Climate Dialogues—Study & Discussion Questions

A. Questions Related to Climate Change Science and Climate Change Impacts

Background (Thinking / "Head") Questions

1) What is Climate Science? (hint: start with considering a) What is climate? and b) What is science?)

2) Distinguish between weather and climate.

3) Defend or refute: Scientists, in measuring or constructing theories, provide exact results / absolute proof.

4) Global surface temperatures are rising. According to scientific consensus why is this occuring? Explain.

5) Explain how the greenhouse effect operates on a) planet Earth. b) in greenhouse or solar thermal collector (Rather than using terms like visible and infrared radiation you may use "a blanket analogy"; identify "glazing")

6) Identify the most important greenhouse gases and comment on each. Comment on how atmospheric concentrations of these (especially carbon) can change using "a bathtub analogy"

7) What is the difference between global warming and climate change? When is it appropriate to use each term?

8) What is the evidence that the global climate is changing (list several global impacts besides warming!)

9) How might the worldwide impacts become more severe if trends continue?

10) What is the evidence that the local / regional climate where you live is changing?

11) How might the local / regional impacts become more severe if trends continue?

12) How do we know human activity is causing atmospheric greenhouse gas concentrations to rise?

13) Is climate change a natural or human-caused phenomenon? (hint: in the big picture, it's both!)

14) Do scientists agree about the reality and cause of climate change? (hint: yes, but public doesn't know it!)

15) Comment on scientific uncertainties related to climate change. How reliable are climate change projections? (hint: look at the uncertainty measures provided) Distinquish projections and predictions.

16) With the aid of an example, explain what "feedback effects" in Earth's climate system are. Comment on how these are both a source of uncertainty and anxiety to climate scientists.

17) Identify arguments that climate change deniers / skeptics use and the flaws in each of them.

18) a) Explain why we can have abnormally cold unseasonal weather if the climate is warming b) Won't some parts of the world benefit from warmer weather? (hint: yes, but overall costs > benefits)

19) Appreciating the importance of time scales in understanding climate change issues, comment on a) "If human activity disrupts the natural world, since humans are part of nature won't natural mechanisms like evolution fix things?" b) an oil & gas industry view: "fossil fuels are in a sense renewable energy sources"

20) Understanding Earth's past is important in responding to human impact on nature today. Explain.

21) Comment on how / why the following professionals take potential climate change impacts seriously?
a) insurance executives b) US military leaders c) economic investment advisors d) public health officials

Part A: Personal Meaning (some are Feeling / "Heart") Questions

1) Carl Sagan liked to say "Science is what works" – what did he mean? a) If you can, share an uplifting story that gets at what this means to you. b) Outline how this applies to creating and validating climate models.

2) Many of us are uncomfortable with accelerating, often technologically driven change and long for a return to simpler times. As we increasingly depend on seeming technological miracles (airplanes, smart phones, cars evolving into "computers on wheels", etc.) and as modern society becomes increasingly complex, it is easy to feel overwhelmed by complexity, and confused by seemingly conflicting views of those we might trust as authorities. Rather than using critical thinking skills / basic foundation in science in seeking clarity, many of us metaphorically find ourselves drowning in muddy waters! So we latch onto overly simplistic explanations or prefer "black & white" to "shades of gray". If you can, share an uplifting story involving how you dealt with such discomfort, decided whom to trust, found clarity, etc.

3) What do you love and hope to never lose to "Climate Chaos"? (question from climateribbon.org)

4) Comment on climate change impact on you personally--current & future, psychological and physical realms.

5) Explain how climate change can be thought of as a… a) social justice issue b) religious issue

6) Imagine a future climate change related disaster that effects you and your family personally.
Two possibilities of many that can be imagined are as follows: Perhaps after an unprecedented drought …
a) …a fire destroys your home near the urban--wildland interface (despite heroic efforts of fire fighters!) or
b) …the well you depend on for water —either your own or a rural water system's –has gone dry and—after weeks of hauling water—you now fully appreciate how heavy water is and how wonderful it's been to have water appear when you turn the faucet in your bathroom or kitchen! Imagine you have a precocious young grandchild who, after hearing about people who have long warned about bad things that could happen because of climate change and urged people to act, asks "Grandpa, what did you do?" What would you tell him or her?

