To: Kadri Simson (Commissioner, DG ENERGY) and Frans Timmermans (Executive Vice President, DG CLIMA EC).

Comments on the nuclear plans in the NECP

We, a group of NGOs in CEE welcome the EU Commission's efforts in combating climate change. Also the Green Deal is an ambitious task put forward and we very much hope that it will succeed. Under this aspect we also assessed the NECP of some of the countries we are active in and would like to point out some of the most serious risks to CO_2 reduction, which is the planned construction of nuclear power plants.

According to the *Annex to the Communication on the European Green Deal Roadmap - Key actions*[1] the final National Energy and Climate Plans will be assessed until June 2020. When nuclear power plants are part of the NECP, the following technology specific risks cannot be avoided:

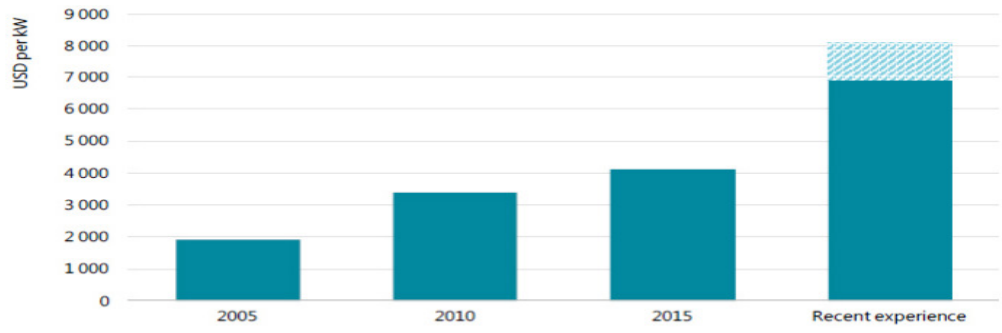
General considerations on nuclear energy investments

1. **Largely underestimated costs and construction delays of new nuclear postponing announced CO_2 reduction by decades**
2. **Nuclear energy CO_2 emissions are not necessarily low**
3. **Nuclear accidents**

1. Largely underestimated costs of new nuclear leading to decades of delay and postponing announced CO_2 reduction

It is a fact that the estimated costs for NPP are always higher than projected, a fact the OECD NEA already acknowledged as well:

Figure 9. Projected overnight construction cost of nuclear power capacity and recent United States and Western European experience



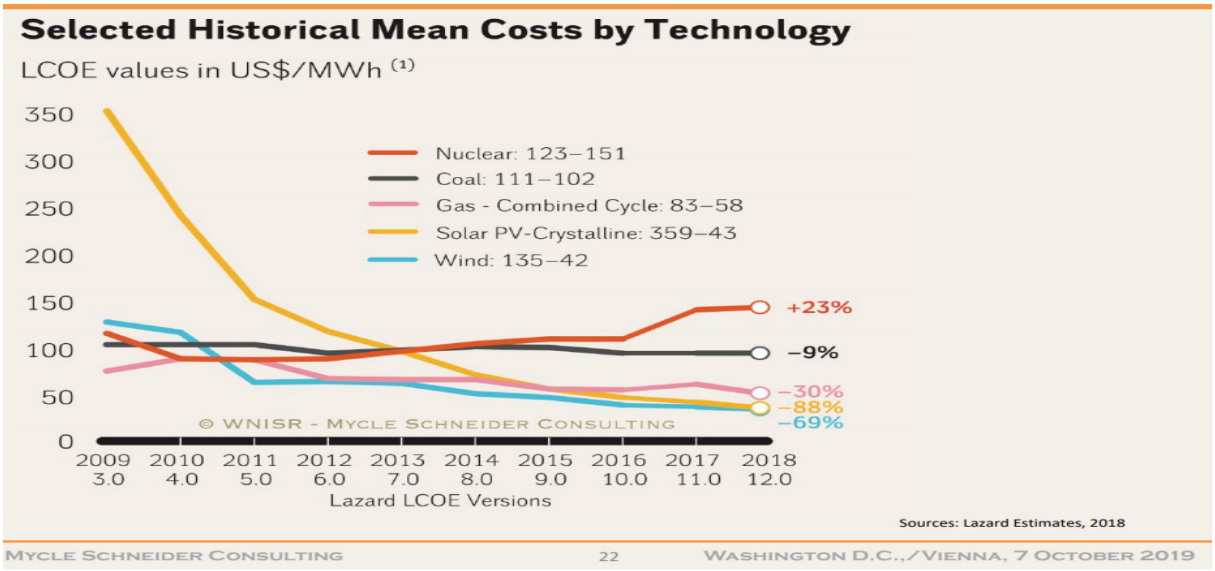
Source: IEA analysis based on IEA/NEA (2005, 2010 and 2015 editions), Projected Costs of Generating Electricity.

