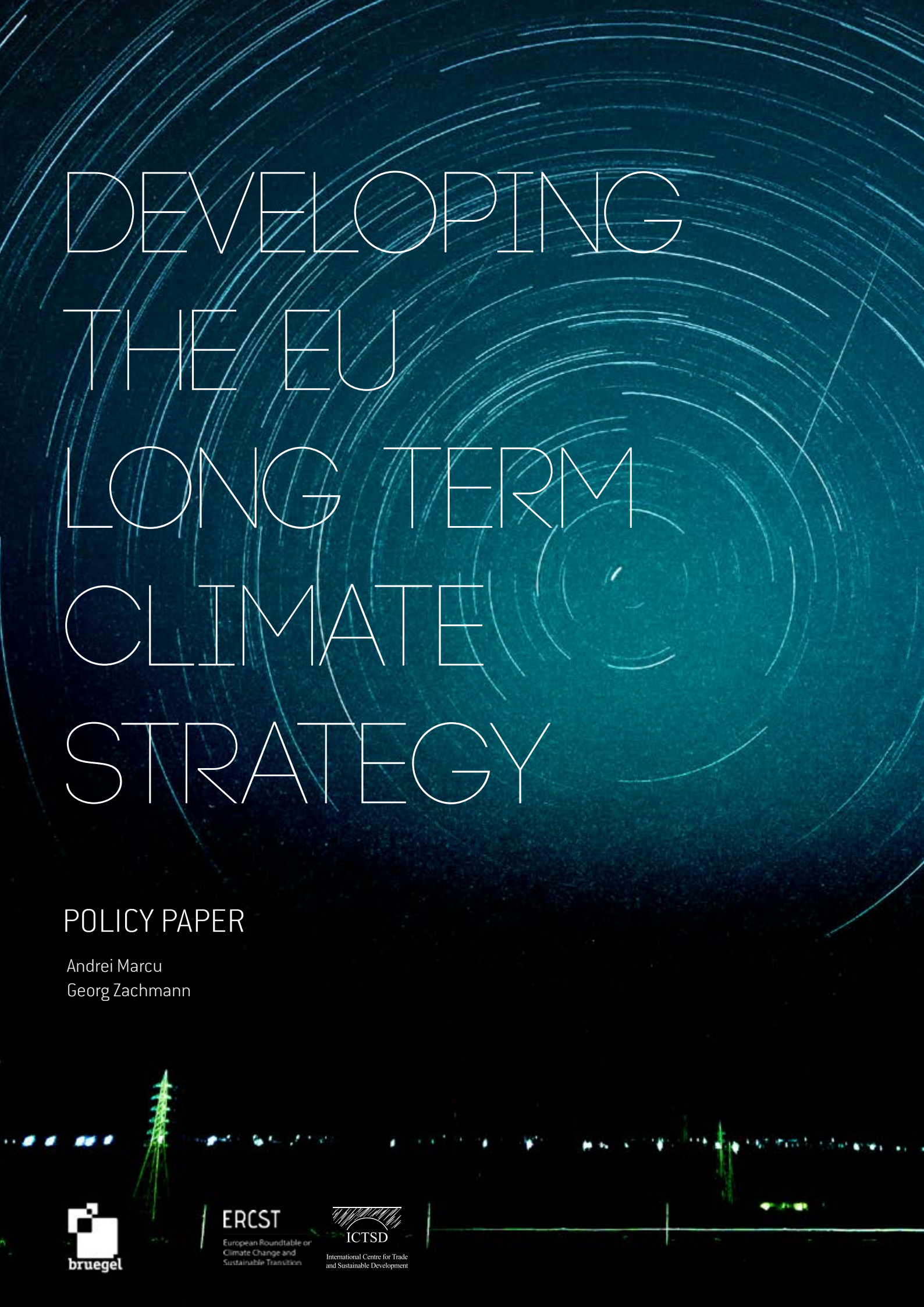

DEVELOPING THE EU LONG TERM CLIMATE STRATEGY

POLICY PAPER

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Project process

This policy paper is the outcome of a yearlong effort, which included an initial brainstorming in Brussels in June 2017, followed by a series of stakeholder engagements in five EU capitals at the beginning of 2018. The consultative process was concluded with a meeting with stakeholders in Brussels in March 2018.