7) Anyone with climate change and ethical concerns who values a) science, b) clean air and water, c) environmental protection laws, d) the rule of law, and e) efficient use of taxpayer dollars can quickly become depressed / cynical given the behavior of Scott Pruitt as chief "fox" guarding the EPA "chicken coop"!
Can we do anything to constructively channel feelings of outrage, or should we just feel depressed / cynical?

8) Meteorologist Eric Holthaus begins a recent *Sierra* magazine "Climate Change Blues" article writing, "I lose sleep over climate change almost every single night…it's getting worse. I confess I need help. A few years ago I shared my climate change depression on Twitter, and the response was overwhelming…Hundreds of people wrote to me admitting their own personal struggles under the weight of an unraveling world." Share a "Climate Changes Blues" personal struggle and / or an uplifting antidote you've found to depression / cynicism?

9) A recent *Sierra* magazine article "Can We Talk About the Weather" begins, "For 47 years, Harvey Krage lived in a white farmhouse…in southeastern Minnesota." It goes on to describe both the area's changing actual and political climate, and quotes Krage saying (in 2013), "Global warming to me was a farce." It then recounts his participation in a "Rural Climate Dialogues" group—described as "a collection of people plucked from opposing sides of the political spectrum…packed into a room to discuss a hot-button subject—a recipe for a shouting match…" Unexpectedly, Krage emerges from the experience having changed his long-held belief! What does it take to change someone's mind? Can you share with us a similar "conversion" type story?

10) Most would agree that use of fossil fuel and other sources of concentrated energy makes our lives much easier. It's been said (politically incorrectly!) that it's as if we augment our human muscle power by getting help from numerous "slaves" (like 100 or so). Comment on a specific illustrative example: the difference between pedaling a (bicycle-type) generator to provide 1 KWH and simply getting it from the power company? And generally comment on the tradeoffs involved between "natural" and "modern technological" lifestyles.

B. Questions Related to Solutions to Problems Posed by Climate Change, Reducing Carbon Footprint

Background (Thinking / "Head") Questions

1) What human activity sectors contribute most to greenhouse gas emissions? (hint: energy supply 26%; transportation 20%; industry 19%; forestry 19%; agriculture 10%; building (residential & commercial) 8%)

2) What climate change solution gives you the most hope?
(hint:the 2017 best-selling book *Drawdown* edited by P. Hawken has 100 solutions)

3) Supposedly 40 % of the human contribution to climate change can be linked to meat-based diets. If true, might this be a relatively quick, simple route to global greenhouse gas emissions reduction?

4) Think about your own carbon footprint.
a) Describe what you feel good about / not so good about.
b) What changes have you made in recent years?; what changes would you like to make?

5) Describe how you use renewable energy. What might you do to increase this?

6) Describe how you use energy efficiently. Where do you waste energy that might be saved?

7) Comment saving energy = saving money. (hint: KWH consumer cost ~$.10 to .20; one therm costs ~$.35)
Electrical energy Natural gas unit

8) What is a kilowatt hour (KWH)? Provide an example illustrating how the operation of a particular electrical appliance leads to a 1 KWH increase in ones electricity bill. How far can electric vehicles travel on 1 KWH? Current cost of batteries to store 1 KWH ?

9) Identify two ways that carbon emissions can be built into our economic system.(hint:cap & trade, carbon tax)

10) Explain the need for a carbon tax. (hint: fixing "the hole" in market system pricing, etc.)

11) Even if future climate change projections are overblown, mitigating measures like switching to renewable energy, using energy more efficiently, etc have other important benefits. Explain.

12) Have documentary movies or non-fiction books related to climate change influenced you?
(hint: *An Inconvienent Truth* by Al Gore, This Changes Everything by Naomi Klein, etc.)

13) Use the tipping point concept in two climate change contexts.(hint: sudden climate changes, public opinion)

14) Identify geo-engineering related to climate change. What are potential pitfalls? Does promise exceed peril?

