

## Japanese Government's "inadequate" proposal for 2030 Climate target will harm not only its reputation but also economy

Japan's Union of the Concerned Scientists on Energy Mix and Climate Target (JUST)

June 5, 2015

**Summary:** The energy mix Japanese Government is about to propose is based on the presumptions that lack economic rationale for the nation as a whole, especially in terms of energy conservations, renewable energy power generation, nuclear power generation, and coal-fired power generation. As a result, its target for greenhouse gas (GHG) emission reduction to be submitted soon as an intended nationally determined contribution (INDC) is set at lower level (26% from 2013 level in 2030 which is equivalent to 18% from 1990 level, and, for CO<sub>2</sub> alone, 13% from 1990 level). It is also possible that unrealistic dependence on nuclear power will eventually lead to approximately 9% higher GHG emission due to increased use of oil-fired and old LNG power plants to compensate unrealized generation from nuclear power. This means that Japan's actual GHG emission reduction would be just 9% in 2030 compared to 1990. If, on the other hand, we assume energy conservation of 30% (from 2010 level), and 35% renewable energy power (280 billion kWh) in 2030 as a recommended scenario, then Japan can reduce GHG emission by 40% from 1990 level without restarting any nuclear power plants, which will also bring more favorable impacts to economy. Therefore, current target will not only invite strong criticism from the international community, but also lose its chance for further economic growth. Fundamental issue is that, in terms of climate change and energy-mix, current Japanese Government does not consider either international reputation or nation-wide economic benefits seriously. Its main concern is just to resurrect energy-system that depends on nuclear power and fossil fuel, especially coal.

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## 1. Introduction

Presently, Japanese Government is set to determine its energy mix and greenhouse gas (GHG) emission reduction target at the same time. The Government is about to propose the GHG emission reduction target of 26% from 2013 level in 2030 (18% from 1990 level, and, for CO<sub>2</sub> alone, 13% from 1990 level)<sup>1</sup>. However, the amount of energy conservations, renewable energy power generation, and coal-fired power generation incorporated into this target lacks economic rationale, and, as a result, may bring adverse effects to Japanese economy. It is certain that such target will invite further criticism from the international community.

If, on the other hand, we assume energy conservation of 30% (from 2010 level), and 35% renewable energy power (280 billion kWh) in 2030 as a recommended scenario (hereafter Policy scenario), then Japan can reduce GHG emission by 40% from 1990 level without restarting any nuclear power plants. Furthermore, such energy mix will bring more favorable impacts to economy, in terms of energy cost and job creation (Fig. 1).

This paper discusses three issues: problems embraced in Government's proposal; positive economic impacts of "30% energy conservation, 35% renewable, and 40% GHG reduction"; and the criticisms from the international community.

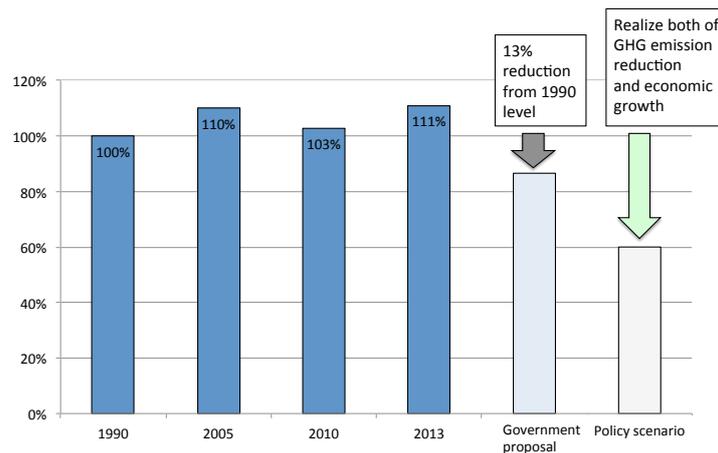


Fig. 1. CO<sub>2</sub> emissions (energy source) of Government's proposal and Policy scenario

