



The Canon Institute for Global Studies

CIGS Working Paper Series No. 18-002E

Tariff Hike of Electricity by Hastened De-carbonization will Obstruct the Advent of Low Carbon Society

Taishi Sugiyama
The Canon Institute for Global Studies

April 2018

※Opinions expressed or implied in the CIGS Working Paper Series are solely those of the author, and do not necessarily represent the views of the CIGS or its sponsor.
※CIGS Working Paper Series is circulated in order to stimulate lively discussion and comments.
※Copyright belongs to the author(s) of each paper unless stated otherwise.

General Incorporated Foundation

The Canon Institute for Global Studies

一般財団法人 キヤノングローバル戦略研究所

Phone: +81-3-6213-0550 <http://www.canon-igs.org>

Tariff Hike of Electricity by Hastened De-carbonization will Obstruct the Advent of Low Carbon Society

Taishi Sugiyama

The Canon Institute for Global Studies

Apr 25, 2018

To solve the global warming problem, CO₂ should be significantly reduced in the long run. To achieve this, “electrification” of the energy consumption, as well as de-carbonization of electricity” is also necessary. In Europe, however, policies such as the hasty promotion of renewables led to electricity tariff hikes, suppressing electrification. This may even delay the fundamental solution of the global warming issue. Japan needs to manage its policy adequately to avoid such risks. As a long term strategy, global warming mitigation should emphasize reduced power costs, rather than hasty de-carbonization.

1. Importance of Electrification to achieve large reduction of CO₂

Electrification (which we define as “an increase in the share of electricity in the final energy demand) has been a historical trend. It made gains in the past because electricity is convenient, safe, and clean. In addition, technological progress allowed the use of new appliances, and the cost of those appliances also declined. These trends will continue, further pushing electrification.

Furthermore, use of electricity is also promising in terms of global warming mitigation. First reason is that there are many low-carbon technology on the supply side, such as nuclear, renewables, high efficiency thermal power, and carbon-capture-and-storage technique(CCS). In the past, the increase of low CO₂ power source and the improvement in energy conversion efficiency reduced the unit CO₂ emission in the power generation sector significantly. The second reason is that there are efficient technology on the demand side, such as heat pumps and motors.

IPCC 5th Assessment Report also confirms that the promotion of electrification, together with de-carbonization of electricity, is a promising strategy for large scale CO₂ reduction.

Granted, it is possible to further increase the efficiency of direct combustion of fossil fuels. However, unlike electricity, it is fundamentally impossible to reduce CO₂ drastically. Hydrogen and bio-fuels hold some promise in terms of future technological development, but from the perspective of the total energy supply and demand, their role

would remain limited as supplements of electricity.

2. Electricity Tariff Hike in Europe

With this in mind, one might expect that Europe may have implemented policies to encourage further electrification. Alas, the reality is the exact opposite. For the past 10 years, electricity price has generally rose significantly, with electricity tariff doubling across many countries and sectors.

The three reasons for the tariff hike are: A) the cost for mass deployment of renewable energy, B) increase in fossil fuel prices for thermal power, and C) the failure in the market reform of the power sector.

3. Concerns for power tariff hikes in Japan

The Global Warming Prevention Headquarters of the Japanese Government (Chaired by Prime Minister Shinzo Abe) submitted a specific goal of “26% greenhouse gas reduction from the 2013 level in 2030” in their National Determined Contribution (NDC) to the Paris Agreement of United Nations Framework Convention on Climate Change.

Looking at the breakdown of this specific goal however, there are concerns that the cost of renewables and energy savings may cause huge power tariff hike.

