“Community Connections Challenge: Metrics Report”

by the Marine EnergY & Oakland University
(ME & YOU) Team

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05 / 13 / 2024

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Metrics Report

1. Overview of Actions Taken

Our team's motivation is captured by our slogan "ME and YOU (Marine EnergY and Oakland University): Because clean energy and water should be for all." The MECC Community Connections Challenge has been a great way of putting this motivation into action. Recognizing the critical role of education and information in shaping future marine energy permitting, regulations, and funding, we've thrown our full energy into prioritizing this crucial thematic area.

Our efforts have been dynamic and diverse, including (1) hosting outreach events and classroom visits for K-12 STEM education, (2) rejuvenating our student chapter of "Engineers for a Sustainable World", and (3) organizing a marine energy seminar for our campus community and online collaborators. Our team also harnessed social media platforms to further our reach.

1.1. K-12 Outreach and Classroom Visits

As part of our outreach initiative, our team engaged with diverse student populations through the Detroit Area Pre-College Engineering Program (DAPCEP) and Melvindale High School. DAPCEP serves underrepresented youth in Detroit and Pontiac, encompassing middle to high school students from diverse socioeconomic backgrounds.

- On March 9, 2024, our team hosted a group of 10 DAPCEP middle and high school students at the Oakland University campus. We shared a presentation on marine energy and a hands-on activity, where students crafted miniature point absorbers to generate power from wave energy. We also offered mentorship through Q&A sessions for those interested in STEM careers.

- On March 22, 2024, our team collaborated with a STEM teacher at Melvindale High School, presenting a marine energy session. Situated near Detroit, the school serves a diverse population. The students' keen interest and engagement, captured in Figure 1, underscored the impact of our outreach. A total of 54 high schoolers took part in the activity.

Figure 1: Hosting DAPCEP Program at OU (*top left*). Visiting high school classes at Melvindale High School (*other photos*)

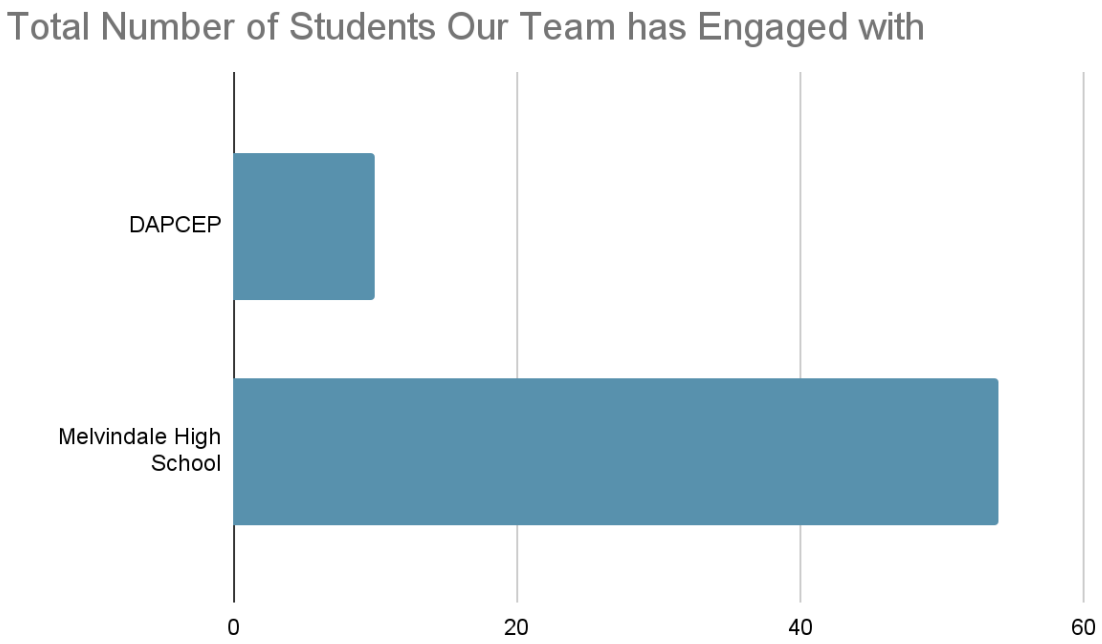


Figure 2: Number of students that we engaged with through our K-12 outreach activity.

