

Community Outreach Reflection and Metrics – Final Report



NAU Hydropower Collegiate Competition

Riley Frisell
Evan Higgins
Evie Melahn
Zonghua Ouyang
Trevor Senior
Winston Steele

Faculty Advisor

Carson Pete

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1 After Action Report

Our team's exploration into workforce development within the renewable energy sector emphasized the need for early education and engagement in hydropower. Through consultations with industry professionals and teachers, we affirmed the importance of sparking interest in STEM careers early on. As college students, we served as relatable role models, bridging the gap between young students and more distant figures like teachers. At the KidWind Challenge, we leveraged our connections to focus on high school students already interested in renewables, effectively showcasing hydropower's dynamic career possibilities, and making these opportunities tangible and attainable to the younger generation.

1.1 Outreach Impact: Community Engagement and Progress

Our outreach journey commenced with a strategic plan to enhance hydropower education across various demographics, aiming to deepen understanding and stimulate interest in renewable energy careers. Initially, after interviewing industry experts during the fall semester, our team had planned three key events as part of our Community Connection Challenge. However, recognizing the need for a more focused and potentially impactful engagement, we decided to pivot from a broader "Earth Day" event to a targeted educational session at the STAR School. Situated in the Navajo Nation and renowned as the first completely off-grid public charter school in the U.S., the STAR School offered a unique opportunity to influence a community that embodies sustainable practices as part of their daily lives.

1.1.1 Science Saturday and STAR School

Our outreach initiatives at Willow Bend's Science Saturday and The STAR School were vital early steps in our strategy to enhance workforce development in the renewable energy sector. At Science Saturday, engaging young students with interactive water wheel models and discussions about water conservation illustrated hydropower's role in sustainable energy (Figure 1 and Figure 2). However, the young age of the participants highlighted the challenges in fostering a long-term interest in hydropower careers, guiding us to focus on audiences who could more readily connect educational experiences to potential career paths.



Figure 1: Crowd at Science Saturday. Note that children's faces have been blurred as a part of the photo release form.



Figure 2: Table at Science Saturday with Willow Bend, with our water wheel activity and poster to present to parents and kids.

The visit to The STAR School in the Navajo Nation, an off-grid community deeply embedded with sustainable practices, offered a more aligned demographic. Our demonstrations, including a stream table (Figure 3) and a generator model (Figure 4), detailed the practical workings of hydropower and career roles within the industry, from engineering to environmental management. This engagement was significantly impactful, as it connected students' everyday experiences with solar and wind energy to the potentials of hydropower, encouraging them to consider these fields as viable career paths.



Figure 3: Stream table demonstration at STAR School.



Figure 4: Generator model demonstration at STAR School.

While these initial events helped us refine our approach and provided valuable insights, they served primarily as steppingstones to our more focused and impactful engagement at the KidWind Challenge. Here, we leveraged lessons learned from earlier events to implement a targeted strategy that effectively communicated the breadth of career opportunities in hydropower to an audience already interested in renewable energies, setting the stage for a more profound outreach outcome.

1.1.2 KidWind Challenge

At the KidWind Challenge, we engaged with high school students keen on renewable energies. Willow Bend's event focused on wind power, offering a perfect stage for us to highlight hydropower. Partnering with NAU's Energy Club, we portrayed hydropower as a viable complement to wind energy, showcasing its diverse career prospects and importance for ecological sustainability, mirroring research initiatives like those at Oak Ridge Laboratory. Our position as college students added a relatable dimension to our presentation, making it easier for attendees to see themselves in our roles. Through interactive demonstrations and

discussions, detailed in Figure 5, we connected students' current interests in renewables and potential career paths in hydropower based on our personal experiences.



Figure 5: KidWind Challenge tabling at the event. Pictured (left to right): Evie Melahn, Trevor Senior, Winston Steele, Evan Higgins, Riley Frisell.

