# Social Issues

# E.06-07

# Mixed feelings for fuel mix

Clean and safe electricity: what is the best way forward? The Student Standard sheds light on the current picture of power generation in Hong Kong and globally

N 11 March, 2011, the Fukushima Daijchi nuclear power plant (福 島第一核電廠) in Japan was hit by a tsunami caused by a severe earthquake.

Three of the plant's six nuclear reactors suffered meltdowns, causing huge amounts of radioactive material to leak into the environment.

Daiichi was the largest nuclear incident since the Chernobyl meltdown in Ukraine, back in April 1986.

As the Daya Bay nuclear power plant (大亞灣核電廠), from which Hong Kong gets part of its electricity supply, is just 50km northeast of us, the incident renewed public concern about nuclear safety.



In response, the Environmental Protection Department (EPD, 環境保 護署) slightly reduced the future proportion of nuclear power generated electricity in our total supply.

Nuclear energy, which has a relatively lower gas emission, has been a key

component in the fuel mix of many countries worldwide. But once again the '3/11' tragedy reminds the world of the catastrophic consequences nuclear power can bring. Is nuclear energy the future

of power production, or a ticking time bomb about to explode? We look into the pros and cons of the energy, and the impact it poses on us.



# **Nuclear vs fossil fuel**

### Advantages

- Using nuclear power to generate electricity emits much lower levels of greenhouse gases than burning fossil fuel. This helps slow down global warming.
- A small quantity of nuclear fuel can release a huge amount of energy (1kg of uranium-235 generates the same amount of electricity as 2,500 tons of coal).
- Nuclear power generation creates less waste than fossil fuels.

#### Disadvantages

- Nuclear waste is generally highly radioactive. Mishandling can lead to **disastrous** consequences.
- Nuclear power plant accidents can release radiation, posing a serious threat to the environment and people who live in the vicinity.





generate (v) 產生

mishandle (v) 處理不當

disastrous (adj) 災難性的

# Impact of nuclear incidents on the environment

- wind, harming living things and people far away.
- As many nuclear power plants are built on the coast, The half-life of nuclear fuel the time it takes for the radioactive substances can leak into the sea, especially when sea water is used to cool down reactors after an accident. Sea currents could carry such cou even further afield.
- Radioactive particles can be carried long distances by Lighter radioactive particles can float up into the atmosphere and come back to Earth in rain.
  - radiation level to reduce by half is extremely long. In other words, the threat of radiation can last for decades or even centuries.

# Impact of nuclear incidents on human beings

• People may inadvertently drink water contaminated by radiation.

• Farmers may use contaminated water for irrigation, and the resulting agricultural produce can be harmful to humans.

· Likewise, radioactive substances absorbed by marine life or land animals would become health threats when people come into contact with them or eat them.

• Radiation can cause cancer and cell mutation, and lead to deformities in newborns.



## **Economic considerations**

#### Pros

- Nuclear fuel is cheaper than fossil fuel and it takes only a small amount to generate a lot of electricity.
- · Waste disposal costs for nuclear fuel are lower than for fossil fuels
- Nuclear fuel costs are relatively less affected by fluctuations in market price.

#### Cons

- · Nuclear power plants are more expensive to build.
- Clean-up and remedial costs for nuclear accidents are extremely high.



## Nuclear energy in Hong Kong

Hong Kong's coal-fired power stations will be retired by 2017. The EPD has two proposals for the future power generation fuel mix. These plans take into account increasing electricity demand and pollution reduction.

Nuclear power is relatively clean, but people are concerned about safety.

Though an accident at the Daya Bay plant is very unlikely, we have a contingency plan, under which two Emergency Planning Zones are set up.

The first is for areas within a 20km radius of the plant. Sparsely populated Peng Chau (平洲) island is the only land mass within that zone. Countermeasures include evacuation, sheltering or the use of thyroid blocking agents.



The second zone covers areas within 85km of the plant, which includes the entirety of Hong Kong. Countermeasures concern mainly food and water control to avoid ingestion of radioactive substances by the population.