

Interview Summary and Outreach Strategy – Midyear Submission



NAU Hydropower Collegiate Competition

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1 Interview Overview

The hydropower industry is currently struggling with issues related to an aging labor force and the need to educate a new generation adept in modern technology to boost clean energy production. Considering this problem statement, the HCC team at NAU decided to focus their community outreach strategy on workforce development. Given this, the goal of the NAU HCC team's outreach is to stimulate youth interest in hydropower through connections with industry professionals and the NAU Energy Club. Through community engagement, we are hoping to attract and inspire the skilled labor force that will be necessary to sustain and advance the hydropower industry.

1.1 Dr. Venkata Yaramasu

Sector: Research in Renewable Energy

State/Region: Flagstaff, Arizona

Job Title: Electrical Engineering Assistant Professor

Organization: Northern Arizona University

Summary of Topic Area:

Assistant Professor Venkata Yaramasu, with a focus on renewable energy and related technologies, provided insights into the intersection of academia and industry in advancing renewable energy solutions. Our conversation explored the implications of current research trends for workforce development in renewable energies, the evolving landscape of clean energy technologies, and the role of education in preparing students for future challenges in Energy.

Key Takeaways:

Dr. Venkata Yaramasu's key takeaways emphasize the competitive landscape of renewable energy sources in Arizona, where solar power, due to its declining costs, has become more economically favorable compared to hydropower. Furthermore, Dr. Yaramasu highlights a concern in the educational pipeline where there's a decline in students entering the field of electrical engineering, which is critical for the advancement of renewable energy technologies. Due to this trend, he explained that he suggests a need for the academic curriculum to adapt and include more courses focused on renewable energy to attract and prepare students for future challenges in Energy.

1.2 Shane Harrison

Sector: Utility/Operations and Maintenance in Hydropower

State/Region: Arizona/Southwest

Job Title: O&M Manager

Organization: Salt River Project

Summary of Topic Area:

Shane Harrison oversees the operations and maintenance aspects of hydropower at the Salt River Project, ensuring the efficiency and reliability of these essential energy resources. Our discussion with Shane aimed to uncover the dynamics of the hydropower workforce, the training and skill development necessary for new hires, and the strategies employed by SRP to attract, develop, and retain talent in this critical sector.

Key Takeaways:

Shane provided a comprehensive overview of the workforce dynamics within the hydropower division at SRP, including the blend of office roles to fieldwork. He detailed SRP's approach to training new hires, emphasizing the importance of general mechanical knowledge and the evolving need for technology training due to advancements in control methods. Shane discussed efforts to develop fresh talent, particularly the difficulty of attracting skilled professionals to remote locations and the competition with jobs in other renewable careers. When discussing the future of hydropower in Arizona, he mentioned the operational challenges posed by aging infrastructure and the necessity of a workforce for proactive maintenance.

1.3 Jonathan Moore

Sector: Developer/Consultant in Small-Scale Hydropower

State/Region: Kentucky/Midwest

Job Title: Principal Engineer (self-employed)

Organizations: Moore Ventures, LLC (Founder) and Appalachian Hydro Associates (Partner)

Summary of Topic Area:

Jonathan Moore, holding three PE licenses in mechanical, controls, and electrical engineering, brings a wealth of expertise to the development and upgrading of small hydroelectric plants. Our questions for Jonathan focused on the integration of these projects within local communities, the specific workforce development challenges they entail, and the potential for community engagement and educational outreach to cultivate interest in hydropower among younger generations.

Key Takeaways:

Moore emphasized the importance of engaging local labor and small businesses in project development, highlighting the mutual benefits for the industry and local economies. He pointed out a significant gap in the industry: the need for individuals with hands-on project management experience and practical skills to follow through on project plans. Moore also shared innovative methods for training the next generation, such as community engagement projects with Eagle Scouts and internships that offer real-world experience. A key takeaway was Moore's active involvement with local schools to spark students' interest in hydropower, underlining the potential of early education in building a future workforce for the sector.

1.4 Albin Atzmueller

Sector: Sales and Project Engineering Division in Small Hydropower

State/Region: York, Pennsylvania

Job Title: Small Hydro Concept Specialist & Sales Manager

Organizations: Voith

Summary of Topic Area:

Albin Atzmueller, specializing in small hydro projects, brings a unique perspective to the hydropower sector, blending technical expertise with sales acumen. Our questions and discussion addressed the impact of innovation on small hydro development, the skill sets emerging as critical in this evolving field, and Albin's personal journey from a business background to a key player in renewable energy, emphasizing the broad spectrum of career paths available within hydropower.

