

# FUKUSHIMA TODAY

AND

# JAPAN'S ENERGY

# FUTURE

2019

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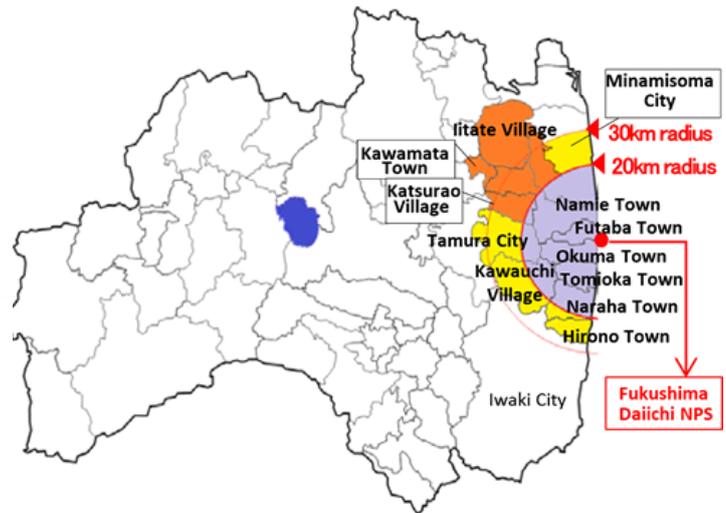
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Note: Currency in this report is in Japanese yen. For an estimate in US dollars, simply divide the yen amount by 100. For reference, average yen per dollar rates in recent years were 80 (2011), 80 (2012), 98 (2013), 106 (2014), 121 (2015), 109 (2016), 112 (2017), 110 (2018), 110 (2019 to mid-year).

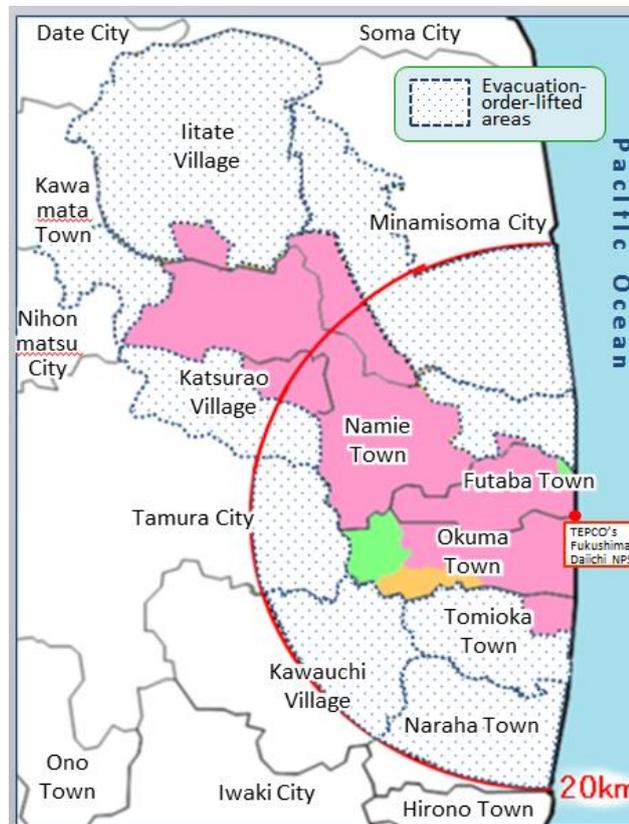
## Transition of evacuation designated zones

April 22, 2011

- Evacuation order zone (warning zone)
- Planned evacuation zone
- Emergency evacuation preparation zone (Evacuation instruction cancelled on September 30)



April 1, 2017



**Evacuation-Designated zones** : About 2.7% of the whole Fukushima Prefecture area (Apr 1 2017)

**Difficult-to-Return zone**

- Annual integrated doses are over 50mSv.
- Entry is prohibited with some exceptions.
- Lodging is prohibited.

**Restricted residence zone**

- Annual integrated doses are between 20 and 50 mSv.
- Entry is permitted, and business operation is partially permitted.
- Lodging is prohibited with some exceptions.

**Evacuation order cancellation preparation zone**

- Annual integrated doses are below 20 mSv.
- Entry is permitted, and business operation is permitted.
- Lodging is prohibited with some exceptions.

Source: website of Fukushima Prefecture:

<https://www.pref.fukushima.lg.jp/site/portal-english/en03-08.html>

## Top news of fiscal 2018 (Apr 2018 to Mar 2019)

### Hitachi abandons nuclear export project to Wales

On January 17, 2019, Hitachi officially announced a “suspension” of its “UK nuclear power stations construction project” (“Wylfa Newydd” on the Isle of Anglesey), which it had been promoting under its fully-owned subsidiary, Horizon Nuclear Power Limited. This freeze means posting a loss of 300 billion yen. Meanwhile, when it was first made public in December 2018 that Hitachi was likely to abandon the project, company shares actually rose. That could be interpreted as the market having viewed this project as a risky venture.



Protest at Hitachi headquarters (Tokyo)

Some reasons for this outcome were that Hitachi could not secure its desired price for electricity sales and was unable to find a financing partner. Therefore Hitachi was unable to finalize the project structure, failing to reduce its own business risk from the project. Investment partners that have been reported include Tokyo Electric Power Co., Japan Atomic Power Co., Chubu Electric Power Co., and the Development Bank of Japan, etc. **(More on p. 34)**

### Japan amends Act on Compensation for Nuclear Damage and continues to protect nuclear industry

Japan’s national parliament passed a bill on December 5, 2018 to amend the Act on Compensation for Nuclear Damage. With this amendment, victims and citizens were again left in the cold, while nuclear power companies, shareholders, banks, and manufacturers continued to get warm treatment by a system that protects them.

The amount of compensation for the Fukushima Daiichi nuclear accident is set at 120 billion yen, less than a hundredth of the 14 trillion yen believed to be necessary. Meanwhile, the Nuclear Damage Compensation and Decommissioning Facilitation Corporation continue to generously protect nuclear energy-related companies, shareholders, and banks. The Act’s stated aims continue to be contradictory, giving equal treatment to “protection of victims” and “sound development of nuclear business.” **(More on p. 25)**

### Yokohama District Court recognizes government’s + TEPCO’s responsibility

In February 2019, the Yokohama District Court recognized the responsibility of both the national government and TEPCO, and ordered them to pay about 420 million yen. This was a response to a lawsuit filed by 175 individuals from 60 households that had evacuated to Kanagawa Prefecture and other locations in the Fukushima Prefecture. This was the eighth judgment in a series of class action lawsuits filed by victims of the nuclear accident. TEPCO was found responsible in every

case, while the responsibility of the national government was recognized in five of six lawsuits in which it was named as a defendant.

The court found that as of September 2009 the national government could have foreseen the occurrence of a tsunami resulting in a total loss of power at the plant, and that this could lead to the external release of radioactive substances. It also found that the Nuclear Safety Commission and the Nuclear and Industrial Safety Agency had been erroneous and deficient in their judgment that the Fukushima Daiichi nuclear power plant had complied with standards to withstand tsunamis. Furthermore, the court also found that the national government had acted illegally by neglecting regulations.

As for the recipients of compensation, consolation money was approved for evacuees that once resided in “areas where returning is difficult,” and “habitation restricted areas.” Furthermore, compensation was provided for those who “lost their home towns,” and for the damage done “to the right of self-determination.”

### Screening for restart, operation extension of Tokai No. 2 nuclear power plant

After completing a screening for the restart of the Tokai No. 2 nuclear plant (owned by Japan Atomic Power Co.), the Nuclear Regulation Authority approved a facilities change (26-Sep-2018) and operation extension (7-Nov-2018). To restart, resume and extend operation, the operator must now gain consent from the municipality of Tokaimura, and five other nearby municipalities (Hitachi, Hitachinaka, Naka, Hitachiota, and Mito). This means that the focus now shifts to getting local consent.



FoE Japan held seminars about the public comment process, where we strongly encouraged people to submit their comments, and prepared leaflets about the problems with the nuclear power plant. We also submitted a petition to the government calling for it to cut its funding to the Japan Atomic Power Co., particularly to TEPCO. Furthermore, we stressed the necessity for the cancellation of the approval for the Tokai No. 2 facilities change, and delivered a formal complaint to the Nuclear Regulation Authority, which was signed by 351 individuals. **(More on p. 27)**

### Japan’s Cabinet adopts Fifth Strategic Energy Plan

Japan’s Fifth Strategic Energy Plan was adopted by Cabinet on July 4, 2018. It is basically a continuation along the same path—prolonging Japan’s reliance on nuclear power and promoting coal power. The power supply mix targets for 2030, as written in the country’s 2015 long-term energy supply and demand forecast, remain unchanged. The target nuclear share is 20 to 22% in 2030 (compared to just a few percent in 2018), and the target for renewable energy (which is supposedly to become a main power source in the future) remains at a meager 22 to 24%. While stating that Japan would “work to reduce plutonium reserves,” it still hangs on to the reprocessing

and nuclear fuel cycle policies that generate plutonium. The plan promotes nuclear plant exports as a growth strategy for the industry. The plan does not mention the new construction of nuclear plants in Japan, but neither does it explicitly rule that out. No public hearings were held for this plan. There was no substantive discussion of public comments. The plan only states that public input was “collected.” The Cabinet approved the plan just slightly more than two weeks after the deadline for public comment.

### **Child thyroid cancer cases rose to over 200, but many missing from stats?**

Since the Fukushima Daiichi nuclear accident, Fukushima Prefecture has been conducting thyroid exams for children who were aged 18 and under at the time of the accident, as part of the “Fukushima Health Management Survey.” According to the data released from the Fukushima Prefecture, in December 2017, 206 children had thyroid cancer or were suspected of having it. After surgery, 164 were confirmed to have had thyroid cancer. Besides these cases, it later became clear that the statistics had numerous omissions, including 11 patients who were missed from the numbers despite having undergone cancer surgery. **(More on p. 15)**

### **One 11-year-old girl’s thyroid exposed to 100 millisieverts**

An independent interview by *Tokyo Shimbun* newspaper revealed that an 11-year-old girl from Futaba Town had been exposed to an estimated 100 millisieverts in the thyroid immediately after the nuclear accident. The government did not measure the thyroids of evacuees from the area where evacuation orders were issued, so the status of exposure was not properly assessed initially, and that situation remains to this day. **(More on p. 16)**

### **The debate about discharging contaminated water from ALPS system to the sea**

The Tritiated Water Task Force (Committee on Contaminated Water Countermeasures, Ministry of Economy, Trade and Industry) held public hearings at three locations in 2018: Tomioka Town (Fukushima Prefecture, Aug. 30), Koriyama City (Aug. 30), and Tokyo (Aug. 31). METI presented five proposals, one being the discharge of treated water into the ocean. Forty-two out of 44 speakers expressed opposition or concerns about dumping the discharge into the ocean. Tetsu Nozaki, head of the Fukushima Prefectural Federation of Fisheries Co-operative Associations, expressed his opposition: “It would be a catastrophe for the fisheries industry, and all our efforts to date would end up just like foam in the water.” Many other criticisms were stated, including “The risk of tritium is being underestimated,” and “other radioactive materials are still above emission standards.” **(More on p. 23)**

### **Citizens oppose project to “reuse” decontamination soil (Nihonmatsu)**

The Ministry of the Environment has developed a policy to prevent scattering and ground covering with soil arising from decontamination work (*josendo*: Note that this is NOT “decontaminated” soil, but soil still contaminated, removed from the ground in the decontamination process), and instead, to “reuse” it for public works projects and farmland development. Moreover, MOE is trying to get demonstration projects going in various places. In

Nihonmatsu City, Fukushima Prefecture, there was a plan to use it as roadbed material for agricultural roads. However, residents strongly opposed the plan, and it was basically withdrawn in June 2018. Several reasons for local opposition were: concerns about radiation being spread around; questions about the logic of using decontaminated material on farming roads, after such extensive efforts had been made to decontaminate the farmland; and fears that despite this being a demonstration project, contaminated material would end up staying there permanently, making it a final disposal site. The MOE is still planning a demo project using decontamination soil for widening of the Joban Expressway in Odaka District, Minamisoma City. But residents there are opposed as well, and in February 2019 they launched an opposition group (*Hantai Suru Shimin no Kai*). **(More on p. 19)**

### **Citizens want Kansai Electric Power Co. to review volcanic ash risk assumptions**

On November 21, 2018, the Nuclear Regulation Authority declared that assessments had underestimated the potential ash fall from a future volcanic eruption and the ash's potential impacts on Mihama Nuclear Power Plant, Oi (or Ohi) Nuclear Power Plant, and Takahama Nuclear Power Plant—all three in Fukui Prefecture and operated by Kansai Electric Power. The NRA decided to reassess the potential impacts. Kansai Electric Power had assumed that 10 centimeters of volcanic ash could fall on the nuclear plant sites based on a simulated eruption of Mt. Daisen in Tottori Prefecture to the west. But citizen groups such as the *Mihama-no-Kai* (Osaka Citizens Against the Mihama, Oi and Takahama Nuclear Power Plants) and *Genshiryoku no Kisei o Kanshi Suru Shimin no Kai* (translated literally as Citizens' Association Monitoring Nuclear Energy Regulations) continue to point out that Kansai Electric Power is understating the risk. They point to a 25 cm layer of ash from a previous eruption, found at a location known as Ochiyata, the same distance from the volcano as the nuclear plants. They have had ongoing negotiations with the regulatory agency and have been effective by basing their advocacy on concrete facts. Despite this, the NRA is not calling for the plants to be shut down. The citizens groups' position is that the reactors should first be stopped, and then the screening should be redone.

### **Evacuee housing assistance programs—terminated**

One after another, assistance programs for evacuees from the Fukushima nuclear accident have been discontinued. The national and Fukushima Prefecture governments have decided on a policies to terminate programs for the provision of temporary housing in March 2020 only in “Areas where Returning is Difficult,” with the exception of Okuma and Futaba.

For evacuees outside those areas housing provision programs were discontinued in March 2017. Despite this, 80% of evacuees living outside their home prefecture chose to continue staying away. After program termination, evacuees living in private rental housing and with incomes below a certain level could receive rent assistance up to 30,000 yen per month for the first year and 20,000 yen per month for the subsequent year. Evacuees living in government employee housing and who could find a place to relocate were allowed to continue living there, but only up to two additional years, and this too was discontinued in March 2019. **(More on p. 10)**

## Evacuation orders lifted but many evacuees won't return

### Lifting of evacuation orders

On March 31 and April 1, 2017, evacuation orders were lifted from “evacuation order cancellation preparation zones” and “restricted residence zones” in Kawamata Town (Yamakiya District), Tomioka Town, Namie Town, and Iitate Village. The evacuation orders had applied to about 81,000 residents of eleven municipalities that had been evacuated shortly after the accident, and about 70% of the areas were lifted from the orders. “Designated reconstruction bases” were created in “areas where returning is difficult” and decontamination efforts are under way.

