Projects covering the necessary ‘societal transformation’ or addressing ‘inter- and transdisciplinary’ topics receive the least attention.

Although one of the most pressing Societal Challenges of our time, ‘society’ seems to play a minor role in the solutions pursued in Horizon 2020 projects.

In contrast, the relevant partnership initiatives presented here appear to do a better job of including different actors and sectors, as well as taking up subjects that promote inter- and transdisciplinary research and innovation while tackling issues of societal transformation through their Joint Calls and activities.

### AUSTRIA IS STRONGER THAN AVERAGE IN CLIMATE-RELEVANT THEMES

The performance of Austrian entities in Horizon 2020 is stronger with increasing climate relevance. While Austria usually comes in 9th in country ranking by number of successful participations, it moves up to rank 8 when only ‘climate-focused’ projects are considered.

Austria’s also receives a bigger piece of the cake in climate-relevant funding (3.09%) than in general funding (2.83%), and an even bigger one when only the ‘climate-focused’ projects are considered (3.36%), while at the same time having a higher share of coordinators.

## **CLIMATE ACTION IS HUGE RELEVANT FOR THE AUSTRIAN PRIVATE SECTOR**

Overall the participation of private for-profit companies (incl. SMEs) in Austria is higher than average in Horizon 2020. Nevertheless, in climate-relevant projects private sector involvement is even higher. It goes beyond the statistical bias of Societal Challenge 3, 'Energy' as described in the projects sample, and results in a higher PRC share for climate-relevant research (see Table 5.2). The representation of Austrian enterprises is well above average in successful participations across all three pillars of Horizon 2020.

 **Any new Societal Challenge on climate in FP9 should consider all possible "solutions" rather than focusing exclusively on technological ones.**

## **CLIMATE ACTION ALSO IMPORTANT IN PARTNERSHIP INITIATIVES**

Horizon 2020 involves a multitude of partnership initiatives, particularly with respect to climate action (see section 4.3). To date Austria has not taken a very strategic approach to its involvement in these partnerships. In some, such as the JPI Urban Europe or JPI Climate, Austria plays an important role, both in the governance and participation of Austrian organisations in the funded projects. Important success factors, particularly in the case of JPI Urban Europe, include the substantial financial commitment of the Federal Ministry of Transport, Infrastructure and Technology (BMVIT). In contrast, Austria has been very active in JPI Climate but without mobilising noteworthy amounts of money at national level. Instead the success factor here lies in the involvement of the respective research community, brought together and coordinated in the form of the Climate Change Centre Austria (CCCA).

These two successful examples of leveraging of national budgets with co-funding from H2020 as well as coordinating the national research agendas and the reduced fragmentation of effort are in stark contrast to other partnership initiatives in which Austria is a reluctant participant (e.g. JPI FACCE, Climate KIC) or does not participate at all in the joint activities (e.g. JPI Water). The limiting factor here is naturally money, rather than lack of interest from the relevant national authorities.

## **CLIMATE ACTION IN FP9**

There is currently broad discussion and a plethora of working groups debating the direction of FP9. It is unclear where these discussions will lead. At the moment the European Commission seems to suggest keeping the three pillar structure of H2020, with ERC forming Pillar 1, a smaller number of Societal Challenges forming Pillar 2, and the new European Innovation Council (EIC) becoming Pillar 3. The reduced number of Societal Challenges might encourage a merging of current Societal Challenges 3 and 4 (Energy and Transport) with the climate-relevant parts of SC5.

Although, intuitively, such a merging of programmes and agendas seems a good idea, it is vital that a new Societal Challenge on climate should consider all possible "solutions" rather than focusing exclusively on technological ones.

As experience with H2020 has shown, interdisciplinary approaches and societal transformation aspects have not been embraced in Energy or Transport. Societal Challenges call for socially-relevant questions to be taken into consideration. Therefore the focus of research on this new Societal Challenge should increasingly entail an integration of social science and humanities issues, rather than lending further weight to technological solutions.