4. High Power Tariff may Prevent Innovation

Generally speaking, innovations in electric appliances are spectacular. There are, however, existing technologies for fossil fuel combustion are also quite advanced. It is not easy to break into this market to gain a substantial share. For example, electric vehicles (EVs) need to compete with gas automobiles, heat pumps need to compete with boilers and co-generation technologies. Still, by gradually discovering niches where electricity command advantage, further innovations can be expected. Even within such niches, however, the power cost is crucial. With higher power costs, such technologies cannot hope to penetrate the market, and must be declared premature, where the only option is to revert to basic R&D in order to lower costs. If policy failures lead to an electricity tariff hike, it would be a folly well worth avoiding. The risk of electricity tariff hike has traditionally been debated on the basis of increased burden for the people, including the industry. This is a completely valid point. But in addition to that, I would like to pose the issue that “electricity tariff hikes are detrimental also in terms of long term global warming reduction strategy.”

5. Electricity tariff control as a long term global warming reduction strategy

If the hasty de-carbonization effort of electricity obstructs the innovation in electric appliance technologies such as EV and heat pumps, this is an exercise in futility, a typical case of killing the goose that lays golden eggs. To avoid this, the control of electricity tariff needs to become an important consideration. If so, under the current Japanese condition, it is clear that the use of cheap coal thermal power is an important option.

“Electrification” and “de-carbonization of electricity” are both important, and both need to be promoted with a long term view. The desirable way is to control the electricity tariff, thereby promoting innovation and electrification. At the same time, de-carbonization of electricity also needs to be promoted at a level that does not cause significant hikes in electricity tariff (figure).

As for renewables, they are expensive at the moment. Therefore, we should not aim for any hasty introduction, but invest in research and development. If and when the prospect of cheap and stable renewable power supply becomes realistic, then there should be mass deployment.

One might argue that higher electricity price is desirable in mitigating global warming, since higher price would suppress the power consumption, leading to reduced CO₂. This argument, however, only stands when electricity price rise in line with other energy price. When electricity alone becomes more costly due to renewables introduction, it will lead to an increase in direct combustion of fossil fuels with associated increase in the CO₂ emission even in the short run. Seen as a long term strategy, this is clearly a mistake that would obstruct electrification.

Higher electricity price does indeed promote innovations to save electricity use. But direct combustion of fossil fuels account for two thirds of Japan’s total CO₂ emission. Without replacing them with electricity, it is simply impossible to achieve the massive CO₂ reduction necessary as the final solution of global warming. Various electrical appliance technologies need to compete under a fair market condition, so that the better ones prevail. For this to happen, we should avoid the excessive tariff hike of electricity by wrong policies.

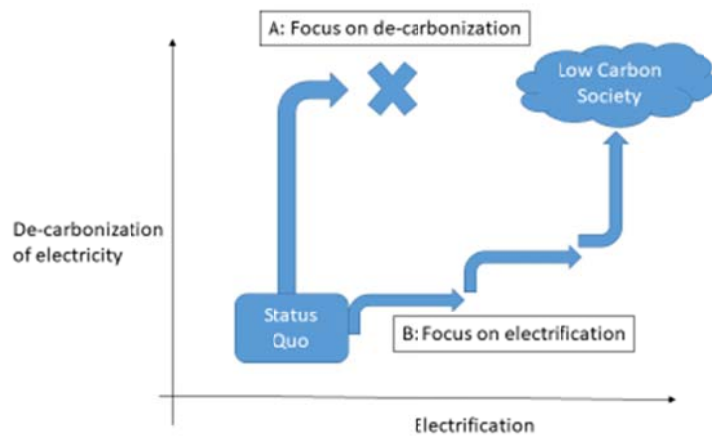


Figure: Two paths to low carbon society. Realization of low carbon society requires both de-carbonization of electricity (reducing unit CO₂ emission), and electrification (larger share of electricity in the final energy consumption).

A: Hasty de-carbonization would lead to higher electricity tariff, causing delays in electrification and preventing the advent of low carbon society.

B: Promoting electrification through controlling the electricity tariff, and gradually de-carbonizing electricity within levels that does not lead to tariff increase.

B would be a more promising path to a low carbon society than A would.