Construction costs of new nuclear power plants in the United States and Western Europe have turned out to be much higher than projected.

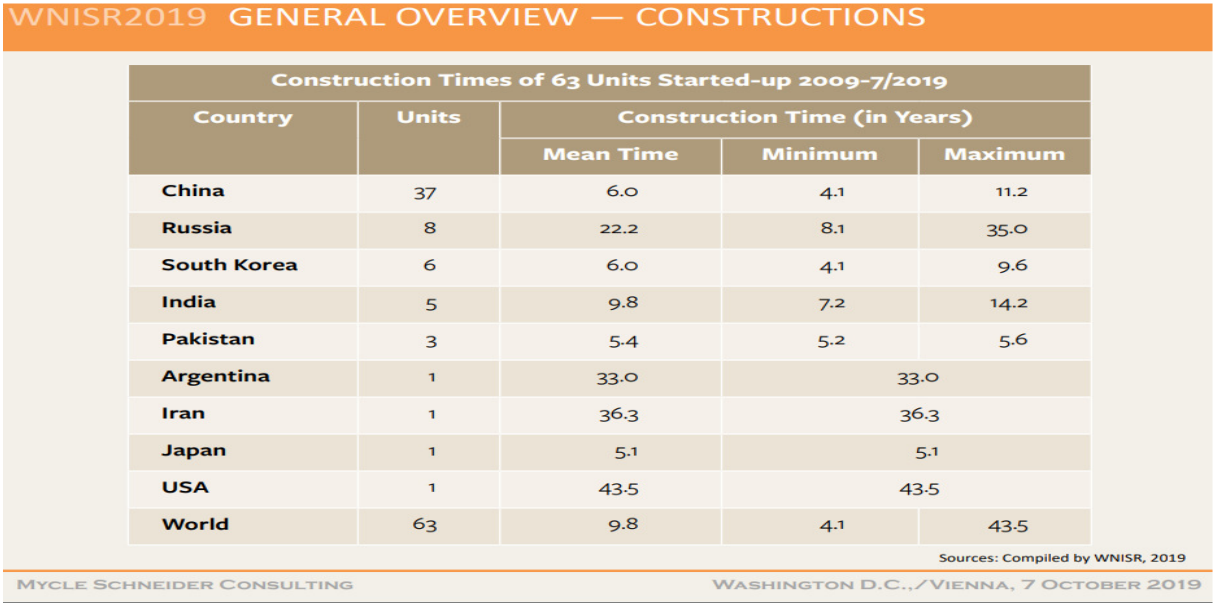
IEA Nuclear Power in a Clean Energy System, May 2019

[1] https://ec.europa.eu/info/sites/info/files/european-green-deal-communication-annex-roadmap_en.pdf

Costs of nuclear keep increasing in relations to other technologies' costs:



Construction time of NPP easily reach up to 30-40 years. Current examples are Mochovce 3/4 in Slovakia, under construction since 1985, or Olkiluoto in Finland, under construction since 2005, the decision to build the reactor was taken by parliament already 2000. Lead times of 10-20 years need to be taken into account as well.



2. Nuclear energy CO_2 emissions aren't necessarily low

Obviously depending on a range of factors (ore grade, fuel etc.) following data need to be considered:

- Intergovernmental Panel on Climate Change (IPCC 2014): 4-110 gCO_2/kWh
- Jacobsen (2009): 9-70 gCO_2/kWh
- Sovacool (2008): 1.4-288 gCO_2/kWh with an average of 66 gCO_2/kWh

Investing in new nuclear construction deepens the climate crisis. While the new very expensive NPP planned to avoid CO_2 emission is under construction with many years of delays until it might become operational eventually, coal fired plants are kept running until then. At the same time investment in renewable energies would achieve more CO_2 savings and quicker per Euro invested.