## 6.2 RECOMMENDATIONS

### RECOMMENDATION 1: DEFINE MISSION-ORIENTED INSTEAD OF MONETARY GOALS FOR CLIMATE ACTION IN FP9

Although the 35% budgetary target in Horizon 2020 was well intended and welcomed, we cannot conclude that it has contributed to a greater prioritisation of climate action in Horizon 2020.

The recent report by Prof Mariana Mazzucato<sup>64</sup> defining the concept of Mission Orientation for FP9 provides an excellent roadmap for defining and framing the highly anticipated missions in FP9. The five criteria for selecting missions which the report presents would perfectly fit several climate-relevant targets from SDG13, for example.

Naturally, the manner in which mission orientation will be finally implemented in FP9 is not yet defined. The report indicates the direction, but we are a long way from the legal texts describing FP9. But it is important that climate action targets in FP9 should not be monetary, but instead aim for societal, technological and political/regulative milestones directly related to the current European and global policy context (e.g. SDGs, Paris Agreement, EU 2050 energy targets, remaining carbon budget).

Missions in FP9 should be accompanied by suitable programme management which should accompany and support funded projects, integrating them with European policies, actively helping to eliminate potential barriers, and dealing with interdependencies, conflicts and resource or knowledge sharing among the projects funded.

### RECOMMENDATION 2: A STRONG SOCIETAL CHALLENGE FOR CLIMATE ACTION IN FP9

At the time this Thematic Dossier was finalised, European Commission plans foresee one of the five FP9 Challenges being “Climate, Energy and Mobility”. Choosing Climate as one of the future Challenges in FP9 should be straightforward. The sheer complexity of the process towards a decarbonised economy and a society liberated from consumerism represents all the elements of a real challenge for European research and innovation policy.

Nevertheless, the definition of this Challenge should provide for all pathways towards its achievement. Areas currently underrepresented (e.g. societal transformation, social innovation, breaking the “growth lock-in”) should be strengthened. Future topics should not prescribe the manner in which projects should achieve goals or milestones, but rather allow for a wide variety of solutions.

### RECOMMENDATION 3: NATIONAL STRATEGIC PLANNING FOR PARTNERSHIP INITIATIVES

Austria’s successful participation in partnership initiatives is becoming more important as the trend seems to be for the Commission to entrust the funding of the relevant topics to these initiatives and avoid duplicating effort in H2020<sup>65</sup>. This means that where Austria does not take part in joint Calls, the research community is deprived of the opportunity to join consortia.

<sup>64</sup> ‘Missions: Mission-Oriented Research & Innovation in the European Union’, European Commission, 2018, <https://publications.europa.eu/s/fJkL>

<sup>65</sup> For example, water topics in Societal Challenge 5 have been steadily decreasing in the open calls for proposals, while the EC allocated co-funding for the Water JPI Joint Calls through ERA-Nets to the order of €35 million between 2014 and 2017.



Decisions regarding the international partnership initiatives in which Austria should be involved must not simply reflect the budgetary constraints of the individual ministries to which the subject is typically attributed, especially in an area such as climate action. There is a need for a strategic decision process, including medium to long-term financial commitments, and involving all the relevant federal government authorities, including the research funding agencies.

There are several good examples, and growing experience at FFG in implementing Joint Calls of Joint Programming Initiatives through ERA-Nets. Such cooperation between the policy-setting ministries and the funding agencies should be strengthened as it reduces the fragmentation in Austria's research funding landscape and provides a one-stop-shop solution for researchers.

#### **RECOMMENDATION 4: STRENGTHEN KNOWLEDGE NETWORKS**

Networking and coordination platforms such as the CCCA should be supported for those areas of research where the decision is taken to strategically participate in partnership initiatives. These platforms should provide advice in agenda setting and promote an attitude of cooperation instead of competition with respect to Austria's participation in international joint activities. Tighter cooperation among the various Austrian members in EU partnership initiatives and national networks such as Climate KIC, JPI Climate, JPI UE and the CCCA, would undoubtedly benefit all the community actors.

