

Should labour content matter in the choice of electricity generation technology ?

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Problem statement

In the choice of electricity generation technology it is sometimes advanced that the employment effects should be taken into account as one of the criterions. The intuition is that, given that there is some unemployment, the government should systematically opt for technologies that imply higher employment even if this increases somewhat the production costs.

In this note we discuss this reasoning.

Is this a valid criterion?

In an open economy like Belgium, this employment criterion is not appropriate for 2 reasons:

1. A cost benefit analysis should concentrate on the opportunity costs of different technologies and not on the employment criterion because the employment criterion is a second order objective
2. In an open economy with the current EU opening of the markets for generation equipment, it is difficult to favor local employment via the selection of generation equipment

To generate a Kwh of power, a country can make use of 4 types of inputs: imports, capital, qualified and unqualified labour. The best a country can do is to make sure this Kwh is produced by giving up a minimum of other goods and services available for consumption. The question is thus how to pick the mix of labour, capital and imports that minimizes the “opportunity costs” in terms of consumption.

In a market economy this problem is made simple: when there is market equilibrium for a given input, the market price paid by other users (other producers in the Belgian economy and in a world economy the importers of Belgian exports) represents the opportunity cost in terms of foregone consumption of this input. Let us illustrate this principle for the different inputs.

When the balance of trade is in equilibrium, the opportunity cost of an import of 1000 Euro is that we need a compensating export of 1000 Euro and this means that we have 1000 Euro of goods and services that are no longer available for consumption in Belgium. In an open economy and in a free trade environment, every country specializes in principle in what it is best in producing. This implies that there is no reason to favor Belgian electricity production equipment in Belgium except if it is, at market prices, cheaper than abroad.

The cost of 1000 Euro of interest paid for capital is either paid to our lenders abroad over the lifetime of the loan (and then we return to the same reasoning as for imports) or we take away capital from other users for which producers were also ready to pay 1000 Euro. The 1000 Euro is again ultimately a loss of consumption possibilities for Belgium.

Let us take now the case of qualified labor for which there is market equilibrium. 1000 Euro paid as gross labour costs for electricity production equipment or operation means that another producer is unable to use the same labor to produce consumption goods for Belgium. It is the gross labor cost for the employer that measures the opportunity cost because other producers are only willing to pay this gross cost if the unit of labour does indeed produce so much market goods (economists say he is paid the marginal product).

For some types of unqualified labor (and in some regions) there is a systematic unemployment¹ because the minimum wage is too high. This implies that the gross labor cost is actually higher than what it can produce in the rest of the economy. So in the case of unqualified labor, the opportunity cost in terms of foregone consumption of employing one unit of unqualified labor is actually lower than the 1000 Euro labor costs paid. This is indeed an exception to our principle of using market prices as indicator of opportunity cost. In this case one could attach a lower opportunity cost to unqualified labor (a so called “shadow cost”). But we should be aware of the different limitations of this approach:

a) we have to make sure that the electricity production technique selected does indeed use unqualified labour in a region where there is a surplus of that type – many of the electricity production techniques require highly qualified labor for which there is no surplus

b) if the electricity produced becomes more costly because one pays unqualified labor more than its marginal product, this has to be paid by either consumers (other industry) or by government (via subsidies); when it is paid by industry or consumers, this could create extra distortions and create a welfare loss, when it is paid by government, it will require higher taxes in other sectors and this could in turn create additional welfare losses.

c) given the open EU market for equipment, it is in practice difficult to control the employment effect of equipment choices.

Conclusion

As a general conclusion I would suggest to continue the use of market prices as input costs for the selection of energy strategies. We conclude this short document with a comment on the use of models to forecast employment and on the macro-economic effect of the use of energy taxes.

¹ Systematic or structural unemployment can be compared with friction unemployment. The latter is due to the normal “frictions” on the labour market that make that the search and matching process between two jobs takes some time.

Models to predict the employment effect of energy policies

The model runs with the energy models for ENERGY 2030 (Primes and Times) implicitly use market prices for labor. Both models could in theory be used to produce employment figures for the energy sector by multiplying the activity results by a technical labor coefficient that reproduces current labor contents. This will not produce more information than the current employment practices and may be wrong as it is very difficult to forecast in the long run the producer of equipment.

In theory one could also run macro models and general equilibrium models to assess the labor market effects of particular energy investment policies. This will not generate very precise information for the energy equipment sector as it relies mainly on information about who supplies energy equipment. One will probably be able to verify that, when if energy equipment is not produced at home, the corresponding labor will be employed in other sectors producing the necessary export to pay for these equipment goods or fuels.

Macro-economic effects of the use of energy taxes

Carbon and energy taxes are often proposed as short term policies to improve overall welfare and employment. These discussions are known under the name of “double dividend discussion”. The main idea of these policies is to use energy (carbon) taxes to reduce energy and or emissions in a cost-effective way. The revenue of this policy is best used to reduce labour taxes and social security contributions on labour in the whole economy. The expected labour impact is in all sectors and the use of the revenues in this way will not affect the energy sector in a different way than the other sectors (except that its activity will be reduced by the extra energy tax).