

**'Go Green on Lamma Island' Programme Series  
(1): Renewable Energy**

**Field Trip Activities on Lamma Island**

Name: \_\_\_\_\_ ( ) S. \_\_\_\_\_ Date: \_\_\_\_\_

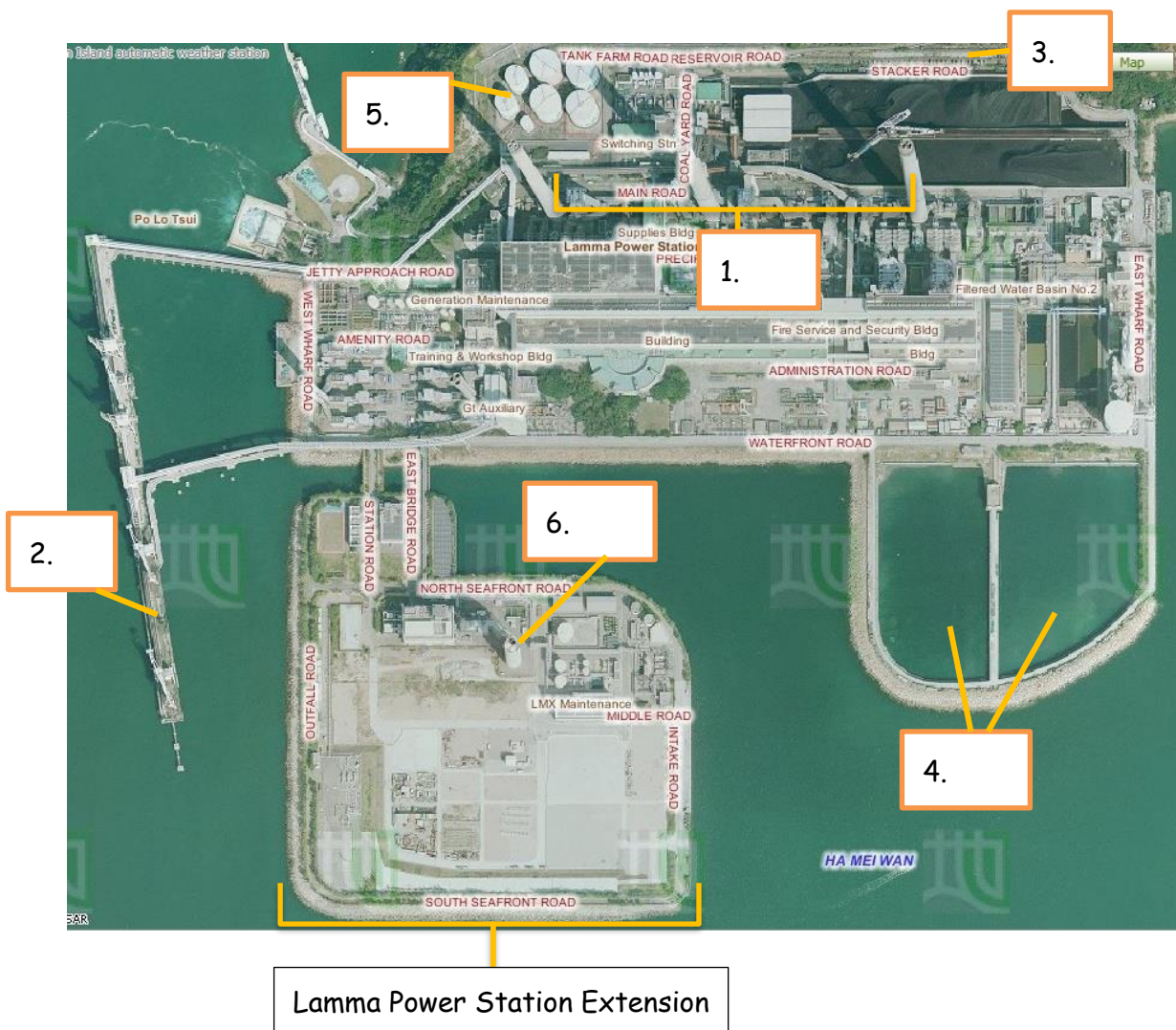
**Stop 1 Viewing at Lamma Power Station**

1. Write the letters in the space provided to show the components of power station in Figure 1.

**Components of Power Station:**

(a) Coal-fired Generating Units	(b) Gas-fired Combined-cycle Generating Units	(c) Oil-fired Generating Units
(d) Coal Yard	(e) Ash Lagoon	(f) Transport jetty

**Figure 1 Components of Power Station**



Aerial Photos from Lands Department

2. Describe and explain the locational advantages of the power station.

Locational characteristics	Reasons
Is it located near the coast? _____	_____ _____
Is it sheltered by hills? _____	_____ _____
Is it near the residential areas? _____	_____ _____

3. Table 2 shows the capacity of the Lamma Power Station.

**Table 2 Capacity of the Lamma Power Station in 2013**

	Number of units	Capacity of each unit (MW)	Total capacity (MW)
Coal-fired Generating units	3	250	750
	5	350	1750
Oil-fired Generating Units	4	125	500
	1	55	55
Gas-fired Combined-cycle Generating Units	1	335	335
	1	345	345
Solar Power System			1
Lamma Winds			0.8
<b>Total</b>			<b>3736.8</b>

Source: Hong Kong Electric

[https://www.hkelectric.com/en/MediaResources/Documents/LPS\\_2014.pdf](https://www.hkelectric.com/en/MediaResources/Documents/LPS_2014.pdf)

(a) What energy source (Hint: a type of fuels) is mainly used in the electricity generation? What do they include? Are they renewable?

