

Nuclear Energy in the Article 6 of the Paris Agreement

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Introduction: The 1.5 °C Goal in the Paris Agreement and Nuclear Energy According to its article 2, the Paris Agreement PA aims at, inter alia, “Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels...” [1]. Paragraph 21 of the Decision, the document that explains the general thinking of the Parties to the United Nations Framework Convention on Climate Change UNFCCC as they adopted the PA in 2015, “Invites the Intergovernmental Panel on Climate Change [IPCC] to provide a special report in 2018 on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways.” [2].

This special report, the most recent issued by the IPCC, is called “Global warming of 1.5 °C” and was released during the UNFCCC meeting in Katowice, Poland, in December 2018. In its second chapter, it states: “By mid-century, the majority of primary energy comes from non-fossil fuels (i.e., renewables and nuclear energy) in most 1.5 °C pathways (p.130).” And: “Nuclear power increases its share in most 1.5 °C pathways with no or limited overshoot by 2050, but in some pathways both the absolute capacity and share of power from nuclear generators decrease. There are large differences in nuclear power between models and across pathways [Kim et al., 2014; Rogelj et al., 2018]. One of the reasons for this variation is that the future deployment of nuclear can be constrained by societal preferences assumed in narratives underlying the pathways [O’Neill et al., 2017; van Vuuren et al., 2017b] (p.131)” [3].

In any case and according to the IPCC, capping the global temperature increase to 1.5 °C requires a fast transition to electricity for energy end use. The resulting higher electricity demand has to be met by low-carbon generation, including nuclear. Nuclear generation increases, on average by around 2.5 times by 2050 in the 89 mitigation scenarios considered by the panel; in some scenarios, it increases sevenfold [3].

Based on these considerations, there is a place for nuclear energy in the PA. The question is, which place? This paper shows one possible, yet unexplored place for nuclear energy. Parties to the PA could use nuclear energy to cooperate and even to increase their nationally determined contributions NDC under Article 6 PA. Under Article 6 Paragraph 2 PA, short 6.2, nuclear energy could be used in generating internationally transferred

mitigation outcomes; or as an integrated, holistic and balanced non-market approach under 6.8. While it also could be part of the mechanism under 6.4, this paper interprets nuclear energy as more compatible with the spirit of Article 6.2 and 6.8 due to their focus on national preferences allowing for differentiation (see below for a more complete explanation of Article 6).

The remainder of this text is organized as thus: First, a brief overview of the PA is provided. Then, the basic provisions of article 6 as well as the current state of negotiations is explained. Based on the logic of the Paris Agreement, this paper develops operationalization criteria for incorporating nuclear energy under the different paragraphs of Article 6 PA. A conclusion summarizes the findings of this discussion.

In terms of novelty, two insights are developed here. At the same time, this paper offers a way forward in the substantiation of article 6 and a different way of incorporating nuclear energy into the Paris Agreement – different from an approach under the technology mechanism. The issues identified here can be used for Party or non-Party submissions to the ongoing negotiations.

The Paris Agreement in a nutshell

The most general and relevant provisions of PA to nuclear energy are [1]:

- Long-term temperature goal (Art. 2) limiting global temperature increase to well below 2 °C, while pursuing efforts to limit the increase to 1.5 °C.
- Global peaking and “climate neutrality” (Art. 4).
- Mitigation (Art. 4) establishing binding commitments by all Parties to prepare, communicate

and maintain a nationally determined contribution (NDC) and to pursue domestic measures to achieve them.

- Voluntary cooperation/market- and non-market-based approaches (Art. 6).
- Adaptation (Art. 7) enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change.
- Loss and damage (Art. 8) averting, minimizing, and addressing loss and damage associated with the adverse effects of climate change, including extreme weather events and slow onset events.
- Finance, technology, and capacity-building support (Art. 9, 10 and 11).

The work undertaken so far, has related nuclear energy to finance, technology, and capacity building; at times, it is seen as an instrument of mitigation, and at times of adaptation [4]. The advantages of treating nuclear as such are straightforward. As a technology, it needs research, deployment, and finance. Electrification reduces emissions of greenhouse gases but also helps adapting to climatic conditions [5]. The disadvantages of such a treatment of nuclear energy are less obvious, but important, nonetheless. First, the addressees of these articles are the Parties to the Agreement, i.e. sovereign countries. They, however, do not research, implement, and deploy technology. Second, because of the considerable private sector involvement in nuclear energy, there are issues of intellectual property IP. IP remains, however, a contentious issue, especially in relationship to Article 10 PA, since this article entails transference and sharing of technology. Third, the impact of nuclear energy as a technology and its outcomes on climate action can only be measured with great difficulty.

