Hello everyone. The environmental issue that Tejvir and I chose to talk about is lithium mining and extraction. **(slide1)**

So what is lithium mining?**(slide2)**

Lithium is a chemical element with an atomic number of 3. It is a soft silver-white metal and its also the lightest of all the alkali metals. To define what lithium mining is, it’s a set of chemical processes where lithium is isolated from a sample and converted to a saleable form of lithium. The different methods which humans use to extract lithium are from the mines and brine water. Most lithium mining producers who extract the lithium through mines have been priced out since the early 2000’s, since the cost of extracting lithium from hard rock is estimated to be double that of producing from brines. Hence, most producers lean towards the brine water method. To do so, the salt-rich waters must first be pumped to the surface into a series of evaporation ponds where evaporation occurs over a number of months. Since solar brines are naturally positioned at high altitudes and in areas of low rainfall, evaporation is an ideal and a cost efficient method of harvesting lithium. **(slide3)**

Here's a short clip from a lithium mining documentary demonstrating the brine water method. (**Slide4)**

Now, I’ll be moving on to possible solutions that we might have to fix this issue. One solution being the hydrogen fuel cells. In a fuel cell, it combines hydrogen and oxygen to produce electricity, heat, and water. This will then convert the energy produced by a chemical reaction into a usable electric power. In a fuel cell, it will produce electricity as long as fuel (hydrogen) is supplied, making it never lose its charge. In the future, hydrogen fuel cells can be used as a resource for energy carriers. These are carriers that move and delivers energy in a usable form to consumers. Like the sun and wind, fuel cells are a renewable resource that can transport or store electricity to where it is needed. Unfortunately, the modern day cannot manufacture hydrogen without using fossil fuels first, which defeats the purpose of helping the environment. **(slide10)**

The second possible solution is solar panels. Although solar panels are a great way of converting a renewable energy resource (sunlight) to electricity through the photovoltaic cells, modern day solar panels are not as efficient as we may want, in order to provide enough power. According to Elon Musk, his team is putting serious work into the solar roof, nanotechnology will provide an evolved leap on technology. In the future, solar panels could be capable of being well enough to power an entire car by being entirely self-sufficient. Solar cell phone chargers also consist of solar panels; used to charge cell phone batteries. They are an alternative to the standard electrical cell phone chargers (lithium-ion battery chargers) we use in the modern day. In some cases, these chargers can be plugged into an electrical outlet. **(slide11)**

The final possible solution is more aimed to vehicles, which are powered roads. There is a such thing as powered roads, which allows for the road to act as power source and the car effectively works like a slot car racer as it absorbs the power. The batteries in a car would be removed in favor of solar-cells, making all vehicles lighter and inflict less damage on the road. But we do face the problem of the investment we need for the infrastructure. We also cannot take away all batteries from the cars until the whole road network has power. It may be possible that this can be a possible alternative lithium battery used in cars. **(slide12)**

So what are some changes that we can have in human behaviors? A global energy transition that we’ve taken a part of is to limit ourselves from burning more fossil fuels for energy and transportation, but rather look for alternatives for the power we need such as renewable non-polluting solar and wind energy. Therefore, we must continue this transition. For an example, this can be achieved with solar panels on your roof, which gives incentives in some provinces like Alberta. **(slide13)**

Some easy ways to fix this issue is to use energy storing objects that don’t include lithium; like rechargeable batteries and/or supercapacitors and ultracapacitors. In a rechargeable battery, you will have the advantage of having up to 1800 charging cycles, making it cost efficient in a long term basis. This will contribute less waste to landfills and will contain less toxic materials. Supercapacitors and ultracapacitors are solid state devices that offer advantages over batteries in lifetime, power density and adapt to temperature changes. Ultracapacitors are storage cells that provide quick, massive bursts of instant energy and can be found in many electronics, from computers to cars. Although the ultracapacitor can only store about five percent of energy that a regular lithium-ion battery has of the same size, they are environment friendly since they can be used for thousands of cycles and contain low toxicity of materials. **(slide14)**

The concludes our presentation. I hope you enjoyed.