



Achieving INLs Net-Zero Future

August 2024

Changing the World's Energy Future

Bryson Justis Shaw, Nicholas Ryan Pell



INL is a U.S. Department of Energy National Laboratory operated by Battelle Energy Alliance, LLC

DISCLAIMER

This information was prepared as an account of work sponsored by an agency of the U.S. Government. Neither the U.S. Government nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness, of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. References herein to any specific commercial product, process, or service by trade name, trade mark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the U.S. Government or any agency thereof.

Achieving INLs Net-Zero Future

Bryson Justis Shaw, Nicholas Ryan Pell

August 2024

**Idaho National Laboratory
Idaho Falls, Idaho 83415**

<http://www.inl.gov>

**Prepared for the
U.S. Department of Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517**

Achieving INL's Net-Zero Future

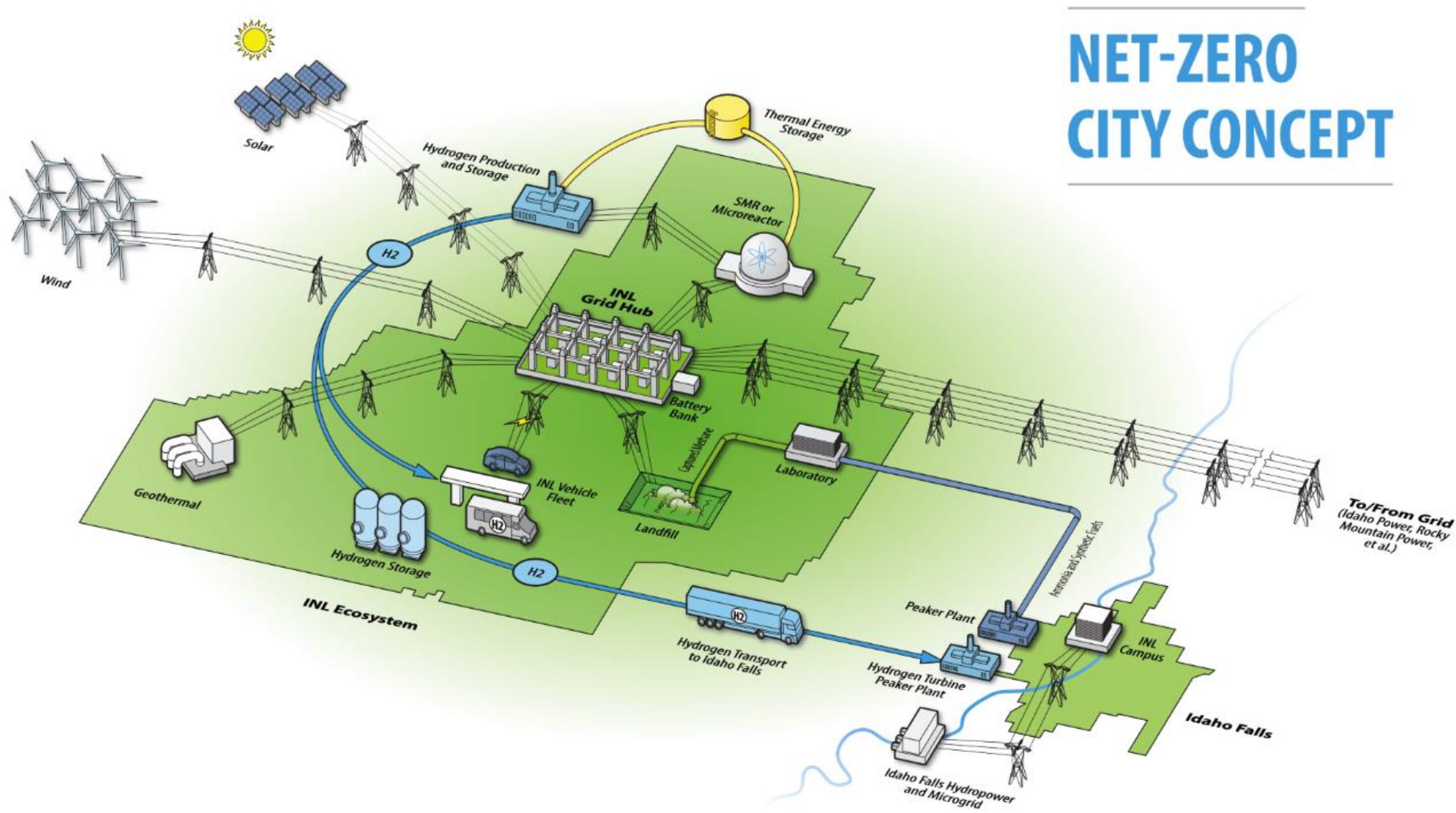
Interns: Nicholas Pell | University of North Carolina | Bryson Shaw | Utah State University
Mentors: Weston Tice | Maryl Fisher | A720

Objective

The Net-Zero Program is leveraging the innovative, synergistic research conducted at Idaho National Laboratory (INL) to achieve net-zero carbon emissions from site operations. This undertaking includes decarbonizing INL's 700+ vehicle fleet and over 300 buildings distributed across the 890-square-mile site as well as the Research and Education Campus.

Methods & Contributions

- Tracking energy use in INL buildings with data provided by metering to find areas for improvement in energy performance.
- Collecting INL-related electric vehicle advancement data to further inform the scope of our vehicle fleet transition which accounted for 9,038 metric tons of carbon dioxide equivalent in FY22.
- Gathering information on 50001 Ready, a DOE program that recognizes organizations that implement an energy management standard (EnMS) that focuses on continuous improvement in energy.
- Researching workforce development data to ensure INL is leading the growth of a diverse energy workforce that is projected to add 33 million new jobs by 2030.



Net-Zero Progress through FY23

- Transitioned 23 light-duty vehicles and 1 motor coach to electric, saving approximately 116.3 $MtCO_2e$ reduction/year.
- Installed 23 level 2 EV charging stations and 2 level 3 EV charging stations.
- Purchased renewable energy credits for 7.5% of the INL's electricity.
- Building temperature setbacks in 16 buildings saving ~80+ $MtCO_2e$ reduction/year.
- 50% waste reduction with recycling.
- Installed meters at about 90 buildings to benchmark energy use.
- Landfill emissions were originally estimated to be 6010 $MtCO_2e$ /year but has since been revised to be 1500 $MtCO_2e$ /year.
- 65.1% of the power provided by the utilities at INL is carbon free.
- Used 235,000 gallons of R99 in FY23 saving an estimated 2,398 $MtCO_2e$ in comparison to using regular diesel.

Conclusions

The Net-Zero program at INL is on pace to significantly reduce emissions by 2031, leading the nation in the clean energy transition, sharing innovations and solutions with the nation and the world. The goal for our contributions as interns is to prepare the Net-Zero program at INL to keep pace with a shifting energy landscape to face new challenges, innovate, and continue sharing its success with the nation and world. Currently, INL sees decarbonization success in electrifying its fleet, electrifying its buildings, and monitoring its energy performance. Looking forward, INL will reach net-zero and secure 100% carbon pollution-free electricity through continued electrification, energy efficiency, and carbon capture efforts.