European Economic and Social Committee

TEN/660
The effects of a new carbon-free, decentralised and digitalised energy supply structure

OPINION

European Economic and Social Committee

The effects of a new carbon-free, decentralised and digitalised energy supply structure on jobs and regional economies
(own-initiative opinion)

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1. Conclusions and recommendations

1.1 Transforming the energy system towards carbon-free, decentralised and digitalised supply offers enormous opportunities, in particular for structurally weak and rural regions in Europe. The development of renewable energy (hereinafter referred to as "RE") can have a major and beneficial impact on employment, and can be configured so as to provide a completely new stimulus for the regional economy.

1.2 In particular, there is potential for mutually reinforcing the positive effects of Europe's energy and cohesion policies. The European Economic and Social Committee (EESC) finds it regrettable that both the Commission and the Member States have yet to properly recognise this potential, let alone exploit it.

1.3 It is true that, since being redesigned, cohesion policy has helped promote RE and energy efficiency, and the EESC welcomes this fact. However, European energy policy has so far done next to nothing to promote cohesion policy. There has been a failure to recognise that RE could make a substantial contribution to the economic development of disadvantaged regions in particular, meaning that major political potential for regional growth is going to waste.

1.4 In order to realise this potential, steps must be taken to enable and support regions to develop RE and related specific network infrastructure as a way of stimulating regional economic growth, and to ensure broad public participation in this growth. An enhanced role for consumers is a particularly important form of participation for regional added value. Thanks to digitalisation (among other things), these consumers could, as prosumers, take on entirely new responsibilities in relation to the energy economy; engage in economic participation; and support broader political objectives following a "bottom-up climate action" approach.

1.5 It is important to pursue an overarching, regional economy approach to the development of RE. This means coordinating the generation and use of RE at local level, and in a way that cuts across electricity, heat and mobility. Artificial intelligence and smart grids could make an important contribution here.

1.6 The relationship between regional energy demand and regionally produced or producible RE should serve as a basis for understanding the extent to which regions succeed in doing this. The EESC recommends that, in the context of "plans for regional energy circular economies", analysis should be carried out that is capable of providing a differentiated assessment of RE's potential for each regional economy. The plans should also lay out the employment policy-related effects for each region. For even if it is generally true that the energy transition creates more jobs than there were in the previous energy system, there will still be regions that benefit from this effect more than others.

1.7 Plans for regional energy circular economies could form the basis of a structured and nuanced dialogue with local people which is important (a) for maintaining or establishing local approval for RE, and (b) strengthening regional centres of economic activity. The EESC is surprised that such analysis and plans have so far been carried out only in a very small number of cases.

1.8 European cohesion policy is not the only area where an overarching, regional economy approach to RE development could make an important contribution. It also has a number of energy policy-related advantages (reducing energy dependency and energy poverty, supporting the coupling of sectors, exploiting the innovation potential of digitalisation, reducing grid load).

1.9 In light of the above, the EESC calls on the Commission and the Member States to take the necessary steps for an overarching, regional economy approach to RE development: these include a definition of energy regions, support for compiling an empirical record of the relationship between regional energy demand and regionally produced or producible RE, targeted education and training, incentives for implementation (e.g. based on support for development of RE infrastructure), the opening up of networks, and appropriate pricing of grid costs.

2. Background

2.1 The European Union is facing profound changes to its energy policy and to the way its energy is supplied. This will not only affect production (away from carbon-based fossil fuels towards the expansion of renewable energy); it will also involve enormous structural changes, both in terms of the places where energy is generated (moving away from large central power plants towards more decentralised structures) and the supplier and consumption structure (new stakeholders and consumption and distributor models, not least as a result of digitalisation).

2.2 The EESC has already issued a number of opinions on the impact of the energy transition on regions that are expected to be adversely affected, such as coal regions[1]. Many people in such regions have already lost their jobs; further job losses can scarcely be avoided. This makes it all the more important to recognise the structural change at an early stage and to support it at political level, so that the economic and social impact can be minimised and mitigated. The EESC welcomes the Commission's initial initiatives in this respect[2].

2.3 However, the EESC has noticed that the positive changes, which might for example concern regional added value and job creation, have so far been only marginally discussed. At various points in the recitals to the current RE directive (2009/28/EC), the Commission refers to the importance of RE for regional economic development; however, in the course of its research, the EESC has found that (a) hardly any studies exist on the possible outcomes for regional economies of developing RE and that (b) within the Commission, but also the Member States, there is no discernible strategy to join up energy policy and regional development in a genuinely more targeted way. No recognisable political strategy therefore exists to fully exploit this potential.

