FORATOM
THE VOICE OF THE EUROPEAN NUCLEAR INDUSTRY

Position Paper

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Reaction to the "Clean Energy for All Europeans" package

The European Atomic Forum (FORATOM) is the Brussels-based trade association for the nuclear energy industry in Europe. The membership of FORATOM is made up of 15 national nuclear associations and through these associations, FORATOM represents nearly 800 European companies working in the industry and supporting around 800,000 jobs.

Summary

FORATOM welcomes the legislative proposals and considers that the package, including as it does EU governance of energy and climate policies, could ensure a coherent and optimal approach towards meeting the EU 2030 energy and climate objectives, if it takes into account the views of the nuclear industry.

FORATOM stands for:

- **cost-efficient decarbonisation;**
- **an effective power market leading to competitive and affordable electricity prices for the end consumers;**
- **the promotion of investments in low carbon technologies.**

An important prerequisite is an improved EU ETS protected from conflicting policy overlaps, in particular from the proposed new 30% energy efficiency binding target.

The European nuclear industry is a strategic sector for the European economy with a turnover of €70bn per year supporting around 800.000 jobs. Nuclear energy is an indispensable contributor to the achievement of the EU's energy and climate goals. Nuclear energy accounts for half of the low-CO_2 electricity currently generated in the EU. It provides reliable low-CO_2 baseload electricity and can provide the flexibility of dispatch required in the new market situation, and hence, continuing to contribute to security of supply.

Considering the above, FORATOM's proposals are:
On **governance**:

- To improve the governance instrument intended to enforce the overarching objective of the EU energy and climate policy, that is to say GHG emissions reduction, following the COP 21 agreement. To this end, national energy and climate plans should include an indicator of the carbon intensity of the power mix (gCO_2/kWh);
- To require Member States to quantify the contribution of nuclear power (both generated nationally or imported) to security of supply as a reliable source of baseload electricity that can also play a role as a dispatchable and flexible source in the future;

On the **reform of the electricity market design**:

- To amend the proposals in order to create an effective market conducive to long-term investments in low carbon generation. In doing so, attention must be paid to providing revenue predictability and visibility for low carbon energy during the energy transition;

On **energy efficiency**:

- To reconsider the 30 % target and to take an efficient approach to calculating energy efficiency reflecting the inherent attributes of low carbon sources in comparison to fossil fuels.

On **innovation** (COM (2016) 763 final):

- To recognize the importance of maintaining EU technology and industrial leadership in the nuclear sector and to adapt the European nuclear energy RD&I strategy accordingly;
- To support European nuclear energy research with adequate resources.

On the **report on energy prices and costs** (COM (2016) 769 final):

- To revise the subsidy figures for nuclear, considering the comments FORATOM provided on the 2015 ECOFYS study used as reference for “Energy prices and costs in Europe” report.

Explanation of FORATOM’s proposals

FORATOM welcomes the publication by the European Commission (EC) of its “Clean Energy for all Europeans” legislative proposals package, which aims to improve the functioning of the energy market and make sure that all energy technologies compete on a level-playing field without jeopardising climate and energy targets.

However, the Commission's proposals do not foresee gradual removal of market distortions but rather reinforce them. This is in a clear contradiction to the goal of achieving decarbonisation in a way which does not endanger the internal market and its integration. They do not provide for sufficient investment confidence into low-carbon sources. The potential occurrence of high scarcity peak prices will not be enough to attract investors to long-term investments or to decrease the cost of capital. Investment choices will thus be further dependent on arbitrary decisions of national governments and the Commission.

FORATOM is concerned that a number of elements in the proposal risk endangering the achievement of a competitive, integrated, secure and decarbonized power market:

- Preferential treatment of certain energy sources on the market;
- Priority dispatch maintained in many cases;
- Ongoing exceptions from balancing responsibility;
- Lack of clear design principles for capacity mechanisms;
- Not addressing overlaps with the EU ETS.