However, the lifting of evacuation orders does not necessarily mean that evacuees are returning. In reality, young people are hesitating to return, and a growing number of households consist of just one or two elderly persons.

**Table 1. Evacuee return status in former evacuation zones (Jan – Feb 2019)**

	Evacuation order lifted	Population (A)	Actual residents (B)	Ratio (B/A)	Note
Futaba	Sep 2015	6,969	3,641	52%	as of 31-Jan-2019
Katsurao	Jun 2016	1,415	357	25%	as of 1-Feb-2019
Minamisoma (Former evacuation zones)	Jul 2016	8,708	3,613	41%	as of 31-Jan-2019
Namie (excluding areas difficult to return areas)	Mar 2017	14,909	896	6%	as of 31-Jan-2019, pop. as of Mar 2018
Iitate	Mar 2017	5,685	1,003	18%	as of 1-Feb-2019
Kawamata (Yamakiya district)	Mar 2017	858	334	39%	as of 1-Feb-2019
Tomioka (excluding difficult to return areas)	Apr 2017	9,396	835	9%	as of 1-Jan-2019, pop. as of Mar 2018

Source: Prepared from data released by municipalities

### This is what reconstruction looks like?

Before the government lifted evacuation orders, the Reconstruction Agency and local government surveys asked evacuees from evacuation areas about their intentions to return home. Responses differed depending on the municipality, but it was clear that many evacuees did not intend to return.

In Tomioka, evacuation orders were cancelled on April 1, 2017. Results of one government survey released in November 2018 showed 5.2% replying “I am already living in Tomioka,” 9.9% replying “I want to return,” and 48.1% replying “I have decided not to return.”<sup>1</sup> The latter response was 1.3 percentage points up from a previous survey. The majority not returning were in their thirties, and the reason for 60.4% of those not returning was “because we already have already established our lives elsewhere.”

<sup>1</sup> Survey by Reconstruction Agency, Fukushima Prefecture, and Tomioka. Survey targeted head of household (6,648), survey period Aug 20 to Sep 3, 2018. Responses received from 2,992 households (44.3%). Details (in Japanese): [http://www.reconstruction.go.jp/topics/main-cat1/sub-cat1-4/ikouyouusa/181130\\_ikouchousa\\_tomioka.pdf](http://www.reconstruction.go.jp/topics/main-cat1/sub-cat1-4/ikouyouusa/181130_ikouchousa_tomioka.pdf)

**Table 2. Former residents' intention to return (Tomioka)**

I am already living in Tomioka	5.2% (2.9%)
I want to return (including future aspirations)	9.9% (11.1%)
I want to return, but an not able to	18.4% (20.2%)
I still cannot decide	16.8% (17.7%)
I have decided not to return	48.1% (46.8%)

Note: Percentages in parentheses are from previous survey (Aug 2017).

Source: Briefing on Public Opinion Survey (Tomioka), 30-Nov-2018.

Nearly two years after the evacuation order was lifted, the occupancy rate in Tomioka was just 9% in February 2019, and this included new people who moved here, so the actual *return* rate was less than that. Elderly people live in scattered locations, and the rest are workers and personnel connected with TEPCO and related companies. Vacant houses are being demolished. The municipality has put in place a full system of welfare, nursing care, medical services, shopping malls, crime prevention systems, fire prevention systems, bus services, and mobility support such as demand taxis, etc.



Barricades block access to “areas that are difficult to return.”

The townspeople have mixed feelings. “Tomioka today is not an environment where children can live, given the radiation effects. But one day I want to return to Tomioka. It is full of memories for me,” said one mother. One couple said, “We want to protect what our ancestors created. We want to return.” However, sons are not returning to carry on the family traditions. Many have decided to settle where they evacuated and start on a new path. One former resident said, “Even if I return home, I cannot farm. So I’m leasing my rice paddies to install solar panels. The landscape has changed

dramatically.”<sup>2</sup> “My decision to return was the first time since the disaster that I was able to make my own decision. That gives me satisfaction...although in my neighborhood, one house after another is being demolished,” said one 90-year-old man.<sup>3</sup>

The government has three criteria for lifting evacuation orders: (1) certainty that the annual cumulative dose will be less than 20 millisieverts, (2) infrastructure for living has been restored, and (3) adequate consultation among the prefecture, municipalities, and residents. Regarding the first criterion there has been much criticism that this level is too high, and regarding the third, the government did not ask residents for their opinion regarding lifting evacuation orders, and went ahead despite much opposition.<sup>4</sup>

It is also questionable whether such a policy to have evacuees return was realistic. It would only be fair to assess the current situation, reflect the opinions of the residents, and redesign the reconstruction policy from a long-term perspective.

<sup>2</sup> From interview February 2017 at Committee 1 of the Citizens’ Commission on Nuclear Energy, plus site visits to Tomioka.

<sup>3</sup> From interviews by FoE Japan in February 2018 and February 2019.

<sup>4</sup> A counsellor of the government’s local response headquarters said, “This was a briefing to explain, not a consultation” (meeting with Cabinet Office and City of Minamisoma, April 16, 2014). This was made public through an information disclosure request to the Minamisoma municipal government by lawyers working on a group action suit against withdrawal of evacuation order under 20 mS/v in Minamisoma.

## Conditions of evacuees

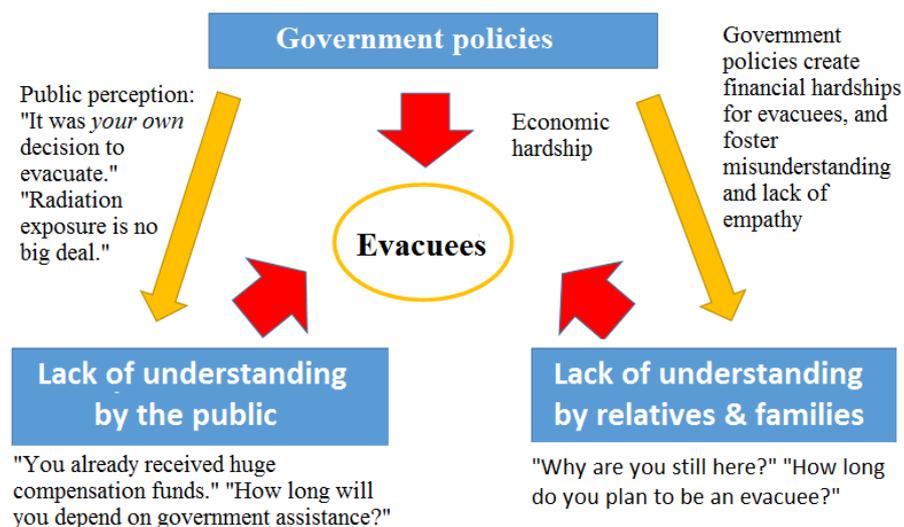
Many evacuees from the nuclear accident received subsidies under what is known as a “quasi-temporary housing program” based on the Disaster Relief Act. However, the provision of relief for some 26,000 residents covered under this Act who were evacuees from the non-designated evacuation zones (so-called “voluntary evacuees”) ended in March 2017. The meager low-income rental assistance that continued thereafter was scheduled to be terminated in March 2019.

The government is also planning to terminate the housing provision in March 2019 for evacuees from areas outside “areas where returning is difficult” where evacuation orders have already been lifted, such as Kawamata, Kawauchi, Odaka Ward in Minamisoma, Katsurao, and Iitate.

Refugees from outside of evacuation areas in many cases decided to evacuate, even without compensation or support, in order to protect their children and families. The compensation finally approved in December 2011 was also small, far too low to cover expenses associated with the evacuation. Many ended up isolated and in need. Some are elderly persons, persons with disabilities, and single mothers with no one else to rely on. These facts have been confirmed by multiple surveys.

### What challenges do evacuees face?

The termination of housing provision, the only government support evacuees received, takes away their basis for living. Nevertheless, 78% of evacuees living outside of Fukushima Prefecture still chose to continue living in evacuation.<sup>5</sup> The policy of the national and Fukushima prefectural government to discontinue support conveys a message to the surrounding community that there is no need to evacuate anymore. This has resulted in a lack of empathy for victims, who end up being criticized for depending on compensation (Fig. 1). It is thought that this context is also resulting in the observed problem of bullying of children from evacuee households.

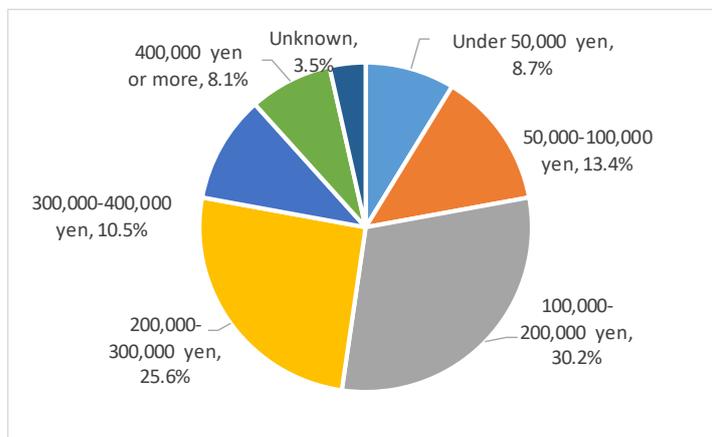


**Fig. 1. What challenges do evacuees face?**

<sup>5</sup> Evacuees Residential Community Coordination Division, Fukushima Prefecture, April 2017 (in Japanese).

## Surveys of evacuees reveal economic hardship and suffering (Tokyo, Niigata Prefecture, Yamagata Prefecture)

The largest number of evacuees lives in Tokyo. In May 2017, the Tokyo Metropolitan Government released the results of a survey targeting evacuees living in Tokyo, including evacuees from inside and outside evacuation zones, and evacuees from outside of Fukushima.<sup>6</sup> It revealed that in the majority of cases the head of the household was over 60 years old, that there was a high and growing proportion of single-person households, and that more than 47% of all the householders were unemployed.



**Fig. 2. Monthly incomes of evacuees outside the area**

Source: Tokyo “Results of survey for evacuees from Fukushima Prefecture, for which the provision of temporary housing was ended at the end of March 2017,” October 11, 2017.

The Tokyo Metropolitan Government also conducted a survey of evacuees whose provision of housing ended in March 2017.<sup>7</sup> It showed that 22% of households had a monthly income of 100,000 yen or less, and for the majority of households it was 200,000 yen or less (**Fig. 2**), which in Tokyo would mean living with significant economic hardship. Additionally, 16.5% of evacuee respondents said that they had no one to contact or from whom they seek advice day to day.

As part of a review by Niigata Prefecture regarding the nuclear accident, Associate Prof. Wakana Takahashi of Utsunomiya University conducted a study based on statements in a lawsuit seeking compensation for the nuclear accident, from all 237 households of the plaintiffs who had evacuated to Niigata Prefecture.<sup>8</sup> The study found that living in prolonged evacuation conditions, people were having a difficult time, with more than 70% voicing feelings of “sadness and internal struggles over losing their hometown.” Among the evacuees who were from outside the official evacuation areas, 78.7% cited economic hardships. More than 60% of those evacuees cited “transportation expenses for meeting/visiting” and “increased food and utilities expenses associated with maintaining two households” as reasons for the increased economic hardship.

The review by Niigata Prefecture also made the following observations:<sup>9</sup>

<sup>6</sup> Tokyo Metropolitan Government, “Results of sixth survey of evacuees in Tokyo metropolitan area,” May 2017. Survey period Feb 16 to Mar 10 (2017), total 837 responses (41.4% response rate).

<sup>7</sup> Tokyo Metropolitan Government “Results of survey of evacuees from Fukushima Prefecture for whom the provision of temporary housing ended at end of March 2017,” Oct. 11, 2017. Target was households who could be reached by postal mail, among 570 households who had left their temporary housing, among evacuees from Fukushima Prefecture whose provision of temporary housing ended by the end of March 2017 (629 families lived in the temporary housing provided by the city as of April 1, 2016). Total 172 responses (response rate: 30.2%).

<sup>8</sup> Documents from fifth meeting of Niigata Prefecture review committee (livelihood subcommittee) on health and livelihood impacts of nuclear plant accident (Dec. 27, 2018).

<sup>9</sup> Documents from second meeting of Niigata Prefecture review committee (livelihood subcommittee) on health and livelihood impacts of nuclear plant accident (Dec. 23, 2018). Survey of 1,174 households and heads of households who evacuated to Niigata Prefecture and are there now, or evacuated there but are

- The evacuation is resulting in smaller household sizes (number of members). Single- and two-person households increased (from 32.4% before disaster to 50.2% at time of survey), and three-person or more households decreased (from 67.5% to 49.9%).
- The number of three-generation households has also decreased sharply (from 15.3% to 6.4%), and families have been dispersed as a result of the evacuation process.
- Evacuation has reduced regular employment, self-employment and family employment, and increased non-regular employment including part-time work, as well as unemployment.
- As a result of evacuation, the monthly average household income decreased by 105,000 yen (from 367,000 yen before evacuation to 262,000 yen at time of survey).
- Many evacuees are feeling isolated as a result of a weakening of the human connections they once had through long-term relationships, friends and acquaintances, and weaker connections with their neighborhoods and communities.

Yamagata Prefecture has been conducting an ongoing survey of people who evacuated to live there. In the October 2012 survey, nearly 40% were mother and child evacuees. A survey in July 2018 found that the number of mother and child households had decreased, but still accounted for 20%.<sup>10</sup> The reasons for continuing the evacuation included “concern about the impacts of radiation” (43.5%), and having trouble due to lack of funds to cover the cost of living (64%).

The three surveys cited here tell of the difficulties faced by evacuees due to financial hardships and mental suffering. One would expect the Reconstruction Agency to be investigating the situation of all evacuees and taking steps to address problems, but the Reconstruction Agency is not surveying their situation at all.