1.2. Rejuvenating our Student Clubs

In addition to our K-12 outreach efforts, our team has revitalized Oakland University's Engineers for a Sustainable World (ESW) Club, aiming to advance technical sustainability. Previously inactive, our team restructured the club from the ground up, envisioning it as a platform for students to engage in renewable energy projects and competitions, such as the MECC project, with club-funded teams. This semester, we organized five events to recruit and raise awareness for the ESW Club. All the events, listed below with pictures included in Figure 3, are centered on promoting and supporting renewable energy initiatives, especially in marine energy. These events, including tabling, tours, and informational meetings, not only bolstered campus community ties but also fostered partnerships with various campus organizations. These endeavors exemplify our commitment to fostering sustainable initiatives and cultivating a supportive community around them.

- January 5, 2024: Organized an informational meeting to discuss progress updates and plans for the renewed Engineers for a Sustainable World (ESW) Club.
- January 9, 2024: Engaged attendees during the OU GrizzFest event, providing information about the ESW Club's revitalization efforts and opportunities for involvement in renewable energy projects.
- March 12, 2024: Held another informational meeting to update members on the latest developments and gather feedback on upcoming initiatives aimed at promoting sustainability within the campus community.
- March 14, 2024: Teamed up with Tau Beta Pi to celebrate "Pi" Day and to further engage with the community.
- March 19, 2024: Hosted a tour of the Renewable Energy Lab, offering insights into potential research projects for ESW members and showcasing the club's progress.

Figure 3: Tabling events (*top*) and lab tours (*bottom*) to promote student clubs.

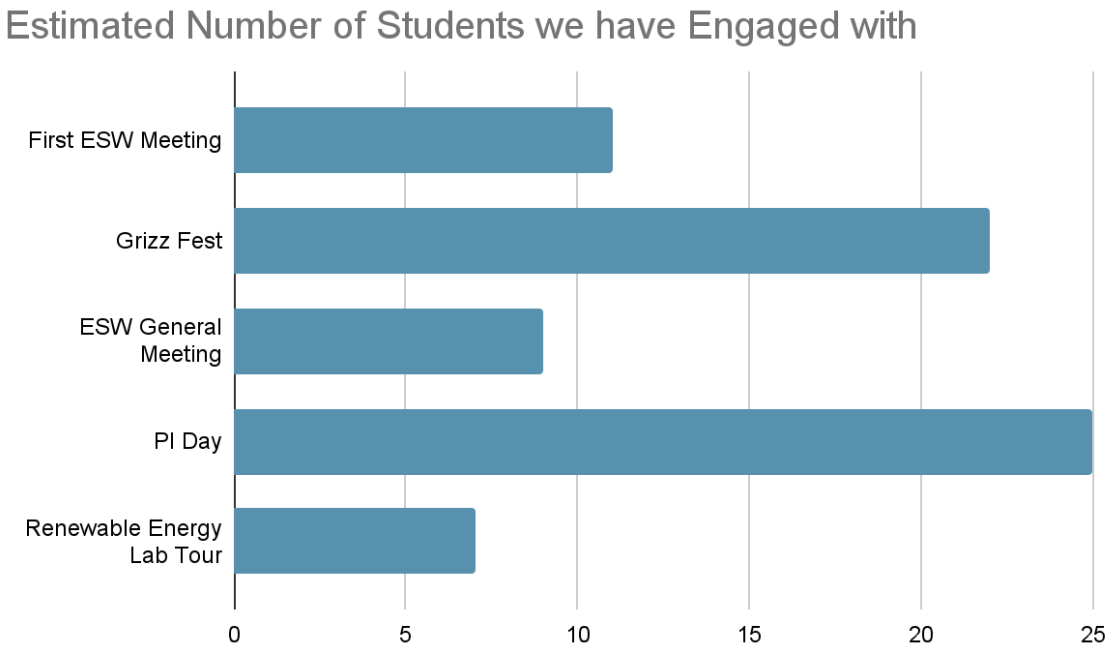


Figure 4: Estimated number of student engagement throughout our events.