There is an alternative framework for relating nuclear energy to the PA. It consists of using it under Article 6, the market and non-market approaches to international cooperation. This framework maintains the advantages of the “mainstream” treatment of it as just mentioned. But it also addresses the disadvantages, especially picking up on the incentives to private sector agents and measuring effects and outcomes. However, there are also disadvantages. The most important is the current state of blockage in the international negotiations on Article 6. This alternative framework, its advantages and disadvantages call for further development.

Article 6 of the Paris Agreement

Article 6 of the PA calls for international cooperation. Specifically, its first paragraph reads: “Parties recognize that some Parties choose to pursue voluntary cooperation in the implementation of their nationally determined contributions to allow for higher ambition in their mitigation and adaptation actions and to promote sustainable development and environmental integrity.” [1]

Article 6 itself consists of a general clause and three distinct parts (this and all subsequent information based on [6]). The general clause in paragraph 1 covers all parts of the Article. Elements of this clause are the voluntary nature of any cooperation, the idea that it can extend to mitigation or adaptation actions, or the combination of both, as well as the commitment towards higher ambition, sustainable development, and environmental integrity.

The three parts of the Article following the general clause are the provisions for the use of “internationally transferred mitigation outcomes” ITMOs (paragraphs 2 and 3), the establishment of a “mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development” (paragraphs 4 to 7), and the recognition of the “importance of integrated, holistic and balanced non-market approaches being available to Parties to assist in the implementation of their nationally determined contributions, in the context of sustainable development and poverty eradication, in a coordinated and effective manner, including through, inter alia, mitigation, adaptation, finance, technology transfer and capacity-building, as appropriate” (paragraphs 8 and 9).

Paragraphs 6(2-3) can be conceived as the “bottom-up” part of multinational cooperation. While not explicit in the text of the PA, this is a market-based instrument (or a window for such instruments), i.e. its outcomes can be measured in equivalents of tons of greenhouse gases and these equivalents can be traded between agents. Under these provisions, Parties to the Agreement can engage in cooperation on their own terms. On the one hand, it is likely that the bodies of the framework convention will elaborate finer-grained guidance with a semi-mandatory character regarding technical issues such as robust accounting and transparency; on the other hand, it is equally likely that their guidance on the scope of activities falling under 6(2-3), governance, environmental integrity and sustainable development will remain on a general level. The ultimate goals of cooperation under 6(2-3) remain open, since the cooperating Parties or the cooperation entities set goals independently from the framework convention; however, their outcome seems to be narrowed down to mitigation.

Paragraphs 6(4-7) are the “top-down” part of multinational cooperation. While not explicit in the text of the PA, this mechanism is also market-based. Most probably, their outcome will be a mechanism with centralized governance and granular rules, modalities, and procedures, which will be developed and managed under the framework convention. Decisions on which activities, programs, sectors, or technologies qualify to participate in the mechanism will most likely be made by a centralized body. This mechanism serves towards multiple goals: mitigating greenhouse gas emissions, fostering (sustainable) economic development; and delivering overall mitigation in global emissions; it seems, therefore that there is a necessary mitigation component as well as – at least – adaptation co-benefits.

Paragraphs 6(8-9) are the “non-market” component of international cooperation under Article 6 PA. They are much more open concerning what can occur under them and how they are governed as well. While the other two parts are more geared towards mitigation, these paragraphs are explicit in including adaptation as well as the public sector. Aside from questions of accounting and transparency, much of the common ground

in negotiations is that these paragraphs do not necessitate further definitional work under the framework convention but will develop further with their continued implementation “bottom-up”. While still to emerge, examples of activities under 6.8 lay in the realms of joint technology-development, multi- and supra-national coordination of policies, or additional financing, inter alia. The goals of these paragraphs can be mitigation as well as adaptation.