The project has two outputs. A technical paper, which provides a "roadmap" for the development and delivery of the LTCS. It describes the main issues that need to be addressed, as well as the potential choices that can be made in the design of the new strategy, as well as an analysis of the implied trade-offs.

This policy paper presents different bundles of consistent choices from the technical paper, resulting in different architectures, and may serve as a basis upon which to build the new LTCS."

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Developing the EU Long-Term Climate Strategy - *Policy Paper*

1. The need for a new EU long-term climate strategy

Issued in 2011, the European Commission's 'Roadmap for moving to a competitive low carbon economy in 2050' (2050 Roadmap) provided a vision of how the European Union could deliver greenhouse gas (GHG) emissions reductions of 80 to 95 percent by 2050 compared to 1990 levels[1]. In March 2018 the European Council invited *"the Commission to present by the first quarter of 2019 a proposal for a Strategy for long-term EU greenhouse gas emissions reduction in accordance with the Paris Agreement, taking into account the national plans"*[2].

Much has changed since the 2050 Roadmap was published in 2011.

At the international level, the 2015 Paris Agreement has been said to have "*changed everything*"[3]. At the EU level, the Governance of the Energy Union[4], and the 2030 Climate and Energy Framework, which sets climate policy targets for 2030 will need to be considered in an LTCS.

The entry into force of the Paris Agreement on 4 November 2016[5] created a new global framework to address climate change, including an increased level of ambition compared to previous agreements (Table 1). The Paris Agreement goals are to hold the increase in the global average temperature to well below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C and for emissions to be net zero[6] by the second half of this century.

Table 1: Ambition level of international climate agreements

	Coverage	Emissions reductions, covered countries	EU reduction
Kyoto	18% of global emissions	4-5% from 1990 to 2012	2012: 8%
Doha	11% of global emissions	18% from 1990 to 2020	2020: 20%
Paris	100% of global emissions	Carbon neutrality second half of 21st century	2030: 40%[7] 2050: tbd

Source: own elaboration

To be in line with the Council's stipulation that the EU long-term greenhouse gas emissions reduction strategy should respect the Paris Agreement[8], the new EU long-term climate strategy (LTCS) will have to suggest that there can be a step up in ambition from the 80-95 percent decarbonisation target that was used as starting point for the 2050 Roadmap to a level that is consistent with the Paris goals. Provisions in the Paris Agreement have also created the need for coordination with the United Nations Framework Convention on Climate Change (UNFCCC) process and cycle.

In addition, climate science is under continued review. The new EU LTCS should be informed by the forthcoming Intergovernmental Panel on Climate Change (IPCC) *Special Report on 1.5°C*[9] and the annual UN Environment Programme *Emissions Gap Reports*, among others.

[1] A roadmap is a document that provides guidance on how to reach certain objectives.
[2] http://www.consilium.europa.eu/media/33457/22-euco-final-conclusions-en.pdf.
[3] See for example Patricia Espinosa, executive secretary, UN Framework Convention on Climate Change, on 23 November 2016: http://www.climateactionprogramme.org/climate-leader-papers/the_game_has_changed_for_good.
[4] The proposed Governance of the Energy Union Regulation integrates the EU's climate and energy planning into a single framework.
[5] See https://unfccc.int/process/the-paris-agreement/status-of-ratification.
[6] Zero net emissions refers to the amounts of greenhouse gases emitted into the atmosphere being balanced by removals.
[7] The NDC of the EU contains a target of at least 40% domestic GHG reductions by 2030, but there are ongoing political discussions about increasing ambition
[8] http://www.consilium.europa.eu/media/33457/22-euco-final-conclusions-en.pdf.
[9] See http://www.ipcc.ch/report/sr15/.

Changes in assumptions

The assumptions the 2050 Roadmap was built on have changed significantly since 2011. The long recession led to GDP in 2020 being forecast 8 percent lower in 2016 than it was in 2011. The CO2 emissions forecast for 2020 was also corrected downwards. The crisis also led to significantly lower discount rates because of the European Central Bank's monetary policy.