<sup>1</sup> "Japan's INDC outline (draft)", a paper on INDCs submitted by the Japanese Government to the joint committee of MOE and METI on Apr.30, 2015. (in Japanese)  
[http://www.meti.go.jp/committee/sankoushin/sangyougijutsu/chikyu\\_kankyo/yakusoku\\_souan\\_wg/pdf/007\\_04\\_00.pdf](http://www.meti.go.jp/committee/sankoushin/sangyougijutsu/chikyu_kankyo/yakusoku_souan_wg/pdf/007_04_00.pdf)

## 2. Problems of Government's proposal

### 1) Underestimating energy conservation

The assumptions used at government's councils indicate the final energy consumption of about 15% reduction from 2010 level, after enforcement of some measures<sup>2</sup>. However, they underestimate the energy conservation of all sectors, including those of industry, business, residence and transport sectors. Especially, the estimated energy conservation in industry sector is only about 6% from 2012 level and, with presumption of production volume increase due to unrealistic demand increase, the overall energy consumption assumed in industry sector will actually become an increase from 2010 level. In particular the energy conservation assumed in 4 raw material industries is about 1% only. Yet, by conforming to the current benchmarks requested by the Japanese Government for these industries under the Energy conservation Law till 2030 alone will enable them to achieve the energy conservation of about 10%<sup>3</sup>. Other industry subsectors also have more room for energy conservation (Tonooka, Tsuchiya, and Masui, 2015).

Basically, the investment in energy conservation projects is a proven way to secure company profit. Governmental policy such as lower interest loan and carbon pricing can facilitate the implementation of such projects. In addition, as indicated in the questionnaires and interviews conducted in Japan, one of the main reasons why energy conservation is not proceeding at the expected rate is the lack of information provided, especially to corporate decision makers with authorities to decide on their investments. The introduction of policy measures will provide an opportunity for further disseminating and expanding the investments in energy conservation. The introduction of GHG emission trading system in Metropolitan Tokyo, for example, has successfully raised the awareness among corporate leaders, with the results in realizing 23% emission reduction in average among participating companies, which far exceeded the original reduction obligations of 6 to 8% set by the Metropolitan Tokyo Government<sup>4</sup>. There exist many other un-implemented governmental measures that require much less cost for implementation, such as business specific information disclosure, publication of rankings in intensity information and the opening of windows for technological consultation.

### 2) Underestimation of renewables

The government's proposal assumes 22-24% renewables in power generation and about 10% variable power sources (solar and wind). Many countries in Europe, however, have already realized higher ratio of variable power sources in 2013, without any drastic increase in capital investment. In Japan, the measure to adjust output from renewable power sources is going to be implemented even at the early

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<sup>2</sup> [http://www.enecho.meti.go.jp/committee/council/basic\\_policy\\_subcommittee/mitoshi/008/pdf/008\\_07.pdf](http://www.enecho.meti.go.jp/committee/council/basic_policy_subcommittee/mitoshi/008/pdf/008_07.pdf)

<sup>3</sup> Benchmark is set to be the efficiency level of around top 30% of each industry/facility. The problem is that attaining the benchmark level is not compulsory under current regulation.

<sup>4</sup> [http://www.kankyo.metro.tokyo.jp/climate/large\\_scale/attachement/press20150219.pdf](http://www.kankyo.metro.tokyo.jp/climate/large_scale/attachement/press20150219.pdf)

stage of renewable dissemination, in comparison to Europe.

Current Japanese Government's policies aim for: 1) prioritizing the restarts of nuclear power plants; and 2) restricting the broader utilization of national grids and the pumping-up hydro power generation system for output adjustment at the stage of renewable introduction. This clearly shows the current Japanese Government's intention not to expand the renewable energy supply and raises a serious question on conformity with government's original policy for increasing renewables, which was clearly stipulated in the Basic Energy Plan and others.

### **3) Drastic increase in coal-fired power introduction**

Multiple scenarios national government has presented at the council meetings assume, one and all, the increase in coal-fired power generation, regardless of the assumption on the ratio of nuclear power, which shows the possibility that nuclear power is crowding out renewables. This may also contradict, in some degree, the government's claims in the past, which have said that "nuclear power is a clean and green power and can be considered as a measure to reduce GHG emission of Japan."