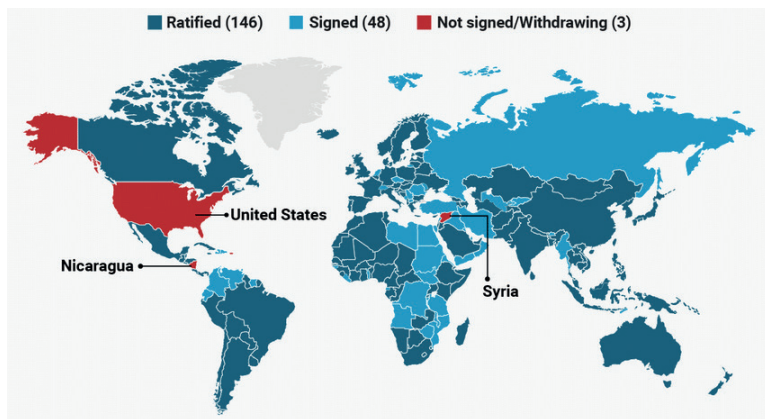
Negotiating and operationalizing Article 6

While the structure of Article 6 is given by the PA, its operationalization requires further negotiations. At the very least, the guidance to 6.2 and the rules, modalities, and procedures to 6.4, as mentioned in the PA, must be decided under the UNFCCC. While these two sets should have been produced by 2018, negotiations did not yield results so far. After the 2019 meeting under the framework convention Parties decided to continue negotiating these provisions, the next possible date for their adoption is the next meeting, which takes place in 2021.

In the meanwhile, further ideas regarding the operationalization of Article 6 can be developed and submitted to the negotiations. Additionally, some Parties decided to pilot instruments under 6.2 and 6.8. Examples of the first is Japan’s “Joint Crediting Mechanism”, Switzerland’s “Pilots” or the World Bank’s “Transformative Carbon Asset Facility” [7]. An example of the second is the “Adaptation Benefits Mechanism” of the African Development Bank [8]. As of yet, little has been developed on the role of nuclear energy under either.

The mechanism under 6.4, being global and with a unified set of rules, modalities, and procedures, cannot be piloted before the adoption of the relevant decisions. This is one reason for this paper to focus on 6.2 and 6.8. The other reason is that a probable majority of Parties would like to continue the “Clean Development Mechanism” CDM as the mechanism under 6.4 [9]. Currently, the CDM does not include nuclear energy.

While this paper discusses the role that nuclear energy can play under Article 6, it is important to mention that some of its instantiations are taking part outside the UNFCCC. In the absence of an Article 6 ruleset, the International Civil Aviation Organization (ICAO), which is in the



Map of Countries that Joined the Paris Climate Agreement. Source UNFCCC 2017

process of developing a “Carbon Offsetting and Reduction Scheme CORSIA” for international aviation, is defining its own rules for global emissions trading. A growing voluntary market is also asserting itself and establishing standards for robust accounting in the post 2020 period [10].

Nuclear Energy under Article 6 PA

Article 6 PA concerns international cooperation. This paper, therefore, does not discuss how nuclear energy can be domestically used for fulfilling NDCs or increasing NDC ambition. This paper argues that nuclear energy can additionally serve as the object of international cooperation under the Agreement. This claim is based on a large number of NDCs being open to international cooperation, and international cooperation usually having a finance-component as well as a component of technology transfer.

The potential benefits to cooperation in achieving the NDCs under Article 6 are large and all parties could benefit. Potential cost reductions over independent implementation of countries’ NDCs total about 250 billion US-Dollar per year in 2030. Cost reductions from cooperative implementation are achieved through improved economic efficiency. If countries are inspired to invest these cost savings in enhanced ambition, then Article 6 could facilitate additional abatement under the Paris Agreement by 50 percent or 5 GtCO₂ per year in 2030. These calculations are on the one hand conservative, i.e. they project the highest amount of greenhouse-gas-reductions per US-Dollar, which again, points towards the potential for inclusion of nuclear energy [11].

For most countries / Parties willing to consider nuclear energy as an instrument in climate policy, some

sort of international transfer will be necessary because of their lack of financial means and technology, as well as due to potential for capacity-building regarding grid, energy and efficiency policies, which comes with the process of adopting and scaling-up nuclear energy.