In FORATOM's view, in order to reach the goals of the proposed legislative package, the following improvements are necessary:

Governance

- In the aftermath of the COP21 agreement, the governance instrument should be foreseen to enforce the overarching objective of EU energy and climate policy, that is to say emissions reduction.
- The contribution of nuclear power to the Energy Union and the need for low-CO_2 baseload nuclear energy in a decarbonised, competitive and secure power mix should be clearly recognised. In this context, FORATOM recalls the EP's INI report on Energy Union[1]:
    - "*Notes that nuclear power is one of the most important contributions of the European energy system, providing for lower CO2 emissions while simultaneously limiting import dependence, securing a stable production of electricity that can serve the internal market and provide a stable base for an energy system where renewables can be phased in…*";
    - "…*notes that nuclear power provided 27 % of the EU's electricity mix and over half of all EU low-carbon power in 2014, that 130 out of 132 EU nuclear plants are due to be decommissioned by 2050, leaving a major gap in low-carbon base load power in the EU electricity mix;…*".
- FORATOM recalls that in the EC's 2016 energy scenario for 2030, the carbon-intensity of power mixes remains high in some Member States despite a very ambitious renewables policy.

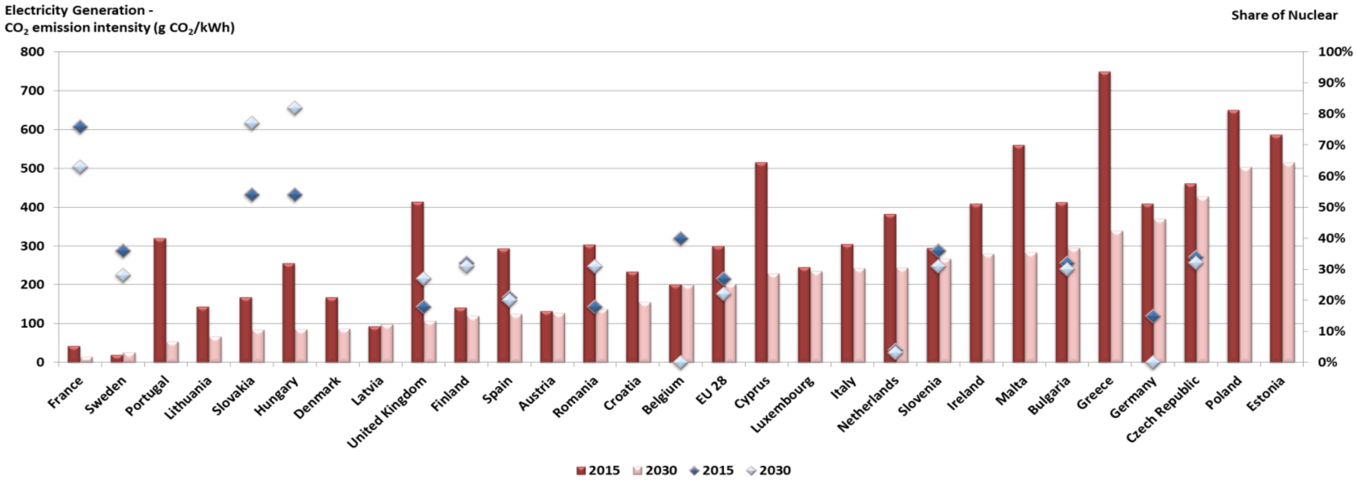

Fig. 1 Electricity carbon intensity in EU-28 in 2015 and forecast for 2030[2]

The 2015 EU average for electricity carbon intensity is around 300 gCO_2/kWh while for 2030 the forecast is for it to drop to 200 gCO_2/kWh. The conclusion from the above chart is that most of the countries that will count on nuclear in 2030 will have an electricity carbon intensity lower than the EU average.

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[1] EP's report "Towards a European Energy Union"

[2] DG-ENER – energy modelling

- Member States should establish national energy and climate plans that include a roadmap for reducing the carbon intensity of the national power mix, including the relevant monitoring, reporting and potential corrective measures. To this end, national energy and climate plans should include an indicator of the carbon intensity of the power mix (gCO_2/kwh).
- The contribution of nuclear energy to ensuring security of energy supply should be explicitly accounted for in some way. National energy and climate plans should also refer, where appropriate, to the role of nuclear energy in providing security of supply. We are recalling the EU Commission's 2014 European energy security strategy[3] which says that import dependency of nuclear fuel (40%) is the lowest comparing with the other fuels (crude oil - almost 90%, natural gas - 66%, and solid fuels - 42%). It should be kept in mind that the nuclear power plants are providing a reliable baseload production, having an average energy availability factor of over 80%.

