**Nuclear Power**

**Listening Comprehension: 'Nuclear Energy'**

Watch the *video 'Nuclear Energy: Is Fission the Future?'* by the *California Academy of Sciences*

(<https://www.youtube.com/watch?v=vp3YyFy4p8c&feature=youtu.be>) and take notes on the following questions:

1. Why do people disagree about the use of nuclear energy?
   * Because people have no proper solution how to handle the leftovers. There is no real way to destroy them immediately.
   * Nuclear accidents can happen when unburying the nuclear waste
2. What makes nuclear energy such 'a complicated story’?
   * First of all nuclear power is carbon and greenhouse gas free but there is a large risk with nuclear power in general.
   * Nuclear power is very expensive and if a nuclear accident happen, the result could be devastating.
3. How can nuclear waste be managed?
   * The nuclear waste is buried under the ground, so that we can never retrieve it again
   * The nuclear waste can also be stored in facilities where we can manage it properly.
4. What’s the difference between nuclear fission and nuclear fusion?
   * During the process of nuclear fission a Neutron crashes into an Uranium atom and the Uranium atom splits in half and releases more Neutrons which cause a chain reaction repeating the same steps again. During this process a lot of energy is released. Scientists know how to handle nuclear fission and how to get energy out of the reaction.
   * Nuclear fusion is the opposite of nuclear fission. During the process of nuclear fusion Tritium and Deuterium get combined instead of splitten. The process of the combination produces an equivalent amount of energy as the splitting process. Nuclear fusion is currently just theoretically possible, that means that scientist are unable to repeat the nuclear fusion process.

**Discussion**

Take notes on the following aspects as there will be a group discussion.  
If necessary, search the net.

1. Outline the benefits and drawbacks of nuclear energy by searching the net.
   1. Benefits:
      1. One of the most low carbon and no greenhouse gas energy source
      2. One of the most reliable energy source.
      3. Produces about 10x more energy than coal in relation to the used amount -> high energy density
      4. Low fuel cost -> Building the nuclear power plant is expensive but the fuel is not that expensive in comparison to coal when it comes to energy production
      5. Energy independence -> countries do not have to rely on other countries in terms of the energy production failure
      6. Low operational cost -> in comparison to other energy source production the operational cost for nuclear power plants is not that high
      7. Reduced land disruption -> large scale renewable energy installations are destroying the natural habitats
   2. Drawback:
      1. Highly hazardous leftovers after production
      2. Cost to build a nuclear power plant is immense
      3. No way to destroy the nuclear leftovers
      4. Slow construction timeline -> the construction of nuclear power plants takes to much time, because there are strong safety guidelines
      5. Public perception -> a lot of people are concerned about nuclear energy and generally don’t like the idea of radioactive waste in their country
      6. Limited location options -> the power plants must be sighted carefully -> cannot be built next to cities
2. Find out about the current situation of nuclear power plants in Austria and its neighbouring countries.
   1. Austria does not have nuclear power plants -> one in Zwentendorf was planed but never built
   2. Slovakia -> 4 nuclear power plants
   3. Czech Republic has 6 nuclear power plants
   4. Hungary has 4 nuclear power plants
   5. Romania has 2 nuclear power plants
3. Present public opinion on using nuclear energy in Austria and worldwide.
   1. Austria: There had been an election about building a nuclear power plant in Zwentendorf or not -> the results were nearly 50% for building and 50% against it.
   2. Worldwide: There are countries that are strictly against it. A few countries like the idea of nuclear energy and a few of them are in between both ideas.
   3. USA,China,France,Russia, South Korea… like the idea of nuclear energy and also use it.
4. Speculate about the future concerning the use of nuclear power.
   1. I think if we keep researching on nuclear fusion instead of hiding or managing the waste produces by nuclear fission, we will be able to use it in the future. If every country implements the new technology of nuclear fusion instead of fission, the energy cost decrease a lot and the population could save a massive amount of money
5. State your personal view on the issue.  
   Why would you (not) support nuclear power?
   1. I am really bipartite because releasing greenhouse gases with non nuclear energy sources results in a massive problem. Implementing nuclear fission results also in a lot of problems, because of the waste production. All in all I think we should keep researching to find new ways to produce energy and simultaneously keep the earth a great place.