2.4 At the same time, a huge number of positive "bottom-up" examples of RE development at local and regional level can already be seen in Europe. To take a more or less random example, a wood-fired heating plant was constructed in Langres in eastern France (10 000 inhabitants),

1 OJ C 303, 19.8.2016, p. 1.

2 https://ec.europa.eu/info/news/no-region-left-behind-launch-platform-coal-regions-transition-2017-dec-08_en.

which uses a five-kilometre-long block heating network to supply 22 water heating systems and, indirectly, a hotel, a water park and an old people's home, among others. This saves 3 400 tonnes of CO_2 each year. What is striking in many such initiatives is that only in rare cases are they systematically evaluated for their importance to the regional economy. In this regard, a significant "lack of statistical knowledge" must be noted.

2.5 Meanwhile, in Feldheim (close to Berlin), not only have local resources been consistently used for local energy production and supply for around 20 years now; the impact on the regional economy has also been thoroughly described. The village's electricity demand is now covered many times over, with demand for heating fully covered. As well as direct income from energy sales, the savings are remarkable: local residents pay an electricity price of only 16.6 cent/kWh, which is only a little more than 50% of the average cost of electricity in Germany. The local population – the "driving force" – should be involved as closely as possible in a systematically operated energy circular economy[3].

In the EESC's view, an overall comparison is important, weighing up the potential positive impact on the regional economy against the negative effects mentioned earlier caused by the energy transition.

2.6 The aim of this own-initiative opinion is to help finally stimulate an in-depth debate, by setting out the various possibilities and potential approaches and identifying shortcomings.

3. The importance of RE to the economic and social development of Europe and its regions

3.1 The EU is the world's biggest energy importer: 53% of our primary energy demand is imported annually for a total sum of more than EUR 400 bn. The EU's energy dependency is a serious economic and geopolitical problem.

3.2 The aim of the "European Energy Union" is (a) to increase Europe's energy security by reducing energy imports, (b) to promote climate action, and (c) to create new jobs. The EESC is of the view that this European macro-economic objective is useful and should be applied at regional level too.

3.3 In light of this, the promotion of RE as a "domestic" energy source which – unlike fossil resources – is available in all EU regions, must not only be discussed for reasons of climate protection but also be seen as an important regional economic objective: energy production could and should stimulate regional economies.

3.4 The greater the success in facilitating the economic participation of regional stakeholders in this process – be they citizens, regional businesses or the municipalities themselves – the greater the approval needed for the development of RE infrastructure. The more actively involved regional stakeholders are, the greater the regional added value resulting from RE.

3 For further details, see the presentation of the case study at the EESC hearing on the "Energy transition in Europe's regions – Assessing regional economic effects of the transition to a smart and low-carbon energy supply" (31 May 2018): https://www.eesc.europa.eu/en/news-media/presentations/presentation-michael-knape (in German).

3.5 How such economic participation might specifically look can be explained by a nuanced overview of the RE added value chain.

- First, actual **investment** in RE installations: these installations are mostly "imported" from other regions. The same applies to the **planning process**, which – especially in the case of larger projects – is often carried out by engineering/development firms that are also frequently based outside the local area; the impact on the regional economy is therefore rather limited.

- However, direct regional added value is created by installations' **operating and maintenance costs**. That said, this kind of expenditure is comparatively low in the case of RE installations. With wind or solar farms, for example, rent payments to local landowners have a positive effect, as does potential **tax revenue** for the municipalities.

- The actual economic benefit of RE installations arises from the use or **sale of the generated energy**. For the regional economy it is therefore key who operates the installations, and who can generate profit from operating them.

3.6 One type of economic participation takes the form of regional jobs, which can be created in the energy sector as RE develops. Numerous studies have shown that the net impact of the transformation of the energy system on jobs is clearly positive, as most recently demonstrated by a study for the Netherlands, for example[4]. It should be pointed out that, according to this study, all Dutch provinces will benefit from this positive effect.

So that such positive developments can take place across all of Europe's regions, steps should be taken at the earliest opportunity to invest in relevant skills development for people.

3.7 Clearly, these positive effects cannot in every case fully offset all the disadvantages of structural change, such as those for coal regions. However, the transition to RE does offer major opportunities for positive development in the many European regions which currently only import energy.