Electricity Market Design

- Low-carbon technologies are characterized by high upfront and low operating costs. To attract financing, market participants need to have confidence that low-carbon generators will receive sufficient revenues to cover the large up-front capital costs. Policies should improve investment certainty in liberalized markets to keep financing costs low.
- In the opinion of FORATOM, the European Commission proposals – if not amended - are likely to fail to create an effective market conducive to investments in carbon free generation.
- FORATOM welcomes that the European Commission introduces as one of the core principles of the electricity market that "*long-term hedging opportunities allow to hedge against price volatility risks"* but calls for a robust set of implementing measures going beyond the current proposal.[4]
- FORATOM recalls the EP's own initiative report[5] where the European Parliament was calling on:
    - "*to ensure the EU provides an enabling framework for those Member States that wish to pursue new nuclear power projects to do so, within EU internal market and competition rules*;"
    - *"…the Commission to submit proposals to allow instruments to mitigate the revenue risk over 20 to 30 years, so that investments in new low-carbon generation are actually driven by the market, such as co-investments with contractual sharing of risks between large consumers and electricity producers, or a market for long-term contracts based on average cost pricing"*.

[3] COM(2014) 330 final - European Energy Security Strategy

[4] COM(2016) 861 final – Regulation on the internal market for electricity: "*Subject to compliance with treaty rules on competition, market operators shall be free to develop forward hedging products including for the long -term to provide market participants, in particular owners of generation facilities using renewable energies, with appropriate possibilities to hedge financial risks from price fluctuations. Member States shall not restrict such hedging activity to trades within a Member State or bidding zone.*"

[5] 2015/2322(INI) EP report "Towards a New Energy Market Design"

In achieving such targets, attention must be paid to providing revenue predictability and visibility for clean energy during the energy transition. Among the possibilities:

- A properly reformed carbon pricing capable of delivering a robust price signal to incentivise the deployment of low-carbon technologies;
- Auctions for new capacities (competition for entry into the market);
- Other kinds of long term arrangement;
- Value for security of supply.

Energy Efficiency

- The EU ETS is the best-available mechanism to reduce carbon emissions in a cost-efficient manner compared with other energy and climate measures aiming at decarbonizing the economy. Uncoordinated overlapping of national and EU policies have an adverse effect on the functioning of the EU ETS and contradicts the objective of measures proposed to reach a robust carbon price. Therefore, in FORATOM's view, the target proposed in the new Energy Efficiency Directive (30%) should be reconsidered in the light of its impact on other Energy Union legislative proposals (see below the impact on EU-ETS of different efficiency targets).

Electricity, carbon prices and ETS emissions (2030)	Ref2016[93]	EUCO27	EUCO30	EUCO+33	EUCO+35	EUCO+40
Average Price of Electricity (€/MWh)	158	161	157	158	157	159
ETS carbon price (€/t of CO2-eq)	34	42	27	27	20	14
ETS emissions (% below 2005)	-37.7	-43.1	-43.1	-44.3	-44.2	-48.3

Fig.2 Electricity, carbon prices and ETS emissions for different targets for energy efficiency (27%-40%) [6]

As can be seen, going beyond a 27% energy efficiency target for 2030 reduces the carbon price and will therefore undermine the incentive to switch from fossil to low-carbon fuels.

- The EC's proposed reduction of the PEF coefficient for electricity from the current value of 2.5 to 2. This change could have the negative effect of slowing down the development of electrification because the amended coefficient prefers savings made in electricity consumption rather than in consumption of natural gas or coal. As concerns nuclear, FORATOM recommends to the Commission to handle low-carbon sources equally and to use the same method, i.e. the direct equivalent method, which would give a PEF for electricity from nuclear equal to '1'.

- Under the current legislative proposal, the nuclear power plants are assumed to generate electricity with 33% efficiency (PEF=3) so, strangely, it seems very advantageous to reduce just the nuclear resources to achieve primary energy savings. This would have the undesirable effect of undermining the decarbonisation efforts of the Member States who choose nuclear as one of their most important decarbonisation tools. The application of the Direct equivalent method with a direct equivalent of 100% for the conversion of fuel into electricity for nuclear would make much more sense for this purpose.