This setting not only allowed us to educate but also to inspire these young minds about the impact they could have in the energy sector, thereby nurturing a new generation of professionals poised to drive the future of sustainable energy. This focused engagement at the KidWind Challenge underscored the effectiveness of direct interaction with students who are already considering their professional futures, refining our outreach strategies, and setting a benchmark for future initiatives.

1.2 Challenges, Solutions, and Insights

Our outreach at the KidWind Challenge capitalized on lessons learned from engaging younger audiences, where we noted their enthusiasm but limited grasp of hydropower's long-term career implications. This insight shifted our focus to older students, a strategy reinforced by our experience at The STAR School where students were more receptive but still needed deeper engagement. At KidWind, the main challenge was clarifying hydropower's complexities to high school students already interested in renewables but unfamiliar with the field's specifics. We

refined our interactive models and presentations to connect theoretical concepts with real career opportunities, enhancing their practical understanding.

Additionally, coordinating these events required significant logistical efforts, including aligning our objectives with hosts like Willow Bend and The STAR School and adapting our materials to fit various learning environments. These efforts underscored the importance of adaptability and a deep understanding of the audience's knowledge and interests. By applying these insights at KidWind, we significantly impacted students, inspiring them to consider careers in renewable energies, particularly hydropower. This strategic approach not only improved their understanding but also strengthened our team's outreach effectiveness at KidWind to maximize our outreach impact.

1.3 Impact and Engagement Within the Hydropower Community

The KidWind Challenge was a key milestone in our outreach goals, effectively connecting high school students to the dynamic possibilities within the hydropower industry. Our demonstrations and discussions about the day-to-day activities of engineering students offered a practical and inspiring view of career opportunities in hydropower. This was crucial at a time when the industry is experiencing significant generational turnover and needs new talent. Positive feedback from students confirmed their growing interest in hydropower, highlighting the success of our approach. Industry professionals tabling at KidWind also noted the students' increased engagement, confirming the effectiveness of our strategy. This initiative bridged the gap between students' renewable energy enthusiasm and tangible career paths, enhancing hydropower's image as a vibrant field with abundant opportunities.

1.4 Community Outreach, Journey, and Reflections

Reflecting on the Community Connections Challenge, it's evident that focusing on the KidWind Challenge as our main event was crucial. Effective outreach is about forging connections that inspire and motivate, as we've learned the power of representation and direct engagement in stimulating interest in renewable energy careers. Our efforts at the KidWind Challenge contributed significantly to the broader challenge of attracting and developing a new generation of hydropower professionals. We take pride in our impact and are committed to continuing our outreach, using the valuable insights and experiences we've gained as a blueprint for future initiatives.

2 Metrics Report

The Metrics Report showcases outcomes of community initiatives and outreach, measuring impact on hydropower career interest. It compiles industry interviews and engagement data, providing insights into our influence on students, professionals, and communities. By analyzing these metrics, we evaluate our impact on hydropower community growth and STEM career interest, driven by hands-on demonstrations and discussions at key events.

2.1 Industry Interview Metrics and Outcomes

In pursuit of enhancing hydropower's appeal to the next generation, we conducted interviews with six industry professionals from diverse sectors, as shown in Table 1. These conversations, which varied from renewable energy research to project development, provided multifaceted perspectives that enriched our outreach narrative, as outlined in our Midyear Submission.

Table 1: Industry interviewee details and contact information.