\_\_\_\_\_

(b) Among the fuels mentioned in (a), which one is mainly used to generate electricity in the power station? \_\_\_\_\_

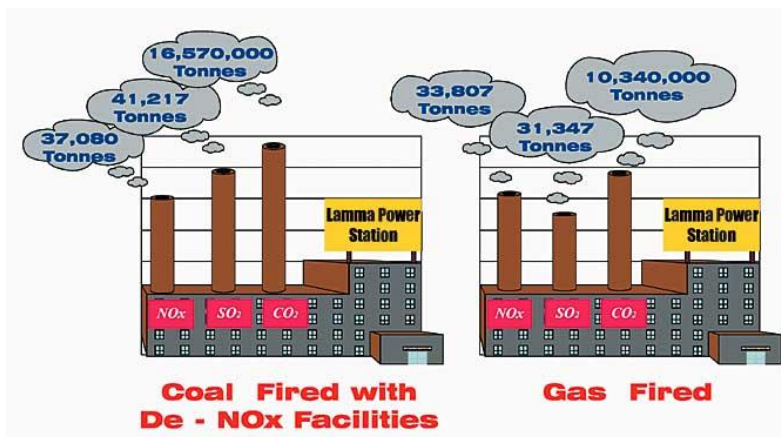
(c) What kind of fuels has been increasingly used to generate electricity recently? (Hint: Think about what kind of generating unit has been built in

the newly-reclaimed area?) \_\_\_\_\_

4. Observe the power station. Does the power station cause air pollution? If yes, what kinds of air pollutants are released?
- \_\_\_\_\_

5. Figure 3 shows the amount of air pollutants emitted from coal-fired and gas-fired generating units respectively when the total electricity generation in the year 2012 would increase by 2.57 times compared with that in 1990.

**Figure 3 Amount of Air Pollutants Emitted from the Coal-fired and Gas-fired Units**



Source: Environmental Protection Department, HKSAR Government

[http://www.epd.gov.hk/eia/operation/english/chapter05\\_4.html](http://www.epd.gov.hk/eia/operation/english/chapter05_4.html)

- (a) Why does the power station cause climate change?
- \_\_\_\_\_
- \_\_\_\_\_

- (b) More generating units will be built to generate more electricity in future. Explain why.
- \_\_\_\_\_
- \_\_\_\_\_

- (c) Which kind of fossil fuels, coal or natural gas, should be more widely-used in the new generating units? Explain why.
- \_\_\_\_\_
- \_\_\_\_\_

THINK



- (d) Do you think that using a mixture of different types of fossil fuels only can

help to minimize climate change in future? Why?

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## Stop 2 Lamma Winds

Is the use of renewable energy a way out in Hong Kong?

1. What types of renewable energy are used at this site?

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2. Why is it suitable to set up the wind turbine at this site? Give five reasons.

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Is it easy to find similar site to build wind farm in Hong Kong? Why?

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3. Collect the data at the tower base of the wind turbine and complete the following table.

Date & time	12 Jan 2017 at 10:34 p.m.	<hr/> <hr/>
Present wind speed	5.9 m/s	<hr/> m/s
Present power output	198.1 kW	<hr/> kW
Cumulative electricity generated	9442719 kWh	<hr/> MWh
Amount of carbon dioxide (CO <sub>2</sub> ) saved	7868932 kg	<hr/> tonnes

Remarks: The units of cumulative electricity generated and amount of carbon dioxide saved shown on HK Electric's website are different from those

shown at the tower base of the wind turbine.

What is the relationship between wind speed and power output?

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4. In 2013, the electricity consumption was 44.21 billion kWh in Hong Kong. Do you think that this wind turbine generates a lot of electricity? Give evidence to support your answer.
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Explain why this wind turbine cannot be designed to produce a lot of electricity.

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5. By observation, list the environmental problem(s) caused by the wind turbine.
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THINK



6. Should different types of renewable energy, particularly solar energy and wind energy, be further developed in Hong Kong?

Each group will be assigned one of the following roles. Collect the information from the exhibition panels for discussion.

Role	Tasks
Government	Discuss why different types of renewable energy should be further developed in relation to existing environmental problems
Spokesman from a power company	Discuss whether the development of different types of renewable energy is cost-effective
Environmentalist	Discuss the negative impact of the development of different types of renewable energy on the environment
Urban planner	Discuss the problems in the selection of suitable sites for the development of different types of renewable energy
Spokesman from Department of Energy	Discuss whether different types of renewable energy can give abundant and reliable energy supply in Hong Kong and their energy efficiency

Your role: \_\_\_\_\_

Your opinion: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

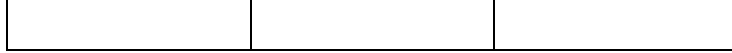
\_\_\_\_\_

THINK



7. Do you agree that the renewable energy should be further developed in Hong Kong as a sustainable measure against global warming? Why?

Strongly disagree    Disagree    Agree    Strongly agree



Give at least three reasons:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

PLAN



8. The use of technical measures, like fuel mix and renewable energy, seems not to be the most sustainable way to combat climate change caused by power station. Then what else can we do to solve this problem?

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