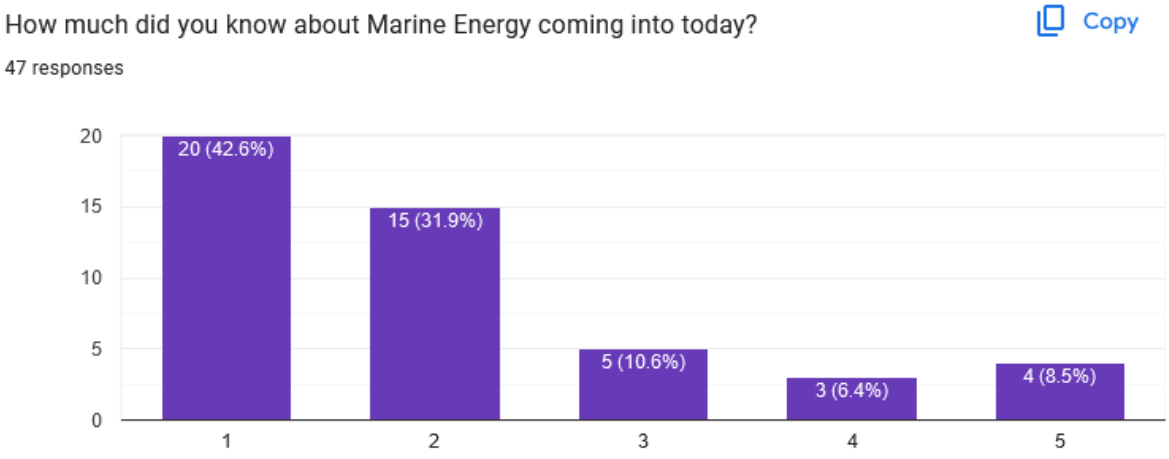
1.3. Promoting Marine Energy on Campus

Our ESW Club's seminar on March 28th was pivotal, featuring esteemed speakers from Sandia National Laboratories, Dr. Carlos A. Michelén Ströfer, and Dr. Jorge A. Leon-Quiroga. Dr. Michelén Ströfer discussed "Control Co-design of Wave Energy Converters Using Pseudo-Spectral Method," optimizing design and control parameters, while Dr. Leon-Quiroga addressed grid integration challenges. Both talks sparked intellectual exchange, advancing knowledge. See Figure 5 for a snapshot of our social media post and event photo.

Figure 5: Instagram post (*left*) for the seminar event, and picture of that event (*right*).

2. Impact on the Marine Energy Community

Our focused outreach efforts effectively engage community members, nurturing discussions and collaboration. Through K-12 initiatives, we ignite passion in future scientists and engineers. During the March 9th DAPCEP Program, interactions with 10 students resulted in a remarkable moment. One student exclaimed, "I never knew the ocean could make electricity!" At Melvindale High School on March 22nd, diverse responses underscored our impact, with students showing keen interest in renewable energy careers. Survey results affirm our success, showcasing tangible impact on 47 students, and enriching their understanding of STEM, especially in marine energy.