### Evacuees call for help

The *Hinan no Kyodo Center* (Cooperation Center for 3.11) is a support center for evacuees in Tokyo, and FoE Japan serves as its secretariat. It has received many inquiries from evacuees facing difficulties and seeking advice. Many of their inquiries relate to housing and to life in general. Below are some examples:

- Evacuees cannot afford the rent for housing, even if they move to a cheaper place.
- An evacuee wanted to move into public housing provided by the local government, but gave up because of overly strict criteria.
- A mother and child evacuated together, but divorce mediation is underway, and one partner is receiving sick pay and being treated for illness. Normally, both partners’ income is included in income calculations until the divorce is finalized. As a result, the “household” income exceeds income criteria, so the mother could no receive a rent subsidy.
- Living conditions are getting worse and the family is finding it difficult to pay the rent. They have run out of money.
- An evacuee applied for welfare but was rejected for various reasons (having living arrangements in both Tokyo and Fukushima, owning a car to care for parents in Fukushima, cannot move due to concerns the children may be bullied in the new location, etc.).

The government’s policy of discontinuing support for evacuees not only forces evacuees further into economic hardship, but also conveys an implicit message that the nuclear disaster is

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<sup>10</sup> currently living in another prefecture, plus another 192 adults and 122 junior and high school students. September 2018, Survey of evacuees (Evacuee Support Team, Yamagata Prefecture Wide Area Assistance Headquarters).

over, so evacuees should be able to stop relying on assistance. As a result, the community is less understanding and supportive, and this all puts additional strain on evacuees.

### New assistance schemes needed for evacuees

The Act on Assistance for Children and Nuclear Disaster Victims, which entered into force in 2012, specifies that the national government will provide adequate assistance to victims who have made the decision to stay, evacuate and or return. Article 9 of the Act specifies that the government is to secure their housing. The basic policy for implementation of the Act adopted in October 2013, including a clause about facilitating entry into public housing, which stipulated that income and hardship criteria be relaxed so that evacuees could enter public housing units. However, the concrete measures are left up to the municipalities to deal with. And as indicated above, evacuees can fall through the cracks and end up with serious hardships and in dire situations.

The government has been strongly promoting national nuclear energy policies, so it should also be responsible for putting in place solid legislation, programs, and implementation structures to assist evacuees.

#### FoE Japan: Challenging the 20 millisievert threshold

In April 2011, the national government issued a notice that facilities such as school grounds were acceptable for use if the annual radiation exposure levels were below 20 millisieverts (mSv). However, this is 20 times the internationally recommended value of one mSv annual exposure limit for the public.

FoE Japan campaigned with parents in Fukushima and citizen groups to have the government cancel the 20 mSv standard. On May 23 that year, under the pressure of the parents and general public that surrounded the Ministry of Education, Culture, Sports, Science and Technology, the government announced it would “aim for” one mSv annual exposure, but left the annual 20 mSv criterion in place for evacuation and return.



#### Advocating for the rights of evacuees

Advocating for the rights of compensation for evacuees from outside of evacuation areas (so-called “voluntary” evacuees). FoE Japan compiled demands made by the evacuees and presented them to a government council. We also carried out surveys of the status of contamination and as well as surveys of the wellbeing of evacuees.



These efforts bore fruit. Evacuees were able to get their messages to the council, and the government acknowledged the “reasonableness” of evacuation by evacuees. And compensation was put in place, although limited in scope.



Additionally, with residents, FoE Japan also advocated for the government to designate “evacuation optional areas” (where people could receive compensation even if it was their choice to evacuate), but unfortunately those efforts did not succeed.

### **Supporting Minamisoma residents who sued the government**

In December 2014, the government canceled all Specific Locations Recommended for Evacuation (*tokutei hinann kansho chiten*) in Minamisoma. The government asserted that the cumulative annual exposure dose would be less than 20 millisieverts, and subsequently discontinued assistance and compensation for evacuees there. A group of 808 residents filed a lawsuit against the government on the grounds that its actions were illegal. FoE Japan launched a support group to support the plaintiffs.



### **Opposing the end of housing provision**

After Fukushima Prefecture announced it would stop providing housing to evacuees at the end of March 2017, together with the evacuees, we made repeated requests to the national government and Fukushima Prefecture, and worked to make the story more prominent through the media. Through the *Genpatsu Jiko Hinansha no Kyosai o Motomeru Zenkoku Undo* (National Campaign for Relief of Nuclear Accident Victims) we implored the government to cancel its plans to withdraw housing assistance for evacuees, and submitted a petition of over 300,000 signatures to the national Diet.

### ***Hinan no Kyodo Center* (Cooperation Center for 3.11)**

This center was established in July 2016. Activities include providing consultation services for evacuees, collaboration with local governments, and advocacy targeting the government. FoE Japan has been serving as the secretariat for the center since May 2017.

## Hidden thyroid cancer in children

According to data for the period up to December 2018 released by the Fukushima Health Management Survey Review Committee, 206 children who were 18 or younger at the time of the Fukushima accident were diagnosed with or suspected of having malignant thyroid cancer. Surgery confirmed it in 164 of them. In addition, at least 11 children underwent surgery or treatment for thyroid cancer at the Fukushima Medical University. An additional 233

**Table 3. Children with thyroid cancer (aged 18 and under living in Fukushima Prefecture at time of accident)**

Screening round	Target vs actual examinees	Confirmed or suspected cases	Confirmed by surgery
1st (2011-2013)	Target 367,672 Actual 300,476 (Ratio 81.7%)	115	101
2nd (2014-2015)	Target 381,244 Actual 270,544 (Ratio 71.0%)	71	52
3rd (2016-)	Target 336,669 Actual 217,526 (Ratio 64.6%)	18	13
Exam when turning 25 years old	Target 22,653 Actual 1,901 (Ratio 8.9%)	2	-
<b>Total</b>		<b>206</b>	<b>164</b>

persons were receiving support services for patients undergoing treatment who were found to have thyroid cancer through the FHMS. All of this suggests that many people are missing from the official numbers announced by the Fukushima Health Management Survey Review Committee.

Source: Prepared by FoE Japan from reports by the Fukushima Health Management Survey Review Committee. statistics to December 2018.

### **Lymph node metastasis, extrathyroidal invasion, remote metastasis, etc.**

Initially, the fact that many thyroid cancer cases were identified was blamed on the “screening effect.”<sup>11</sup> It was the National Cancer Center Japan that estimated that there were 2.0 persons with thyroid cancer under the age of 18 in Fukushima Prefecture as of 2010. Dr. Shoichiro Tsugane, head of the Center for Public Health Science of the National Cancer Center, pointed out that the number of cases of children with thyroid cancer in Fukushima was about 60 times that estimate (as of November 2014). Regarding the first screening, the Fukushima Health Management Survey Review Committee interim report stated this: “The number of detected cases is dozens of times more than the number of thyroid cancer cases estimated by the national government’s regionally registered cancer morbidity statistics.” Despite this, the committee also wrote that “it is difficult to consider this to be an impact of the accident.”

Some experts claim that the discovery of many thyroid cancer cases is due to “over diagnosis,” which means cancer diagnosis that is not life-threatening or has no symptoms. However, the actual cases are serious. According to data prepared by Prof. Shinichi Suzuki of Fukushima Medical University published on August 31, 2014, 72 out of 96 children who underwent surgery had lymph node metastasis, while 92% of cases had lymph node metastasis, extrathyroidal invasion, or remote metastasis. Head of thyroid cancer testing, Prof. Suzuki, said that said of patients who went through surgery, “clinically-speaking, most of those who clearly had hoarse voices already had lymph node metastasis” and it “was not something that could be left untreated.”

<sup>11</sup> The screening effect occurs when a mass screening identifies more cases of potential illness than in cases where noticeable symptoms are examined and diagnosed as being present.

## Severe cases also found outside Fukushima Prefecture



Children with severe cases of thyroid cancer have also been found outside of Fukushima Prefecture. Since December 2016, the *3-11 Kojosengan Kodomo Kikin* (3.11 Fund for Children with Thyroid Cancer, President: Hisako Sakiyama) has supported medical treatment expenses for patients living in Tokyo and 15 prefectures in eastern Japan who were aged 18 years or under at the time of the accident. As of

December 2018, 140 patients had received assistance (93 in Fukushima, 47 outside). Recipients include cases of recurrence and repeat surgery, and metastasis to the lungs. Dr. Sakiyama commented, “There is talk of plans to reduce screening but looking at the situation, it’s the opposite we need. It should be expanded and enhanced, and a greater effort should be made for earlier detection and treatment.”

## Initial exposure not fully reported

An independent investigation by the *Tokyo Shimbun* newspaper revealed that an 11-year-old girl in Futaba-cho had been identified with a cumulative exposure of an estimated 100 millisieverts to the thyroid immediately after the nuclear accident.<sup>12</sup> The national government had not made this public. From March 24 to 30, 2011, the Nuclear Emergency Response Headquarters did thyroid exams on 1,080 children in Iitate, Kawamata, and Iwaki. Since all were below 100 millisieverts, no further measurements were made. Regarding the residents in areas under evacuation orders, the government said it did not take thyroid measurements, with the excuse that “they evacuated, so they were not exposed.”

As for body surface contamination testing of evacuees from the nuclear accident, the decontamination standard was raised from 13,000 to 100,000 counts per minute (cpm)<sup>13</sup> on March 14 “because of a shortage of water for decontamination” and “to facilitate evacuation.” Apparently, no accurate records were kept regarding body surface contamination exams of evacuees, and evacuees themselves have no such records, but some evacuees claim that their measurements exceeded 100,000 cpm.

As such, even though there appears to have been no clear assessment of initial exposure, the authorities quickly concluded there was “no impact on health.” So here we are today without adequate radiation protection measures or other actions having been taken.

### **“3.11 Fund for Children with Thyroid Cancer” continues direct support for patients**

FoE Japan has worked along with experts and civic organizations, compiling information and conducting advocacy on radiation exposure and health management. The government continues to claim that the impacts of radiation from the nuclear disaster are so minor that they are hard to distinguish from other causes. FoE Japan held meetings repeatedly with many of those striving to make a change and work on this issue, which led to establishing the 3.11 Fund for Children with Thyroid Cancer, in July 2016. The main purpose is to support those in need (i.e., children with thyroid cancer) and to research and monitor the health impacts of the nuclear accident. The fund continues to support patients suffering from thyroid cancer.

<sup>12</sup> *Tokyo Shimbun*, “11 year old girl had 11 mSv exposure immediately after Fukushima accident: Report by National Institute of Radiological Sciences” (morning edition, January 21, 2019)

<sup>13</sup> Unit of measurement of radiation per minute detected by detector, indicating the quantity of radioactive materials present.

## Recreation and recuperation for evacuees still needed

Since the Fukushima Daiichi nuclear accident, various groups have been offering children places to rest and recuperate in areas where they are safer from radioactive contamination. As they live day to day in a situation of rumors and myths about radiation safety, many people are still concerned about living with radiation pollution, so there is still a significant need for opportunities like this, even eight years after the accident.

### Actual situation in Japan

A number of recreational programs have been implemented by citizens' organizations since the nuclear accident. "Refresh Support" and the *311 Ukeire Zenkoku Kyogikai* (311 Japan Nuclear Disaster Aid Association) surveyed 234 groups providing recuperation/recreation opportunities nationwide, and here are their main findings:<sup>14</sup>

- 69% of the groups offering retreat programs are volunteer organizations. 71% of their revenues were by donation. However, donations are declining year by year.
- The average number of participants per retreat program was 27.2 and the average length of stay was 5.3 days. A total of 107 groups received over 9,000 people. The average hosting cost was 70,391 yen per person per stay, including direct and indirect expenses.
- The main problems facing host groups were "insufficient funds for activities," followed by "shortage of staff."

The fiscal 2013 budget was 330 million yen for the "Support Program for Encouraging Nature Experiences and Exchange Activities for Fukushima Children," which was included in the basic policy of the "Act on Assistance for Children and Nuclear Disaster Victims." But this was reduced to 170 million yen in fiscal 2017. In addition, the program has high hurdles for application requirements, such as a minimum of 6 nights and 7 days, as well as being a group from Fukushima Prefecture. Less than 3% of the program funds went to groups outside the prefecture.

### Comparison with Chernobyl

More than thirty years have passed since the Chernobyl accident, but up to the age of 18 years, children from the contaminated areas of Belarus and Ukraine still have the right to participate in a three-week retreat. It has been reported that in 2010, 100,000 of 150,000 eligible children in Belarus, participated in the retreats, while 50,000 of 150,000 eligible children in the Ukraine participated.

In Ukraine the retreats are implemented as a national policy, and experts and young university graduates in education are hired to take care of children. A governmental "retreat agency" serves as a public entity that conducts needs-assessment surveys in different regions to identify retreat facility needs, then decides on program details and numbers of people, and manages the bidding process for services. In contrast, in Japan the system is based on citizen groups operating on a shoestring budget.

### The need to provide healthy retreats as a national policy

The national and prefectural governments are encouraging evacuees to return. Many people have

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<sup>14</sup> Report by the two groups indicated, entitled "Report of survey of status of recuperation after the nuclear accident" (July 2016). The survey was conducted 1-Nov-2014 to 31-Oct-2015.

no choice but to return to their home towns despite having many concerns about their own safety. FoE Japan receives many inquiries about the retreat program. We also receive requests from mothers of young children and from other residents who were not able to evacuate but have already experienced a recuperative retreat and would like to continue. Meanwhile, many groups that were offering retreat programs have been forced to shrink or close due to growing financial and personnel strain. All of this points to a growing need for the government to make recuperation retreat programs part of a national policy as a concrete measure to reduce radiation exposure.

### FoE Japan: “Fukushima Poka Poka Project”



While the children are free to play, mothers can gather at these places of retreat to talk about their concerns.

Immediately after the nuclear accident, FoE Japan began calling on the Japanese government to create “evacuation optional areas” where if the public faces annual radiation exposure of one millisievert or more people will receive assistance and compensation regardless of whether they choose to stay or evacuate.

However, the government refused to change its stance that evacuation is unnecessary in areas where annual exposure would be 20 millisieverts or less. As a result, many people who wanted to evacuate but could not do so for various reasons were left behind. FoE Japan, with other organizations, launched a weekend retreat program called the “Fukushima Poka Poka Project” (*poka poka* means “warm”) in January 2012.

Starting in April 2013 we began offering 7 to 10 programs a year in Inawashiro (relatively low dose area in Fukushima), a mountain resort town and a longer ocean-side retreat in Minamiboso, Chiba. From 2013 to the end of 2018 a cumulative 1,591 people participated. Starting in January 2015, FoE Japan took over the lease of a former recreational lodge in Inawashiro and named it the “Poka Poka House.” The facilities have been used for nature watching, lectures on renewable energy, study sessions given by local medical doctors, and as a platform for parents to engage in dialogue.



