



## “Switch,” A Documentary Film by the Switch Energy Project Argument-Based Questions

“Switch” is an award-winning documentary by the [Switch Energy Project](#). The documentary focuses on what it calls the practical side of the impending and inevitable global conversion from the use of fossil fuels, like coal and oil, to renewable sources of energy, such as solar and wind. It tries to avoid the politicized debate over energy as much as possible, looking instead at comparative advantages to various forms of energy and practical technological realities. The same is true of the Switch Energy Project’s work in general. The Switch Energy Project is a collaboration between Harry Lynch, a documentarian, and Dr. Scott Tinker, a geologist and professor at the University of Texas.

These are argument-based questions for use with “Switch.” Students should be given these questions before the film is screened. They can use the questions afterward in small group discussions, or to prompt extended written responses. Alternatively, the documentary can be paused at intervals so students can discuss or respond in writing to the questions. The timings that align with the film are approximate.

There are various debatable issues that these questions can align with. Two good possibilities are these.

**Which of the following sources of energy should receive the highest priority investment by the American government and the American private sector as it transitions to an energy system based mostly on renewables -- wind power, solar power, nuclear power, or biofuels?**

**Will the world succeed in switching to an energy system based almost fully on renewables by about 2064, *and* before climate change becomes an irreversible catastrophe?**

- (2:30)            What percentage of Norway’s electricity comes from water? What are three advantages to Norway’s extensive use of hydro-power, either stated directly, or implied, by Dr. Tinker? How long did it take Norway to make this transition to hydro-power?
- (6:00)            How much energy does each American consume, on average, per year? Identify at least five different ways that each of us consumes energy and constitutes our energy footprint.

- (7:30) How many people can the coal extracted from the Belle Ayr coal mine in Wyoming power each year? How many feet per year does the mine move across the Wyoming countryside? How much does the largest rope shovel in the world, used at this mine, cost?
- (10:00) What percentage of the American electricity supply comes from coal? What percentage of the global electricity supply comes from coal? How many years can the world's supply of unmined coal continue to produce this level of electricity?
- (12:00) Describe the process of turning coal into electricity, described in the film when Dr. Tinker visits the Parrish Generating Plant in Texas.
- (12:30) Why are Americans so dependent on coal for their electricity? What are the two major environmental problems associated with burning coal to produce electricity, according to Dr. Steve Koonin, the U.S. Undersecretary for Energy during the Obama Administration?
- (14:00) What is the position taken on “clean coal” by David Crane, CEO of NRG Energy. Dr. Tinker seems to refute Crane’s position, however. How does Tinker do this? (Hint: it has to do with the economics of “clean coal” technology.)
- (17:00) Dr. Tinker makes the claim that oil is very tightly interconnected with the global economy. What is the best evidence he gives to support that claim?
- (20:00) The Perdido oil platform is the largest offshore oil drilling site in the world. Where is it? How many people does the oil it pumps power every year? How many feet of water does the Perdido rig float over? How long did it take to build Perdido? How much did it cost?
- (22:00) Why will the risk of an oil spill from offshore drilling increase over time, even if it will still remain rare?
- (24:00) What makes gasoline so hard to replace as a transportation fuel?
- (25:00) Why will oil be expensive in the future, according to Dr. Tinker?
- (27:00) Why will the world’s demand for oil and electricity grow substantially in the near future? Provide at least two pieces of evidence, from the documentary, to support your argument in response to this question.
- (29:00) How does Dr. Tinker sum up the big challenge the world now faces with energy – the challenge that essentially motivates the Energy Project and its production of “Switch.”
- (31:00) Name two reasons that corn is not a good commodity (or feedstock) to use to produce biomass fuels.
- (35:30) What is the main challenge – or counter-argument – to using cellulosic biomass energy, compared with corn-based ethanol and with petroleum?
- (38:00) What are the advantages of compressed natural gas (CNG) as a fuel versus diesel fuel (which is a form of petroleum)? What is the main challenge, or counter-argument, to compressed natural gas?
- (42:00) How much oil is currently in the ground (if we assume oil costs about \$70 per barrel)? Of that amount, how much oil is the world projected to use between now and 2030? And more importantly, why do experts say that the amount of oil that is in the ground and can be drilled and extracted **depends** on the price of oil? How does the economics of oil actually influence and affect the supply?
- (43:00) What is a hybrid car? What is the difference between a regular hybrid car and a plug-in hybrid car?



- (45:00) What argument for the Tesla electric sports car does Dr. Tinker focus on in the documentary? What argument against the Tesla do he and Dr. Ernest Moritz, of the U.S. Department of Energy, also make?
- (46:00) Why does the challenge of reducing our use of oil linked back to how we are going to generate electricity?
- (49:00) How is geothermal energy created? What is its most important challenge or counter-argument, according to Dr. Richard Muller?
- (51:00) What is the big factor that determines whether our society will use solar power to generate significant amounts of electricity?
- (56:00) Describe the current state of technology in large-scale solar power plants.
- (59:00) Which country invented the modern wind power turbine? Identify two of the major advantages of wind power? What is the biggest challenge or counter-argument to wind power? How has Denmark, in effect, rebutted or refuted the counter-argument?
- (1:02:00) How has wind power benefitted farmers in west Texas?
- (1:04:00) What is the debate in the expansion of wind power pertaining to transmission lines?
- (1:09:00) Describe the hydro-fracturing – or “fracking” – process for extracting natural gas from the earth. What is the controversy that fracking has created? What is the evidence that fracking does not present a risk? What is the big advantage to using the natural gas that fracking extracts over using coal to produce power?
- (1:13:00) What is LNG? How is it made? Why do energy producers make LNG?
- (1:18:00) Why is there so much thick concrete at the Comanche Peak nuclear plant?
- (1:21:00) What is Dr. Richard Muller’s argument that the world should create more of its electricity through nuclear power? Does Dr. Steve Koonin agree or disagree with Muller? Explain. Does France’s experience support or contradict Muller’s argument?
- (1:27:00) What is nuclear energy’s biggest benefit, according to Dr. Tinker? But why is that benefit also nuclear energy’s risk?
- (1:31:00) What is the key to a successful transition – a successful switch – to energy that is not produced using fossil fuels (oil and coal)? What examples does the documentary provide to support this conclusion?