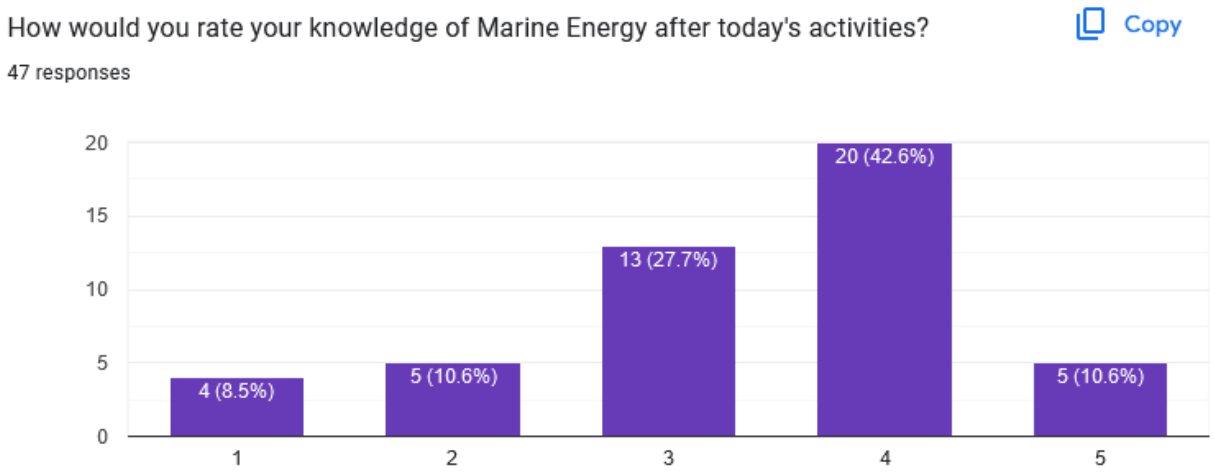


Figure 6: Survey results from students participating in our outreach events.

Our dedication to nurturing Engineers for a Sustainable World (ESW) has yielded significant outcomes, both quantitatively and qualitatively. Events like Winter Grizz Fest and PI Day witnessed a surge in membership, with 12 and 15 new sign-ups respectively, demonstrating our impact. The revival of the dormant ESW Club on January 5th attracted 7 attendees, including the full team, reigniting interest in our mission. Subsequent meetings maintained momentum, with 6 attendees on March 12th, indicating sustained engagement. Our recent seminar, in collaboration with ESW, drew 48 attendees and 5 virtual participants, gaining global academic and local community support. An Instagram post about the event gained 36 followers, showcasing its broad reach. These results affirm ESW's tangible growth and influence, reinforcing our commitment to a sustainable future.

3. Social Media Strategy Outcomes

Throughout the competition, we engaged with over 200 individuals via K-12 events, the Engineers for a Sustainable World Club, and a seminar. Utilizing our website and the university's platform, we directed attention to our team and club. Social media, notably Instagram, attracted 36 new followers, enhancing MECC competition awareness. Although initially reliant on social media, we found greater success with university postings. We plan to implement a monthly digital newsletter for wider outreach.

- Website: Energy, Water, and Environment Innovation Lab @ OU
- ESW Instagram: https://www.instagram.com/oaklandesw/?hl=en

4. Interview Outcomes

To delve into marine energy, we interviewed 20 professionals from various backgrounds as shown in Figure 8. Interviewees included the professional relationships of Dr. Jörg Vogel, Dr. Carlos Michelén Ströfer, Peter Stricker, and Kelley Ruehl, with Dakota Zehler as our sole alumni relationship.