Industry Interviewee	Sector in Hydropower	Company Affiliation	Email Address	Origin of Relationship	Interest in HCC
Dr. Venkata Yaramasu	Research in Renewable Energy	Northern Arizona University	venkata.yaramasu@nau.edu	Alumni	No
Shane Harrison	Utility/O&M	Salt River Project (SRP)	shane.harrison@srpnet.com	Professional	N/A
Jonathan Moore	Developer/Engineering Consultant (Small-Scale Hydro)	Moore Ventures, LLC Appalachian Hydro Associates	jonathan@mooreventures.com	Professional	Yes
Albin Atzmueller	Sales and Project Engineering (Small-Scale Hydro)	Voith	albin.atzmueller@voith.com	Professional	Yes
Moran Henn	Education and Outreach	Willow Bend Environmental Education Center	moran@willowbendcenter.org	Alumni	Yes
Ben Lemkau	Solar Project Development	RWE and Con Edison	benjamin.lemkau@rwe.com	Professional	N/A

Attendance metrics for these interviews, as depicted in Figure 6, reflect the commitment of our team, NAU Hydro Homies, in engaging with industry experts to gather insights that would underpin our educational efforts.

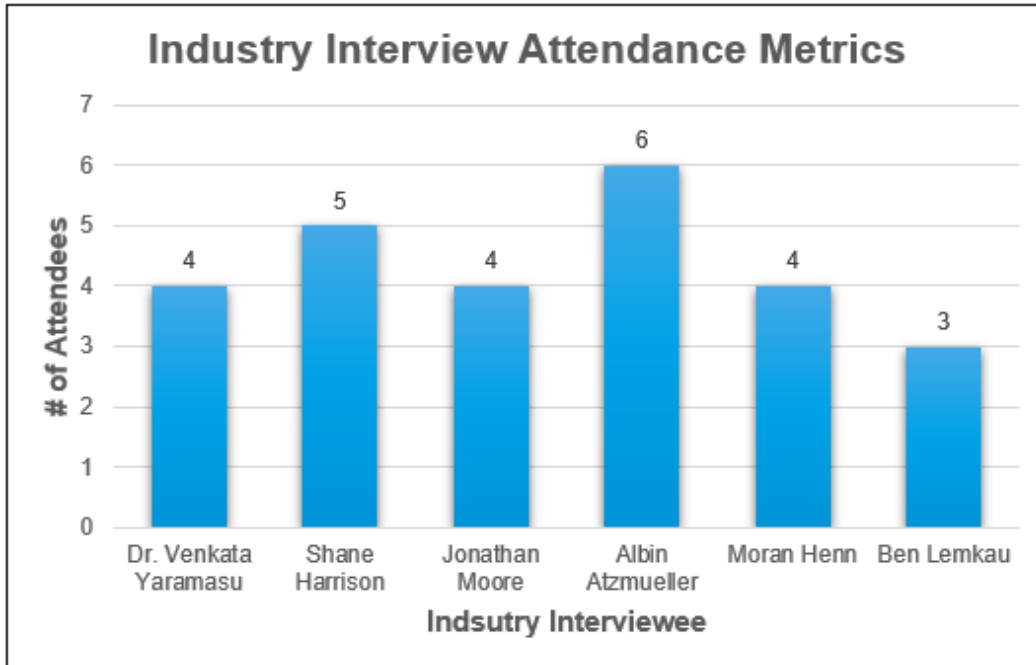


Figure 6: Attendance metrics for industry interviews.

2.2 Outreach Impact Assessment

Our goal was to leave a lasting impression during our community engagements, primarily through an interactive stream table that captured and held the attention of our audience. This tool was not only a focal point for demonstrating the mechanics of hydropower but also served as a catalyst for sparking interest in the field. We aimed for this interaction to resonate on a personal level, seeding curiosity and understanding. The stream table, now donated to Willow Bend for their renewable energy education initiatives, has been well-received, reflecting the positive impact of our efforts. Feedback and metrics from these events affirm that our personal approach, particularly during one-on-one conversations at KidWind, was effective in fostering genuine connections and a deeper interest in hydropower careers.

2.2.1 Event Summary and Represented Regions

At STAR School, located 25 miles east of Flagstaff, Arizona, we engaged with 6th grade students about hydropower's practical applications and career opportunities using a brief PowerPoint presentation and engaging activities outlined above in Figure 3 and Figure 4.