### **4) Unrealistic dependence on nuclear power**

The government's proposal is to assume 20-22% nuclear power in power generation sector. This seems to be based on the assumptions: 1) restarting all nuclear power plants, 2) decommissioning after 60 year operation, 3) increasing utilization factor of 80% (greater utilization factor despite the aging of nuclear power plants), etc. These assumptions are largely optimistic and not realistic (Fig. 2, Fig. 3).

For example, 60 years operation is clear violation of the "40 year operation principle" set by the previous administration. In addition, 80 % operation rate was achieved only in the period of 1995 to 2001, and never afterward. With the further aging of nuclear power plants, the needs of inspections will undoubtedly increase while operational troubles will likely become more frequent.

Any power shortages occurred as a result of such extremely unattainable assumptions must be complemented by other sources, so it is quite foreseeable to raise dependence on oil fueled or old LNG power generation (with energy conservation and renewable introduction to be postponed). In fact, whenever accidents occur at nuclear power plants in the past, power generated by oil-fueled or old LNG type power plants rapidly increased.

If we assume "realistic" power generation from nuclear mentioned in Fig.3, the additional amount of CO<sub>2</sub> emission by the oil-fired or old LNG type power plants would be about 119 million ton-CO<sub>2</sub><sup>5</sup>, which is equal to 9% of 1990 emission level. So the "real" emission reduction of Japan for 2030 from 1990 will not be 13% but 4% of CO<sub>2</sub> emission, which is similar level to the Kyoto target of Japan for 2012.

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<sup>5</sup> In case of 22% power generation from nuclear power.

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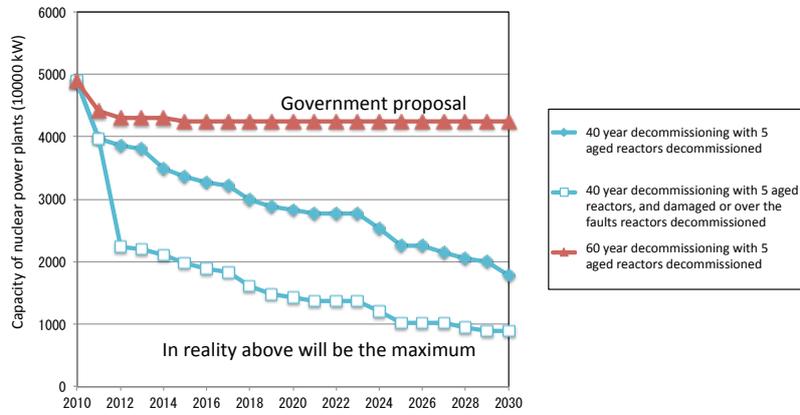


Fig. 2. Reality of nuclear power capacities described in Government's proposal

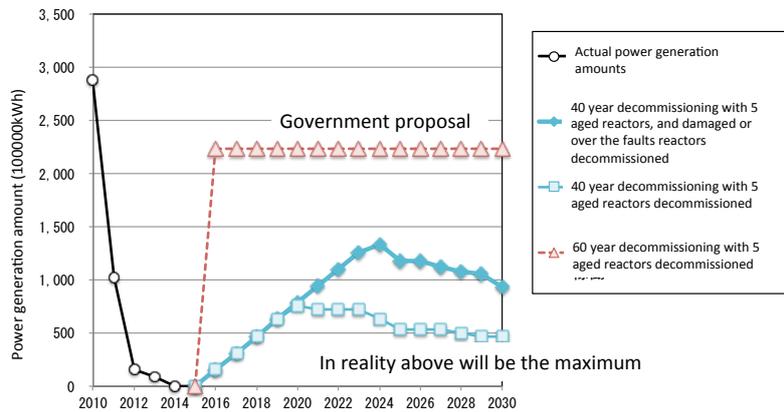


Fig. 3. Reality of nuclear power generation described in Government's proposal

### 3. Economic impacts of Policy scenario

Based on the discussions in sections 1 and 2, this section describes the results of calculations conducted to determine the economic effects of Policy scenario to implement 30% energy conservation (from 2010 level) and 35% renewables<sup>6</sup>, thereby realizing 40% GHG emission reduction (from 1990 level) without nuclear power. Note that assumptions on many other factors such as GDP, population growth, etc., remain almost the same as those assumed in the calculations of Government's proposal. Also note that there are several other studies that show economic rationale in scenarios assuming greater than 30% energy conservation and 35% renewable, resulting in greater GHG emission reduction. For the details of those studies, refer to the Japan's Union of the Concerned Scientists on Energy Mix and Climate Target (2015a, 2015b).