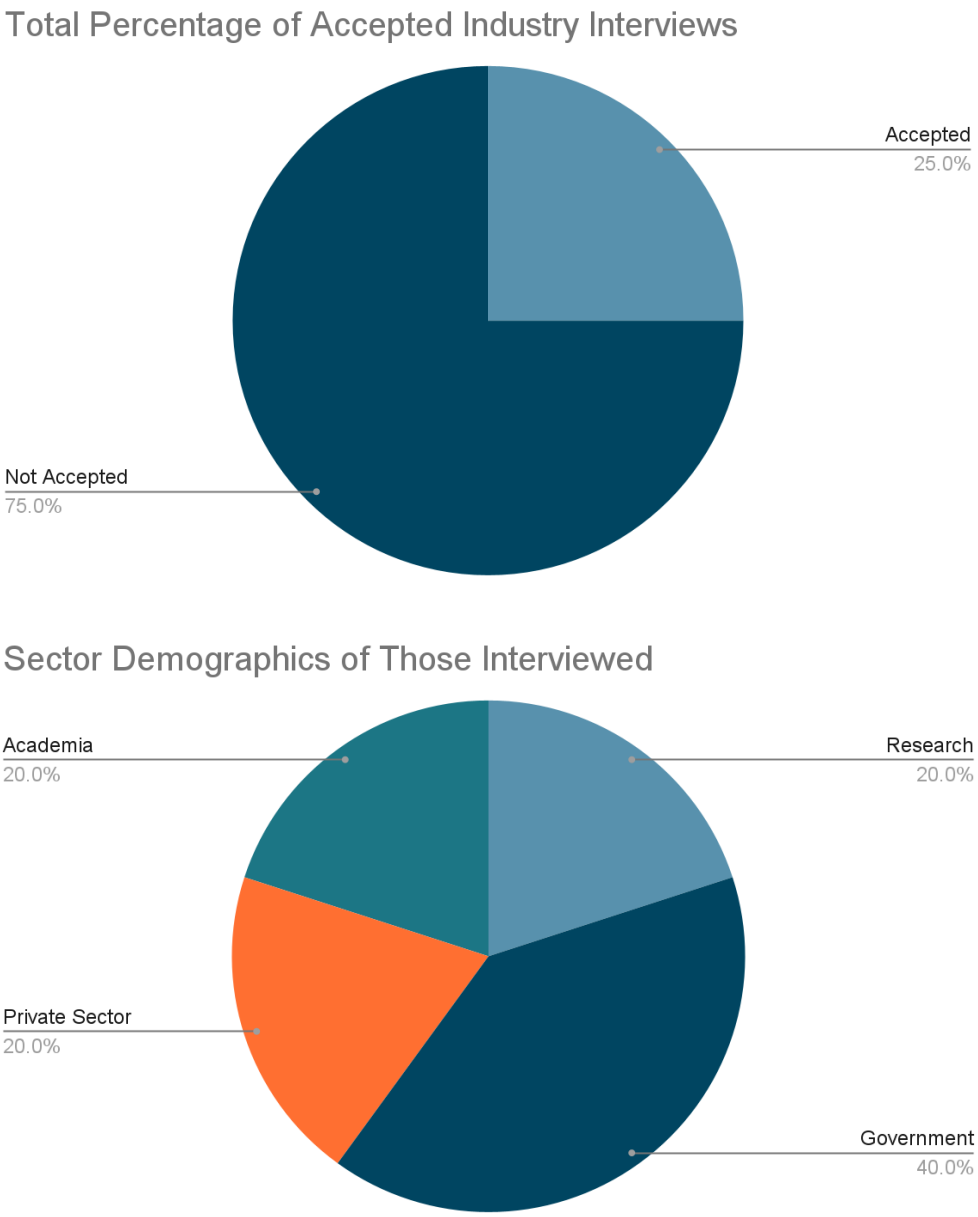


Figure 8: Interview metrics

4.1. Interview with Dr. Jörg Vogel

- *Sector:*
  Researcher
- *Job Title and Organization (Location):*
  VP Open Innovation
  Aquaporin (Denmark)
  jvo@aquaporin.dk
- *Summary of Topics Discussed:*

Our team's first industry interview with Dr. Jörg Vogel took place on 11/13/2023, with the entire team present. Dr. Vogel addressed entry hurdles, like funding and competition, underscoring uncertainties about survival. He emphasized Aquaporin's global membrane presence and delved into desalination's future profitability, drawing on his expertise. Dr. Vogel showed interest in upcoming MECC events.