[6] Table 10 of the SWD(2016) 405 final for EED revision

Energy prices and costs in Europe

- FORATOM challenges the Commission's figure of €14 billion of subsidies to nuclear in 2012 which, if external costs are added, goes up by an additional €14.9 billion[7]. The Commission is strongly advised to take into account our comments (see Annex) on the ECOFYS report[8] and amend these figures accordingly.

[7] Part 6 of the SWD(2016) 420 final, figure 227

[8] 2015 ECOFYS final report on "Subsidies and costs of EU energy"

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Detailed Comments on DG Energy’s Report on Subsidies and Costs of EU Energy

Introduction

On 13 October 2014, the European Commission published an Interim Report on Subsidies and Costs of EU Energy, covering ‘public interventions’ for all Member States and for all forms of energy, including nuclear. The report was prepared by contractors Ecofys & partners. The Commission invited comments and FORATOM wrote to Commissioner Oettinger on 29 October 2014 with initial comments, offering to follow up with a more detailed analysis. On 11 November 2014, DG Energy published the contractors’ report as a final report[1].

FORATOM was invited to attend three stakeholder meetings during the preparatory phase of the project, held separate discussions with the author of the section on decommissioning & waste management, and sent written comments to DG Energy in September 2014, relating in particular to the uranium resource depletion issue.

Annex 6[2] of the final report summarises how the contractor took stakeholders’ comments into account in presenting the final report. FORATOM was pleased to see that reconsideration was given to a number of the nuclear aspects – nuclear taxes, decommissioning costs, nuclear liability, uranium depletion, grid costs, water consumption, costs of nuclear accidents, historic costs of capital, full load hours, etc – however we remain of the view that the final report is still deficient in a number of these areas and that the conclusions drawn are therefore open to question. Our reasons are explained below.

Direct support

The total direct support for nuclear in 2012 is estimated in the report to be just under €7 billion, out of a total annual support of €122 billion for all energies. The breakdown of the €7 billion, in terms of what is Member States' support and what is EU-level support, shows that €2.8 billion comes from the UK and €3.3 billion from EU funds; the contribution from the other Member States is minor.

The UK'S contribution appears to be roughly equivalent to the annual budget of the Government's Nuclear Decommissioning Authority (NDA), of which the lion's share is spent on decommissioning one site: Sellafield.

As is well-known, Sellafield was associated with the British Government's production of material for nuclear weapons, and some of the facilities now being decommissioned were built in the 1950s and 60s as part of the military programme. Consequently, we question

1 http://ec.europa.eu/energy/gas_electricity/doc/ecofys_2014_subsidies_and_costs_of_eu_energy_11_nov.pdf
2 http://ec.europa.eu/energy/gas_electricity/doc/annex_6_stakeholder_comments_v2.pdf

whether there is any justification for linking all of this UK 'subsidy' with current civil power production. We believe that his whole question requires more detailed investigation.

Regarding EU-level support, the report doesn't provide any breakdown of the €3.3billion figure quoted. We were not aware of such a large level of EU support for nuclear, and question whether the report might have taken a cumulative figure and mistakenly quoted it as an annual one. Our interpretation of the report is that the EU-level funding relates to the decommissioning of Soviet-era reactors in Slovakia, Bulgaria and Lithuania, which were required to close when those countries joined the EU. Because the operators of these reactors were unable to accumulate funds for decommissioning under the Soviet system, a political decision was taken at EU-level that they should be compensated for the forced early closures out of EU funds. It is, in our view, unreasonable for the Interim Report to apportion all that funding (if indeed this is the case) to nuclear power production from other reactors.

Historic Support

We question whether the report has properly taken account of depreciation. With the average age of nuclear power plants in the EU approaching 30 years, we would have expected most of the historic investments to have been written off by now, a typical depreciation period being 20-25 years.

The report estimates that nuclear has benefited from 220 bn€$_{2012}$ of historical public support between the years 1970 and 2007 of which 2-8 bn€$_{2012}$ still has an effect on the energy market today. The range 2-8 bn€ is large and indicates a considerable level of uncertainty, implying that either the quantity or quality of input data is poor or that the results achieved using different methodologies are at significant variance. We would like to see a more detailed explanation as to how these figures were calculated, why the range for nuclear is so large, and why only nuclear, coal and hydro were included.