Nuclear Energy under 6(2-3)

Paragraphs 2 and 3 of Article 6 PA are likely to enable a diversity of different international and multilateral cooperation mechanisms. This part of Article 6 covers mitigation under a NDC. Different safeguards apply here, for example environmental integrity and sustainable development. The content of the guidance is still being elaborated. In any case, for nuclear energy to fit under these provisions, the following points need to be addressed – they are largely based on [12]:

- The use of nuclear energy leads to mitigation outcomes, which are within the scope of the country/ Party’s NDC and can be metricized.
- Nuclear energy contributes to achieving sustainable development goals (SDG) [4]. In the social pillar, it contributes towards addressing needs such as electrification of economies and households, leading not only to reduced carbon dioxide (-equivalent) emissions, but also to increased comfort, health-standards, human development and more. In the economic pillar, nuclear power contributes to the security of energy supply, local employment and technological development, all of them facets of accumulation of capital. Furthermore, it also leads to lower energy prices which especially benefit local employment and the poorest households. The environmental contribution of nuclear energy is based on its environmental integrity as well as diminished impact on natural ecosystems.

- Nuclear energy is environmentally integer because in addition to reducing carbon dioxide (-equivalent) emissions it impacts less on different aspects of the ecosystems, such as land use and wildlife maintaining biodiversity. This lesser impact occurs in comparison to other technologies used at comparable scale. While there are concerns about water use and waste, these can be addressed in equally integer manner. Similar concerns regarding environmental integrity apply to all forms of energy generation and use.

Some of the strengths in including nuclear energy under 6(2-3) are the clear mitigation outcomes it generates and therefore their relatively easy metrication. Also, nuclear power generation faces fewer legitimacy-related problems as an instrument for reducing carbon dioxide (-equivalent) emissions, especially when compared to other ways of generating electricity on a large-scale.

Some of the weaknesses in this approach are the constraints of the mechanism per se: The units generated can only be exchanged within a multilateral agreement. Because of the political concerns involving nuclear power, mitigation units going back to nuclear energy face potential political resistance about being included in a multilateral trading scheme. The problem of political resistance is the argument for including nuclear power under bi- and multilateral instruments (6.2) rather than under global instruments (6.4).

Another weakness of this approach is that it reduces nuclear energy to mitigation. Reducing nuclear energy to mitigation disregards many of the social and environmental advantages it could bring to its adopters.

Nuclear Energy under 6(8-9)

Paragraphs 8 and 9 of Article 6 PA address a broad scope of actions. First, it considers adaptation and mitigation as equal goals that can be combined. Second, it is open to both, public and private agents. And third, it combines mitigation and adaptation with yet other areas for climate-action, such as finance, technology transfer and capacity building, as deemed appropriate by the individual country/Party and its eventual cooperation partners. In any case, for nuclear energy to fit under these provisions, the following points need

to be addressed – they are largely based on [4]:

- The use of nuclear energy leads to mitigation outcomes and adaptation; it generally is organized as public-private-partnerships and it sets in motion flows of finance and technology, including the mobilization of local and endogenous technologies. In this sense, it fulfils most of the criteria of paragraphs 8 and 9 – criteria that were not conceived as cumulative but could be cumulatively fulfilled by nuclear energy.
- Nuclear energy could contribute to enabling opportunities for coordination across instruments and relevant institutional arrangements. For example (1): when deploying or scaling up nuclear energy, often regulations and organizations have to be updated, too; this opens windows for introducing energy-efficiency, cross-sectional and other provisions into the market-architecture. Or (2): when deploying or scaling up nuclear energy, transformational opportunities for the local economy might be identified, such as reviewing the distribution grid making it more efficient and less prone to disturbances, opening new economic sectors and activities, or making electrification of households or mobility possible. And (3): The adoption of nuclear energy leads to international cooperation in matters of finance, be it as loan guarantee, reducing market risk, or equity stakes, among others.
- The implications of nuclear energy for sustainable development and environmental integrity, as they were discussed above in section 3, also apply here. In fact, it is the relationship between nuclear energy and sustainable development as well as environmental integrity that makes nuclear able to combine mitigation and adaptation. Cumulating different desiderata of these paragraphs, nuclear energy could be conceived, here, as an enabler of strong sustainability, which allows for exchange of natural capital for human and technological capital.