Rapid technological development since the publication of the 2011 Roadmap has reduced the prices of renewable energy and battery storage much faster than anticipated, leading to an increase in expected renewable generation capacity. This has contributed to a reduction in expected fossil fuel consumption. However, carbon capture and storage (CCS) is now expected to make a much lower contribution to the decarbonisation of the power sector in 2050[10].

The political environment has also changed considerably, with a phase-out of coal-based power generation and of combustion engines now deemed politically feasible[11].

Therefore, three elements will define the ethos of the LTCS: ambition, defined by the increased ambitions of the Paris Agreement; urgency, highlighted by the scientific evidence from the IPCC; and market solutions, which is the default approach, unless conditions dictate non-market intervention.

2. The key choices

Designing the LTCS will require a number of important decisions to be made. They range from the purpose and main audience of the strategy, to the format and scope of the strategy and important technical and procedural questions. In most cases, the decisions will be between several distinct options, all with political implications[12]. These decisions are not independent from each other. While all important in their own way, four can be highlighted: (1) the purpose of the LTCS; (2) the level of granularity of the analysis; (3) the role of the LTCS in the policy process; and (4) the way ambition is defined.

The main purpose of the LTCS

To fulfil its domestic climate policy processes and international climate commitments, the EU must address a number of objectives: i) develop guidance on EU climate policy and related EU member state policy; ii) deliver a long-term low greenhouse gas emission development strategy to the UNFCCC; iii) ensure coherence with the proposed Governance of the Energy Union regulation; iv) guide industry investment decisions; v) provide a vehicle for engaging EU citizens and stakeholders in decisions.

These deliverables are complementary, as it is unthinkable that the submission to the UNFCCC would differ in substance from the general policy direction of the EU.

The LTCS will therefore likely need to address several of these objectives, and possibly even, to some extent, all of them. However, it is unlikely that the LTCS can tackle all issues simultaneously and satisfactorily. A single plan that seeks to meet all needs might become unfocused, and politically more difficult to approve. The LTCS may therefore have a particular focus and/or can then also serve as a basis for the development of other planning strands that the EU needs to deliver.

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[10] By 2016, the CCS net generation capacity forecast had dropped 80 percent compared to 2011.
[11] A coal phase out was possibly also not considered that necessary in 2011, as expectations surrounding CCS were still high.
[12] In the technical paper, we discuss 119 options for the 34 choices.

Thus, it is in our view preferable that there should be different climate strategies for different main purposes, which could build on one another (see section 4).

Granularity of the pathways

The LTCS might ultimately guide the definition of targets. The metrics by which ambition is measured in the LCTS and the level of granularity of the analysis will be influential in this.

The 2011 Roadmap described pathways to 2030 and 2050, with the analysis broken down to six sectors, but not to individual EU countries.

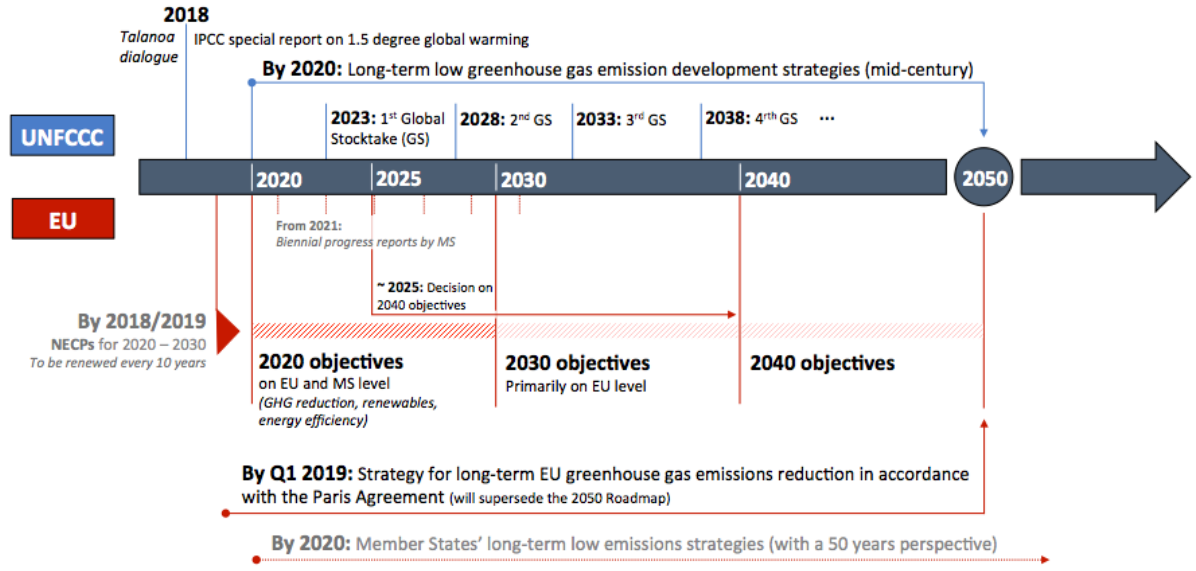
Defining pathways on a country-by-country basis will allow more informed national debates, and will mean that the strategy serves as a top-down benchmark of the consistency of national strategies with the overall EU decarbonisation pathway.