Key Takeaways:

Albin Atzmueller shared insights from his role as a project and sales engineer in the small hydro sector, emphasizing the value of "learning by doing" and the importance of self-sourced education and networking within the industry. While not incorporated in hiring processes Albin covered the aspects of working for Voith and the diverse possibility of offered roles within the company and how it develops its younger workforce. Despite his business background and initial lack of focus on the energy sector, Atzmueller has found a fulfilling career in hydropower and encourages individuals without specialized knowledge to explore diverse career paths. Atzmueller's journey underscores the potential for personal and professional growth in the hydropower industry by remaining open to new experiences and adhering to one's principles.

1.5 Moran Henn

Sector: Education and Outreach in Environmental Education

State/Region: Flagstaff, Arizona

Job Title: Executive Director

Organizations: Willow Bend Environmental Education Center

Summary of Topic Area:

Through the KidWind Challenge, Moran and her team are aiming to inspire and educate students about renewable energy, highlighting wind power while fostering a broader understanding of its relationship to climate change. Our engagement with Willow Bend and the KidWind Challenge centered on leveraging this platform to introduce hydropower concepts to young learners, thereby expanding their view of renewable energy careers and STEM opportunities, along with exploring collaborative efforts to enhance educational outreach in renewable energies.

Key Takeaways:

Moran highlighted the effectiveness of repetitive, hands-on learning experiences in retaining students' interest and fostering solution-oriented thinking. The emphasis on making renewable energy education both informative and engaging, particularly through practical activities like building windmills, aligns with our goal of inspiring the next generation to consider careers in renewable energy. KidWind's efforts to involve the community in their educational programs, and their strategies for addressing the challenges of teaching complex topics like climate change, provide a model for how to effectively communicate the opportunities within the renewable energy sector to young audiences.

2 Strategic Outreach and Partnership Synergy

Our team's exploration into workforce development within the renewable energy sector, particularly hydropower, underscored the critical need for early engagement and education. Interviews with industry professionals revealed a consensus on the importance of sparking interest in STEM and renewable energy careers from a young age. Our team believes that college students, like us, can serve as relatable role models, bridging the gap between younger students and more distant figures like teachers or industry professionals. This strategy allows us to utilize our current connections and partnerships, while also making the concept of a career in hydropower more tangible and attainable for these young minds.

2.1 Leveraging Relationships for Outreach

Along with our connections made with industry interviews, we also have a relationship with an Arizona Public Service (APS) substation operator, who gave us a tour of a nearby substation and offered his background on educating the community about the power grid. Additionally, our active role in NAU's Energy Club and collaboration with Willow Bend Environmental Education Center enhances our reach within Flagstaff. Through Willow Bend's established programs, the NAU Energy Club can introduce hydropower concepts to young students, while leveraging Willow Bend's events to highlight sustainable energy's importance.



Figure 1: APS Soldier Pass substation tour team photo. Pictured (left to right): Trevor Senior, Evan Higgins, Winston Steele, and Zonghua Ouyang.

2.2 Overall Plan of Action

Beyond leveraging the NAU Energy Club's platform, our team has outlined a trio of events that serve as conduits for our outreach efforts. At each of these events, we would plan to open a booth with engaging visuals, interactive activities, and possibly take-home materials that delve into how hydropower works. In the upcoming weeks, we plan to work closely with Willow Bend's team to ensure our materials resonate with students' diverse age ranges. Our narrative will also include insights from us as young professionals, providing real-life examples of the rewarding paths within hydropower. By adapting our message to the context of each event, we aim to showcase renewable energy as a multidisciplinary field with extensive career opportunities.

2.2.1 Proposed Solution #1 – Science Saturday

Willow Bend invited us to their water conservation-themed “Science Saturday” to talk with their students in April. With this theme, recognizing the importance of water in both conservation and energy contexts allows us to craft activities and discussions that highlight hydropower's role in sustainable water usage and energy production. Engaging students in hands-on, practical learning experiences related to water and energy would not only educate them on important environmental issues but also introduce them to potential career paths in renewable energy, particularly hydropower.

2.2.2 Proposed Solution #2 – Earth Day Event Tabling

Earth Day provides a platform to discuss hydropower's role in renewable energy and its importance in mitigating climate change. Choosing the Earth Day event for our outreach would allow us to connect the dots between renewable energy, environmental stewardship, and career development in a context that resonates with attendees' existing interests and values. This approach underscores the relevance of hydropower in addressing global challenges, thus fostering a deeper interest and appreciation among students.