4.2. Interview with Dr. Carlos Michelén Ströfer

- *Sector:*
  Government
- *Job Title and Organization (Location):*
  Marine Renewable Energy Researcher,
  Sandia National Laboratories (New Mexico, USA)
  cmichel@sandia.gov
- *Summary of Topics Discussed:*

Dr. Carlos Michelén Ströfer, of Sandia National Laboratories, was our second interview. We had full team attendance at this interview. Our interview date was on 11/17/2023 and the main discussion was government funding since he is under the Department of Energy. The future profitability of marine energy and the viability of various desalination markets were also major topics that were discussed. Dr. Ströfer gave us good insights into how the government funds and deals with renewable energy such as marine energy. Dr. Ströfer has also mentioned he would like to participate in future MECC events.

4.3 Interview with Peter Stricker

- *Sector:*
  Industry
- *Job Title and Organization (Location):*
  Chief Executive Officer,
  SeaWell LLC (California, USA)
  pstricker@seawellwater.com
- *Summary of Topics Discussed:*

CEO Peter Stricker of SeaWell LLC provided valuable insights in our interview on 12/4/2023, with 4 team members present. Discussions centered on current desalination technologies, given SeaWell's leading role. Future profitability, small company challenges, and desalination market viability were key focuses, reflecting the industry's novelty. Peter expressed interest in future MECC events.

4.4 Interview with Dakota Zehler

- *Sector/Region:*
  Academia
- *Job Title and Organization (Location):*
  Master's Student,
  University of Graz (Austria)
  dzehler@oakland.edu
- *Summary of Topics Discussed:*
  On 12/15/2023, Dakota Zehler, a sustainability-focused business major and OU MECC veteran was interviewed alongside 3 team members. Discussions encompassed energy efficiency, marine outreach, and future project prospects. Dakota offered crucial feedback on our MECC progress and expressed interest in Future MECC events.

4.5 Interview with Kelley Ruehl

- *Sector:*
  Government
- *Job Title and Organization (Location):*
  R&D Engineer,
  Sandia National Laboratories (New Mexico, USA)
  kmruehl@sandia.gov
- *Summary of Topics Discussed:*
  Our final interview was with Kelley Ruehl on 12/21/2023, with 4 members of our team in attendance. She was another representative from Sandia National Laboratories and is heavily involved with the outreach program there. Various outreach goals and outcomes, as well as the metrics involved, were discussed during the interview. Kelley has also mentioned that she would like to participate in future MECC events.

5. Challenges Faced and Lessons Learned

Despite initial challenges, our outreach efforts resulted in fruitful collaborations with industry, educational, and community partners. While responses were initially sparse, we persisted, reaching out to 46 individuals and organizations. Through perseverance and networking, we achieved our goals with the support of responsive partners.

Specifically concerning K-12 outreach, we encountered students' unfamiliarity with marine energy. It was eye-opening to realize that we might be their first introduction to concepts like potable water and desalination. However, guiding students through these topics proved immensely rewarding, as we found that adapting our explanations and engaging through questioning significantly enhanced their understanding. Overall, these experiences show the importance of interactive teaching methods in effectively communicating complex subjects to diverse audiences.

6. Reflection on the Community Connections Challenge

Reflecting on the Community Connections Challenge as a whole, we recognize its significance in fostering collaboration and knowledge sharing within the marine energy sector. The challenge provided a platform for teams to innovate, collaborate, and drive positive change, ultimately contributing to the advancement of sustainable energy solutions. Our experiences throughout the challenge have reinforced the importance of community engagement, adaptability, and continuous learning in achieving our shared goals for a sustainable future. By prioritizing general curriculum and awareness, through the means of (1)

hosting outreach events and classroom visits for K-12 STEM education, (2) rejuvenating our student chapter of “Engineers for a Sustainable World”, and (3) organizing a marine energy seminar for our campus community and online collaborators, we have laid the foundation for overcoming regulatory barriers, identifying funding pathways, and shaping a supportive community that values marine energy initiatives.