#### 1) Decrease of fossil fuel imports

When calculated from the energy price data of International Energy Agency (IEA) and others, Policy scenario of 30% energy conservations and 35% renewable (280 billion kWh), and 40% GHG emission reduction will decrease the amount of fossil fuel imports by ten trillion yen, compared to the case of current government proposal (Fig. 4)<sup>7</sup>. Needless to say, this ten trillion yen would have been the amount flowed abroad to fossil fuel exporting countries and fossil fuel sellers, if no measures have been implemented. On the other hand, if the fund is used to invest in energy conservation and renewable, then such fund will remain in the nation as national assets, increasing domestic jobs, and bringing further economic growth. As mentioned above, the assumption of 30% energy conservation and 35% renewable is a conservative one and realizable with no technological problem in their introduction. Essentially, the matter is how the Japanese Government articulates Japan's economy as a whole, and how business leaders make management decisions.

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<sup>6</sup> Although 35% renewable energy power generation seems rather a big number, note that energy conservation is greater in Policy scenario than in Government proposal. In other words, this 35% is actually 280 billion kWh in absolute value, which is not too different from 234.3 to 255.6 billion kWh in Government's proposal. Moreover, as of May 25, 2015, renewable energy power generation facilities registered under current Feed in Tariff (FIT) scheme can generate about 200 billion kWh. So 35% renewable energy power generation can be considered as a quite conservative enough and realizable number if current governmental policy on renewable energy continues without any drastic change.

<sup>7</sup> Fossil fuel import cost for Japan is calculated by multiplying Japan's primary energy supply quantities per fuel types with the unit price assumed in "New Policy scenario" of World Energy Outlook 2014 by International Energy Agency (IEA).

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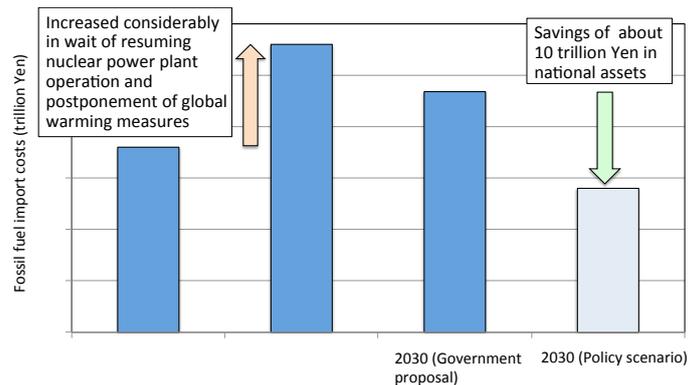


Fig. 4. Comparison of policy scenario and Government’s proposal (in fossil fuel imports)

## 2) Decreases in unit price and total cost of power generation

When calculating the Policy scenario of 30% energy conservation and 35% renewable, we use almost the same unit price of power generation in 2030 as in Government’s proposal. The total cost of power generation in 2030, however, is about 5 trillion yen less in the case of 30% energy conservation and 35% renewable than in the case of Government’s proposal (Fig. 5)<sup>8</sup>. Note that, although unit cost of power generation in Government’s proposal continues to rise with the rising fossil fuel prices even after 2030, such cost in the case of 30% energy conservation and 35% renewable continues to decrease as the unit price of renewable decline.

