CSE 2020 Experience Summary
February 21-23, 2020

Workshop 1: How Sustainability Will Shape Your Future
Workshop 2: Nuclear Power’s crucial role in Combating Climate Change
Workshop 3: Why the World Needs the Sustainable Development Goals
Workshop 4: Applying the Green Building Solutions: LEED & Toronto Green Standard
Workshop 5: The Future of Electric Vehicles and Their Impact on the Grid
Workshop 6: A Startup in Cleantech

→ Summary Takeaway
  ● Personal and community initiatives must be standardized to be innovative and more progressive to change the narrative of environmental change.
  ● Introduction to sustainable urban infrastructure design and the power supply required. Careful overhead and a collective effort must be made to plan “green” cities.
  ● As knowledgeable individuals entering the industry, we have the opportunity to help corporate organizations make a change. In order to persuade, it is necessary to highlight the monetary incentives while acknowledging becoming sustainable is an investment. There are many industries that can’t thrive in a sustainable global climate, such as the non-renewal resource industries. In place of those industries, new technology and companies can emerge.
  ● The knowledge I learned, specifically in workshops 5 and 6, helped me answer questions in a preliminary co-op phone interview that resulted in an invitation for a technical interview. I got a 8-month co-op offer at an electric bike engineering firm called Grin Technologies.

Workshop 1: How Sustainability Will Shape Your Future
  ● Climate change is not just an environmental issue. It is an issue that affects societal, economic and environmental factors. Climate change impacts/accelerates all other risks.
  ● We must do more than the stereotypical concepts when climate change is mentioned, such as the textbook ethos of environmental change of “recycling” and “tree-planting”. However, these exhausted misconceptions need to be redefined to encapsulate how much more progressive humans need to be.
U.N Sustainable Development Goals (SDGs) were created to standardize the world’s expectation of sustainability and to define successful and progressive actions. All the goals are independent and affect each other in each way, therefore, there are various ways to try to accomplish them.

- For example, there are many opportunities (or risks) associated with transitioning into an environmentally-friendly and sustainable office.

Workshop 2: Nuclear Power’s crucial role in Combating Climate Change
- Innovative nuclear technology today is focused on efficient waste management and power generation.
- Nuclear power is advantageous in terms of its longevity and maintenance in comparison to other forms of reusable energy sources.
  - For example, nuclear power plants can be very small as opposed to hydroelectric dams which have a large, destructive impact on the local environment.
- One of the largest challenges hindering the use of nuclear power is the misconceptions of nuclear power’s safety.
  - There have only been incidents. There have been no reported deaths within the United States of America in the last 50 years.

Workshop 3: Why the World Needs the Sustainable Development Goals
- U.N Sustainable Development Goals (SDGs) were created to be the universal framework for sustainable initiatives. We want to address and employ the “spillover” effect which refers to how a nation’s actions in a specific aspect affects another nation’s unrelated aspect.
- The SDGs are tracked and rewarded based on a goal-based system where all the participating nations are ranked. Canada is a conservative player which is reflected in the country’s rank of 20th. Although Canada works towards these SDGs as a whole, people must initiate local plans to build the large SDGs.
- The system must be evolved. The flaw with this system lies in the type of data it can rely on the gaps within some unattainable and unmeasurable pieces of information.

Workshop 4: Applying the Green Building Solutions: LEED & Toronto Green Standard
- “Green” building is one whose characteristics adhere to the local standard and Leadership in Energy and Environmental Design (LEED).
  - A building can obtain levels of certification through points relating to specific characteristics and standards.
  - The LEED system employs incentives to score points as it requires integration of work and collaboration of various teams.
It is important to pursue contractors to support these initiatives as engineering and business are intertwined.

Workshop 5: The Future of Electric Vehicles and Their Impact on the Grid

- There are 3 types of electric vehicles:
  1. **Hybrid electric vehicles** (HEV), which is not quite considered electric as the battery's contributions are small.
  2. **Plug-in Hybrid vehicles** (PEV), which is composed of 2 main systems where the engine is used only when the battery has been drained.
  3. **Battery-electric vehicles** (BEV), where a battery-powered energy source is utilized resulting in zero tailpipe emissions.
     - However, people are afraid that a single charge and lack of charging stations will result in them being stuck in a random place.

- Why is it encouraged to drive an EV?
  1. Save money on gas
  2. Save money on repair (i.e. no oil change required and the battery life is about 10 years)
  3. Reduces environmental footprint

- Challenges faced in EV adoption
  - Batteries are expensive
  - Infrastructure limitations
  - Range anxiety
  - Convenience, long charging time then stopping for gas

- Design considerations include battery degradation, temperature and drive behaviors

Workshop 6: A Startup in Cleantech

- They saw a problem: wind turbine blades get iced overnight and are unable to supply power to the grid, especially in the ideal part of Canada. When turbines are turned off during this period, the grid must be supplied by more reliable sources.
  - Icing can either be removed manually or left to melt naturally. However, it is expensive and unsafe to remove manually whereas melting is too long of a process.
  - Both methods are efficient.

- The business has 3 pillars to success: **Idea**, **People** and **Capital**. Preferred assets include a technically feasible idea and it has a valid business case.

- Important to define your Business Model.
• Important to make sure your people or team are a mix of knowledgeable, as dedicated as the investors/owners and flexible because they can make or break a business.
  ○ It is important to network in school and/or at conferences. It is important to also connect with an incubator for office assets (i.e. paper, office funeranature, etc)
• Capital includes looking into grants, loans and investments to help start your business.
• Advantages of starting a clean tech company:
  ○ Head and/or defining factor of the new/clean-tech industry, which is rapidly growing.
• Disadvantages:
  ○ Massive scales to large business
  ○ The tech industry is already protective and tight-knit as it is, especially if they do not see that this type of change is important.