High school students depart for Germany

Today, children who participated previously in the Poka Poka Project have returned as high school student volunteers. In April 2016, some of them participated in an exchange with German and Belarusian students in Germany, making Poka Poka House a place for children to build the “strength to live” and broaden their horizons. A new program began in August 2018 with participants themselves planning and running activities. Overall this has all evolved into a participative program with participants themselves organizing activities, and cooperation from groups of friends and mothers of repeat participants.

The annual budget for the Fukushima Poka Poka Project is about 5 million yen, including maintenance costs for the “Poka Poka House,” which receives a cumulative total of about 250 people each year. The proximity of the facilities and food support from west Japan helps us operate on a relatively low budget.

## What should be done with radioactive soil and materials?

### Government wants to “re-use” contaminated soil – in public works projects

A committee under the Ministry of the Environment (MOE) developed a policy in early 2016 that would allow soil generated from decontamination work to be utilized in public works projects and as fill in farming areas all over Japan if the soil has a radiation level lower than 8,000 Bq/kg (Investigative Committee on Strategy for Technological Innovation for Reducing and Recycling Temporarily Stored Contaminated Soil).<sup>15</sup> The aim of this policy is to reduce the total volume and recycle soil and waste from decontamination work, estimated at up to 22 million cubic meters from within Fukushima Prefecture. The current plan is to store decontamination waste for up to 30 years at temporary storage sites proposed to be built near the Fukuoka Daiichi Nuclear Power Plant. After that, the waste is to be transported to sites outside the prefecture for “final disposal.” However, it has proven difficult to secure any disposal locations, so the MOE deems it crucial to reduce the volume of waste.

Regulations under the Nuclear Reactor Regulation Act originally specified that waste containing 100 Bq/kg or more of radiation (cesium equivalent) was to be considered “radioactive waste” and to be controlled onsite at nuclear facilities. The revised policy of the MOE would allow radioactive waste 80 times that level to be used in public works projects.

This double standard dates back to the 2011 Act of Special Measures concerning the Handling of Pollution by Radioactive Materials. With its enactment, waste containing up to 8,000 Bq/kg of radiation could be disposed in the same way as general (municipal) waste.

Examples of public works include the construction of roads, tidal embankments, seaside protection forests, and reclamation of land and water areas. The idea is that soil and materials would be used as structural material.

However, there have been many cases of problems such as leakage of pollution into the surrounding environment, even at managed disposal sites with supposedly water-impermeable designs. If these materials are used in public works, there are concerns that they may end up being used without making the sites water-impermeable. Moreover, there are concerns about possible collapse and leakage in the event of disasters such as floods, earthquakes and tsunamis.

### Nihonmatsu community fights back



The MOE was planning a demonstration project to use soil generated from decontamination work for roadbeds of farm roads in Nihonmatsu City, Fukushima Prefecture. But the citizens of Nihonmatsu opposed it several reasons. Despite the fact that only a portion of the affected population had participated in briefing sessions, the proposal was

Farm roads where the government plans to use soil from decontamination work

<sup>15</sup> Bq (becquerel) is a unit of radiation emissions per second. The amount of radiation is proportional to the amount of material; therefore, amounts expressed in becquerels are seen as representing the quantity of a radioactive substance present.

deemed to have been “accepted” by the local community. The government’s original commitment was to transport decontamination soil away from temporary storage areas. However, using it to build farm roads would effectively mean the final disposal will be right there. This has caused the public to be gravely concerned about the spread of radioactive substances.

The new plan was to excavate some 200 meters of farm roads in the Harase Saiki district of Nihonmatsu, take 500 bags of decontamination soil now stored at a temporary storage site, spread it out as roadbed material, and cover it with about 50 centimeters of covering soil. In February 2018, local citizen groups submitted a request to MOE to completely cancel the plan. In April, they set up a “STOP contaminated soil reuse” banner and distributed 20,000 leaflets door to door. The grassroots campaign was also covered in the media by NHK Fukushima. In May, there was a move to cancel transactions of fermented animal feed that would be produced near the proposed demonstration project, which made people aware of the serious consequences of the project. Local residents also participated in negotiations with the MOE organized by FoE Japan in Tokyo. Due to the opposition, the MOE indicated its intentions to effectively cancel the plan in June 2018.

### Demonstration project in Iitate (Nagadoro) and Minamisoma (Odaka)

A demonstration project using decontaminated soil to create farmland is underway in the Nagadoro District of Iitate Village. The plan is to take 30,000 bags (a cubic meter each) of decontamination soil being stored in the village, transport them to a stockyard in the Nagadoro administrative area, open the bags in the soil recycling facility to obtain the required volume of material, remove foreign matter, separate the soil based on radioactive concentrations, and utilize soil with radioactive concentrations below 5,000 Bq/kg as filler to raise the elevation of farmland along the Hiso River (Hisokawa). It is then to be covered with 50 centimeters of soil, and then horticultural crops and “resource crops” would be grown on it. Initially, 0.1 hectares of farmland would be created, but the scale would later be expanded to 34 hectares. This would be implemented as part of the plans for the Iitate “zone designated for reconstruction and recovery,” but residents feel they were given no opportunity to reject these plans, including the so-called “decontamination” going on around their homes.



Community meeting of group opposing the use of decontamination soil in Odaka Ward (Minamisoma City)

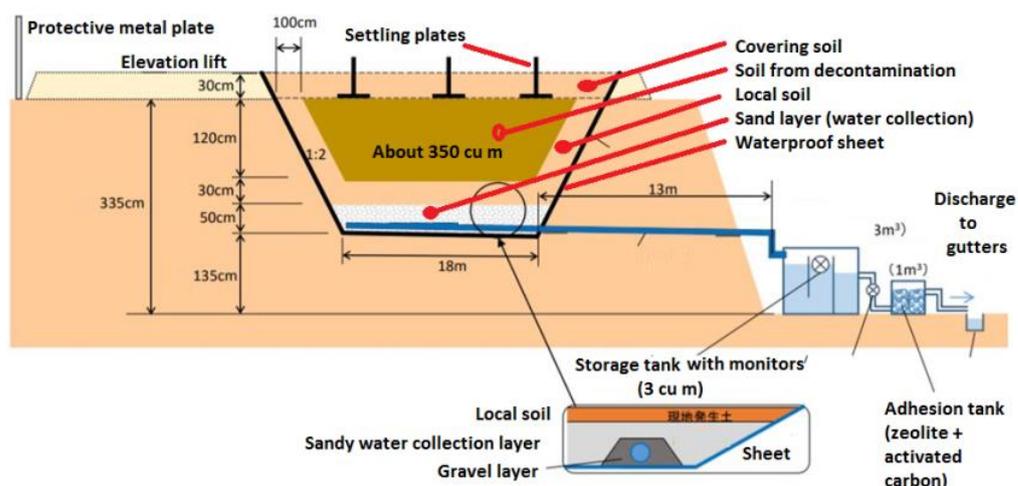
Meanwhile, in Minamisoma the government is promoting a plan to reuse soil from decontamination work in a road widening project on the Joban Expressway in the Odaka Ward. On February 1, 2019, local residents formed an opposition group. A representative of one of the local communities explained why they are opposed: “The government’s original commitment was to transport decontamination soil away from temporary storage sites to intermediate storage facilities within three to five years. Eight years have now gone by but the commitment has not been honored. The government says this is just a ‘demonstration,’ but we are concerned that once the approach is used once, decontamination soil will end up being placed here permanently.”

### What about final disposal outside Fukushima Prefecture?

The MOE is currently conducting demonstration projects in Tochigi Prefecture (Nasu Town) and Ibaraki Prefecture (Tokai Village) to landfill 330,000 cubic meters of decontamination soil from so-called Intensive Contamination Survey Areas (ICSAs) outside Fukushima Prefecture. Based on findings, the MOE intends to formulate enforcement ordinances and guidelines under the Act on Special Measures Concerning the Handling of Radioactive Pollution.

In Nasu, a demonstration project that began in September 2018 involved the removal of about 350 cubic meters of decontamination soil from bags that were being stored below ground at what was formerly a tennis court in the Iohno Sanson Square, and re-burying it. It would be covered with 30 centimeters of soil, and the decontamination soil would be above a water-collecting sand layer, which would be above a waterproof sheet. Leachate would then be collected and tested. It would be treated with a process using zeolite and activated carbon and then discharged into a gutter.

Fig. 3. Cross-section of demonstration project in Nasu Town (Tochigi Pref.)



Source: Ministry of Environment website

The MOE has set a median value for radioactive cesium in decontamination soil to go out of Fukushima Prefecture at 800 Bq/kg and 95% must be at 2,500 Bq/kg or less, but the amount of cesium in the soil to be actually reclaimed is unknown at this stage. The community is opposed, as it has not been made clear who will manage what, and what kind of monitoring system there will be after the demonstration project.

### Plans to landfill radioactive waste by Tenryu River, Miyadamura (Nagano Pref.)

Under the 2011 Act of Special Measures concerning the Handling of Pollution by Radioactive Materials, upon an written application submitted by a party that possesses such wastes, the Minister of Environment will classify it as “designated waste” if it has 8,000 Bq/kg or greater radioactive contamination, and disposal becomes the government’s responsibility. Any waste below 8,000 Bq/kg can be handled as general waste.

A private firm plans to build a final landfill site near the Tenryu River in Miyadamura, Nagano Prefecture for industrial waste. This includes radioactive waste. It is envisaged that the waste would be hauled to the proposed landfill site from the Kanto region (which contains seven prefectures, including Tochigi and Ibaraki Prefectures).

The proposed site sits close to the confluence of Tenryu River and Otagiri River, on an alluvial fan terrain where waters from surrounding mountains meet. The area is also abundant in groundwater.

The local community has collected more than 100,000 signatures to oppose the plan, saying “The project could adversely affect not only local agriculture, sightseeing and the economy but also the wellbeing and health of the residents living in the Tenryu River region.” They have also alerted residents more broadly about the plan, and nine local governments in Kami Ina County and Shimo Ina County have adopted statements opposing the spread of radioactive waste and contaminated soil.



Site of planned processing plant in Miyada Village, Nagano Pref.

### **FoE Japan: Calling for legislation to prevent radioactive pollution**

FoE Japan has been doing on-site studies, interviewing residents, and spreading information on issues about demonstration projects intending to use recycled soil from decontamination work. On the belief that contaminated soil should be centrally managed, we have been collecting signatures calling on the government to cancel plans to reuse soil from decontamination work. So far, we have submitted 43,000 signatures to the Ministry of Environment and negotiated seven times with the Nuclear Regulation Authority (under the Ministry of Environment).



We gathered 43,000 signatures opposed to the reuse of contaminated soil

In order to classify radioactive materials as a pollutant and to regulate them in the same way as other pollutants, we organized a seminar led by lawyer Yukio Yamamoto from Sapporo, who has proposed a Radioactive Pollution Control Act. Through cooperation with citizens' groups who are conducting similar efforts in Okayama Prefecture and Chiba Prefecture, we are working to raise public interest and support.

## Ocean discharge of treated (but still contaminated) water

Many tanks sit at the site of the Fukushima Daiichi Nuclear Power Plant, filled with water that has been processed by the so-called Advanced Liquid Processing System (ALPS, also described as a multi-nuclide removal system). The system treats a mix of cooling water from fuel debris as well as groundwater that has flowed into the reactor and turbine structures. At the time of writing, already more than a million cubic meters of treated water were being stored in about 1,000 tanks.

The Ministry of Economy, Trade and Industry (METI) held briefings and public hearings on the disposal of ALPS treated water on August 30 and 31, 2018, in Tomioka and Koriyama (both in Fukushima) and Tokyo. Documents distributed there stated that the tanks contained 1,000 trillion Bq of tritium. METI claimed that most radioactive substances other than tritium had been removed from the water, and presented five proposals to dispose of it. One proposal was to release it into the sea. The documents claimed that tritium only emits weak radiation, exists in nature, does not bio-concentrate, and is emitted from nuclear power plants all over the world.

### Water in most tanks contains radioactive substances other than tritium

Prior to the public hearings, *Kyodo News* broke the story that nuclides other than tritium were detected in the treated water at concentrations that exceeded regulated standards.<sup>16</sup> More media outlets then covered the story. With regard to iodine-129, as far as FoE Japan was able to confirm from data disclosed on TEPCO's website that concentrations exceeded standards in 65 out of 143 samples between April 2017 and July 2018. At the public hearing the documents used at that time presented old data for the period September 20 to 28, 2014, when standards were not being exceeded. However, TEPCCO announced after the public hearings that 85% of the tank water exceeded standards.<sup>17</sup>

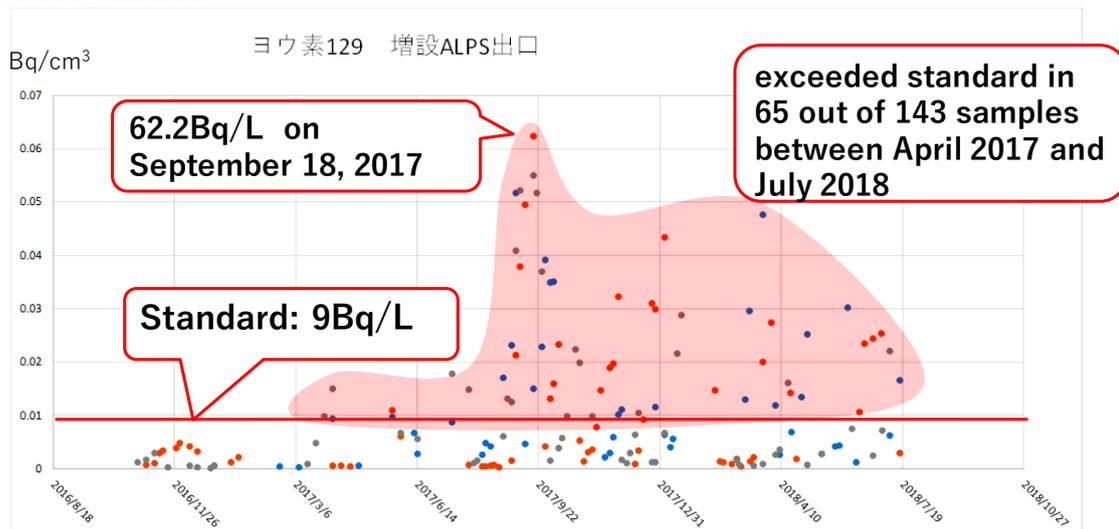


Fig.4 I- 129 concentration at the exits of the ALPS

<sup>16</sup> Kyodo News, August 19, 2018, “Radioactive substances other than tritium detected at above regulated levels in Fukushima, including nuclides with long half-life” (in Japanese).