Sectoral pathways help to prioritise policies between different sectors, and provide some guidance to investors. But if the purpose of the strategy is to obtain endorsement for a sufficient level of ambition, sectoral and national pathways – that somewhat predetermine distributive effects – might be counterproductive.

The role of the LTCS in the overall EU climate and energy architecture

The LTCS should not exist in a vacuum, but should be integrated into a policy process. To situate the LTCS in the policy process, the timing of its release and the set-up of a potential review cycle (eg in line with the UNFCCC or EU process, see Figure 1) are important.

Figure 1: UNFCCC and EU policy processes linked to a long-term climate strategy



Source: own elaboration. Note: All information presented in grey is based on EU Commission's Proposal for a Regulation on the Governance of the Energy Union (2016) and is depended on the outcomes of the trialogue negotiations.

The LTCS will interact with a number of other EU strategies, such as for energy, transport, innovation, industry and agriculture. The LTCS's role relative to other strategies will determine to what degree climate concerns are a dominant driver for EU policy, or one among many.

The LTCS could be a headline climate strategy, followed by a series of other long-term strategies. The 2050 Roadmap, for instance, was followed by a number of sectoral actions plans, such as the Energy Roadmap 2050[13] and the Transport White Paper[14]. This framework would give political priority to the climate strategy.

Alternatively, the LTCS could be part of a set of equally-weighted strategies that would each inform the others, without any being predominant. Consistency would be guaranteed by common modelling. Such a framework would provide policy coordination and integration across sectors.

Finally, one overarching, integrated long-term plan could include the LTCS and also energy, innovation and other long-term strategies. All plans would carry equal weight within one integrated plan, which would provide a holistic view of the low-carbon transition and the tools to harness to the greatest extent cross-sectoral synergies.

How is ambition defined?

There are different possible approaches to defining the level of ambition of a long-term emissions mitigation[15] strategy. In the political process, the metric of ambition can be used to define targets (eg the 20 percent emission reduction compared to 1990 level for 2020). The chosen metric is not just a technical question; different metrics can imply quite different optimal mitigation pathways.

Both at European and international level, ambition in climate policy is mostly defined in terms of the amount greenhouse gas emissions are reduced by in a target year. This is typically formulated in relation to a (convenient) benchmark year. The 2050 Roadmap stipulated the EU's ambition of reducing overall emissions by a range of 80-95 percent by 2050 compared to 1990 levels.

Ambition can also be defined in terms of maximum temperature rise. The LTCS could indicate whether it envisages 1.5 °C or well-below 2°C – a choice that will have a substantial impact on the EU's decarbonisation pathway. Alternatively, the goal can be expressed in terms of carbon budget. However, politically, carbon budgets imply a zero-sum game of distributing a fixed carbon budget between different countries/sectors.

Finally, the strategy could set a point in time by when net emissions reach zero. This would be in line with Article 4 of the Paris Agreement, which affirms that parties aim *"to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century"*.