As discussed, the KidWind Challenge saw our active participation in a career fair format, facilitating discussions around hydropower with students from the following schools and regions:

- Prescott, Arizona
 - Northpoint Expeditionary Learning Academy
- Eloy, Arizona

- Santa Cruz Valley Union High School
- Flagstaff, Arizona
 - Coconino High School
 - Flagstaff High School
 - Northland Preparatory Academy

2.2.2 Event Metrics and Attendance

Attendance: We achieved a participation rate of **4 out of 6** team members at STAR School, and recorded attendance of **5 out of 6** team members at the KidWind Challenge.

The detailed metrics in Table 2 and Table 3 illustrate the positive response to our outreach efforts, with high levels of enjoyment and interest in learning more about hydropower indicated by the participants. Our team's presence and interactive approach at these events were instrumental in increasing awareness and sparking consideration of hydropower careers, demonstrating the effectiveness of our targeted outreach strategies.

Table 2: Survey Metrics from STAR School (16 Participants)

Question Surveyed	Yes	Percentage
Did you know about hydropower before today?	1	6.25%
Did you enjoy learning about hydropower?	16	100.00%
Do you want to learn more about hydropower?	11	68.75%
Do you think a job relating to hydropower could be fun?	9	56.25%

Table 3: Survey Metrics from KidWind Challenge (33 Participants)

Question Surveyed	Yes	Percentage
Did you know about hydropower before today?	18	54.55%
Did you enjoy learning about hydropower?	30	90.91%
Do you want to learn more about hydropower?	24	72.73%
Do you think a job relating to hydropower could be fun?	21	63.64%

2.2.3 Social Media Metrics

For the competition, the team built a [website](#) designed around our capstone and HCC deliverables to serve as a portfolio of our work through the year. While metrics for the website

are not available, we made sure to include a QR code linked to our website at the three outreach events we participated in for people who had questions or wanted to learn more about our project. We also made an [Instagram](#) (Figure 7) account for our NAU Hydropower Team to make informational posts on hydropower and showcase our work on the HCC.