Therefore we urge the EU Commission to include this aspect in its assessment, to ask where the financing for those plants should come from under realistic construction times and circumstances and to ask how those standard difficulties with the construction of NPP should be overcome and to recommend to EU member states to embark on reliable decarbonization paths.

3. Nuclear Accidents

The accident at Chernobyl 1986 and at Fukushima 2011 affected millions of people, resulted in severe health consequences, amongst them latent fatalities and long-term (genetic) impacts on a number of future generations, but also in extensive re-settling of people, loss of agricultural land and economic setbacks.

The risk of a severe nuclear accident like Chernobyl or Fukushima with at least 20 million USD in damages has been recently recalculated. Swiss, Danish and UK researchers made an analysis of 216 nuclear energy accidents and incidents. (Wheatley et al. 2016) The authors assess a 50% chance that such a severe accident occurs every 60-150 years, that is once or even twice in a century. Smaller accidents like Three Mile Island/USA could even happen every 10-20 years according to this statistical assessment.

Overview analysis of the NECP of the countries we work in:

Czech Republic

The updated version[2] of the Czech NECP contains a small chapter on nuclear energy (p. 79.). The NECP mentions the 6 operating reactor units and that the existing strategic planning documents assume continuation of the current nuclear energy share. In addition new nuclear is planned (on existing sites and on new sites) as the key tool for fulfilling the Czech Republic's low-emission obligations.

The valid State Energy Concept plans for an increase of the nuclear power share (primary energy source) from currently approx. 15% to 25-33 % and increase of the gross nuclear electricity production

[2] https://www.mpo.cz/cz/energetika/strategicke-a-koncepcni-dokumenty/vnitrostatni-plan-ceske-republiky-v-oblasti-energetiky-a-klimatu--252016. In Czech only.

share from 29% to 46-58 %. NECP also refers to the National Action Plan for Nuclear Energy, which serves as the basis for new nuclear power plants. This plan foresees the life-time extension of the four Dukovany units to fifty years, which will be reached in 2035. The preparation of the new units has gained speed in the recent weeks with preparing the financing model and the necessary licensees for a new unit at the Dukovany site. This development is relevant for the period after 2030.

The plan for a very high share of nuclear energy is problematic for several reasons. The old units at Dukovany are already operating beyond their originally designed life-times and shouldn't be extended to run for 50 years. Their design is outdated, their reliability is declining while maintenance and outages are increasing. Also problematic is the intention to replace old nuclear units with new ones. The preparation for the new units already got stuck several times, currently another utterly new financing plans is under preparation based on a contract between state and energy utility which is supposed to share the risks but is however bound to increase legal insecurity. Another serious problem is the Czech government's claim to be able to build the new unit (up to 1200 MWe) for approx. 6 billion euros, which is only half of what other comparable current NPP units cost in Europe (Hinkley Point: 12 billion euros). The severely underestimated costs and usually enormous delays in construction of NPP will postpone the intended CO_2 emission reduction. Most likely the plan for new units will have to be abandoned at some point thus wasting time for real CO_2 reduction. Once it will be clear that the new reactor will not be operational by 2036 the old NPP will be extended, or as already mentioned new gas fired plants will be quickly built or even worse old coal fired plants kept operating.

It would be safer in many aspects and cheaper to increase the share of renewables and energy efficiency starting now.

Poland

Poland doesn't have any commercial nuclear power plant and the government has been preparing a nuclear power program in the recent years, however, without any tangible progress. The NECP 2019 states that Poland has no infrastructure for nuclear as of yet.

According to both versions of NECP 2030 (both the initial draft and the most recent "official" one), a first reactor is to be built and to start up commercial generation by 2033, then one more nuclear unit would be added to the grid every next two years, with the last one connected in 2043. Those would amount to six units in total, with units in the range of 1 to 1.5 GWe each, in consequence totaling 6 to 9 GWe.

However, since the announcement of the nuclear programme in 2014, no financial plan has been presented and is still on wait.

Meanwhile: What is inside that draft policy? It comprises a number of unfavorable, mostly detrimental developments, in terms of climate saving, or even disastrous ones from the point of view of sustainability. Primarily, in 2040, coal burning is envisaged to be maintained: its share is to be decreased by that time only to 30% in the mix, but in 2030 it is still to be as high as 60%. However, as the total consumption of energy in the country would, according to the plan, increase, almost the same amount of coal would be burned and thus, the absolute GHG emissions from the energy sector effectively would remain at almost the same levels.