2.2.3 Proposed Solution #3 – KidWind Challenge Participation

The KidWind Challenge's focus on wind power provides a natural entry point to discuss the broader spectrum of renewable energy, including hydropower. This setting, filled with students already interested in renewables (4th-12th graders), offers fertile ground for planting seeds of interest in hydropower careers. Using KidWind's direct partnership with NAU's Energy Club (which includes members of NAU's Collegiate Wind Competition), we can present hydropower to younger students as an extension of their current interests. This can effectively broaden their perspective on renewable energy and encourage them to consider diverse career paths within this growing field.

2.3 Social Media and Communications Strategy

Over the past few months our team has created a [website](#) and an [Instagram account](#) to highlight our progress during this competition and showcase the opportunities that this competition has brought us. The website functions as our engineering capstone site and includes all project progress. it offers lower-level undergraduates and professionals an opportunity to view the project, encouraging them to participate in it in the future or pursue a job in the hydropower sector. As our account expands, we intend to keep highlighting hydropower and the experiences that have come from the project on Instagram.

3 Timeline of Events

Our NAU HCC team's commitment to nurturing the future hydropower workforce has shaped a focused outreach agenda, driven by insights from industry experts and alliances with organizations like Willow Bend. Our upcoming timeline, detailed in the accompanying chart, outlines a series of educational events designed to promote hydropower to a new generation, ensuring our message resonates across various platforms. We're excited about the opportunity to spark a sustained interest in hydropower among the youth, laying the groundwork for a future rich in clean energy solutions.

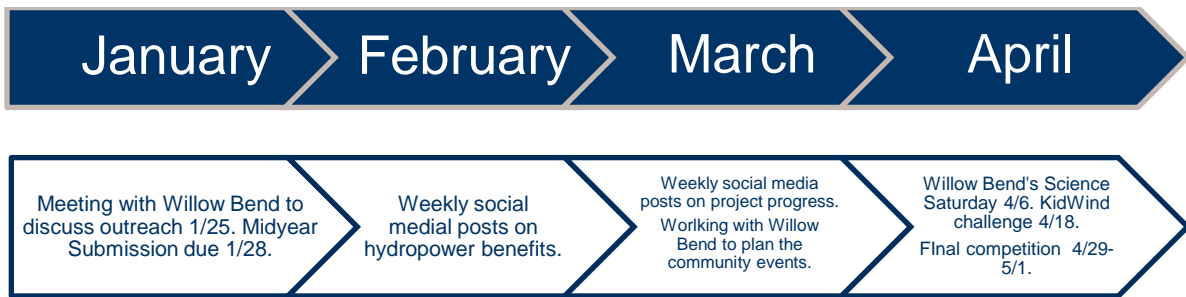


Figure 2: Timeline of upcoming events and outreach plans

Outreach Images



Figure 3: Team logo for outreach purposes



Figure 4: Hoover Dam image for team website use taken by Trevor Senior

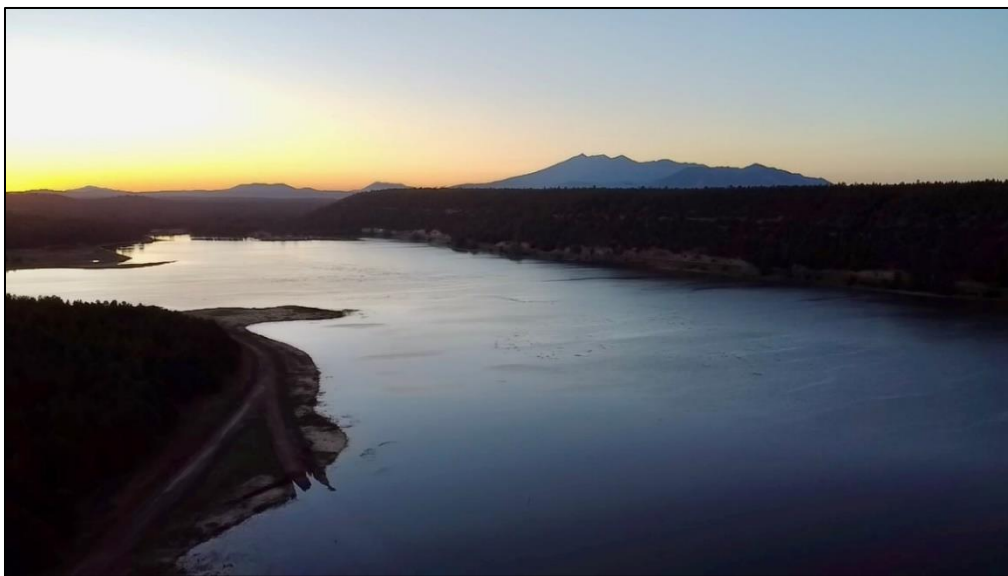


Figure 5: Lake Mary image for team outreach use taken by Trevor Senior