

Embodied energy in a carbon market

Embodied energy

Those who will need to purchase emission permits or emission credits in a carbon market are those who are substantial emitters of carbon and consequently required to acquit their emissions with either emission permits or emission credits. They pass the cost of the purchases on in the price of the goods they sell. The most significant of those who will be required to purchase in the carbon market will be the producers of non-renewable energy derived from coal, oil and gas.

What is embodied energy?

To the extent that this energy goes into the making of a material or into things that are made with materials it is referred to as 'embodied energy'. That embodied energy includes not only the energy used directly in making the material or the thing, but also the indirect energy used in such functions as obtaining raw substances from which the material is made, refining substances, transportation, manufacturing the equipment used in any of the processes, running the offices of the businesses involved in any of the above and many other functions as well.

In short, all the energy, the cost of which (however small) finds its way into the end cost of the material becomes the embodied energy in that material. It follows that when the cost of energy is increased the increased cost of the embodied energy in a material causes the cost of that material to increase as well. This increase is not, however, limited to the additional cost of the embodied energy because that cost is invariably increased in the process of being passed on.

Effects of embodied energy

Most Australians have yet to realise that embodied energy is the hidden factor that makes supply and demand and the dynamics of a carbon market very different from their present understanding of it. This is because once a carbon market is in operation the cost of all materials (goods) will alter depending on the quantity of energy that is embodied in them either directly or indirectly. As a result the more embodied energy there is in a material, the dearer it will be.

In addition, the higher the price of emission permits and emission credits become, the dearer the materials become. The intent of course is that, as its cost increases, the material is increasingly rejected by buyers in favour of an alternative that contains less embodied energy and is consequently cheaper. It is this which will cause businesses to rethink everything they have previously learned about energy costs or go out of business.

The effect of a carbon market, however, is not necessary to make goods (and services) dearer by pricing into them the cost of reducing carbon gases in the atmosphere. Goods (and services) that contain less embodied energy become cheaper, or at least relatively cheaper as a result of the market process.

It follows from the above that every business will need to consider not only the quantity and type of energy it uses directly (operational energy) but also the quantity and type of energy that is embodied in the materials, processes and service it uses which is a far more difficult proposition.

It is from this information that a business makes its decisions such as:

- Does it switch to another form of energy?
- Does it switch to different material?
- Does it switch to a different product that does an equivalent job, but in a different way?; or
- Does it switch to any combination of the above?

Market impacts

A carbon market will cause "market impact" in one or more of three ways:

- **Direct impact** – it directly drives the cost of gas, petrol and electricity as discussed above;
- **Indirect impact** – it directly drives the cost of materials and services produced with energy as discussed above; and
- **Market impact** – it influences the cost of materials where there is an alternative use for those materials and competition develops (e.g. timber products).

Embodied energy in a carbon market (...continued)

All of these impacts in a carbon market would be expected to drive prices higher, but by no means uniformly (as with the GST). For example, assuming a price of A\$40 for a 1 tonne emission permit or emission credit, the price of steel would be likely to rise by about 20%, but plastics by only about 6%. Aluminium might well rise by 30% unless you are aware of Alcoa's worldwide hedging against this eventuality for some years past and at very considerable cost. It follows from this that a manufacturer who has previously used steel in manufacturing goods might consider switching to plastic or some other substance containing less embodied energy than steel and therefore cheaper under a carbon market.

Without a market

The issues run even deeper. You may have noticed recently, references to the distance that groceries travel to reach the shelves from which you buy them ("food kilometres"). This is an emotional and not overly logical argument that maintains shoppers will be helping to save the planet if they buy only what is produced close to where they buy it, while at the same time ignoring the many other ways in which the shopper harms the planet in the shopping process. It takes little imagination unfortunately to take this punitive approach even further. How long will it be, I wonder, before advertising campaigns start telling us that we should distinguish between (say) different meats on the basis of the carbon emissions of the animals from which they are derived. Clearly this is a present risk to a number of rural businesses that does not appear to have been considered either by government or those involved in those businesses. It results from the absence of a carbon market which spreads the cost of reducing carbon gases equitably across the community.

Opportunity knocks

It will be clear to all of you that a carbon market will alter the costs of all goods, all services and all property and do so anything, but uniformly. Every five years as the Kyoto targets around the world are progressively lowered down to about 30% of what they were in 1990, this effect will occur all over again with an impact, each time, at least twice that of the introduction of the GST in Australia.

Fortunes will be made and lost as businesses judge wisely or unwisely what lies ahead. What we make, the way we make it, the materials we use, and the energy we use will all be revolutionised. The design of buildings, the means of transportation, the food we eat, the clothes we wear and the houses we live in will be quite different 50 years from now. This is the lesson all of us need to learn before the introduction of a carbon market in order to adapt to the effects a market will produce before they harm our businesses.

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