<sup>8</sup> Cost of power generation (total cost) was calculated by adding the costs related to equipment capacity (kW) (such as equipment costs and maintenance costs that incur regardless of operation), and the relative costs of power generation (kWh) (such as fuel costs, carbon costs, etc.) in reference to the calculation made at Cost Review Committee of Japanese Government in 2012. The difference in the total cost of power generation between the Policy scenario and Government’s proposal mainly reflects the difference in the degree of energy conservation. For nuclear power plants, BAU (business as usual scenario) includes operational maintenance cost till decommission, with 40 year operation (including maintenance costs of those without restarts, and the fuel costs of coal-fired power plants to compensate nuclear power). In the case of Policy scenario, no maintenance costs of nuclear power plants are included, assuming all nuclear plants to be decommissioned in 2015 (decommissioning costs are already allocated, so no additional costs are needed). The unit cost of power generation is calculated by dividing the total cost by the amount of electric power generation.

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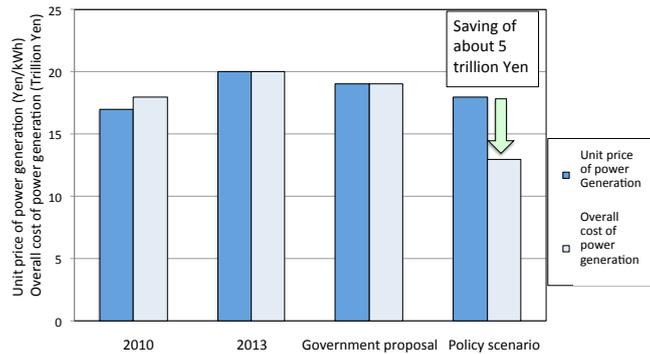


Fig. 5. Comparison of Policy scenario and Government's proposal (cost of power generation)

### 3) Job creation

In the case of 30% energy conservation, 35% renewable, and 40% GHG emission reduction, there will be further stimulation of investment and increase in domestic demands, which will likely create more jobs in the order of several millions, compared with the case of Government's proposal (Fig. 6)<sup>9</sup>.

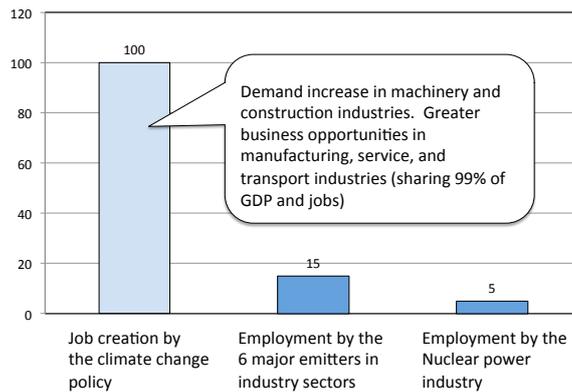


Fig. 6. The number of new jobs created and the number of employees in existing industries

**Note:** Six major emitter industries include: thermal power generation; blast furnace iron manufacturing; chemical industry (organic materials and soda industry); cement manufacturing; paper manufacturing; and oil refinery. In the case of nuclear power plants, above include the number of employees at nuclear power plants and those related to nuclear reactor production (Japan Atomic Industrial Forum, 2014).

<sup>9</sup> The number of jobs created is calculated in reference to capital investment and demand increase assumed for the introduction of energy conservation and renewable in macro economy model developed by Citizens Alliance for Saving the Atmosphere and the Earth (CASA). For details, please refer to:

<http://www.bnet.jp/casa/2/CASA2030Model/CASA2030Model.pdf>

In the case of Japan, those industries with greater potential for growth and job creation are industries directly and indirectly related to energy conservation and renewables, such as machineries, construction, and service-related industries, employing up to 20% of total employees in Japan. The industries other than these (non-major emitters) will also find more business opportunities. These industries have smaller share of GHG emissions in Japan, while dominating about 99% of GDP and employment.

Six major GHG emitting industries (thermal power generation, blast furnace iron manufacturing, chemical industry, cement industry, paper manufacturing, and oil refinery) share only 1% of GDP and 0.3 % of employment in Japan, while emitting 60% of Japan's GHG emissions. The number of employees at nuclear industry is about 47000 (Japan Atomic Industrial Forum, 2014). This means that the industries which may be adversely affected by climate change mitigation measures contribute much less to national GDP and employment when compared with the contribution made by the industries that can get more market demands and business opportunities by the increased investment in energy conservation and renewables, which are major climate change mitigation measures.