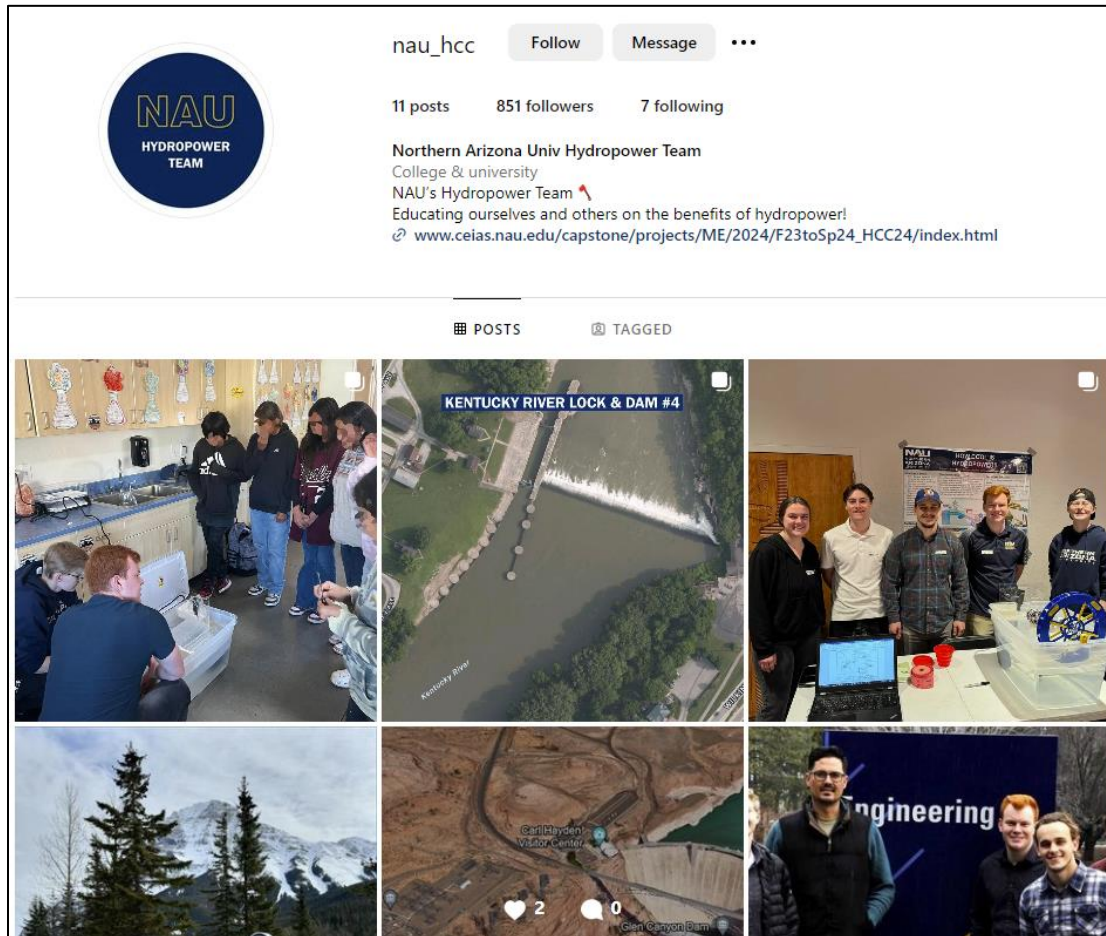


Figure 7: NAU Hydropower Team Instagram page.

By transforming a personal account with about 670 followers into the official social media platform for the NAU Hydropower Team, we grew our account by over 150 followers (Figure 8) to a **total of 851 followers**. By leveraging an existing audience, the team was able to amplify our outreach and impact. From Instagram Insights, we reached 141 accounts in the past 90 days, 81.7% of which were followers and 18.2% were non-followers (Figure 9). Our team created a **total of 11 posts** for outreach purposes.

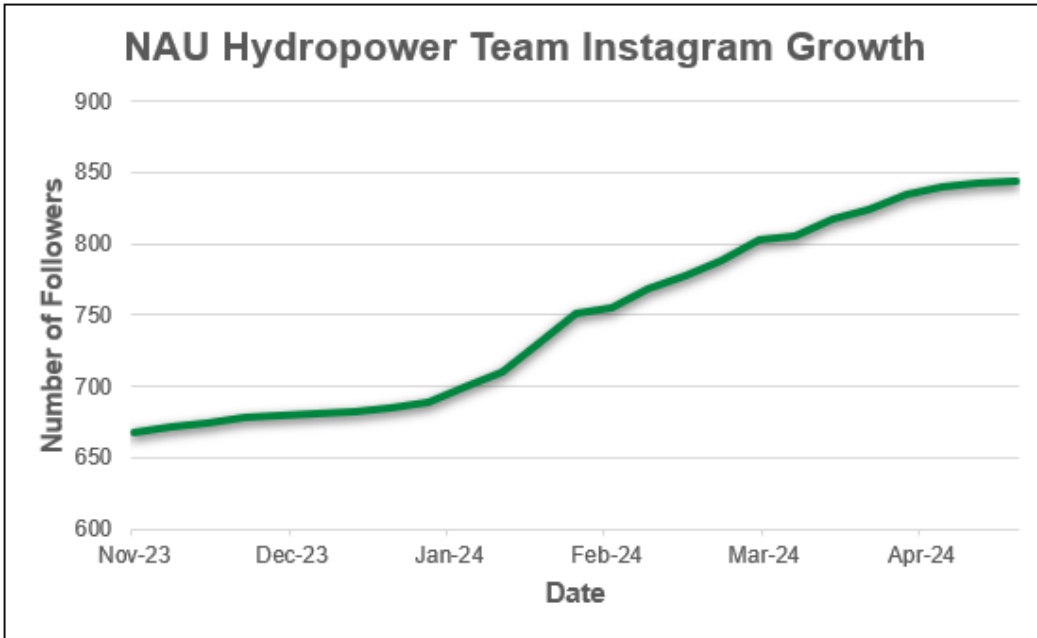


Figure 8: NAU Hydropower Team Instagram growth over the past six months.