15) Why should the USA be required by global climate change agreements (like the Paris Accord) to make significant reductions in emissions when other big polluters (China or India) are not called on to do as much?

16) Won't switching from fossil fuel to renewables cost consumers money? (hint: yes & no, its complex!)

17) If we limit carbon emissions, won't we limit economic growth, reduce GDP, cut jobs, hurt the economy?

18) Energy use is indirectly linked to <u>water use</u>. Explain. In this regard for electricity generation, compare fossil fuels, hydroelectric, nuclear, solar, wind. Comment on water used in fracking (to produce natural gas or oil).

19) Link trees & forest management linked to climate change impacts. Answer from local, global perspectives.

Part B: Personal Meaning (some are "Acting not Talking" some are "Feeling / "Heart") Questions

1) Consider in the chart of greenhouse gas emissions by sector presented above in question 1).
a) Where is food in this chart? (hint: see question 3) above!) Share your diet➔greenhouse gases comments.

b) Provide locally relevant and controversial potential development examples related to the previously cited chart of human activity sectors contributing most to greenhouse gas emissions. Examples might come from i) energy supply sector (say in storage of intermittent energy) or ii) industrial sector (say in cement manufacture)

2) Problems like climate change with a science component intimidate many people. Can you bring this down to earth by pointing to simple, common sense, easy to understand / implement solutions? Where things are not so simple, can you point to a local green business or organization that helped you reduce your carbon footprint…

3) One of our facilitators began a recent climate change related presentation with the lyrics from a song that was popular when he was a kid in the 1950s: You load sixteen tons, what do you get?

Another day older and deeper in debt
Saint Peter don't you call me 'cause I can't go
I owe my soul to the company store

Explain what this song is about, and speculate on how it could possibly be recast in a way that would be relevant to the changes individuals and society need to make based on climate change considerations.

4) A recent study concluded that the single most important choice that reduces our societal carbon footprint affluent people can make is to decide to have one fewer child. Discuss this in terms of how you relate to a) the concept of "enoughness" and b) this quote: "The freedom that matters is the freedom to choose responsibility"

5) Many of us are (relative to the typical global citizen) very affluent. We live in large, comfortable homes and would be expected to enjoy a typical resource intensive, consumption-based American lifestyle – heavy on using fossil fuel, eating meat, etc. Comfortable with the status quo, many of us don't want to hear from those with climate change concerns and their urgent message that we need to change our lifestyles. Can we change? Talk is cheap: can we change our actions? Reduce our carbon footprints? Perhaps you'd like to share a story of a significant lifestyle change—spurred by environmental concerns—you've made in recent years?

6) Cheap gas prices are pushing a resurgence of Americans buying big trucks and SUVs. Are dreams of a different personal transportation future (renewable energy powered electric cars, etc.) pipe dreams?

7) a) If you believe that human activity causes climate change and are concerned enough about where this may lead in the future to share your concerns with others, perhaps you have a story about an (eventually positive) encounter with a climate change skeptic you'd like to share.
b) If you are skeptical regarding concerns about human activity causing climate change, perhaps you have story about how you, without changing your basic belief, learned something of value from someone who believed otherwise? (Hint: common ground found can involve saving money/energy or using alternate energy source)

8) The above question suggests that those divided over climate change (very concerned vs.skeptics) might find common ground in the desire to save money by reducing energy costs. Another area of potential common ground involves fixing what some believe is a dangerously unsustainable problem with the market system: its prices do not factor in environmental costs such as pollution and what has been called natural capital depletion. Those wanting to put a price on carbon face opposition of the "no new taxes crowd". Using "the ultimate fixing of the infrastructure" and other arguments, how might you convince them to support such a plan.

9) a) Think about the futuristic or apocalyptic movies or fictional books you've seen or read where runaway climate change brings about the disaster? (hints: *Water World*, *The Snow Piercer*, etc.). What has tugged at your heart strings the most or been the most emotionally disturbing? Tell us why…b) Comment on media coverage of climate change related issues (lack of it, sensationalism, problems, potential solutions, trade-offs, etc).