#### **4. International assessment of Government's proposal**

The quantified target of GHG emission reduction proposed by Japanese Government would have several problems when reviewed by international community, as stated below.

Firstly, to have the year 2013 as a base year will impress the international community to show Japan's "ignorance" or "cunning". This is because almost all research institutes and national governments of the world will convert the number of quantified target to the one in comparison with 1990 level, when assessing the fairness and ambition levels of national targets. Therefore, the difference in base year has little significance in international assessment. Thus, the international community will interpret the selection of difference base year as "to signify Japanese Government's intention to show bigger number to impress upon its own nationals with little knowledge in international negotiation."

Secondly, the GHG emission reduction quantity itself is not sufficient. The current proposal make it almost impossible to achieve its international commitment of "80% reduction by 2050", already adopted by the Cabinet. This fact will undoubtedly lead to question Japan's policy in keeping the international commitment. The "Climate Action Tracker (CAT)" that is constituted of 4 European research institutes and has assessed various national GHG emission reduction targets has evaluated Japan's quantified target proposal (11% reduction from 1990 level by 2030" reported in media on April 9<sup>th</sup> and concluded that it is "inadequate" (Climate Action Tracker, 2015). Current Government's proposal is 6 % more than that, but it is almost certain to be assessed as "inadequate", as well.<sup>10</sup> Among those countries already announced their quantified targets (the US, EU, China, Norway, Mexico, Switzerland, Russia, etc.), only

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<sup>10</sup> Considering the methodology the Climate Action Tracker adopts to rank quantified targets of national governments, Japan needs to set up approximately 26% reduction from 1990 level by 2030 to receive the evaluation of "medium" the US, EU and China received.

2 countries, Russia and Japan, have received such low evaluation. Compared with Japan's target, the Switzerland, which has almost equal marginal cost of GHG emission reduction but only about 60% of per capita emissions, announced their target of 50% reduction from 1990 level by 2030.

## 5. Conclusion

The reasons why Japanese Government has selected such energy mix and proposed such lower quantified target of GHG emission reduction include: 1) it has examined the target only from the viewpoint of emission reduction potentials, while in ignorance of internationally common target of 2 degrees; 2) in order to calculate the emission reduction potentials, it has adopted the presumptions without economic rationale; and 3) it presumed the restart of all nuclear power plants and chose to maintain the existing energy system which put lower priority on energy conservation and renewable energy. In short, as for the climate change mitigation action, Japanese Government does not consider it as a really serious issue, though it strongly keeps on claiming the need of nuclear power plants as an important countermeasure.

Emission reduction target the Japanese Government is going to propose has been already criticized by various institutions (Climate Action Trackers, 2015; E3G, 2015; Prescott, 2015) and will inevitably face strong opposition in the international community. While heightening the sense of unfairness in Japan's target, it is possible that other countries may start to consider the introduction of countermeasures such as trade measures (e.g. border tax adjustment) against exports from Japan. It seems that, only extremely strong pressure from the international society such as trade measures can change the attitude of Japanese Government. Otherwise, the Japanese Government will just keep on dismissing the international commitment for the climate change mitigation action.

Presently, many countries are well aware of the need to reform existing energy system in order to promote their economic development and energy security, and actually developing such systems. As a result, the decoupling of economic development and GHG emissions growth is actually happening in many countries. In Germany, for example, the whole-sale price of electric power has been decreasing steadily by further introduction of no fuel cost renewable energies with extremely lower cost of power generation, providing positive effects to national economy.

Japan, on the other hand, is not trying to change its existing energy system. Therefore, it is not developing any policies or systems for its reform. Its national wealth continues to flow out because of the growing dependency in fossil fuels. Its electricity price continues to rise. Its GHG emissions increase. No new jobs are created. In this way, it will certainly miss the opportunity of further economic development.

Fundamental issue is that, in the field of climate change mitigation action and energy-system change, current Japanese Government does not care much about either international reputation or nation-wide

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economic benefits by changing energy system. Instead, it just considers restart of nuclear power plants and short-term benefits for the entrenched interests from keeping existing energy system. In that sense, it is quite difficult to expect ambitious GHG emission reduction target coming from current Japanese Government spontaneously.

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