Orphaned and Abandoned Mines

1st Annual OAM Workshop

Industrial Ecology & Symbiosis

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Disclaimer

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Industrial Ecology & Symbiosis

- Envisions man-made ecosystems that operate similarly to natural ecosystems, where “waste” from one process is a valuable input into another
- “Waste is a resource in the wrong time, place, state … or from the wrong perspective”
- Innovation is often found at the intersection of disciplines and industries

Examples …

Example #1:

Dark Matter & Closed Mines

Dark Matter & Closed Mines

- Mine depth seen as a valuable opportunity to study dark matter & other subjects
- Sanford Underground Research Facility (SURF)
  - Leading research which is changing how we understand the universe and planet
  - Hosts experiments in physics, including dark matter and neutrinos, as well as biology, geology and engineering
- It also has and will have a tremendous economic impact throughout the region
- Other examples: Stawell Underground Physics Lab (Australia), Yemilab (South Korea)

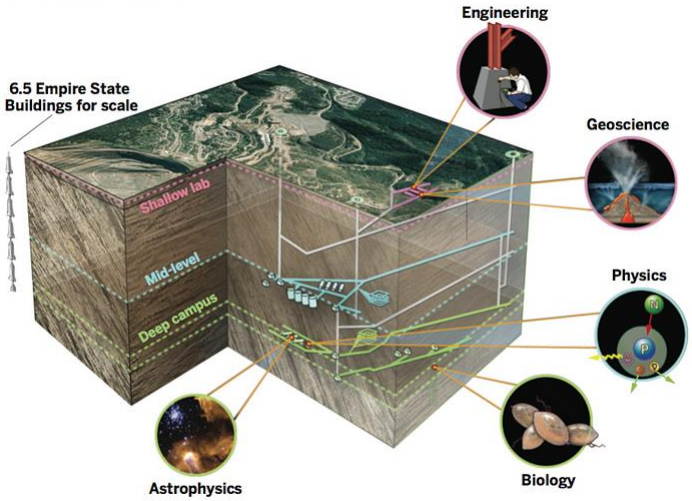


Image credits: Sanford Underground Research Facility)

$2 billion

SURF's net economic impact in South Dakota will total nearly $2 billion through 2029.

1,178 Jobs

On average, activities at SURF are expected to generate 1,178 jobs annually over the next decade.

$651 million

Activities at SURF are expected to generate $651 million in household earnings for South Dakotans over the next decade.

Example #2:

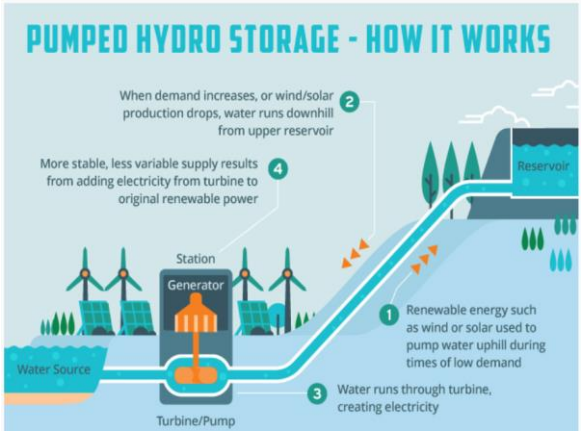
Clean Energy Generation & Storage

Clean Energy Generation & Storage

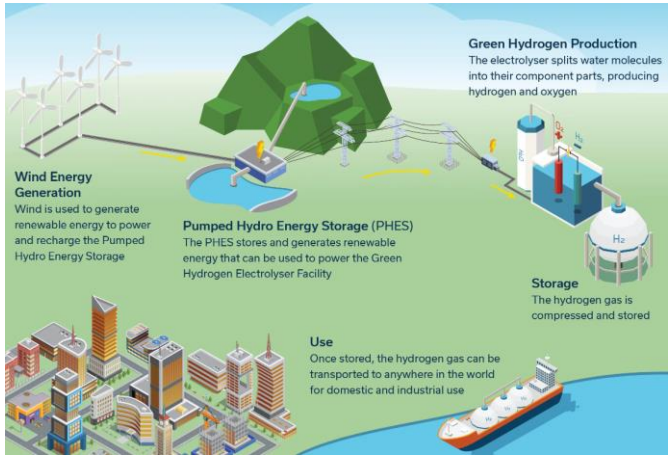
- Solar, Wind, Pumped Hydro Storage, Green-Hydrogen Production