Moreover, we suggest that the evaluation should take in to consideration a netted approach that would enable a check as to whether any theoretical advantage gained hasn't already been fully paid back. The 220bn€$_{2012}$ figure is mainly derived from the French national case. In France, regulated tariffs, set at a level reflecting the costs of nuclear production, were in place from the very start of the operation of the nuclear power plants.

The report is estimating the consequences of historical subsidies on the current market. To be consistent however, we believe that the report should be more forward looking and also take into account the aid that Member States commit to pay between now and for example 2030 to those installations existing already in 2012. Energy prices today are also being affected by subsidies already granted (typically in the form of long-term contracts) but that will be effectively dispensed in the future.

External Costs

A: resource depletion

With respect to external costs, we note that Ecofys has departed from 'the established wisdom' (Extern-E, NEEDS, etc.) and included resource depletion as an additional factor in the total externalities. The addition of uranium depletion has the effect of tripling the external costs of nuclear, from around 7€/MWh (similar to the figure for onshore wind) to 22€/MWh. We wrote to the European Commission (email dated 12 September 2014) criticising this methodology, and are disappointed to see that the report has persisted in applying it. The simple fact is that when the currently estimated reserves of uranium (ca. 300 years' supply at current rates of consumption, according to the latest IAEA/OECD NEA data) begin to be depleted, there are a number of proven alternatives that can readily be deployed: reprocessing (around 98% of the uranium in spent fuel can be recycled), MOX fuel using accumulated plutonium stocks, Generation IV reactors that can increase the energy recovery from uranium by a factor of 50, or thorium (six times more abundant in the earth's crust than uranium).

The two most problematic underlying assumptions of the ‘Resource Scarcity Adjustment’ method are that

- the quantities of reserves and resources are fixed; and,
- the cost of extracting these resources will rise.

Historical and geological evidence suggests that there is almost no foundation to these two assumptions in the nuclear case. Firstly, the total quantity of uranium in the earth’s crust (and oceans) is much higher than the 9800EJ (energy content) assumed in the report. The technology for finding uranium continues to improve and additional resources are identified regularly. Secondly, the history of uranium extraction has been one of trend cost reduction due to improvements in extraction technology and there is no reason to believe that these reductions will not continue into the future.

Furthermore, we seriously doubt that the 'oil depletion logic' is applicable to uranium. Extending the depletion value of oil (0.05 €/koe) to other energy sources is not justified since there is no reason why the same marginal cost increase would be experienced from one deposit to another whatever the raw material.

In fact the final result reached by Ecofys suggests a flaw: a value of externality in the same range of 9-14 €/MWh is derived for nuclear, oil, gas and coal whereas the direct fuel consumption costs are vastly different: less than 10 €/MWh for nuclear, about 60 for gas, about 200 for oil. For nuclear alone, the external depletion cost is even greater than the direct fuel consumption cost!

Such a situation arises simply because Ecofys has extended the depletion value of oil and applied it to uranium. In fact for uranium minerals (as for other minerals) the depletion cost should be determined per kg of metal. It should be taken into consideration that the energy content per kg of uranium is extremely high: 1 g of U producing as much electricity as 100 kg of oil.

This flawed conclusion is even hinted at by Ecofys who note an alternative methodology for valuing resource scarcity that attributes a zero cost to uranium energy resource depletion. The authors have chosen to ignore this method in the calculation of the cost of uranium depletion for nuclear power without justification.

We also question some of the other external costs quoted for nuclear. We were puzzled to see that the attributed external cost for 'particulate matter formation' for a nuclear power plant (€0.76 billion) is nearly one third of that for a lignite-fired power plant, when in reality nuclear power plants do not emit particulate matter under normal operation.

B: Cost of Accidents

The Ecofys study takes into account the cost of a nuclear accident, though it does not calculate such a scenario for other technologies. We believe that in order to compare external costs for all technologies, the same criteria should be applied to each. Indeed, other electricity producing technologies have experienced or could experience in the future severe accidents such as dam failures or oil fires.