The Climate Change Centre Austria, an example of best practice, should be continued and strengthened through the provision of long-term financial security. The CCCA should revise its "business model" and more actively offer communication, consulting and brokerage services to its members and the policy community, while further developing the infrastructures it now provides.

#### **RECOMMENDATION 5: GOVERNANCE OF NATIONAL PROGRAMME COMMITTEE REPRESENTATIONS**

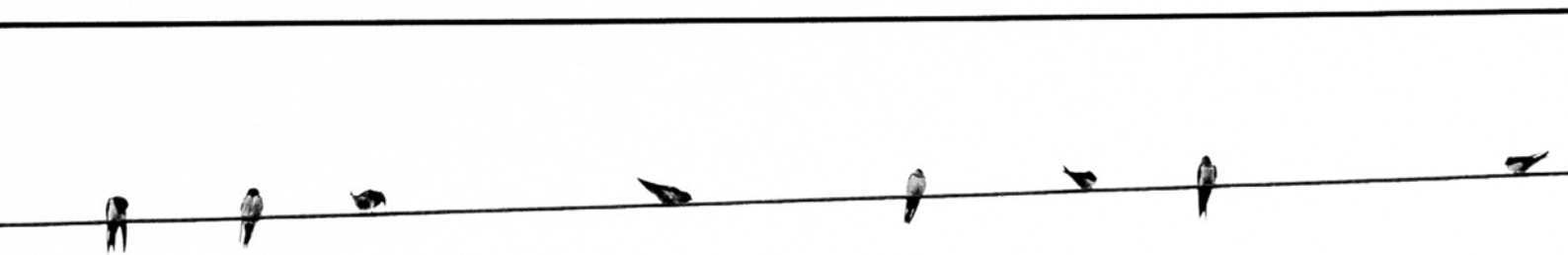
Both the anticipated mission orientation and the reduction in the number of Societal Challenges in FP9 will impact the work of programme committees and national delegations. More frequent and better structured exchange and discussion among the relevant policy and research stakeholders will be necessary in order to effectively represent the interests of the Austrian research and policy-making community.

There should be deeper coordination between the national delegates and the National Contact Points from various FP9 programme lines and different ministries and federal agencies to enable national 'strategic programme planning'. This should guide the formulation of calls in FP9's missions and challenges as well as Austria's thematic orientation and financial commitment in future missions and partnership initiatives.



Climate action targets in FP9 should not be monetary, but instead aim for societal, technological and political milestones directly related to the current European and global policy context.

# 7 LIST OF ABBREVIATIONS



ACRP	Austrian Climate Research Programme	ICT	Information and Communication Technology
CCCA	Climate Change Centre Austria	IPCC	The Intergovernmental Panel on Climate Change
COP	Conference of the Parties of the UNFCCC	JPI	Joint Programming Initiatives
CSA	Cooperation and Support Action	LEIT	Leadership in Enabling and Industrial Technologies
EC	European Commission	NDCs	Nationally Determined Contributions (to the Paris Agreement)
ERA	European Research Area	P2P	Public-to-public
ETS	EU emissions trading system	RIA	Research and Innovation Action
EU	European Union	RPO	Research Performing Organisation
FET	Future and Emerging Technologies	RTI	Research, Technology and Innovation
FFG	Austrian Research Promotion Agency	SRIA	Strategic Research and Innovation Agenda
FP6	6th Framework Programme	SSH	Social Sciences and Humanities
FP7	7th Framework Programme	UNFCCC	The 1992 United Nations Framework Convention on Climate Change
FP9	9th Framework Programme		
FWF	Austrian Science Fund		
H2020	Horizon 2020		
IA	Innovation Action		

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All data in this dossier are based on analyses of data provided by the European Commission. FFG points out that the results refer to a specific point in time; this dossier uses the most recent data release from 30 September 2017. Horizon 2020 is continuously producing new data as a result of new calls, grant agreements etc. Some proposals retained for funding will not lead to a grant agreement and the next project on the reserve list will be considered. This may result in changes in the statistical data.

This dossier offers a snapshot of the current situation.

While we have made every effort to ensure the accuracy of the information provided in this report, no liability can be accepted.