In numbers the NECP 2019 explained:

"4. Reduction of the share of coal and lignite in electricity production to 60 % in 2030 and a further decreasing trend until 2040 At present, the share of coal and lignite in electricity generation is ca. 77 %. The share of coal-fired generation units will decrease systematically as a result of the forecast increase in the domestic electricity demand due to economic development, the decommissioning of old and worn-out conventional generation units which do not meet the environmental requirements in terms of pollution emissions, the implementation of high-efficiency technologies, the dynamic development of renewable energy sources and the implementation of nuclear power projects from 2033 onwards. As an effect of changes in the electricity generation sector, CO_2 emissions will decrease."

At the same time the NECP foresees too little energy efficiency measures as the EU Commission pointed out, and too little renewables.

Conclusions: Poland's NECP counts on having the first NPP unit in 2033, in 14 years and claims to launch another five such units every 2-3 years (with a total capacity of approx. 6-9 GW).This is unrealistic since not even a financial plan or manufacturer exists at this point. In addition, Poland has no nuclear infrastructure at all; this makes this claim not only unrealistic, but actually ridiculous. At the same time, NECP acknowledges that 50.4% of Poland's CO_2 emissions stem from the energy sector, the renewables share and the energy efficiency are low; in combination with the fully unrealistic NPP plans this plan is likely lead to a continued high use of coal. This is unacceptable and the final NECP needs to find a realistic way to reduce the energy sector's emissions.

Bulgaria

Throughout the past four decades Bulgaria has had numerous attempts to build a new 2000-MW nuclear power plant, Belene NPP. Belene was expected to come online by 2035. In 2020, Bulgaria removed the construction of the NPP Belene from the NECP 2030, because the government recognized that the NPP cannot be built until 2030.

Hungary

One of the most serious problem in Hungary, which hinders the spread of renewable energy sources is the planned expansion of the Paks nuclear power plant capacity. This project imposes such a burden on Hungarian taxpayers and the state coffers that there are no substantial resources left to move the energy revolution in a sustainable direction. In this context, the disinformation activity that the nuclear lobby has been carrying out for years with very significant government funding and the active involvement of the Russian Rosatom should be highlighted. The aim of this action is to bomb the widest possible circle of Hungarian society with distorted information, using the channels of public media, festivals and educational institutions. The essence of their message can be summarized in two points: the potential of using renewable energy sources poses a serious risk to security of supply (because the sun does not always shine); while the domestic development of nuclear energy is presented as the only realistic option that they believe is not only cheap but also clean and safe.

With the calculations of independent experts and international examples, the claim of NECP is that Paks II. investment is essential to bring Hungary closer to carbon-neutral energy production: "the

creation of a carbon-neutral economy is only possible with nuclear energy". This is a surprising and unsustainable concept, especially in the light of NECP's other key statement, that "Hungary has a clear interest in reducing its energy import needs" - knowing that both the technology needed to build a nuclear power plant and the fuels needed to operate it come from would be a risk factor and vulnerability in a strategically important area of the electricity sector.

According to the WAM scenario (Annex 2-3 of NECP), electricity consumption in primary domestic energy consumption (gross domestic energy consumption) will increase to 216%. The main explanation for this is not the significant increase in consumption, but the entry of the inefficient new Paks nuclear power plant units. Gross electricity production and final electricity consumption are expanding at a more modest rate, which can even be considered a normal phenomenon due to the reorientation in the field of thermal energy and transport, with a partial switch to electricity.