[13] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0885&from=EN.
[14] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN.
[15] We refer here only to domestic mitigation, which will be a core component of the LTCS. Other related issues, such as climate finance or adaptation, are not discussed here.

Box 1: Transparency and Participation in the modelling processes

The degree to which the analysis underpinning the LTCS is made public has implications for the credibility of the entire strategy. With the Roadmap issued in 2011, discussions about how transparent the analysis was almost over-shadowed the actual results. Although the model documentation was improved over time and some assumptions were made public, many stakeholders have argued that a more open approach from the beginning could have led to a more fruitful discussion.

To increase credibility, interested stakeholders should be given easy access to all the information (data, model structure, assumptions) necessary to broadly reproduce the analysis underpinning the LTCS[16]. Structuring a process that allows stakeholders to provide input into the modelling could not only improve the analysis, but also make the co-created results more acceptable to these stakeholders.

3. Four types of LTCS

The choices we have described show that the LTCS could evolve in a number of different ways. We believe there are four structures that would be particularly well suited to fulfil the purposes of an LTCS.

Vision 2100

The Vision 2100 would be a short strategy laying out the broad strategic approach and providing general guidance on decarbonisation in this century. Given the uncertainties around technological capabilities in the second half of this century, the underlying analysis would be rather qualitative. But by describing the institutional and societal preconditions for achieving carbon neutrality in the EU, the strategy could stimulate a debate on a deep transformation of the EU's economy. The Vision 2100 would not contain precise milestones for specific sectors or individual EU countries. But it would feed into the definition of more concrete techno-economic pathways for the first half of the century.

The Vision 2100 strategy would address four questions in broad terms:

1) How should the EU translate the goals of the Paris Agreement into domestic ambition?

2) What general policy instruments will be used to achieve the climate goals?

3) What is the EU's strategy in international climate negotiations?

4) How will the transition affect citizens, the public and the private sector?

The concise format and the non-technical analysis will allow this Vision 2100 strategy to kick off a debate with a wide array of stakeholders.

UNFCCC submission

This LTCS would be a concise official document outlining the EU's pathway towards net-zero emissions by mid-century. As indicated by the name, its main purpose would be to communicate by 2020 the EU's

[16] In fact, the European Commission plans to move in this direction by building an open database (JRC–IDEES) to underpin its new POTEnCIA model.

mid-century strategy to the UNFCCC. To ensure endorsement by the European Council in time, it would not be broken down into the national or sectoral pathways.

The UNFCCC submission – being officially endorsed by the European Council – would take precedence over other sectoral strategies. That is, the emission pathways implied by sectoral strategies need to be consistent with the overall decarbonisation pathway communicated to the UNFCCC. But as the UNFCCC submission would solely focus on the climate objective, other strategy documents that analyse how synergies with other objectives (eg energy security) can be exploited would be complementary.

Roadmap 2.0: sectoral pathways

A Roadmap 2.0 would essentially be an update of the 2050 Roadmap issued in 2011. It would propose for individual sectors decarbonisation pathways that are consistent with the goals of the Paris Agreement. To make sure that these pathways take into account technical and economic constraints, they would be based on sufficiently sophisticated modelling. Given the uncertainties around technological and economic developments, the modelling will be run for different scenarios.

The key difference compared to the 2050 Roadmap issued in 2011 would be that the new LTCS would explicitly discuss how policies interact and what social and economic impacts are to be expected from the transition to a low-carbon society – and how they might be addressed. Hence, the LTCS would not only model which techno-economic system would lead to which pathway but also which policy mix would be needed, and also analyse how policies could be designed to incentivise innovation and cost minimisation across sectors and mitigation options.A key political objective would be to provide the analytical underpinning for new 2040 energy and climate targets (the 2020 and the 2030 targets set goals for emissions reductions, renewable energy and energy savings).

The Roadmap 2.0 would not, however, prescribe pathways for member states because sectoral results at member-state level might be less stable (especially for smaller countries, where national idiosyncrasies could undermine the credibility of the results) and it would be politically sensitive if the European Commission explicitly suggests, for example, that Estonia should close its Narva oil shale power plant in, say, 2035.