3.8 A further form of regional economic participation is based on direct participation in RE installation investments and thus on their operation. Capital costs account for the largest share of the total costs of RE installations. For regional added value, it is therefore all the more important that regional stakeholders are able to invest in RE installations. According to a study carried out for the German federal state of Hessen, regional added value can be up to eight times higher if a wind farm is run by a regional operator[5].

4 Weterings, A. et al. (2018): *Effecten van de energietransitie op de regionale arbeidsmarkt – een quickscan* (Effects of the energy transition on the regional jobs market – a brief survey), PBL, Den Haag, p. 36.

5 Institut für dezentrale Energietechnologien (Institute for Decentralised Energy Technologies) (2016). Regionale Wertschöpfung in der Windindustrie am Beispiel Nordhessen (Regional added value in the wind industry: the example of northern Hessen).

3.9 In some European regions, policy-makers have recognised the importance of this and started initiatives to boost regional participation in RE, such as the Community Empowerment Bill in Scotland, *Lov om fremme af vedvarende energi* (Law on the Promotion of Renewable Energy) in Denmark, the *Bürger- und Gemeindenbeteiligungsgesetz* (Citizen and Municipality Participation Act) in the German state of Mecklenburg-Western Pomerania, and the "National Energy Independence Strategy" in Lithuania.

3.10 A third possible form of participation involves consumers being able to directly obtain energy generated by installations in their region, for example through "power purchase agreements" (PPA). Digitalisation will also make PPA accessible to smaller energy consumers and price trends strongly suggest that, increasingly, the costs of locally produced wind or solar power will be below the wholesale market price.

3.11 There might be another important effect. When a regional energy circular economy creates new added value in a region through savings or revenue based on RE, or reduces the outflow of money due to energy imports, capital becomes available that can be invested in other economic sectors too – i.e. outside the energy sector. This means that not only should the "direct" impact on employment be considered (such as jobs in the RE sector), but also the "indirect" effects that can be derived from new regional financial flows.

4. RE as regional policy – a best-case scenario from Poland (Podlaskie)

4.1 The Polish region of Podlaskie provides a particularly clear example of how the considerations from section 3 can be implemented regionally. This example shows how a structurally weak region can undertake a successful regional policy by developing RE – even when national objectives are far from optimal. However, a systematic approach – as described below – is a prerequisite.

4.2 In 2012, the regional parliament (Sejmik) adopted a regional development plan, which formed the basis for implementing operational programmes using European structural funds.

4.3 Podlaskie is one of Europe's weakest regions in terms of development and income and spends some PLN 5.2 bn (EUR 1.25 bn) annually on importing energy. The region does not have its own sources of fossil fuels.

4.4 The development strategy refers to a planned "revolution" with four objectives: 1) independence from electricity imports, 2) increasing the share of RE in energy consumption, 3) reducing CO_2 emissions and 4) increasing the economic potential of the region in which imported (heavily carbon-based) energy sources are substituted with regional (cleaner) forms of energy.

4.5 There is recognition in Podlaskie that a "regional energy policy" can only succeed if the stakeholder structure of the energy market is also taken into consideration. Thus efforts are being made "to turn Podlaskie's residents and businesses into the owners of decentralised energy sources".

4.6 Since the end of 2016, the municipality of Turośń Kościelna in Podlaskie has used resources from the ERDF to arrange the purchase of 38 heat pumps as well as 77 PV and 270 solar thermal installations for its residents. It coordinates billing, ordering and installation, and does all of the legal and technical work for residents. The investments were 85% co-financed using EU Structural Funds. Around 25% of all houses will in future be equipped with modern RE technology.

4.7 On the basis of the "net metering" system used in Poland for small PV installations, citizens produce their own "green" electricity (including all associated costs) for approximately PLN 0.18/kWh (around 4.3 cent/kWh). By way of comparison: for a grid connection (to obtain electricity mainly produced using coal), the current price is PLN 0.65/kWh (= 15.5 cent/kWh). The former leads to a reduction in electricity costs of around 75% and the money saved benefits the regional economy.

4.8 The Marshal's Office has taken up this approach and in 2017 it paved the way for similar projects in 62 other municipalities. Overall, funding was requested for some 4 700 solar thermal rooftop panels and 2 250 PV rooftop panels on homes with a total capacity of just over 7 MWp; roll-out is due to take place in 2018.

4.9 For a long time, however, people have been thinking beyond this, to areas such as electro-mobility. Of the PLN 5.2 bn that Podlaskie spends annually on energy imports, around PLN 1.5 bn alone goes on the import of petrol and diesel for cars.