"Decarbonisation of energy production" as one of the main objectives is clearly unquestionable, but the method, namely a 20% increase in nuclear power plant capacity (2400 MWe instead of the existing 2000MWe) does not stand the test of either scientific reasoning or practicality, because of the followings:

- nuclear power plants increase Hungary's vulnerability in a strategically key area through import dependence (technology and fuels);
- in the event of a technical failure, the significant lost capacity is difficult or impossible to make up for without a power failure (the planned increase in the capacity of the Paks units from 500 to 1200MWe only exacerbates this problem);
- inelastic generation makes it increasingly difficult to integrate into the international energy system, in which weather-dependent producers dominate. This problem has long been reported by researchers in the scientific literature and is now experienced by system operators in practice.
- the costs of setting up nuclear power plants and disposing of waste are dramatic, so the investment never pays off, but it diverts significant financial resources from transforming the energy sector into a sustainable one;
- high capacity concentrated in one unit is an obvious target in a hostile military attack or terrorist action (even a cyber attack), as evidenced by many events that have already taken place in the world;
- nuclear power plants pose a serious accident risk, as evidenced by at least 12 major environmental and health problems in the last 50 years– the exact figures are not known because the nuclear industry as a rule seeks to deal with such events (also) to conceal;
- the environmental risk of the final disposal of radioactive waste cannot be assessed with sufficient thoroughness over a period of hundreds of thousands of years, as long as the existence of the radiation problem justifies strict separation from the ecosystem, taking into account the present technology.

The delays in the preparatory work of Paks II so far allows to conclude that, even if the two new 1,200 MWe units are built they can only start production late, after 2030. It also raises concerns about meeting the government's emission reduction targets.

Other parts of the measures of NECP are not considered acceptable due to the following conceptual approaches: The development of a nuclear power plant (Paks II.) forced by the current Hungarian government (and attacked by the current opposition) is a completely unacceptable idea in all respects. Among the counterarguments, it is emphasized that the ~ 4,000 billion HUF planned for this and related developments - in fact expected ~ 10,000 billion HUF - will divert this huge source of funding

from the other elements of the energy revolution, thus supporting the transition to renewable energy sources.

Status of Hinkley Point C/UK

Nuclear projects typically have projects to get started and all along the way. The most recent project is Hinkley Point C, only some still remember the start of the project in 2006, when then prime minister Tony Blair announced nuclear to be back with a vengeance. 14 years later not much is in place yet, financing still and again unsecured.

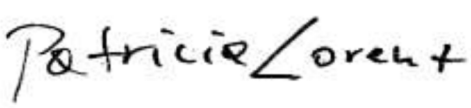
In January 2020, professor Steve Thomas summarized the situation: *"Completing Hinkley will need an open-ended commitment of British and French public money. The sensible course is to abandon the plant now before more public money is wasted. When the deal for Hinkley was announced in 2013, for two reactors using the Areva EPR design, it was the British government's offer to guarantee all the borrowing that would be required, expected to be about £10bn, that was the key. This seemed to open the way to borrowing at rock-bottom rates. The plant was expected to be online in 2023, the power purchase price was set at £92.5/MWh."*[3]

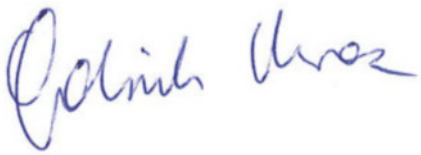
The expectation that once the first reactor is built the successor reactors will be cheaper and the whole process more efficient, also proved wrong: *"Hinkley was supposed to be first of a new fleet of reactors in the UK that would provide the cheapest way to meet the UK's emission targets. But the five follow-on projects have either collapsed or are in serious doubt, and the costs of the alternatives (offshore wind etc) have fallen as dramatically as the costs of Hinkley have risen. The only logical decision is to abandon Hinkley and all the successor projects now."*

Currently it is expected that Hinkley Point C will not go online before 2027, costs expected to reach 27,1 bn euros for 2 reactors with 1600 MWe each.

We ask the European Commissioners recommend to the EU member states to exclude their unrealistic nuclear new-built plans from their NECP.

Sincerely yours,





Patricia Lorenz & Gabriele Mraz

for the Joint Project – Nuclear Risk & Public Control

http://www.joint-project.org/

[3] Financing the Hinkley Point C project. Steve Thomas 2020. Downloadable: https://teags.org/core/wp-content/uploads/2020/01/HPC-finance-final.pdf

- Austrian Institute of Ecology (AT)
- Patricia Lorenz, antinuclear campaigner (AT, EU)
- Calla – Association for Preservation of the Environment (CZ)
- South Bohemian Mothers (CZ)
- Energiaklub (HU)
- Za Zemiata (BG)
- Foundation for Environment and Agriculture (BG)
- Association 'Common Earth' ('WspólnaZiemia') (PL)
- Hungarian Environmental Partnership Foundation (HEPF)