The external costs of accidents for various technologies have been assessed using a specific methodology developed by Dr Hirshberg (Paul Sherrer Institute) drawing from an extensive data bank that has been compiled over many years. PSI draws many conclusions from its studies including that the externalities associated with accidents on other power production technologies are of the same order of magnitude or even higher than for nuclear. We would therefore call for the Ecofys report to be amended so as to include such externalities due to accidents among the various technologies.

Ecofys has reviewed several studies on the costs of a nuclear accident, and finds that these are in the range of magnitude of 0.5 to 4 Euros/MWh. Ecofys specifically mentions that this is the same order of magnitude as with the most comprehensive review the literature on the subject carried-out recently by W. D‘haeseleer. The latter concluded that a central value of 1 Euro/MWh with a range of uncertainty from 0.3 to 3 should be used. But in figure 3.8 of the Ecofys interim report, the figure retained is at the upper boundary of its assessment (4 Euros/MWh) which is four times that of the D’haeseleer reference figure.

The Ecofys report refers to some studies that calculate very high costs of nuclear accidents, such as Rabl, A and al (2013)(External cost of nuclear: Greater or less than the alternative?). However these costs include the decommissioning cost of the plant and neighbouring buildings on the same site, as well as the cost of lost electricity production. These costs obviously cannot be considered as external costs or subsidies, but represent a significant part of the overall cost of the accident.

In addition, the estimated probability associated with this kind of accident is not the most accurate way of reasoning according to probability theory, as explained by François Lévêque in his book “Nucleaire on/off” (Paris Dunod November 2013).

Nuclear taxes and the effect on net subsidy

The Ecofys report does not account for the effect of energy-specific taxes in its assessment of direct public intervention. This is an important omission in the methodology, and means that the report calculates a gross subsidy, and not a net one. This gives an unbalanced profile of the different energy technologies. An attempt is made to justify the omission of taxes on page 2:

> *"Apart from the fact that energy services are a critical requirement for virtually all human activities, the benefits include tax revenues raised by Government (in fact there are a number of energy sectors with higher rates of tax than comparable enterprises), employment, and economic activity. These benefits though are already reflected in market prices, are therefore unlike the external impacts we consider, and are not reported."*

However this justification is flawed. Not all energy forms pay the same amount of tax and some taxes are arbitrary, designed to strip out profits and are not related to an externality. Nuclear energy in particular is subject to such discriminatory taxes in several EU member states. We estimate that nuclear operations were taxed approximately €3 billion in 2012, and quite possibly more (see following table – source WNA). These are assumed to be cashflow transfers rather than accounting entries.

Country	Tax detail (for 2012)	Tax paid in 2012 (estimate)
Belgium	Nuclear tax of 0.5 Euro cents/kWh	€479 million*
France	Tax on basic nuclear installations	€350 million**
Germany	€145 per gram of fissile uranium or plutonium fuel loaded into reactor. This translates to 1.4 Euro cents/kWh (2012 nuclear generation of 100 billion kWh)	€1400 million***
Sweden	Nuclear tax of 0.67 Euro cents/kWh. (63.5 billion nuclear kWh generated in 2012)	€424 million***
UK	0.61 Euro cents /kWh† Climate Change Levy (70 billion kWh 2012 generation)	€427 million***

* Exact figure. Source: https://www.electrabel.com/assets/be/corporate/documents/activity-report-2012_EN.pdf

** Estimate based on NEA report https://www.oecd-nea.org/law/legislation/france.pdf , which cites 2006 values.

*** estimated by multiplying tax rate by 2012 generation levels

† 0.51 p/kWh used. http://www.hmrc.gov.uk/rates/ccl.htm conversion rate of 1.2 euro per pound used.

The UK climate change levy affects nuclear plants despite the fact that these emit zero greenhouse-gas emissions during operation.

Several other countries have enacted similar tax initiatives (e.g. Spain), but were outside the reference time period in question and therefore have not been listed. Legal challenges have been brought against the taxes in Belgium and Germany, with results pending as of writing.

Costs of Decommissioning

In Annex 2.9.2 Ecofys describes the nuclear decommissioning process. However, the outline is too generic. Decommissioning of light water reactors may also start with removal of the reactor and the core components. This is the plan for the decommissioning of the plants in Sweden and it has been the procedure for several plants. The claim that the removal of the reactor should take as long as 200 years might be valid for graphite core reactors but is certainly not valid for light water reactors.