4.9.1 One consideration specific to Podlaskie: every year, licensed cars in the region cover a distance of some 5.2 billion km. If all vehicles were powered using electricity, around 800 000 MWh of electricity would be needed based on a consumption of 15 kWh/100 km. With grid connection costs currently at PLN 0.63/kWh, around PLN 500 million would be required to run these cars, instead of the PLN 1.5 bn that is currently spent to run them using fossil fuels. Some PLN 1 bn would be left over for the region purely as a result of this, which could be used to help bolster the economy.

4.9.2 The required quantities of electricity could be generated using around 70 wind turbines (regionally installed). Electricity generated annually by one such installation is enough to power some 7 000 cars; one kWh costs around 6-7 cents. If 7 000 drivers were to join forces and run such an installation in the form of a cooperative, the costs they would incur of running an electric car would fall significantly once again. This, however, would need to be made possible from both a legal and administrative point of view, for example by opening grids for peer-to-peer distribution. Digitalisation opens up such possibilities, but the political reality acts as a brake on them.

4.10 The use of regionally generated wind power in heating plants as a substitute for coal is also being considered in Podlaskie. Wind power would be used in industrial heat pumps and heat storage devices. This seems to make a great deal of economic sense. However, these ideas have yet to move beyond the pre-planning phase. The financial means are not even available for a feasibility study.

5. **More regional added value through regional use of regionally generated RE**

5.1 The example of Podlaskie shows that one of the major effects of RE is its potential to boost regional purchasing power. In order to assess this, it is important – in the context of a "regional energy circular economy" – to first estimate the potential, both in terms of electricity and heating and transport.

5.2 The example of solar thermal energy provides a good illustration of the potential of the regional economy approach. Installation and operation bring little regional added value, especially as there are also negative effects, such as if oil heating is replaced, thus putting pressure on heating oil sellers' jobs. But solar power is in fact very positive for consumers. Because the higher the share of their overall heat demand is met by solar thermal energy, the more they can do without imported energy raw materials such as coal, oil or natural gas, which represent an outflow of purchasing power from the region to the benefit of coal-, oil- and gas-exporting countries or multinational mineral oil and natural gas companies.

5.3 Overall, there appears to be a need to calculate a region's energy balance in order to identify the extent to which regional energy consumption is or could be successfully met using regionally generated (and, potentially, temporarily stored) RE. The balance must take into account four elements:

1. It must be established how much energy a region needs in terms of electricity, heat and mobility. Consideration of heat and mobility is important for two reasons: first, these areas account for 75% of energy consumption. Second, heat and mobility applications offer important flexibility options which are mostly available at local level only.
2. How much potential there is to meet this demand with RE from the region should be worked out. To this end, the extent to which this actually re-routes capital flows for the benefit of the region should also be established. In the case of bioenergy, this depends on the source of the biomass; with all RE technologies, it depends on the origin of the installation and of the businesses contracted to set them up and maintain them. Furthermore, it needs to be determined, on the basis of the operating structure and – where appropriate – the volume of intra-regional electricity consumption, whether the operating turnover remains in the region, thus implying economic participation by regional stakeholders.
3. The difference between the regional energy demand and the proportion of this demand that can be met from regional RE shows how much energy needs to be imported from other regions (outflow of capital from the region). Many European regions will continue to be unable to avoid importing energy, whether because it is inefficient, uneconomical, or simply technically impossible to fully cover regional energy demand with regionally produced energy.
4. In so far as more energy is produced in the region than is consumed regionally, it should be determined who participates in the proceeds of electricity sales.

5.4 The balance between regional energy production and regional energy consumption should be calculated for each European region, although this should not be a legal requirement. Rather, it should be in the interest of each region to calculate this balance on their own initiative. It should be checked whether the established category of NUTS 3 regions can be used for this purpose. In

some cases, cross-border energy regions seem to be an interesting possibility, not least in connection with the "Europe of the regions" idea. In this connection, the energy information service, whose creation was called for in a previous EESC opinion[6], could play a coordinating role.

6. The potential for energy and regional policy of energy equilibrium or a positive energy balance

6.1 If the balance described in section 5 between regionally produced and regionally used RE can be improved, this will help lower Europe's energy dependency.

6.2 If regional stakeholders are able to play a bigger economic role in RE, this would strengthen regional cohesion. This is due to the fact that regions with structural weaknesses frequently offer the largest potential areas for RE, meaning that RE can have the most pronounced effect on the regional economy in such regions.

