



Integration of SDGs in

- Institutional governance/strategic level
- SDGs in research
- SDGs in campus operations
- SDGs in curriculum development
- SDGs in student engagement activities
- SDGs into community activities
- SDGs at a whole-institution level

Focus on

- Goal 1 - No poverty
- Goal 2 - Zero hunger
- Goal 3 - Good health and wellbeing
- Goal 4 - Quality education
- Goal 5 - Gender equality
- Goal 6 - Clean water and sanitation
- Goal 7 - Affordable and clean energy
- Goal 8 - Decent work and economic growth
- Goal 9 - Industry, innovation and infrastructure
- Goal 10 - Reduced inequalities
- Goal 11 - Sustainable cities and communities
- Goal 12 - Responsible consumption and production
- Goal 13 - Climate action
- Goal 14 - Life below water
- Goal 15 - Life on land
- Goal 16 - Peace, justice and strong institutions
- Goal 17 - Partnerships for the goals

Summary

The “*Soil from nothing: The Effectiveness of Biochar in Soil Reclamation For Industry and Education*” project is a direct response to a request for further education on an environmental issue. An industry partner of Saskatchewan Polytechnic requested research on soil amendments to aid in soil reclamation after they experienced soil reclamation failure at one of their sites. The research tested the effectiveness of a variety of amendments and proved that treated biochar, a unique form of charcoal, encourages a healthy soil microbiology and helps soil hold onto nutrients and moisture much longer.

Since less than 0.1% of oilsands extraction sites can currently be certified as reclaimed, sharing findings has significant impacts. Prior to this project, biochar was a promising tool for soil reclamation, but its potential had not been sufficiently explored. Through a series of research trials, researchers found that biochar was especially efficient and cost-effective.

Besides its potential for soil revitalization, biochar also provides an effective mechanism for sequestering carbon. According to the International Panel on Climate Change, forests offer significant protection against climate change because of their ability to capture and convert CO₂ to vegetation and soil. This protection can further be enhanced by incorporating carbon as part of the soil reclamation process. The potential for oil and gas producers to play a role in mitigating CO₂ emissions is immense, because biochar is effective in terms of costs as well as soil amendment results.

This project resulted in ongoing knowledge sharing to improve the industry as a whole, along with unique research opportunities for students to create experienced, innovative employees in future soil reclamation work.

Outline the benefits of integrating this theme:

- 1.** This project resulted in direct benefits for the soil reclamation industry. Our project partners not only received an answer to their question, but the research also provided ground-breaking new commercialization opportunities for cost-effective soil reclamation.
- 2.** Our direct partners have taken this knowledge and provided further education to other industry members. Education has focused on providing research and accessible practical solutions to the industry’s questions about soil reclamation in boreal forest regions.
- 3.** Hands-on learning opportunities extended beyond coursework for Sask Polytech students, giving them real-world, employable fieldwork and data analysis skills. Planned education efforts for the next phase of the project, beginning this summer, will also include student researchers developing presentations and workshops for high school students in the region where additional research is taking place. Both levels of students will have the opportunity to learn about environmental protection careers in oilsands regions.

SDG Accord Reporting 2022 CASE STUDY

Outline the barriers or challenges encountered in integrating this theme and how you overcame these:

1. Research projects of this scope take time. Sask Polytech began the initial project with one partner as a 10-week research project in summer 2019. The project was continued in 2020 with a second project partner, who supplied biochar for a second phase of research.
2. Research funding was required to undertake both project phases. Sask Polytech project partners provided some research funds up front. Additional funding was sought and granted by Natural Sciences and Engineering Research Council of Canada (NSERC) and National Research Council of Canada Industrial Research Assistance Program (NRC IRAP).

Conclusions and recommendations

Educational partnerships with industry to solve real-world problems that address sustainability yield opportunities that go beyond research. In this case, the partnership between Sask Polytech researchers and industry helped solve a specific problem related to soil reclamation. Extending the project into a second phase with an additional industry project allowed for longer-term test results and the identification of a viable solution for soil amendment that will yield benefits to both industry and the environment.

Additional project benefits include the training of students and sharing of information beyond project partners. By pairing research with unique student opportunities and industry knowledge sharing, all participants in the research are now better positioned to develop new approaches and technologies for incorporating biochar into a variety of other sustainability initiatives, whether in industry applications or in ongoing research.

Quote from research partner:

“We found that the applied research team in the Natural Resources Technology (NRT) program has a wealth of field experience, making them well equipped to ask relevant questions and enhance the rigor and application value of the trial. Overall, partnership with Saskatchewan Polytechnic and access to Hannin Creek Educational and Applied Research Centre (HCEARC) has allowed us to refine and improve our field methods, thereby improving Reclaimit’s ability to provide forest reclamation solutions that are both reliable and sustainable.” -Andrew Carpenter, Owner, and Deanna van Muyen, GIS Administrator, Reclaimit Ltd.

SDG Accord Reporting 2022 CASE STUDY



Before and after photos in "Soil from nothing" project