Regarding Annex 2.9.3 we argue that comparing decommissioning costs and installed MWe is not appropriate. Smaller plants have the same kind of materials that need to be removed as larger ones do. The decommissioning cost does not scale at the same rate as installed power.

Also, to include all stages leading to the dismantling of an NPP is misleading since there are only a few countries that actually have concrete plans for how to handle and dispose of the decommissioning waste and the spent nuclear fuel. These costs should be presented separately.

Under Annex 2.9.5 it should be mentioned in the Member State analysis whether or not that country has a plan, or perhaps even facilities in operation, for waste management and storage. Otherwise the comparison is not valid.

Regarding the UK, we question the use of data taken from a 2006 Wuppertal Institute report rather than quoting more up-to-date and reliable figures from the UK Government's Nuclear Decommissioning Authority (NDA).

Finally, in Annex 2.9. the claim that the "real cost" of decommissioning is above 0.8 MEUR/MWe is not valid. Ecofys has not explained how the figure 0.8 MEUR/MWe is calculated. It can also be noted that two of the countries that are reported to have "too low" decommissioning costs, Finland and Sweden, are pioneers when it comes to handling and final storage of spent fuel. These countries have filed applications with the authorities for approval to construct deep geological storage facilities. Compared to other countries they should be able to present more correct cost estimates for handling of the spent nuclear fuel since they have a clear picture of what costs the procedures might imply. To consider "knowing what to do with the waste" as a subsidy is absurd!

To make this section of the study more valid, we would suggest that the costs for decommissioning, the actual dismantling and demolishing of the plants, should be presented separately from the costs for handling the decommissioning waste as well as costs for handling of the spent fuel. Since the level of planning for final storage of waste differs quite dramatically between the countries, so do the estimated costs and hence the provisions made.

Levelised cost (LCOE) comparison

The methodology used by Ecofys was designed to compare costs for "newly constructed plants in the period 2008 - 2012 in the EU28" (see e.g. Box 3-4 on Page 46: ‘How to interpret the levelised cost charts?’).

We find comparisons on this level to be quite misleading if Ecofys only takes units constructed in a short and recent period into account, without having consolidated the data for write-down periods and technical lifetimes. Theoretically, CAPEX falls to zero after the write-down period, limiting production costs to OPEX (operating expenditures) which includes fuel costs. The latter cost remains comparatively low for nuclear compared to technologies such as fossil fuels. In light of this it seems that Ecofys is not taking in to consideration the likely 50+ year lifetime of nuclear power plants. It should be recalled that the capital costs for a wind generator, with an expected lifetime of 20 years, has to be paid three times over to reach the same lifetime as for a typical nuclear plant. We would suggest that the methodology should be reviewed with perhaps a "fleet approach" (or "averaged life cycle costs") comparison being used instead.

Conclusions

FORATOM considers that the ‘final’ version of the Commission’s report of November 2014 on EU Energy Costs and Subsidies is still deficient in the nuclear context in a number of respects.

The main comments are as follows:

- The direct nuclear support (€7bn/y) appears to be almost totally comprised of UK and EU-level interventions, neither of which is satisfactorily explained. There is a strong suspicion that a large proportion of the UK intervention relates to military and not civilian facilities.
- The range of uncertainty in the figure for historic nuclear support (€2-8bn/y) is very large and casts doubt on the methodology emplyed.
- There is evidence that historic nuclear subsidies have already been negated through depreciation, asset sales or price regulation.
- We strongly contest the inclusion of uranium depletion as an external cost for nuclear power.
- FORATOM considers that the external cost per MWh of a theoretical nuclear accident has been exaggerated and that major accidents should also be considered for other energy sources.
- The failure to take into account specific nuclear taxes in a number of Member States leads to a distorted picture of net subsidies.
- The methodology used for scaling up decommissioning costs, apportioning the costs over time and for dealing with waste and spent fuel is flawed.

- The use of levelised costs (LCOE) for comparing energy sources does not properly reflect the full life-cycle cost advantage of nuclear power over a 50+ year operating lifetime.