Background Paper on the PINC 2016

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PINC stands for **P**rogramme **I**ndicative **N**ucléaire de **C**ommunauté. The European Commission prepares and decides upon a new PINC at regular intervals of approximately 7 years. Each PINC contains an analysis of the status quo of the nuclear industry in the EU, and outlines upcoming investments and developments. PINC is a Communication, and the Economic and Social Committee (EESC) and the Energy Committee of the European Parliament each deliver an opinion on the PINC within 6 months after its presentation by the EU Commission.

This short background paper provides information on the content of PINC 2016. This analysis also takes the EU Commission´s Staff Working Paper into consideration. In general, the European Commission tries to give the impression that the nuclear industry is just another industry; however, it is not only important what is in the PINC, but also what has been omitted. It is also informative to look into the changes, which the EU Commission performed after one version was leaked (February 2016) until the final release in April 2016.

1. Future of nuclear power in Europe

The determining factors are new build, lifetime extensions and decommissioning, and especially financing, which is the Achilles' heel of all undertakings in the nuclear field.

1.1 **New build and state aid**

<u>With state aid but without tenders</u>

Here lies the most important difference between the current and former PINC (2008): the statement about *no state aid for nuclear power plants* has been dropped in the latest PINC.

Instead PINC only quickly mentions the subject of contentious financing, such as the decision to declare state aid for Hinkley Point C compatible without further discussing the issue. The fact that enormous amounts of state aid have been granted, together with a guaranteed minimum electricity price set for 35 years, and that Austria is challenging this decision at the European Court of Justice, is simply not mentioned.

The message is that the EU Commission and the nuclear power plant vendors are not pretending that new nuclear power plants could be built without state subsidies or only within a "separate nuclear market" because new plants no longer even require tenders. As with Hinkley Point C, Hungary did not issue a public tender for the construction of Paks II, instead awarding the contract directly to the Russian company Rosatom. The last country to issue an international tender was the Czech Republic, for Temelin 3 and 4. This tender, however, had to be cancelled in 2014. Instead of reissuing it, however, the Czech government, with its New Nuclear Action Plan, has already announced that the reactors for Dukovany and Temelin will

be built without a tender, and with a strategic investor instead, following the Hungarian example.

1.2 Current NPP projects and construction costs

PINC 2016 states a figure of €500 billion in required investment, and assumes that this would enable EU nuclear generation capacity to be maintained at the level of 100 GW through to 2050, or to even increase it slightly. However, the EU Commission does not explain where these funds should come from, and which financing model would solve the traditional problems of nuclear construction. The EU Commission does not assume that it will be possible to build nuclear power plants at new sites.

As the lead time for a new nuclear power plant is a minimum of 15–20 years, it cannot be expected that those reactors currently under construction, or in preparation, will start operating before 2030, or soon after. PINC acknowledges this fact, but believes numerous new reactors will come online after 2030. In order to reach 100 GW of installed capacity during the period 2030–2050 (assuming an EPR of 1600 MW as the basis for the calculation), 3 – 4 new reactors would need to be connected to the grid every year. However, only a severe trend reversal would make this possible because, since 1990, **worldwide** only around 3 new reactors are completed each year, almost none of them in the EU.

The real costs of constructing nuclear power plants are currently unknown, so the old estimates used in the new PINC are worthless. The EU Commission refers to around 4 reactors currently under construction in the EU, so it makes sense to take a look at the nuclear industry´s **current construction sites** to see the actual state of the industry. First we look at the flagship of the nuclear renaissance, the EPR. This should be regarded as a prototype as nowhere is an EPR currently in operation:

EPR reactor in Olkiluoto (1x1600MW) in Finland

Ordered in 2003 with projected costs of €3.2 billion, start-up was scheduled for 2012.

To date the costs have climbed to €9 billion, and are still growing. Date for completion unknown, 2018-2020 is occasionally mentioned. What is still ongoing is the major dispute over whether the supplier or operator will be responsible for covering the additional costs not covered by the turnkey contract.

This is rather similar in EPR's home country:

Flamanville reactor (1x1600MW) in France

Ordered in 2006 at a projected cost of €3.3 billion, start-up scheduled for 2012.

According to most recent info from EDF: start-up in 2020, costs €10.5 billion

It is unlikely that the plant will generate electricity before 2020. If it turns out that the reactor pressure vessel is unusable then this date could be pushed back further, leading to extra costs of anything up to €5 billion.

The only other NPP construction site in the EU is Slovakia:

Mochovce 3 and 4 (2x440MW) in Slovakia

Two reactors are under construction in Slovakia, however, they are not a model for the industry´s future as they represent the completion of two VVER-440 reactors. Construction started around 30 years ago, in the 1980s. Current scheduled date for completion is 2016/2017.

The technical problems inherent in a dying industry are causing additional problems; deficits discovered at the EPR reactor pressure at Flamanville were so serious that it may not be usable. The Russian reactors are not trouble-free, either. One prototype on the market (VVER 1200/Leningrad II) is not even on the grid in Russia, and instead is still 3 years behind its original schedule.

There are no signs that the nuclear industry will be able maintain its current market share, as the EU Commission suggests in PINC 2016, because this would require the construction of 100 GW of new capacity by 2050.

The future has already started: The World Nuclear Industry Status Report (WNISR 2015) showed a drop in nuclear power production between 1997-2014: while wind power added 242 TWh and solar 98 TWh, nuclear power output during the period fell by 47 TWh.

