



Pacific Institute  
for Climate Solutions  
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### M3L1: MITIGATION QUESTIONS AND DISCUSSION POINTS

To avoid what scientists call “dangerous climate change”, what do we need to do about global warming, by the year 2100? What are the fears about the current track we’re on? (slide 1)

What does “mitigation” mean with regard to climate change? (Slide 1)

What is the difference between energy efficiency and energy conservation? (slide 1)

There are complexities, in both the global North and the global South, in trying to attain international cooperation to reduce greenhouse gas emissions. Developing countries say reduction will hamper their development while countries in the industrialized North talk about competitive disadvantage. Discuss both points of view. (slide 2)

Two approaches for reducing greenhouse gas emissions, carbon tax and cap-and-trade, were hotly debated in the 2008 B.C. election. What arguments were made for and against each approach? In the end, a carbon tax was implemented. Discuss the results – both in terms of reduction of emissions, and the growth of BC’s economy – since that time. (slide 2)

BC’s provincial election was in 2009, not 2008, and I don’t believe cap and trade/C tax issues sparked a debate then...what have I missed? Moreover, the tax was designed in 2007, approved in the 2008 provincial budget, and took effect on July 1 that year, so “2008 election” doesn’t fit with that chronology...

My recollection was that the carbon tax was introduced with the 2008/09 budget (it would have been February). And ahead of the 2009 election the NDP ran the Axe-the-tax campaign which was when David Suzuki was very critical of the NDP’s position.

Around the same time I think the Liberals said they would proceed with cap and trade for big emitters, working in partnership with western states.

Who is Yoichi Kaya and why is the energy equation he developed so significant? How many of the six factors he included in the equation can you name? (slide 3)

What are carbon sinks? Can you give an example? (slide 3)

How can forestry management practices influence biomass? (slide 3)

Some people argue that controlling population growth in developing countries is a key to reducing greenhouse gas emissions. Others would point to the fact that while families in the industrialized

North have smaller families, their per capita emissions footprint is as much as 15 times higher than people in the South. Discuss. (slide 6)

British Columbia is rich in hydro-electric power. Plug-in hybrid or electric cars are cited as ways to greatly reduce greenhouse gas emissions. But electric vehicles are still in relatively early stages of development to be widely accessible to the average person. Discuss what needs to change before significant numbers of people can switch from gas-powered cars to electric. (slide 7)

Which two countries are the highest energy consumers at the country scale? Where does Canada rank? What are the approximate populations of each of these three countries? What does this tell us about energy consumption on a per-person basis? (slide 8)

Define “energy efficiency”. Name one example of how your community has initiated actions to make something or some activity more energy efficient. (slide 8)

Energy conservation requires changing behaviour. Why is change often so difficult on an individual level? Why do we resist change? Discuss. (slide 8)

Consider this statement: *“The real challenge that humans face is not a dwindling supply of fossil fuels but the impacts of their consumption.”* And yet we continue to find and develop new sources of fossil fuels. Discuss the energy impacts of the development of these new sources of fossil fuels such as oil and gas. (slide 10)

Name four examples of renewable and inexhaustible energy sources. (slide 10)

What is the “but” when considering biomass as a “renewable energy” source? (slide 10)

The fastest growing energy technology is grid-connected solar photovoltaic. What is this? What three countries are leading the way in using this method? (slide 10)

Spanish engineers have developed a method of concentrating and storing solar thermal power using what common material? (slide 12)

What is the more common method of solar energy found in some parts of Canada and the U.S.? Why is this easy to spot? (slide 12)

How is wind created? (Hint: It involves uneven heating and air rushing!) (slide 13)

Wind energy has been used for thousands of years. Discuss some ancient examples. (slide 13)

Which country is leading the way in wind energy? Which country comes next? (slide 13)

When considering harnessing wind energy, what is the most important consideration regarding location for the turbines? (slide 13)

British Columbia has been described as a “marriage made in energy heaven” because of its two

sources of renewable energy. What are they? Would you agree with this statement? (slide 13)

The installation of wind farms in some areas of Canada has caused controversy. What are some of the negative impacts cited by people living near wind turbines? Do the positives in energy generation outweigh the negatives? How would you judge this? Discuss. (slide 13)

What are some sources of biofuels? (slide 14)

What is biodiesel and how is its creation different from other biofuels? (slide 14)

Why don't more people use biodiesel in their cars? What about trucks or farm machinery like tractors? What are the drawbacks at present? (slide 14)

Methane gas is produced by bacterial fermentation of organic matter in the absence of oxygen. It is a powerful greenhouse gas that can be captured to produce heat or electricity. Manure from animals is a good source of methane. Which country is leading the way in its use of methane for energy? (slide 14)

Sewage can also be used in a "closed loop" system if treated properly – and some urban areas do this. The mixed-use Dockside Green development in Victoria is an example of innovative energy use, including sewage, using treated water for its toilets, irrigation, creeks, and ponds system. It has a centralized biomass gasification plant that converts waste wood into gas used for space heating and hot water production, with peak period support from natural gas boilers. Biomass generation makes the development carbon neutral in greenhouse gas production. High-efficiency shower heads, faucets, urinals, dishwashers and clothes-washing machines are standard. What would it take to make all new housing developments adopt these energy-efficiency, low-emissions measures? What's stopping us?

Dams have been described as "energy storage systems" that can generate substantial energy needs for an area and beyond. But what are the downsides of building dams and diverting water? The "Site C" dam project in B.C. is a controversial proposal that has been extensively reviewed. Discuss why there has been vocal opposition to this project. (slide 15)

The "precautionary principle" implies that there is a social responsibility to protect the public from exposure to harm when scientific investigation has found a plausible risk to a project or strategy. Could, or should, the precautionary principle be applied to the Site C dam project? Discuss.

Name two examples of "intermittent" sources of energy and explain what that means. (slide 15)

*"By meeting our energy needs through a variety of renewable sources, we ensure diversity of supply. This cushions us from geopolitical uncertainty and volatility in energy markets."* Discuss an example of "geopolitical uncertainty and volatility" with regard to oil. (slide 15)

It's been said that carbon capture and storage is a mitigation strategy with good potential. But what are two negative factors that need to be overcome? (slide 18)

Another carbon capture storage strategy is to inject it into the deep ocean. What are the dangers associated with this?

Recall the precautionary principle. Would the deep ocean carbon capture strategy be an example where the precautionary principle could be applied? Discuss. (slide 18)

Another storage option for carbon dioxide is injection into geological formations such as depleted oil and gas reservoirs and deep saline aquifers in which the CO<sub>2</sub> will dissolve. Which country developed the first such project using this method? It's an expensive method and so to offset the costs, Norway has implemented what? (slide 18)

What are "biomass sinks" and where are they found? What is "afforestation" and how does it enhance carbon sinks? (slide 20)

Conservation strategies protect land from development and thus can contribute to carbon sequestration. One example is in southeastern British Columbia, an area known as the Darkwoods Conservation Area. Can you name other areas in B.C. that are protected? (slide 20)