In contrast to the 2050 Roadmap issued in 2011, modelling and in particular the definition of the modelled scenarios, would be done openly with involvement of stakeholders. The Roadmap 2.0 should be developed jointly with related sectoral strategies[17] in order to identify synergies and resolve trade-offs. Extensive analysis, meaningful coordination with stakeholders and the development of other sectoral strategies will be time-consuming. But this process would be important to ensure broad buy-in that would give political sustainability to the long-term decarbonisation agenda. Correspondingly, the preparation of a new Roadmap 2.0 should not be rushed.

Roadmap 2.0: EU Energy and Climate Plan

The 2050 Roadmap issued in 2011 can also be updated and modified so that it takes on a markedly different role in the EU political process. The Roadmap 2.0: EU Energy and Climate Plan would set out country-by-country decarbonisation pathways. In other words, different decarbonisation pathways would be identified for, for example, Germany and Slovenia. While the analysis will be based on techno-economic modelling, taking into account different sectoral contributions in different member states, the

[17] Such as energy, transport, heating and cooling, innovation, industry and agriculture.

resulting decarbonisation pathways would not be split down to the sectoral level. Member state decarbonisation pathways would not be formally binding. But they would inform the national debate what commitments made by the EU would imply for the national level. Furthermore, the national decarbonisation pathways would serve as benchmarks to assess national energy and climate plans and the member states' low-emission strategies foreseen in the Energy Union Governance Regulation.

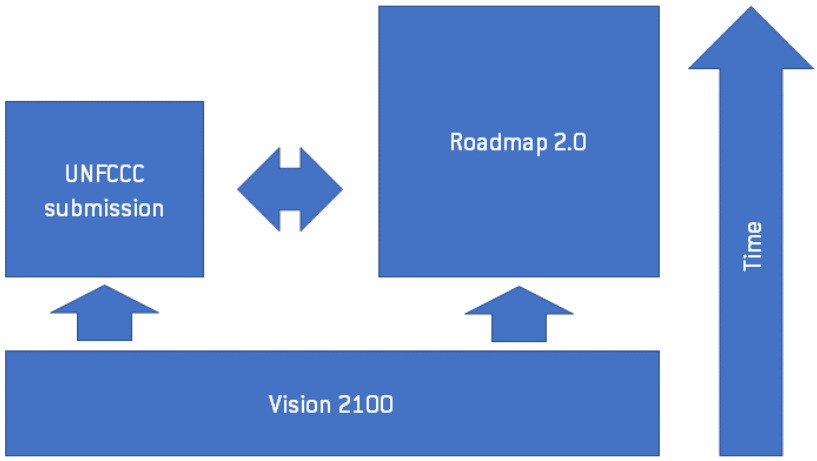
Accordingly, the Roadmap 2.0: EU Energy and Climate Plan would be regularly updated, taking into account the most recent batch of national plans and allowing member states and the European Commission to assess whether they are on track or need to step up their efforts.

In all other aspects, notably the importance of stakeholder involvement and transparency, this version of a Roadmap 2.0 would correspond to the Roadmap 2.0: sectoral pathways.

4. A sequence of strategies

As each of the described approaches to an LTCS would be targeted at a distinct purpose, it would likely be necessary to develop a suite of different strategy documents. The different strategy documents would target political processes with different timelines, and would require different levels of analysis and stakeholder involvement. Publishing these documents in a sequence could ensure that each plays its role in the political process.

Figure 2: Potential sequencing of climate strategy documents



Source: own elaboration

Work on an initial Vision 2100 could be the starting point, followed by the coordinated preparation of (i) a comprehensive update of the 2050 Roadmap to provide the analytical basis for the EU's climate policies; and (ii) the EU's submission to the UNFCCC. As the UNFCCC process is time-critical, the EU's submission might need to be concluded before the release of an updated Roadmap.

The Roadmap 2.0 could be a one-off document to replace the 2011 issue. Alternatively, it could be (or could contain a part that is) regularly updated. This would help ensure the consistency of national plans and policies under the Energy Union Governance framework while adjusting to inevitable new developments.