If all existing reactors were to be given a lifetime extension, by 2030 90% of all reactors in the EU would be operating outside their intended lifespan – this represents a hugely underestimated danger for the whole of Europe, something PINC 2016 fails to mention.

1.3.1 Costs for upgrades for lifetime extensions

The EU Commission estimated the level of investments needed to upgrade existing NPPs at **€45 to €50 billion** by 2050. However, no explanation is given on how this figure was reached. France officially estimates the upgrade costs for their own reactors at between €400 million and €4.5 billion per reactor. Even if France shut down a third of its 58 reactors, at least €16 billion would be used for the almost 40 reactors remaining, or, assuming an average of €2 billion per reactor upgrade, around €80 billion in total.

If this figure were used to calculate the costs of upgrading 90% of the 129 reactors operating in the EU which, according to PINC need to be shut down or to operate in PLEX (Prolonged Life Time Extension), then the overall cost of upgrading around 117 reactors throughout the EU would be between **€46.8 billion and €234 billion**.

The final version comes closer to reality by saying that "Investments are also needed in replacing existing nuclear plants, which could **partly also** go to new nuclear plants. The total estimated investments in the nuclear fuel cycle between 2015 and 2050 are projected to be between EUR 650 and 760 billion".

Highest possible levels of nuclear safety – lessons from Fukushima

PINC praises the high nuclear safety level in the EU which the EU Commission sees as confirmed once again by the stress tests; without providing any concrete information, the Commission is satisfied with the implementation of national measures. An independent

examination of the planned improvements, however, has shown that many of these only exist on paper, or will only be implemented sometime in the future. In many cases the cheapest solution has been chosen[1]. In its summary this study on the stress tests concludes that the NPPs in the EU countries examined do not meet acceptable safety standards. In its final version of the PINC the EU Commission pulls back from nuclear safety regulation and hands this issue back to the nuclear safety authorities (ENSREG), thereby returning to the situation before Fukushima and the nuclear safety stress tests. The national nuclear authorities fought against the loss of their absolute power in this matter and won, now exactly five years after the Fukushima nuclear disaster.

Also rather inconspicuous with potentially dangerous consequences is the fact that the sentence about the continuous improvement of nuclear safety is gone. The newly added statement on the high nuclear safety level in the EU, Switzerland and the Ukraine shows that the EU Commission acts mainly politically. While Switzerland is operating the world´s oldest nuclear power plant (47 years of NPP Beznau operation) in spite of severe safety issues concerning the reactor pressure vessel, Ukraine has a nuclear authority which does not even claim to be independent.

Nuclear Waste and Decommissioning

What is also lacking in PINC: the demand to segregate funds for decommissioning so that these funds are actually available when needed, and cannot disappear as stock market share prices fall. This is something the Commission continues to ignore. There is not even an announced push for this, only an announcement that more data will be collected from member states.

In its final version of the PINC the EU Commission reduced the funds available according to the Member States for nuclear decommissioning and construction of final repositories to EUR 133 billion, i.e. 17 billion less than in the previous draft. At the same time EUR 123 billion will be needed for decommissiong and EUR 130 billion in spent fuel and radioactive waste management, as well as deep geological disposal. This adds up to an arithmetic difference of EUR 120 billion, which however does not correspond with the real funding needs.
To illustrate the reliability of the data provided by member states, we take a look at an example from France in January 2016: in 2015 the nuclear waste agency Andra concluded that the cost for the final repository would be €34.4 billion. The operator EdF only wanted to recognize €20 billion, and in the end the competent minister set the reference costs at €25 billion.

The EU Commission has chosen not to comment on the next steps for operators of future NPPs in the PINC, even though they have already agreed further state aid for new NPPs. They

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1 Comprehensive information on stress test results: Oda Becker, Patricia Lorenz: Critical Review of the Updated National Action Plans (NacP) of the EU Stress Tests on NPP, 2015. As download: http://joint-project.org/upload/file/Four_years_after_Fukushima_September_2015FIN.pdf an 10 more NPP in Europe: http://www.greenpeace.org/eu-unit/Global/eu-unit/reports-briefings/2015/20150629%20FINAL%20-%20Critical%20Review%20NAPs.pdf

wish to cap the disposal costs in order to protect investors against costs which are likely to be much higher in the future (Waste Transfer Price).[2]

Small changes compared to the previous draft from February show what the EU Commission puts the focus on or rather would not like to give critics an easy target: Reprocessing is clearly mentioned as an option. An unrealistic solution, while the wish of many countries, also made it into the PINC: "Shared repositories" where several countries would make use of one shared repository for their highly active nuclear waste. Key problems are: "…several issues remain to be solved, in particular communicating with the public and building public acceptance. Determining the ultimately responsible actor for the radioactive waste to be disposed of in a multinational approach is also a critical step." Currently the responsibility lies with the nuclear waste producer and the national state.

Liability for nuclear damage

After the nuclear disaster in Fukushima 2011 the EU Commission announced an initiative on nuclear liability. However, one task force and a few conferences later, everything remains the same: operators can still continue to be protected against victims´ claims for ridiculously small sums.

Consequently, the word "liability" fails even to appear in the latest PINC.

2http://www.nopoint.de/wpcontent/uploads/2016/02/1601_Studie_Sicherheitsrisiken_Atomm%C3%BCll_Becker.pdf