<sup>17</sup> According to Document 3 of the Subcommittee on handling of treated water including from multi-nuclide removal equipment (10th meeting, 3-Oct-2018), for the total of 62 nuclides, 85% of the water exceeded standards.

## 42 of 44 speakers opposed discharge to the sea

At the hearings held at three venues, 42 out of 44 speakers stated clearly that they opposed ocean discharge. Most poignantly, speakers from the fishing industry, including Tetsu Nozaki, head of the Fukushima Prefectural Federation of Fisheries Co-operative Associations spoke about the devastating impacts the marine discharge would have on the fisheries which had been revived so painstakingly. Many speakers pointed out the dangers of tritium and said it should be stored in tanks long term. Here are key issues raised at the hearings:

- The government should consider proposals for long-term storage in large tanks.
- There has been a failure to consider total discharge volume controls and cumulative impacts.
- The annual control target value for tritium discharge before the Fukushima Daiichi accident was 22 trillion Bq, but the ocean release proposal surpasses that amount.
- The risks (bioaccumulation, internal exposure, uptake into DNA) of organically bound tritium have not been sufficiently studied and explained
- This will become an international issue. It may be in conflict with the intent of the London Convention (Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972).

After the hearing, Mr. Yamamoto, chair of METI's treated water subcommittee, stated that they would add "tank storage" as an alternative plan. People are watching closely to see what happens next.



Citizens protest against proposed tritium release

## Who ultimately pays the price of a nuclear accident?

### Amended Act on Compensation for Nuclear Damage

The amended Act on Compensation for Nuclear Damage was passed in the National Diet on December 5, 2018. Despite calls for major revisions, fundamental problems were not resolved. Provisions were kept in place to protect nuclear operators and shareholders, banks and manufacturers. The burden of compensation for the Fukushima Daiichi nuclear accident was shifted onto the public in order to avoid a TEPCO bankruptcy, and the same mechanism can be applied in the future as well. Here are six main problems with the amended Act.

#### (1) Amount of compensation completely inadequate

Article 6 of the Compensation Act states that “A nuclear operator shall not operate a nuclear reactor unless it has taken measures to compensate for nuclear damage,” and Article 7 states that this amount should be 120 billion yen. The operator is to secure compensation in case of an accident with two types of insurance: nuclear liability insurance and nuclear indemnity agreements. The compensation to victims in the Fukushima Daiichi accident is 8 trillion yen, and the decontamination costs are 6 trillion yen, so the estimated total required for compensation amounts to 14 trillion yen.<sup>18</sup> It is clear to everyone that the current compensation amount of 120 billion as indicated in the Compensation Act is only one-hundredth or less of what is required. That is completely inadequate. Despite this, this amount has been maintained in the Act. The excuse given is that the insurance market cannot underwrite more than that. In other words, the insurance market has determined that the risk of nuclear power is too great. It is our view that if that is the case, nuclear plants should not operate.

#### (2) “Unlimited liability” and “no-fault liability” stay in Act (but seriously watered down)

The Federation of Electric Power Companies of Japan and other parties were calling for review and changes to the conventional “unlimited liability” (no limit set on compensation owed by nuclear operators) and “no fault liability” (nuclear operators are liable whether or not they are at fault), but unsurprisingly these were left unchanged. However, as described below, the “unlimited liability” was effectively watered down.

#### (3) Who are the protected ones? (Nuclear operators, shareholders, banks)

The government established the Nuclear Damage Compensation and Decommissioning Facilitation Corporation in 2011 to avoid the bankruptcy of TEPCO. It is a framework to pay TEPCO from government bonds, government-backed loans, and contributions from other utilities, etc. (Fig. 5).

TEPCO is exempted from legal restructuring, and the management, shareholders and banks lending to TEPCO bear no responsibility. Of the compensation funds issued through the Corporation, TEPCO only bears only 25.5 to 45.1%,<sup>19</sup> and the remainder is borne by the people of Japan. The interest costs are estimated at 143.9 to 218.2 billion yen, and this is borne by the government.<sup>20</sup>

Article 16 of the Compensation Act states that if the damage exceeds the stated compensation amount, the government “provides the nuclear operator with the necessary support for the nuclear operator to compensate for the damage,” and this is the basis for the establishment of the Corporation. However, if the government provides assistance while the responsibilities of nuclear

<sup>18</sup> Report of the METI 1F Committee on TEPCO Reform, December 20, 2016.

<sup>19</sup> Board of Audit of Japan, “Report on results of audit on the state of implementation of government support relating to compensation for the nuclear damage concerning TEPCO” (March 2018).

<sup>20</sup> Ibid.

operators are obscured, the management, shareholders and creditors of nuclear operators will not be held liable.

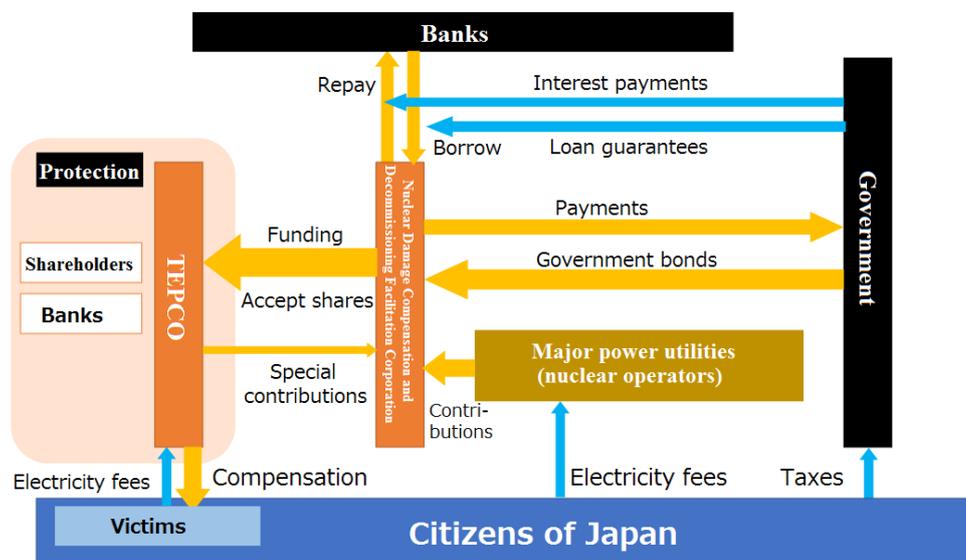


Fig. 5. Funds flowing to TEPCO via the Nuclear Damage Compensation and Decommissioning Facilitation Corporation (prepared by FoE Japan)

#### (4) Is nuclear power “sound” development?

Article 1 of the Compensation Act states that its “purpose is to protect persons suffering from nuclear damage and contribute to the sound development of the nuclear industry.” However, it is strange to think that protection for victims and sound development of the nuclear industry should be given equal treatment. The purpose *should be to protect victims*.

#### (5) Need to fix the Dispute Reconciliation Committee for Nuclear Damage Compensation

Even though TEPCO promises to respect proposed settlements by Alternative Dispute Resolution (ADR), the fact is that it has rejected ADR settlement proposals over and over again. In an ADR class action case of 15,700 residents of Namie Town (filed January 31, 2013, closed on April 5, 2018), TEPCO rejected settlement proposals six times. By October 2018, over 900 of the applicants in the case had died, including the elderly. Unless the proposed settlement is obviously unreasonable, the nuclear operator should be obliged to accept it.

#### (6) Mandatory preparation and publication of compensation implementation policies

Under the amended Act, a nuclear operator is required to prepare and publish a policy on the implementation of compensation (Article 17-2). However, no details are provided, and there is no consideration of adequacy of the policies. The Act should include provisions stipulating that third parties must check the contents of the policies and that no nuclear plant should be operated if the policies are inadequate.

#### FoE Japan activities

FoE Japan held meetings with the government to review the Compensation Act, provided input on problems with the draft text, held public seminars, and encouraged citizens to submit public comments to the government.

We were invited to provide input to parliamentary meetings, and provided comments regarding the various problems of the Act based on our knowledge of the actual situation facing victims of the Fukushima Daiichi nuclear accident.



## Our money being used to restart Tokai No. 2 NPP

### Why are we restarting old and damaged nuclear plants?

In September 2018, the Nuclear Regulation Authority approved a screening report saying that the Tokai No. 2 Nuclear Power Plant (Japan Atomic Power Co.) was in compliance with new regulatory standards, and issued a permit to change facilities. In October it issued a construction plan approval, and in November an operation extension approval for at least 40 more years of operation.

Tokai No. 2 is an aged nuclear power plant that has been in operation for over 40 years. Even if replaceable parts are replaced, risks increase with time. The “40-year rule”—that a nuclear power plant cannot be operated past 40 years unless it is in exceptionally good condition—was abruptly watered down.

Tokai No. 2 was damaged by the Tohoku earthquake and tsunami in 2011. For more than three days after the loss of external power due to the tsunami, it was effectively in cold shutdown and has not operated since then. A comprehensive verification of damage has not yet been done.

Not a single reactor has operated at a nuclear power plant in East Japan since the March 2011 disaster, but still the power supply has been stable. In 2018, Japan was hit by a record heat wave. Even with heavy demand for air conditioning, the government made no public appeals to conserve electricity. In conclusion, there is no good reason to restart aging or damaged nuclear power plants.

### Problem-riddled safety measures at Tokai No. 2

There are many concerns about safety measures. Here are some of them:

- Of approximately 1,400 km of cables, only a portion are currently or will be replaced with fire retardant cables in the future.
- The containment vessel of Tokai No. 2 is the MARK II design, which comes with the risk of a steam explosion if core melting occurs in the event of an accident. But for the safety screening it was assumed there was a low likelihood of that occurring, so it was deemed to be acceptable to ignore. Thus, that risk has not even been taken into account.
- When Mount Akagi erupts, up to 50 cm of volcanic ash could fall. There are concerns about insufficient strength of reactor buildings and the possible clogging of the diesel generators that would have to supply emergency power.
- The emergency response center does not have a seismic isolation structure.
- The Tokai Reprocessing Plant (currently in the process of being decommissioned) is storing high-level radioactive liquid waste and other materials, in the vicinity. But there has been no consideration of responses there in the event of an accident at Tokai No. 2.

### Big utilities pay a fortune to Japan Atomic Power, get zero electricity in return!

Japan Atomic Power Co. is a utility specializing in nuclear power generation, and it owns the Tokai Nuclear Power Plant, Tokai No. 2, and Tsuruga No. 1 and No. 2. A decision was made to decommission the Tokai Nuclear Power Plant and Tsuruga No. 1, and an active seismic fault has been found directly under Tsuruga No. 2.

Tokai No. 2 has not generated any electricity since 2012, but the company has been kept on life

support with at least 100 billion yen in electricity revenues annually from Tokyo Electric Power Co., Kansai Electric Power Co., Chubu Electric Power Co., Hokuriku Electric Power Co., and Tohoku Electric Power Co. The total for fiscal 2012 to 2017 comes to 735 billion yen. In other words, electricity users all over Japan—who have not received a single kilowatt-hour of electricity from Japan Atomic Power for years—are bearing the burden of keeping the company alive. TEPCO has paid the highest basic fee, a cumulative total of 322.8 billion yen from fiscal 2011 to 2017.

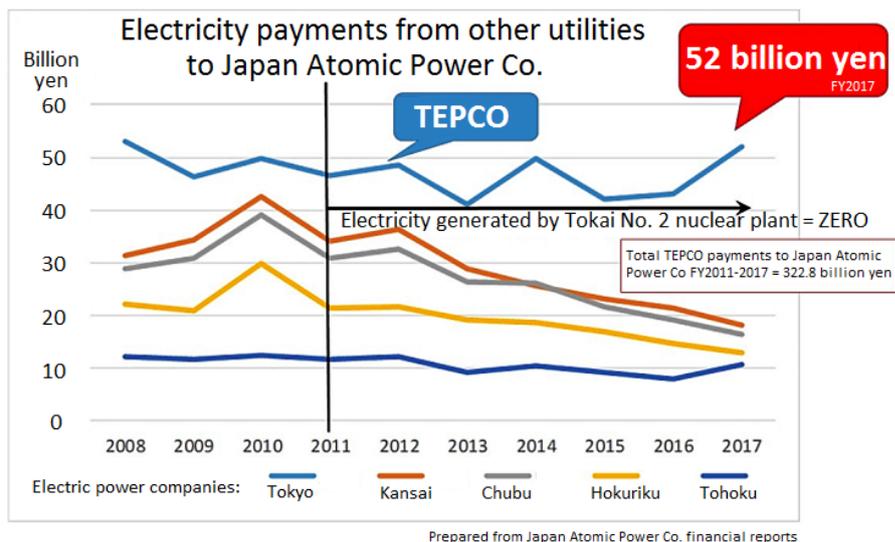


Fig 6. Electricity fees paid to Japan Atomic Power Co. by other utilities in Japan

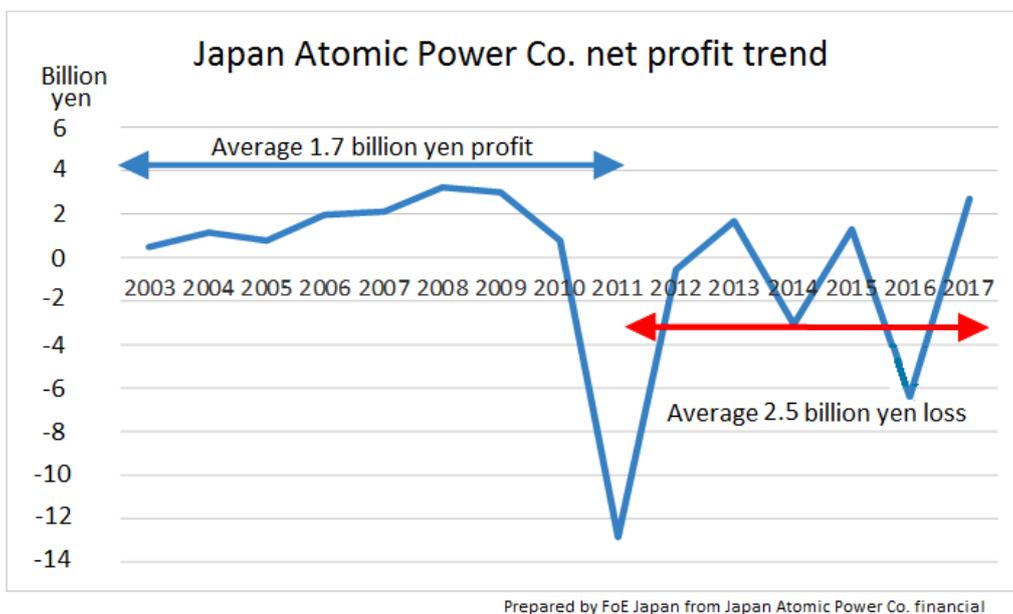


Fig. 7. Japan Atomic Power Co. net profit

Source: Fig. 6 & 7 prepared by FoE Japan from Japan Atomic Power Co. financial reports

## The shaky finances of Japan Atomic Power Co.

It has been estimated that restarting Tokai No. 2 would cost about 174 billion yen for seawalls and other safety measures, as well as roughly 80 billion yen for anti-terrorism measures. Japan Atomic Power Co. had an average annual net profit of 1.7 billion yen from 2003 to 2010 when Tsuruga Nuclear Power Plant Units 1 and 2 and Tokai No. 2 were in operation, but an average annual loss of 2.5 billion yen from 2011 to 2017 (after the Tohoku earthquake and tsunami).<sup>21</sup> Even if it were possible to return to the 2003 to 2010 level of surpluses, it would take *more than 100 years* to cover the additional safety and security costs. But at most, the Tokai No. 2 nuclear plant could operate for another 18 years.