Table 2: Choices defining the proposed long-term climate strategies

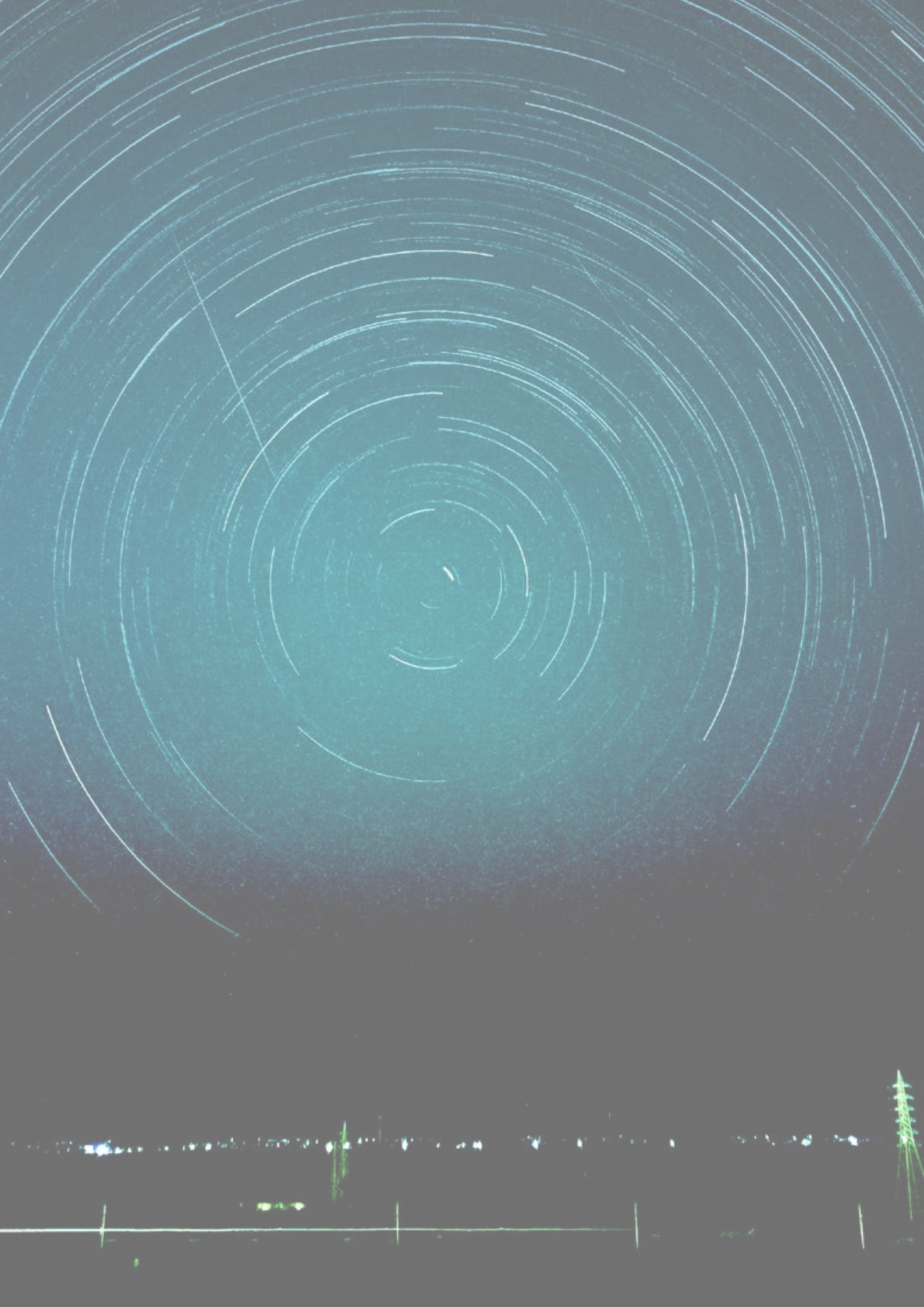
Name	**Vision 2100**	**UNFCCC submission**	**Roadmap 2.0**	
			Sectoral pathways	**EU Energy and Climate Plan**
Short description	A short document laying out the broad strategic approach to decarbonisation in this century, providing general guidance.	A concise official document outlining the EU's pathway towards net-zero emissions by mid-century.	An update of the 2011 Roadmap. The key difference is that it also explicitly discusses how policies interact.	An update of the 2011 Roadmap. The key difference is that it breaks down results to member-state level to assess the NECPs.
Purpose and need, audience				
Main purpose	Guidance for EU policymakers on broad vision	Mid-century strategy required by the Paris Agreement	Break down the overall ambition level to the sectoral level to guide EU and member-state policies	EU document to benchmark the National Energy and Climate Strategies
Audience, beyond policymakers	- Communicate with citizens	- Communicate with citizens - Early guidance for investors	- Communicate with citizens - Early guidance for investors	- Communicate with citizens
Type of document				
Legal Status	Commission Communication	Approved by Council	Commission Communication	
Role in overall climate framework	Over-arching guidance for other strategy documents	Pathway serves as guidance for other strategies	Integrated long-term strategy that includes the LTCS, an energy strategy, transport strategy…	
Governance/Cycle	One-off	One-off	One-off	Repeated in line with NECPs
Type of document	In the order of 10-20 pages	5-15 page official communication with modelling annex	20-30 page document + impact assessment + modelling documents	
Role in the debate	Initiator of debate	Integrates contributions from stakeholders	Integrates contributions from stakeholders	Integrates contributions from stakeholders in a continuous process
Scope of document				
Scope of modelling	Socio-technical analysis	Techno-economic modelling	Techno-economic and policy modelling	Techno-economic modelling
Relative emphasis of climate vs. other objectives	Focus on climate objectives	Focus on climate objectives	Other objectives are treated as side benefits	
Technical decisions				
Reaction to international developments	The LTCS should consider the uncertainty of the level of delivery of the Paris Agreement	Present EU pathway under the implicit assumption that others also contribute to the Paris goal	Achieve EU targets irrespective of international developments	
Temporal granularity of analysis and time-horizon	- No discrete intermediate milestones - Outlook towards the end of the century	'Mid-century'	2040 (possibly new renewable and energy efficiency targets) 2050	in line with NECPs
Geographic granularity of analysis	Focus on EU level, with emphasis on developments beyond the EU	Analysis on the EU level	Analysis on the EU level	Analysis on the member state and the EU levels
Sectoral granularity of analysis	No quantitative sectoral pathways, but possibly qualitative differentiation of sectors	No sectoral break-down	Sectoral break-down in order to prioritise policies	No sectoral break-down
Stakeholder process	Wide consultation, including with citizens		Normal consultation process on document; transparent and participatory modelling process	