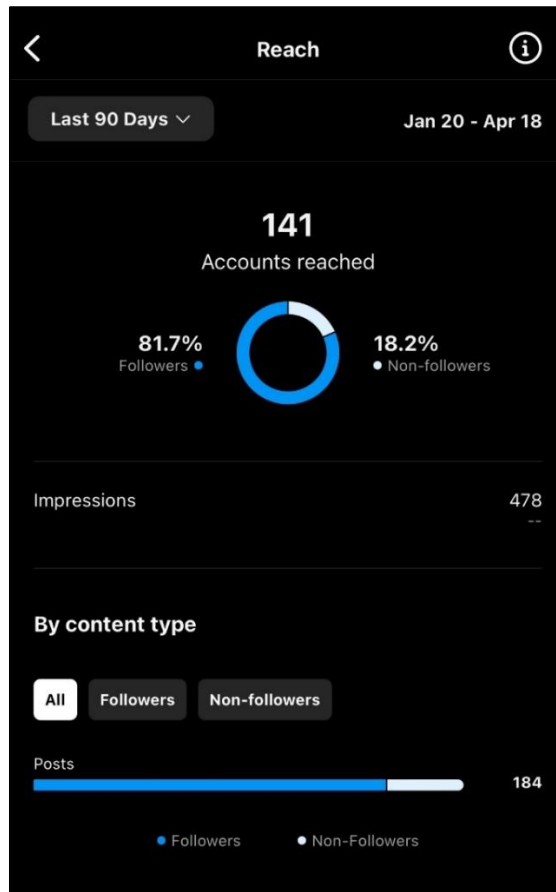


Figure 9: Account Insights on Instagram app.

Overall, the website and Instagram have been instrumental in keeping students, families, and friends informed about our competition journey and in sharing educational content on hydropower.

2.2.4 Reflection

Reflecting on our outreach strategy, it's clear that interactive elements like the stream table were key to capturing attention and engaging participants. We learned that adapting our communication style for different audiences, from sixth graders to industry professionals, was crucial in making our message about hydropower resonate. Best practices included utilizing social media for broader reach and incorporating real-life project experiences to illustrate career paths. These lessons have taught us the value of flexibility, relatability, and the power of visual storytelling in educational outreach.

3 Outreach Images



Figure 10: Stream table and poster at the KidWind Challenge.



Figure 11: Stream table our team built with a water wheel.



Figure 12: Group photo with high schoolers, industry professionals, and staff at KidWind Challenge.



Figure 13: Team logo for outreach purposes.



Figure 14: NAU Energy Club meeting helping with HCC outreach.

**We're taking it easy this week in
our club meeting because we are
helping out with a community
event Thursday
(more info next slide)**


**Lots of food! Kahoot/Trivia!
Come and hang out**



Want more info?
Club President: Ryan Frost (rjf244@nau.edu)
CWC Contact: Sam Russell (sr2429@nau.edu)

Figure 15: NAU Energy club recruitment flier.



This Week In Energy Club!



**Help Hydropower Collegiate
Competition Team build a stream
table for Willow Bend's Science
Saturday!**

Free Monster Energy Drinks!!!

**Weekly Energy Club Meetings:
LRC Rm 106C
Thursdays 6-7pm**

Want more info?
Club President: Ryan Frost (rjf244@nau.edu)
Club Advisor: David Willy (David.Willy@nau.edu)

Figure 16: NAU Energy Club recruitment flier.