Meanwhile, the construction allowance for Japan Atomic Power Co. is 166 billion yen, which exceeds their net assets of 156.2 billion yen.<sup>22</sup> This allowance is believed to be for the construction of Tsuruga No. 3 and 4 but their sites are currently vacant land, their possibility of completion and operation is low, and their asset value is questionable. If they have no asset value, the company will be insolvent.

Japan Atomic Power Co. cannot cover the cost of safety measures for Tokai No. 2 on its own, so TEPCO and Tohoku Electric Power Co. have indicated their intention to provide financial support in the form of loan guarantees or prepayment of electricity charges. However, TEPCO has already received a huge injection of public funds (p. 21), and is expected to focus on compensation and reactor decommissioning. The provision of financial support from TEPCO for the restart of Tokai No. 2 *should* be out of the question.

### FoE Japan activities

On November 20, 2018, we delivered 10,077 petition signatures to TEPCO, METI and the Nuclear Regulation Authority calling on them halt economic support to Japan Atomic Power Co. for the restart of Tokai No. 2, and asking the NRA not to approve the restart of Tokai No. 2.

In addition, with 351 citizens from Tokyo, Ibaraki Prefecture, Fukushima Prefecture and elsewhere, we have filed a dispute under the Administrative Complaint Review Act to request a formal review and called on the government to cancel its facilities change permission at Tokai No. 2, on the basis that Japan Atomic Power Co. does not have the necessary financial capacity.



<sup>21</sup> Securities report of Japan Atomic Power Co.

<sup>22</sup> Construction allowance: An accounting category for provisionally recording expenditures on tangible fixed assets before completion, such as buildings under construction or equipment under production.

## Three years of electricity market liberalization

### New power producers and suppliers rise to about 14% market share

Three years have passed since the Japanese electricity market was fully liberalized in April 2016. It is one step of the market reforms adopted after the 2011 disaster and nuclear accident, and a big change for citizens and consumers. The share of power producer and supplier

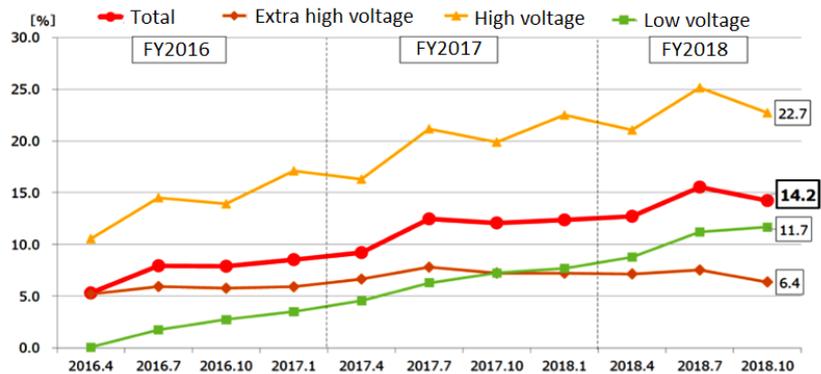


Fig. 8. Share of new producers. Source: METI materials

(PPS) companies (low voltage and high voltage overall) in terms of electricity sales increased from about 5% before full liberalization to 14.2% as of October 2018 (Fig. 8).

But as the presence of new power producers and suppliers is increasingly being felt in the market, the large utilities (the big traditional companies, not electricity retailers) are clawing back market share by offering huge discounts, which is seriously hurting the PPS industry.

### Aggressive tactics by big utilities reveal systemic unfairness

According to PPS company insiders, many large contracts have been taken back by large power companies, having a severe impact on the new entrants. Especially in the service areas of Kansai

Electric Power Co. and Kyushu Electric Power Co., the big utilities are enticing business back by offering huge discounts to former customers, including high-voltage users and local governments. PPS companies are facing tough conditions, as their sales efforts to attract customers end up wasted, they are forced compete on

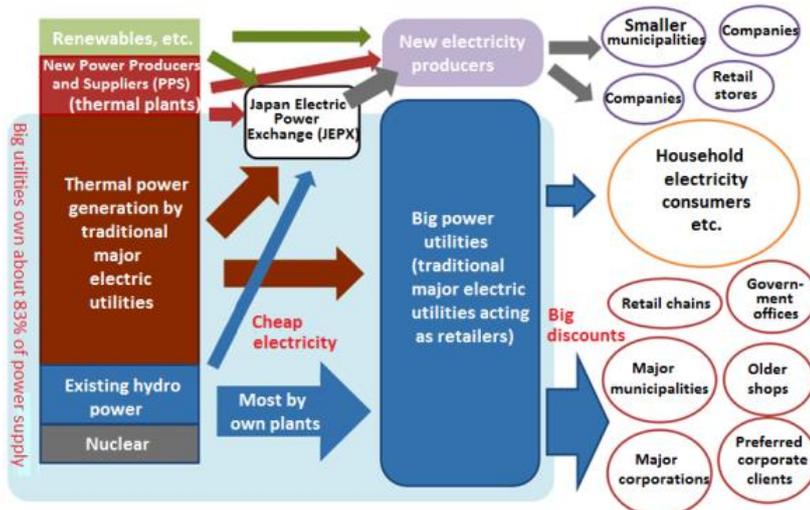


Fig. 9. How the mega-utilities can afford to offer mega-bargains

price, and their businesses come under financial pressure. Some customers say they support the concept of local production for local consumption, but simply do not have the financial leeway to

afford it when they see the huge discounts being offered.

Big traditional utilities can afford to offer large discounts because they benefit from low-cost power sources such as large-scale hydropower (with zero fuel cost). But the reality is that the costs of building those power sources were borne by all electricity consumers under the full cost pricing method before market liberalization. It is not fair competitive behavior that those power sources can now be used by the major utilities to offer discounts as if they had paid to buy the hydropower. If such a situation continues and new PPS companies continue to lose their ability to compete or are forced to abandon their business models, the promises and hopes of electricity market liberalization will evaporate.

### **SDGs, ethical procurement and Power Shift**

One aspect of this discussion looks more positive. A growing number of companies and business establishments are buying renewable energy with a priority on rationale other than on price. Large companies can use the “RE 100” program to procure renewable energy, but unique efforts are also being done by small and medium-sized enterprises that want to procure energy in ways that are compatible with their own business philosophy. It is not just companies with high environmental awareness doing this, but also well-established food processing companies, community-based pharmacy chains, children’s clothing brands, paper manufacturers, major department stores, outdoor brands, private schools and religious facilities (such as temples), law societies, radio stations, apartment buildings, cafes, pastry shops, bars, beauty salons, offices of civic groups, and so on.

They have various reasons and motives to procure electricity from renewable sources. Many want to procure materials from environmentally friendly sources, to support the UN Sustainable Development Goals, to promote the local economy, to avoid nuclear power, to avoid another accident like the one in Fukushima, and so on.

But caution is also needed. The RE100% plan is based on existing large-scale hydropower generation by the big power utilities. Some options that claim to be “renewable energy” are not truly sustainable (wood biomass by palm-based fuels and imported fuel, solar power on fields after large-scale logging, etc.), and some suppliers claim to have zero carbon dioxide emissions but will not disclose their power mix. These are sometimes advertised as being environmentally-friendly. Therefore, the buyer must beware.

It is important that users not only change their electricity source, but also to communicate to others about their reasons for switching. By such communication, there have been many cases of ideas and efforts spreading among other stakeholders in an industry, in an area, or among customers. We want to support the voices of citizens and consumers who want to shift to sustainable renewable energy, and create a chain reaction of ideas turned into concrete action.

#### **FoE Japan: Promoting Power Shift**

Since the nuclear accident in 2011, people have been searching for electricity supplies that are from renewable energy and avoid nuclear. FoE Japan has played a key role in organizing the **Power Shift** campaign and has worked with environmental groups, consumer groups and anti-nuclear groups to call for consumer-led choice of renewable energy.

## Nuclear power versus climate change

### Is nuclear power a solution for climate change?

In recent years the world has experienced an increase in the frequency and intensity of extreme weather events caused by climate change. Japan too has been hit by torrential rains and heat waves. We urgently need to reduce anthropogenic greenhouse gas (GHG) emissions, which are the main driver of climate change. In particular, we need to rapidly decarbonize the energy sector, which is a major emitter.

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released the Special Report “Global Warming of 1.5°C.” It concludes that in order to limit warming to 1.5°C, GHG emissions must be reduced by 45% from the 2010 level by 2030 and must reach net zero emissions by 2050. In other words, over the next few decades we must significantly reduce the use of fossil fuels, which account for over 80% of primary energy consumption. Meanwhile, nuclear power accounts for no more than 4% of the primary energy supply worldwide.<sup>23</sup>

The Japanese government states that since nuclear power when operating has lower GHG emissions than other power sources, it can be seen as low carbon energy and a measure against climate change. But in emissions trading, nuclear power plants are not recognized as a means of addressing climate change.<sup>24</sup> In the OECD Arrangement on Officially Supported Export Credits (rules to be followed when OECD countries make loans and guarantees using their own funds for exports from their domestic companies), funding of nuclear power is not recognized as official development assistance (ODA). The World Bank does not provide support for nuclear power. In other words, the international community does not recognize nuclear power as a means of providing international cooperation or as a solution to climate change.

### At the root of climate change: Disparities, and injustices

FoE Japan has long warned against flawed attempts to address climate change—projects that cause environmental destruction and human rights violations but are promoted in the name of climate change, and measures that are not really helping to fight climate change. Among them, nuclear power stands out prominently.

At the core, climate change is intensifying as a result of the privileged in the world—the wealthy class and developed countries—having developed and emitted large amounts of GHGs. Even now, poorer developing countries are more vulnerable to climate change, while the developed countries continue with mass production, mass consumption, and mass waste. In other words, we could say that at its root, climate change relates to North-South issues, disparities, and injustices. The concept of trying to correct this is known as “climate justice.” Seen from the perspective of historical responsibility for causing climate change, developed countries should reduce their own GHG emissions as quickly as possible and provide support to developing countries. But if the sole aim is to reduce GHG emissions, we may destroy nature and trigger more human rights abuses. Nuclear power illustrates this point, and the same could be said about non-sustainable “renewable” energy.

The Paris Agreement, an international framework adopted in 2015 to address climate change, clearly states that in the context of addressing climate change we need to respect and consider human rights, health-related rights, indigenous peoples, communities and generational equity.

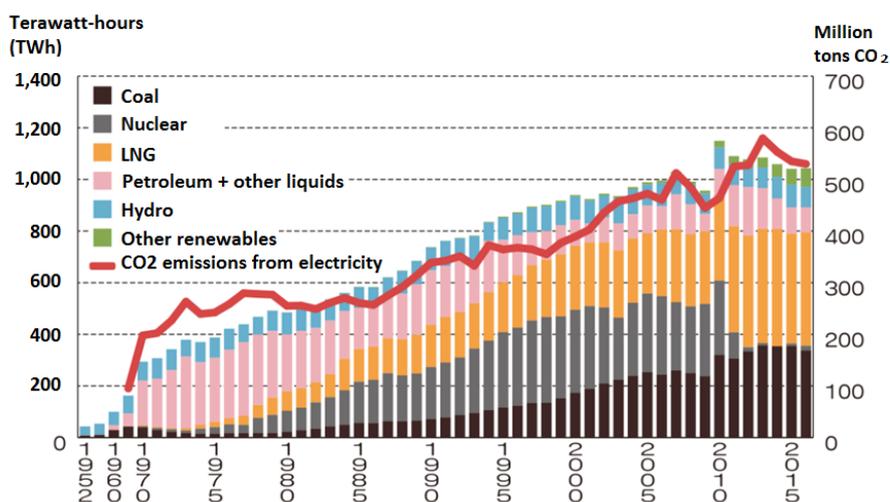
<sup>23</sup> World Energy Council, *World Energy Resources 2016*

<sup>24</sup> Under the Clean Development Mechanism developed countries can count GHG emission reductions in developing countries as their own reductions when they assist projects in developing countries to reduce emissions or increase carbon sequestration, but nuclear is excluded from this arrangement.

Even if some measures can reduce GHG emissions, they should not be automatically seen as a solution. They need to be judged comprehensively from the perspective of sustainability, human rights, and more.

### Nuclear power actually hinders climate action

In Japan, nuclear power has been promoted as a means of mitigating climate change, but Japan's GHG emissions have not decreased over the past few decades. Nuclear power props up a society of high electricity consumption that relies on large-scale and centralized power generation, and it actually hampers measures to promote renewable energy and conserve energy. It is telling that Japan's GHG emissions actually began to decline *after* 2014, when virtually *no nuclear plants* were operating.



**Fig. 10. Electricity generation by source, and CO2 emissions in the electricity sector**

(Source: e-shift, *Do suru? Kore kara no Nihon no enerugi* (What shall we do? Japan's energy future))

In recent years, the cost to build a nuclear power plant has increased to at least the trillion yen level. In 2018, the US National Academy of Sciences published a report on the role of nuclear power in combating climate change, and rejected its usefulness primarily from an economic point of view.<sup>25</sup>

Indeed, it is ironic that climate change is actually making nuclear power more vulnerable. In 2018, there were many nuclear plant shutdowns in France and Sweden as water temperatures rose due to extreme heat and cooling water could not be kept cool enough.<sup>26</sup>

### First, save energy and change lifestyles

For decades, Japan has been working to conserve energy, so many people seem to think that not much more can be achieved. But is that really true? Vending machines and convenience stores can be found everywhere, and Japan also produces a huge amount of food loss every day. Retail stores use excessive air conditioning, and there is room for improvement. Energy saving targets in the industrial sector are lax. People have warned about the limits of the global environment for years, but lifestyles have not changed much.