6.3 Calculating energy balances specifically for regions would enable the significance of the energy transition for individual regions to be ascertained. The debate about structural change in certain regions could be placed on a sound basis. Corresponding regional policy measures could be better developed than they are currently, when we have to speak in relatively broad terms about "coal regions" or "energy islands".

6.4 Whether a region is a net importer or exporter of energy, or is in energy equilibrium, has a tangible impact on inhabitants. A dialogue on the subject must be conducted with regional stakeholders. There is no perfect solution that suits all regions equally. Instead, fairer solutions that are tailored towards regions must be agreed, including with regard to "spatial justice" (i.e. what areas are used for what purpose). Regional politicians and administrators will need to be trained accordingly.

6.5 The more regional energy demand is successfully met using regional RE, the more independent consumers living and working in the region will be of changes in international market rates, particularly mineral oil and natural gas prices. This is the best way of reducing energy poverty and the vulnerability of end users. As energy prices are an increasingly important factor in investment decisions, this also makes local economic and industrial centres more attractive.

6.6 The forthcoming integration of the heating and mobility sectors into the electricity system could be supported, in a targeted way, by means of incentives for regional use of regionally generated RE and thus for consolidation.

6.7 The digitalisation of the energy industry offers great opportunities. Here, too, incentives to improve regional use of regionally produced RE could unlock the specific potential of digitalisation, promoting innovation.

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6 TEN/657 – Third Report on the State of the Energy Union. (See page XX xx of this OJ.)

6.8 The European Energy Union aims to strengthen the role of citizens/energy consumers in the energy transition. However, high barriers to entry exist in interregional energy markets and economies of scale play an important role[7]. Ultimately this is a consequence of historical, monopolistic market structures. It is a lot easier for citizens and consumers to play this new, more active role on a regional scale – i.e. within a regional energy circular economy.

6.9 If more regionally produced RE were used at regional level, this would lighten the load on the grid and may potentially reduce the need to massively expand European electricity transmission networks (see also recital 52 of the proposal for a Directive on the promotion of the use of energy from renewable sources (COM(2016) 767 final)).

7. Regional energy circular economy-related recommendations

7.1 The EESC calls on the EU institutions to view regional use of regionally produced RE as a goal of European energy policy and cohesion policy, and to use the balance between regional energy demand and regional RE generation as a gauge. This means taking account of the specific characteristics of community energy, as well as other regional stakeholders not benefiting from economies of scale, in the future design of measures to promote RE[8]. The particular aim must be to dismantle barriers to market access that limit the opportunities of small-scale (regional) stakeholders. A European programme to train regional stakeholders and enhance exchange of best practices would also be helpful.

7.2 This requires a strategic decision to gear energy policy towards a decentralised approach. In this respect, there are still far too many contradictions in the "Clean Energy for All Europeans" package between a more decentralised and an unequivocally centralised energy policy. It would be welcome if Europe's regions and municipalities had the power to directly regulate the participation of regional stakeholders in the use of regional renewable energy. This would also be in line with the established tradition in many European Member States of providing municipal services of general interest.

7.3 The EESC calls on the Commission to set out which policy measures relating to the energy mix at European, national and subnational level help to promote regional energy. Part of this might be a specific version of public procurement law. Furthermore, a methodology should be developed to help regions calculate their specific energy balance. An online application for regional politicians and stakeholders, which provides at least approximate results, would be a good idea.

7.4 Restructuring network charges – and possibly other levies and taxes too – could help achieve the described regional economic effects linked to RE development. The export and in particular the import of energy should be priced so as to at least take transport costs into account.

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7 OJ C 288, 31.8.2017, p. 91.

8 OJ C 246, 28.7.2017, p. 55.

7.5 Differentiated network charges – i.e. setting a price for an electricity transaction according to how many grid levels are needed to carry out the transaction – in combination with greater coverage of regional energy demand using regionally produced RE also make it easier to ascertain the actual need for grid development on a market-oriented basis. Although it will be important to connect Europe's energy regions effectively, this does not mean that network expansion should always be given absolute priority. This is still too often the case today, without it being economically justifiable[9].

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The president of the European Economic and Social Committee

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9 See Peter, F.; Grimm, V. & Zöttl, G. (2016). *Dezentralität und zellulare Optimierung – Auswirkungen auf den Netzausbaubedarf* (Decentralisation and cellular optimisation – impact on the need for network expansion) https://www.fau.de/files/2016/10/Energiestudie_Studie.pdf (in German).