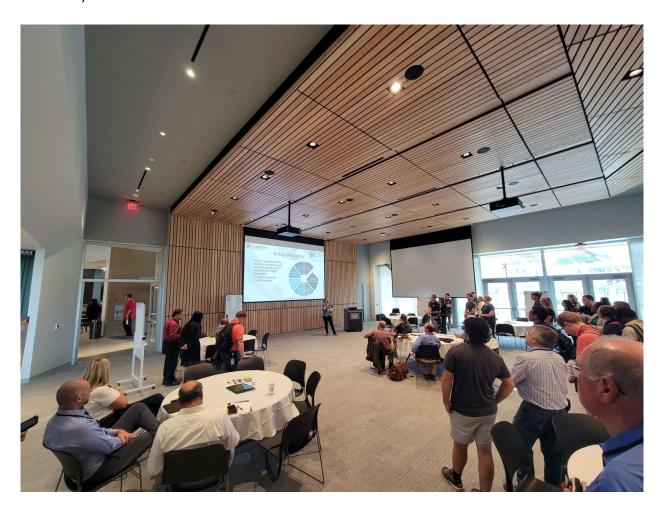# Rural Infrastructure Challenge Summit Toolkit

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For more information: https://sites.mst.edu/pitun/rural-infrastructure-challenge-summit/

Content

Executive Summary

The Rural Infrastructure Challenge Summit addressed the workforce element of critical infrastructure needs in rural communities. The initiative involved students, faculty, rural infrastructure professionals, and community members collaborating through networking and design exercises to envision future solutions. Key objectives include:

- inspiring students to pursue careers in public interest technology (PIT),
- developing an entrepreneurial mindset, and
- enhancing participatory research opportunities.

The Summit's activities included facilitated problem identification, solution generation, and networking during a Mini-Summit in March 2024 and a larger event in September 2024. In the design of the Summit activities, we expect that combining external engagement with project-based learning is a potential strategy for increasing societal engagement and interest in PIT careers.

The Mini-Summit focused on identifying and prioritizing infrastructure issues through collaborative exercises. Key themes included consumer understanding, visibility, affordability, and workforce challenges. The larger Summit expanded participation and activities, including a mingle & mentor fair and an energy resilience workshop. Evaluation metrics showed improvements in empathy, societal engagement, career awareness, and diversity of participation. Both events saw active participation and positive feedback, with participants valuing the opportunity to collaborate and network. Participants expressed a strong likelihood of attending future events and sharing their experiences.

This report outlines the planning, execution, and outcomes of these events, highlighting the challenges and strategies for scaling up. It was challenging to ensure meaningful dialogue between students and professionals with varying levels of expertise. Detailed planning and logistics prior to the summit-style event could facilitate better interaction and opportunities to display group work. Future efforts for scaling up the event may benefit from earlier recruitment, expert panels, and pre-read materials.

Similar summit events are envisioned as a core component of the Kummer College of Innovation, Entrepreneurship, and Economic Development, with plans to integrate it into existing courses and projects. The toolkit developed from these experiences aims to guide similar initiatives, fostering broader impacts on rural infrastructure development.

What is the Rural Infrastructure Challenge Summit?

Rural communities often find that their infrastructure (e.g., energy, broadband) does not always meet their needs and values. This is especially important in the context of increased federal funding for infrastructure projects (e.g., the Bipartisan Infrastructure Law). To make matters worse, there are concerns about a "brain drain" limiting human capital to find creative solutions to these infrastructure challenges. Rather than train people who go to rural areas to do this work, we need to train rural people. At Missouri S&T, 23% of undergraduate students are from rural counties. These rural students are also most likely to return to their hometowns as future leaders. In the design of the Summit activities, we expect that combining participatory research with project-based learning is a potential strategy for increasing societal engagement and interest in PIT careers.