Individuals, organizations, and society need to work towards a society that values sustainability and human rights for future generations, and responsible consumption behavior.

<sup>25</sup> Jidson, Jim, *Nuclear Power and Climate Action*, 2018

<sup>26</sup> Quartz "Europe's heatwave is forcing nuclear power plants to shut down" <https://qz.com/1348969/europes-heatwave-is-forcing-nuclear-power-plants-to-shut-down/> August 6, 2018

## Nuclear export flop: Hitachi suspends plans for UK nuclear plant

### Hitachi freezes nuclear plant export project to the UK

On January 17, 2019, Hitachi, Ltd. decided at an extraordinary board of directors meeting to freeze the nuclear power plant construction project it had been promoting in the United Kingdom. Hitachi's wholly-owned subsidiary, Horizon Nuclear Power Co., planned to build two nuclear power generating units on the Isle of Anglesey in northern Wales.

For a long time, Hitachi, Ltd. had stated there were three conditions to continue the project: (1) acquisition of necessary licenses and approvals, (2) securing of profitability, and (3) lowering Hitachi's the investment ratio in the project and removing it from the consolidated financial results of the Hitachi parent company. The company eventually decided on the freeze because these conditions were not met.

Meilyr Tomos, a member of "People Against Wylfa B" (PAWB),<sup>27</sup> a community group from Wales, came to Japan in May 2018. She had this to say: "We do not want to leave a burden for our children That's why we have continued our opposition. We welcome the freeze of the project." Robat Idris, also with the delegation, said: "I think nuclear power is an outdated technology. The economics are a problem, but this project also has problems in terms of Welsh culture, the natural environment, radioactive waste, and so on. We welcome the freeze."

### Project cost 3 trillion yen: Attempt to shift risks onto Japanese and UK citizens!

For Hitachi's planned nuclear plant export, one big problem was *who* was going to cover the huge cost of 3 trillion yen in project costs. Initially, it was reported that the UK and Japanese government agencies would directly invest in the project and provide government-backed loans. "The common understanding is that if the two governments do not have the commitment, the business cannot proceed," said Hiroaki Nakanishi of Hitachi, Ltd. (current chairman of Keidanren, the Japan Business Federation). The concept was to shift the risks that could not be covered by one private enterprise alone to the Japanese and British citizens.

In addition, to ensure the profitability of the project, Hitachi, Ltd. asked the UK side to pay an expensive rate for the electricity that would be produced. Electricity market prices remain around 40 to 50 pounds per MWh. Meanwhile, the electricity rates from another nuclear power plant currently under construction in the UK are 92.5 pounds/MWh. Seeing the nuclear rates at about twice the market rate for other electricity, UK citizens voiced their criticism loudly.

Hitachi would have to charge exorbitant electricity rates in order to make the project profitable. But higher rates would simply increase the burden on UK electricity consumers. The UK government, meanwhile, stated that it could not pay rates more than 75 pounds per megawatt-hour.

Hitachi said that it is "freezing" the project, but has not made a complete withdrawal. However, based on the above conditions, it will be very difficult in reality to revive the project.

### What about impacts on the Isle of Anglesey?

Anglesey is an island with a population of 70,000, its main sources of income being tourism and agriculture. These would be the industries most affected if a nuclear accident occurs. Only two

<sup>27</sup> PAWB has opposed the nuclear plant since the plan first arose on the island of Anglesey in the 1980s. It has conducted anti-nuclear activities including information dissemination and demos, and has also worked to promote a local economy that does not depend on nuclear power.

bridges connect Anglesey to the main island, so morning rush hour traffic is heavy. In the event of a nuclear accident, residents would face challenges in evacuating from the island. There are many environmental and landscape-protected areas on the island. The European tern, requiring protection under EU law, has habitat near the nuclear plant site.

Robat Idris of PAWB said, “If the decision is made based on economics alone, there might end up being a return to nuclear if it becomes cheaper than other energy. We will continue to talk about the problems with nuclear power besides economics. Also, we want to continue spreading information and having dialogue about a local economy that does not rely on a nuclear plant.”



Island of Anglesey

### Japan’s nuclear plant exports: A growing list of collapsed deals

Internationally, with the rapid growth of renewable energy, many countries are withdrawing from nuclear power. Going in the opposite direction, Japan has been promoting nuclear exports as a national policy, even after the nuclear accident in 2011. In response to the 2005 Framework for Nuclear Energy Policy under the (former) Koizumi Cabinet, a plan for national prosperity relying on nuclear energy was formulated the following year, featuring the Japanese nuclear industry. Until then the industry had been mainly domestic, but now it was seen as playing a leading role in promoting nuclear power in the international market. A big effort was then made to sell to countries like India and Vietnam, etc.<sup>28</sup> After years of negotiations, a nuclear agreement was signed with India in 2016, and it entered into force in 2017 after a parliamentary debate.

However, Japan’s concerted efforts for nuclear exports, reliant on generous helpings of public tax money, have ended in a series of failures due to ballooning costs and public opposition in other countries. Nuclear power has been clearly exposed as a risky business. What Japan should really be exporting is systems for sustainable society, lessons learned from the Fukushima nuclear accident, and ways to exit from the mass consumption of energy.

#### FoE Japan’s activities

FoE Japan visited the Isle of Anglesey twice (Nov. 2017 and Oct. 2018) to interview residents and study the local situation.

We also hosted members of the local anti-nuclear citizens’ group PAWB who came to Japan in May 2018. We organized public meetings in Tokyo, Osaka, and Fukushima, and met with ministries including the Ministry of Economy, Trade and Industry. We also met with and delivered signed petitions to Hitachi Corp. and the Japan Bank for International



FoE Japan worked closely with the Isle of Anglesey community

Cooperation (JBIC, an expected funder), and garnered considerable media coverage. In addition, we published leaflets and booklets in Japanese summarizing the key facts and distributed them to parliamentarians and the media.

<sup>28</sup> Yoichi Nakano, *Sekai no genpatsu sangyo to Nihon no genpatsu yushutsu* (The global nuclear industry and Japanese nuclear exports), 2015.

## The global nuclear exodus gains momentum

### The nuclear exodus

It can be said that the decline of the nuclear industry became more pronounced after TEPCO's Fukushima Daiichi nuclear accident in 2011. Many nuclear reactors currently being planned and under construction have been significantly delayed due to soaring costs and additional safety measures.

As of January 2019, there were 453 nuclear power reactors worldwide and 55 under construction.<sup>29</sup> The ratio of nuclear to total electricity generation has been in a long-term steady decline, from the peak of 17.5% in 1996 to 10.3% in 2017.<sup>30</sup>

New photovoltaic installations in 2017 (approx. 100 GW) increased by 33% over 2016.

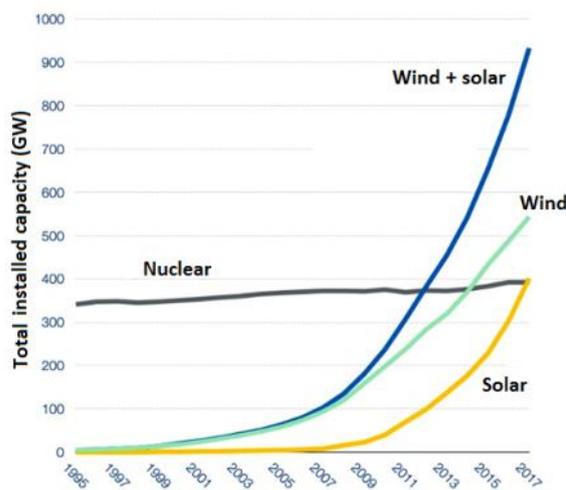
In addition, approx. 52 GW of wind power was newly installed worldwide in 2017, for a total of approx. 539 GW, an increase of approximately 11% over 2016.<sup>31</sup> The global offshore wind market grew by 30%.

Meanwhile, nuclear reactors around the world are aging. Excluding nuclear power reactors under a long-term shutdown, the average number operation of the 413 operable nuclear reactors around the world is about 30 years. This includes 81 that are already over 40 years old.<sup>32</sup>

In response to the Fukushima Daiichi nuclear accident, Japan has set the operating period of the nuclear plants at 40 years in principle, but the operating life of nuclear plants differs from country to country. In the United States, the operating life in principle is 40 years, but most are allowed an extension of 20 years. However, even with extensions approved, decisions have been made to decommission several nuclear plants (e.g., Diablo Canyon, Vermont Yankee, and Pilgrim Nuclear Power Station) because of cost and safety concerns.

In Europe, in countries including Austria and Italy, nuclear power has been rejected as a result of public referendums. The governments in some countries such as Germany have adopted a national policy of denuclearization. Meanwhile, the nuclear power market is said to be active in Asia, but conversely, nuclear has been under pressure with construction delays and cancellations, and the movement toward nuclear-free policies.

In November 2016, Vietnam cancelled plans to construct nuclear plans, and in January 2017, Taiwan passed a law to abandon nuclear power. South Korea decided on a policy of phasing out nuclear power under the leadership of President Moon Jae-in. Indonesia has frozen nuclear power



**Fig. 11. Total global installed capacity of solar, wind and nuclear** Source: Institute for Sustainable Energy Policies

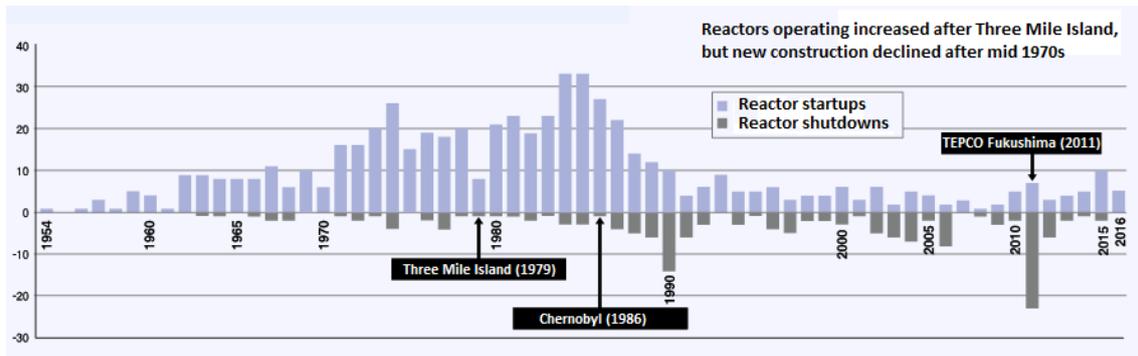
<sup>29</sup> IAEA PRIS accessed 5-Feb-2019. Among units under construction, 33 are delayed. World Nuclear Industry Status Report 2018, Schneider et. al.

<sup>30</sup> Ibid.

<sup>31</sup> REN21 Renewables Global Status Report 2018 (translated by Institute for Sustainable Energy Policies). <https://www.isep.or.jp/archives/library/category/renewables-global-status-report>

<sup>32</sup> World Nuclear Industry Status Report 2018, Schneider et. al.

projects and will not advance any until 2050 at the earliest. Both Thailand and Malaysia have postponed nuclear projects. Singapore eliminated nuclear from its energy options in 2012. China had plans to build 58 GW of nuclear capacity by 2020, and 21 reactors are under construction, which accounts for a third of newly nuclear plant construction worldwide. But half of them are behind schedule.<sup>33</sup>



**Fig. 12. New reactors startups (top) and shutdowns (bottom)**

Source: Mycle Schneider et al., “World Nuclear Industry Report(WNSR) 2016”

## Examples of countries abandoning nuclear power<sup>34</sup>

### 1. Vietnam abandons pro-nuclear policy

In November 2016, the Vietnam National Assembly passed a resolution calling for the cancellation of nuclear plant construction planned in Ninh Thuan Province the central-south part of the country. Russia was expected to receive the order for the first nuclear plant in that province, and Japan the second one.

The main reason Vietnam decided to give up on nuclear power was economic. After the Fukushima Daiichi nuclear accident in 2011, projected construction costs for the nuclear plants rose from the initial projection of one trillion yen to 2.8 trillion yen, and projected electricity rates from nuclear power increased by a factor of about 1.6 compared to initial forecasts.<sup>35</sup>

Vietnam’s conclusion: “Nuclear power is not economically competitive.” For the construction of the plant from Japan, it had been agreed that Japan would provide preferential loans at low interest rates, and this most likely meant that government-affiliated financial institutions such as the Japan Bank for International Cooperation would be involved. But the view that Vietnam should not increase its debt to Japan any further was another reason to cancel nuclear plans.

“This is a ‘courageous withdrawal,’ “ said Le Hong Tinh, Vice Chairman of the Committee of Science, Technology and Environment, in an interview with VnExpress.<sup>36</sup> “The growth in electricity demand is slower than expected at the time the nuclear construction plan was proposed. Power saving technology has advanced, and LNG and renewable energy are starting to become



Fishing village near once-planned nuclear plant construction site (photo Nov. 2011)

<sup>33</sup> The Bulletin of the Atomic Scientists “Global Nuclear Power Database” (accessed 9-Feb-2018) <https://thebulletin.org/global-nuclear-power-database>

<sup>34</sup> MITSUTA Kanna, “The global tide of the end of the nuclear era: Countries withdraw from nuclear, but Japan still clings on” Imidas (January 5, 2018) in Japanese.

<sup>35</sup> VnExpress, “Majority of legislators approve halt of nuclear plans,” 10-Nov-2016.

<sup>36</sup> VnExpress, 10-Nov-2016

competitive. We can adequately meet domestic demand. We need to stop the projects as soon as possible before suffering any further losses.”

There is no doubt that Vietnam’s confidence in nuclear safety was shaken after the Fukushima nuclear accident, although official statements did not use that as an ostensible reason for withdrawing. There is conjecture that Vietnam had to be deferential to Japan, its biggest aid donor. Cautious comments were made one after another by domestic experts and former officials of the Communist Party of Vietnam.

Japan had been counting on nuclear exports not only to Vietnam, but also to Lithuania, Turkey, the United Kingdom, and more. But one after another the prospects have fizzled out.

**Table 4. Japan’s nuclear export prospects fizzle out**

Vietnam	Multi-agency efforts were made with significant Japanese public tax money committed, but Vietnam cancelled plans.
Lithuania	Hitachi was planning nuclear exports, but nuclear plans were frozen by public referendum.
Turkey	Mitsubishi Heavy Industry was moving ahead on nuclear exports, but construction costs doubled, and partner Itochu Corp pulled out of the deal. MHI eventually pulled out too.
UK	Hitachi was planning to construct a nuclear plant in northern Wales, with total project costs of 3 trillion yen. Hitachi was calling on both Japanese and UK governments to provide funding, but decided to freeze the project in January 2019. Practically speaking, Hitachi has withdrawn.