- Pumped Hydro Storage:
  - Water pumped to upper reservoir when excess renewable energy or when energy is cheaper during periods of low demand
  - Water is released (and electricity generated from turbines) when there is a spike in demand, or insufficient wind or solar generation

- Examples:
  - Tent Mountain Renewable Energy Complex (Canada)
  - Genex Kidston Pumped Hydro Storage (Australia)



Images credit: Tent Mountain Renewable Energy Complex




Images credit: Genex Kidston Pumped-Hydro Storage

Example #3:

One Industry’s Waste is Another’s Treasure

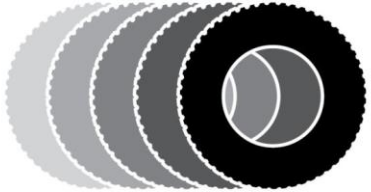
One Industry's Waste is Another's Treasure

- Mining tires are a common mine closure problem, however in some regions …
  - Tire manufacturers see this problem as an opportunity to recover high-quality materials like carbon black, pyrolysis oil, gas and steel
- In Chile:
  - Mines currently have > 400,000t of unused tires & are producing ± 27,000t a year
  - Bulk of tires are located in the country's **mining-dense** Antafagasta region
- Local problem solved through collaboration with an external industry & a regional perspective …
- Kal Tire & Michelin are investing $ millions in mine tire recycling plants in this region

KAL TIRE'S OTR RECYCLING PLANT IN ANTOFAGASTA

KALTIRE

A full load at the Chile plant is 20,000 kg of tires—the equivalent of five 63" tires that will be converted into:

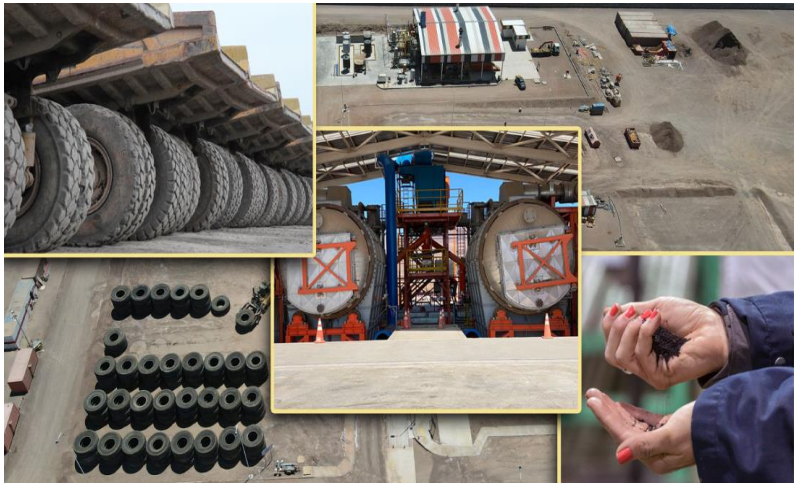


6,500 litres of alternative fuel

4,000 kg of steel

8,000 kg of carbon black

Enough **synthetic gas** to fuel the plant for seven hours



Images credit: Kal Tire

“When the winds of change blow, some build walls & others build windmills” – Old Proverb

- **Key takeaways:**
  - **Potential value in approaching problems from new perspectives**
  - **Multi-stakeholder collaboration is key to unlock opportunities**
  - **Let’s close mines with an <u>open mind</u>**

Thank You!

If you would like to connect with the presenter, you can do so via LinkedIn:

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