Source: own elaboration. Note: NECP = National climate and energy plan.

5. Conclusion

To ensure that EU climate policy is in line with the goals of the Paris Agreement, and takes into account substantial recent shifts in the technical and political framework, the EU needs a new long-term climate strategy that will supersede the 2050 Roadmap that was issued in 2011. Designing a new LTCS implies decisions about how to deal with important climate policy questions. These decisions will shape the strategy and therefore the European climate policy debate on the transition to a low carbon society. It is always important to recall that this is a transition that needs to be sustainable, and that addressing the social and economic impacts will ensure societal buy-in, and a faster transition.

In making those policy decisions there are a number of elements that are a part of the ethos and DNA of the LTCS. Ambition, as defined by the greater ambition of the Paris Agreement compared to previous international agreements, should underpin the way the EU thinks about the LTCS. Urgency, underpinned by the scientific evidence from the IPCC, needs to drive the timing. Market solutions provide flexibility and efficiency, and need to be combined with non-market intervention when there are market failures or other justifications for non-market intervention.

Given the different tasks an LTCS will need to perform, several coordinated strategy documents with clearly defined purposes will be needed: a sequence (or suite) of strategic documents that outline the EU's decarbonisation strategy for different audiences.

Given the wide-ranging implications of the drive for net-zero emissions and the limited power of the European Commission to push through top-down legislation, soft instruments such as the LTCS are crucial. A transparent and participatory process in developing the LTCS is therefore vital to generate the buy-in from stakeholders that is necessary to underpin the climate polices that will meet the ambitious goals of the Paris Agreement.