The strengths of this approach are the openness of paragraph 8 and 9 to the multifaceted nature of the adoption and scaling up of nuclear energy. This corresponds to the open texture of adaptation [13]. Through this, nuclear energy can better be understood as an

instrument contributing towards the achievement of a variety of goals. It especially enables a strong approach to sustainability via adaptation. Also, since it is probable that these paragraphs will be less the object of further negotiation under the framework conventions, their implementation can occur quicker.

The weakness of treating nuclear energy here could cause problems due to the lack of methodologies, especially for counting and accounting, comparing, as well as transparency. Also, the meaning of the word “holistic”, which is featured in the text of the paragraph, remains little understood.

Conclusions and Findings

This essay developed a series of arguments for including nuclear energy in international cooperation under Article 6 PA. It took an approach favoring arguments for including nuclear energy under paragraphs (2-3) and (8-9). The main arguments favoring nuclear energy are its efficiency in mitigation and the many co-benefits in adaptation and sustainable development.

This paper takes a novel approach in including nuclear energy under Article 6 PA (rather than under the technology mechanism). Despite the challenges associated with its further negotiation, there are several advantages in the approach proposed here. Article 6 foresees two types of activities that rely on the preferences of the participating Parties; additionally, under Article 6, outcomes, especially regarding mitigation, can be measured more easily.

The difficulties with this approach should not be understated. The ongoing negotiation of Article 6 is an apparent one but could be circumvented especially due to the bi- or multinational deployment of 6.2 and 6.8. Additionally, the IPCC cautions potential frictions of using nuclear energy within the framework of sustainable development. Finally, there are challenges emerging out of the novelty of this approach. On the other hand, as Gene Roddenberry put it: “It isn’t all over; everything has not been invented; the human adventure is just beginning.”

References

- [1] United Nations Framework Convention on Climate Change (2015): Paris Agreement, FCCC/CP/2015/L.9/Rev.1.
- [2] United Nations Framework Convention on Climate Change (2015): Decision 1/CP.21 Adoption of the Paris Agreement, FCCC/CP/2015/10/Add.1.

- [3] Intergovernmental Panel on Climate Change (2018): Special Report: Warming of 1.5°, Mitigation Pathways Compatible with 1.5 °C in the Context of Sustainable Development. In: Global Warming of 1.5 °C. An IPCC Special Report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. IPCC.
- [4] International Atomic Energy Agency (2016): Nuclear Power and the Paris Agreement.
- [5] Petti, D., et al. (2018): The future of nuclear energy in a carbon-constrained world. Massachusetts Institute of Technology Energy Initiative (MITEI).
- [6] Asian Development Bank (2018): Decoding Article 6 of the Paris Agreement.
- [7] Greiner, S., Chagas, T., Krämer, N., Michaelowa, A., Brescia, D. and Hoch, S. (2019): Moving towards next generation carbon markets. Observations from Article 6 pilots. 2nd ed., Climate Focus and Perspectives, Amsterdam/Freiburg.
- [8] Hoch, S., Friedmann, V. and Michaelowa, A. (2018): Mobilising private-sector investment to mitigate climate change in Africa. Stockholm Environment Institute.
- [9] Obergassel, W.; Arens, C., Herms, L., Kreibich, N., Mersmann, F., Ott, H. E. and Wang-Helmreich, H. (2017): Setting Sails for Troubled Waters. An Assessment of the Marrakech Climate Conference (Conference Report). Wuppertal: Wuppertal Institute for Climate, Environment and Energy.
- [10] Schneider, L., Michaelowa, A., Broekhoff, D., Espelage, A. and Siemons A. (2019): Lessons learned from the first round of applications by carbon-offsetting programs for eligibility under CORSIA. Öko-Institut e.V., Perspectives Climate Group and Stockholm Environment Institute.
- [11] Edmonds, J., Forrister, D., Clarke, L., de Clara, S., and Munnings, C. (2019): The economic potential of article 6 of the Paris Agreement and implementation challenges.
- [12] Schneider, H. (2019): The Role of Carbon Markets in the Paris Agreement: Mitigation and Development. In: Sequeira, T., and Reis, L. (Eds.). Climate Change and Global Development. Springer, Cham, pp. 109-132.
- [13] International Atomic Energy Agency (2016): Nuclear Power and Sustainable Development.
- [14] Lesnikowski, A., et al. (2017): What does the Paris Agreement mean for adaptation? In: Climate Policy 17(7), pp. 825-831.

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