## 2. Taiwan<sup>37</sup>

In January 2017, Taiwan’s Legislative Yuan (legislature) passed an amendment to its Electricity Act. The amendment states that the life of operating nuclear power plants will not be extended, and they will be decommissioned after they have reached 40 years of operation. This meant that Taiwan would no longer have nuclear power after 2025. Moreover, the amendment also stated that the renewable energy sector will have electricity deregulation in order to promote private sector participation, and eventually to increase the proportion of renewable energy from 4% then to 20% by 2025.

In Taiwan, a civic movement demanding an end to nuclear power emerged after the lifting of martial law in 1987. Mass protests were held, especially against the Lungmen Nuclear Power Plant. After the Fukushima nuclear disaster in 2011, mass demonstrations and public opinion against nuclear power led to a declaration in 2014 under the administration of Ma Ying-jeou that construction plans for the plant would be frozen.<sup>38</sup> Ma Ying-jeou was with the Taiwanese National Party, which had been promoting nuclear power. The biggest reason Taiwan shifted towards abandoning nuclear power was the shock of the Fukushima accident. The First and Second Nuclear Power Plants are within 30 kilometers of the capital city Taipei, and if an accident occurs, millions of people will be affected. The cost of a disaster would be huge. Furthermore, existing nuclear power generating facilities are approaching the end of their service lives, and the disposal of radioactive waste is still a problem.

In 2018, the national policy of going nuclear free by 2025 was tested in a referendum, and there were slightly more votes against versus in favor of denuclearization policies. However, among

<sup>37</sup> Ayumi Fukakusa, “Taiwan: People Power Victory to End Nuclear Power” (FoE Japan, Sep. 2017, in Japanese).

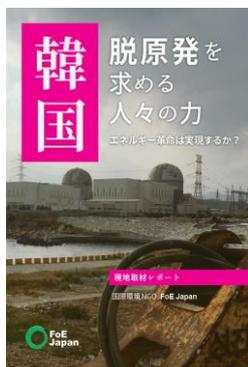
<sup>38</sup> No Nukes Asia Forum, ed., “People in Asia Stopping Nuclear Power Plants” (September 2015), p. 88-105 (in Japanese).

the four nuclear power sites in Taiwan, Units 1 and 2 had already exceeded their deadline to request an extension of operations, and the local mayor near Unit 3 is opposed to any extension. In the case of Unit 4, a revised budget allocation would be needed to restart construction. Although the “no” vote for denuclearization by 2025 won by a slight margin, the basic policy of denuclearizing remained unchanged,<sup>39</sup> and in 2019 the national government announced that there would be no change to the national policy to denuclearize.<sup>40</sup>

### 3. South Korea

Twenty-four nuclear reactors were operating in South Korea, plus four under construction and six that were at the planning stage. Thirty percent of South Korea’s power generation came from nuclear. It was under such circumstances in 2017 that then-presidential candidate Moon Jae-in (still in office as of 2019) made the following election campaign pledges regarding nuclear power: (1) to stop construction of any reactors that were under construction, (2) to cancel any new ones being planned, (3) not renew the licenses of operating reactors, and (4) to create a roadmap to exit from nuclear power in South Korea. If he were to follow his pledges, the new Kori Unit 5 and 6 projects would be discontinued.

President Moon Jae-in was elected with overwhelming support from voters. Once elected, at a ceremony on June 19, 2017 marking the end of operations the Kori Unit 1, South Korea’s oldest



FoE Japan, *Kankoku: Datsu genpatsu wo motomeru hitobito no chikara* (South Korea: People power demanding an end to nuclear power) Feb. 2018.

nuclear reactor, he declared that his country would exit from the era of nuclear energy. In regards to Kori Units 5 and 6, he said he “will reach a conclusion after hearing public opinion,” which was considered a retreat from his election pledges.

Construction of Kori Units 5 and 6 had reached 30% of completion, so the idea of canceling these projects was controversial. In fact, local residents were employed in their construction and compensation was being paid to the local community, so there was strong resistance to any talk of cancellation.<sup>41</sup> Despite his pledge, President Moon Jae-in dared not make his own decision, but entrusted the fate of those projects to a public process.

Public opinions were gathered for three months starting in July 2017. A public debate committee was established, and it documented both the pro and con arguments for these nuclear projects. A first public opinion poll was conducted on 20,000 people, and by considering region, gender and ages, 500 people from the respondents were selected as a group of citizens to

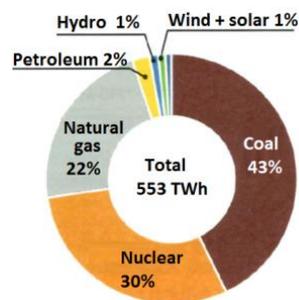


Fig. 13. Korea’s electricity generation mix (2015)  
Source: IEA Electricity Information 2017

<sup>39</sup> FoE Japan, *Taiwan no datsugenpatsu ni matta!? Datsugenpatsu seisaku no yukue* (Denuclearization in Taiwan: Wait a minute!? The direction of denuclearization policies) <https://foejapan.wordpress.com/2019/01/28/taiwan-2/>

<sup>40</sup> 31-Jan-2019, *Mainichi Shimbun*, Taiwan, *datsugenpatsu hoshin wo keizoku, min'i mushi no hanpatsu mo* (Taiwan, some opposition to ignoring public will and continuing with denuclearization policy).

<sup>41</sup> Interview with Korean Federation for Environmental Movement (KFEM), 23-Nov-2017.

participate. Among them, 471 studied up in advance, then participated in a comprehensive discussion, and answered a final survey. The result was 40.5% voting for cancellation and 59.5% for restart of construction. Based on this result, the South Korean government decided to continue with construction of Kori Units 5 and 6. Besides the question about those two units, the participants were asked about the future of nuclear power. The results were 53.2% in favor of reducing, 9.7% in favor of expanding, and 35.5% in favor of maintaining the status quo with nuclear power.

The design life of Kori Units 5 and 6 is 60 years, which translates into a significant delay in the ending of nuclear energy in South Korea. On the other hand, President Moon Jae-in said he would carry out the cancellation of all new nuclear power plant construction projects and the earliest possible deactivation of Wolsong Nuclear Power Plant Unit 1. Even before it reaches its planned service life, if that reactor is confirmed to be unnecessary for the electricity supply, he will use that as a basis to take policy steps towards its decommissioning.<sup>42</sup>

#### **4. Germany**

After the serious radioactive contamination from the 1986 Chernobyl nuclear disaster was reported in Germany, there was growing sentiment against nuclear power. In public discussions about abandoning nuclear power, after various complications the Atomic Energy Act was amended in 2002 towards the phase-out of nuclear power under the administration of Gerhard Schroeder, who was leading a Green Party and Social Democrat (SPD) coalition. The amendment prevented the construction of new nuclear power plants, and the duration of operation of existing nuclear plants was stipulated as 32 years, so nuclear plants reaching that milestone were required to be deactivated, which would have meant a complete nuclear exit by 2022.<sup>43</sup> However, in 2009 the second Merkel administration bowed to requests from power utilities and decided that nuclear plant operations could be extended for up to another 14 years. Accordingly, the Atomic Energy Act was amended again in October 2010.

After the Tohoku earthquake and tsunami in March 2011, the subsequent Fukushima Daiichi nuclear accident was reported day after day in Germany. Large demonstrations took place around the country, and there was a rise in public opinion seeking an end to nuclear energy. Chancellor Angela Merkel responded quickly. She decided on a three-month moratorium on nuclear power, and ordered the Reactor Safety Commission to perform safety inspections on all 17 nuclear plants in Germany.

That same year Merkel launched the Ethics Commission for a Safe Energy Supply. The commission met many times from April 4 to May 28, held hearings with a wide range of stakeholders, hosted dialog meetings with citizens, and then compiled a report and submitted it to the Chancellor. The report said that “the phase-out of nuclear power is possible as there are alternatives with lower risks,” recognized the phase-out of nuclear power as a chance for Germany’s development based on an energy transition and technological innovation, and proposed withdrawing from nuclear power energy promptly.

In light of this, Merkel, on June 6, 2011, made a cabinet decision to deactivate all 17 existing nuclear plants by 2022 and to switch to alternative energy. In July, the Atomic Energy Act was

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<sup>42</sup> The Hankyoreh (newspaper), “Prospects for 1st Wolsong Nuclear Power Plant to be included in roadmap to abandon nuclear power,” 22-Jul-2017 (in Korean).

<sup>43</sup> Gen Maejima, “Germany’s Social Democratic Party (SPD) and antinuclear policies,” in “Alternatives” (Pacific Asia Resource Center magazine).

amended again. After watching scenes of the Fukushima nuclear accident, Merkel, a physicist, admitted that her view on nuclear power had been “too optimistic.”<sup>44</sup>

It may appear that Germany swiftly changed course in its policy toward the phase-out of nuclear power in 2011. But it is important to recognize the tremendous underlying flow of events that led to this decision on the nuclear phase-out, including the severe impacts felt after the Chernobyl nuclear disaster, the rising movement against the construction of radioactive waste disposal sites, distrust in nuclear technology, the formation and rapid progress of the Green Party, and steady investments in renewable energy. Chancellor Merkel, as a realistic politician, recognized this movement toward the phase-out of nuclear power, and made it a reality by establishing the Ethics Commission and reviving the previous decision to phase out nuclear energy.

### **FoE Japan: Fact-finding on the frontlines, monitoring public money flows**

We closely monitor Japan’s attempts at nuclear exports, and our work includes (1) monitoring the use of public money for the export of nuclear power plants, as well as public loans and insurance by the Japan Bank for International Cooperation (JBIC) and Nippon Export and Investment Insurance (NEXI), (2) cooperating with civil society groups in different countries, (3) conducting research and sharing information, and (4) providing information to legislators and policy-makers.

In Vietnam, we first conducted on-site research in 2011. We went back to Vietnam in 2016 and presented information about the impacts of the Fukushima nuclear accident to an international symposium for Vietnamese legislators.

Regarding nuclear exports to India, Turkey, the United Kingdom, Taiwan, South Korea and elsewhere, we have been going to the frontlines to meet and exchange information with local citizens’ groups, and we continue to monitor developments there.

FoE Japan staff went to Turkey in 2014 to study the situation and meet local citizens concerned about the Sinop nuclear plant. We delivered a letter of support from “Mayors for a Nuclear Free Japan” to mayors around Sinop who had been voicing opposition to the nuclear plant there. We also delivered a letter from Sinop citizens to Japanese parliamentarians opposing a nuclear cooperation deal between Japan and Turkey. The project was abandoned in 2018.

At the phase of preliminary studies for nuclear plant construction in Vietnam and Turkey, we raised questions regarding the lack of transparency in regard to the flows of public funds from Japan’s Ministry of Economy, Trade and Industry to the Japan Atomic Power Company.

In 2017 we visited Taiwan and South Korea which had just made the dramatic policy turn toward ending nuclear power. We investigated the situation and then published our findings in Japan.



Fishing port near Sinop nuclear plant in Turkey

<sup>44</sup> Politas, “Current status and topics in Germany which chose to exit from nuclear energy”(22-Jun-2015, in Japanese) <http://politas.jp/features/6/article/389>

17th January 2019  
Friends of the Earth Japan  
People Against Wylfa B

**Joint Statement:**

**We welcome Hitachi's decision to freeze its Wylfa Newydd Nuclear Project  
Now Hitachi and Japan should pull out of nuclear power completely!**

Today at Hitachi's board meeting, it was decided to freeze its Wylfa Newydd Project, a project of Hitachi's subsidiary, Horizon was planning to build new nuclear reactors in Wales, the United Kingdom.

The environmental NGO, Friends of the Earth Japan and the local anti-nuclear group, People Against Wylfa B (PAWB) welcome this decision, and furthermore demand Hitachi to completely pull out of its nuclear power business.

Nuclear power places residents at great risk of accidents, and will contribute to unsolvable nuclear waste problems for future generations.

Due to such danger of nuclear power, PAWB has been protesting against the project, and voice their concern that the project would ruin the beautiful nature and distinctive culture of the Isle of Anglesey.

The most questionable aspect of the Wylfa project was its economic feasibility. The strike price of the electric power from the Hinkley Point C nuclear power plant, a power plant that is currently under construction in the U.K., was twice the average market price. Based on this case, a high strike price was going to be essential in order to make the project economically feasible. Furthermore, both the Japanese government and the U.K. government were expected to support it with public funding.

When the media reported that Hitachi would take a loss of 200 to 300 billion yen, Hitachi's stock price rose. This indicates that the market also observes the project as very risky.

One of the major reasons Hitachi suspended the Wylfa Newydd project was that they could not find investment partners to reduce the possible risks that they would have to bear.

Tokyo Electric Power Company (TEPCO), Japan Atomic Power, Chubu Electric Power and the Development Bank of Japan were mentioned as potential investors. Considering the fact that TEPCO has not yet provided enough support to the victims of the nuclear disaster they caused on March 11, 2011, it is surprising that TEPCO was even mentioned. In the end, they concluded that the project was also too risky for them to be involved in.

The risks associated with nuclear power are not only limited to the Wylfa Newydd project, but

all nuclear power plants in general.

We have learned from TEPCO's nuclear disaster that we cannot quantify the loss that people face due to nuclear disasters - the loss of their livelihood, their loved ones, and even the will to live. The government calculated that the cost related to the TEPCO nuclear disaster would now rise up to 22 trillion yen. TEPCO would have had to file for bankruptcy without the governmental system to financially support them.

Since the nuclear accident, the government has begun to consider the costs associated with safety measures, which used to be completely externalized. However it is still not enough.

In Japan, public polls always show that the majority of citizens are still against nuclear power. It is also clear that the nuclear fuel cycle is not feasible.

People no longer believe the narrative that nuclear power is cheap, or that the country is short of electricity.

We should stop using nuclear power for the benefit of a small number of people. We need an immediate nuclear phase out, and should instead spend money to support the nuclear victims and to shift to sustainable energy.

We demand Hitachi, the government of Japan as well as the government of the U.K. to fully withdraw from nuclear business and the building of any new nuclear reactors, and instead, invest in more economically viable, safer, and renewable options.

## **Fukushima Today and Japan's Energy Future**

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Friends of the Earth Japan is an international environmental NGO working on energy transformation, climate justice, deforestation, and among others, toward creating a sustainable and democratic society.

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