Summit participants include students, faculty, rural infrastructure professionals (e.g., rural co-op operators, regional planners, county commissioners), and rural community members (e.g., farmers, business owners, retirees, non-profits). Through informal networking and facilitated design exercises, participants collaborate on a vision for the future. Key evaluation metrics include (a) empathy, perspective-taking, and collaboration skills, (b) societal engagement, (c) career awareness, (d) interest in participating again, and (e) diversity of participation. The Summit is inspired by Rocky Mountain Institute's (RMI) model for facilitated collaboration via the e-Lab: Electricity Innovation Lab. During this process, we reached out to RMI and got advice for how to design the Summit.

The Rural Infrastructure Challenge Summit has three main objectives:

(1) **Raise student interest in PIT careers**: Rural students are most likely to return to rural communities in a reverse brain drain. This supports economic development efforts to increase human capital in rural communities.
(2) **Develop an entrepreneurship mindset**: Students practice skills related to problem identification and solution generation using Design Thinking.[1]
(3) **Enhance participatory research**: Faculty and students build relationships with rural community members and professionals. This increases capacity for conducting participatory research.

Scoping the Summit

The first step is to choose an appropriate scope for the summit event. We approached this in an iterative process by hosting a smaller mini-Summit before scaling up. This allowed us to test and refine our strategies for achieving the Summit's objectives. Initially, we focused on both energy and broadband topics. We determined that this scope was too broad, and a narrower event would be more successful.

In scaling up the Summit, we also determined that it was most effective to connect with existing and ongoing efforts rather than put on a stand-alone event. In this case, there was an existing project funded by the Kauffman Foundation to develop curricula for community resilience training. We focused the Summit on energy resilience to support idea generation for this effort. Ideally, discussions at the Summit would also support planning for future funding opportunities.

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[1] Rowe, P. G. (1991). Design thinking. MIT press.

March 2024 Mini-Summit

Activities

The goal of the Mini-Summit was to pilot potential activities for a larger gathering in September 2024. This event was hosted in the Sky Room at the Phelps County Courthouse on March 1, 2024 from 10am-2pm. There were 16 participants, including 9 students, 5 professionals, and 2 rural residents, divided into 4 tables of 4 people. While 2 of the tables focused on broadband, the other 2 tables focused on energy issues. After a team building exercise (brainstorming the worst ideas possible), each table conducted a series of problem definition exercises described below:

- **Step 1: State the issues:**
  - Participants used Post-it notes to write down specific issues related to rural infrastructure, keeping the customer in mind. They were encouraged to be as specific and measurable as possible, considering questions such as: What is the problem? Why is it a problem? Who has the problem? When and where does the problem occur? How is it solved today?

- **Step 2: Prioritize the issues:**
  - The issues were grouped into common themes and prioritized using sticky dots. This helped to identify the most pressing problems that needed to be addressed.

- **Step 3: Determine the root causes:**
  - Participants worked step-by-step to determine the root causes of the identified issues. This involved asking probing questions to uncover underlying problems.

- **Step 4: Draft problem statements:**
  - Problem statements were drafted without proposing solutions at this stage. Data was used to support these statements where possible.

- **Step 5: Identify principal adopters and create user stories:**
  - The groups identified the principal adopters affected by the problems and created user stories. These stories included fictitious personas representing different demographic areas and needs, helping to illustrate the impact of the issues and potential solutions. The users were given names, personalities, and some personal information. The story stated why the users were affected by the problem and what they would see as success and failure.

At the end of the workshop, each team shared out their results. The main themes were: (1) disconnect between consumer understanding of infrastructure systems and operational requirements, (2) lack of visibility and awareness about infrastructure systems, (3) affordability as a pervasive issue, and (4) challenges in hiring and retaining a specialized workforce.

Figure 1. Photos of the teams working on the problem definition exercises.

Figure 2. Group photo from the Mini-Summit in March 2024.

Evaluation

After the mini-Summit, we had a team debrief to summarize what worked well and what should be improved moving forward. Overall, there was high engagement and the activities were well-paced. Working in small groups of 5-6 people including facilitators supported good dialogue. The atmosphere was relaxed, low-tech, and intimate. It was effective to have a flexible buffet lunch so that groups could work through lunch or take a break as needed.

During the debrief, we also identified key challenges for scaling up this event. Overall, the primary challenge was identifying how to balance the needs of external stakeholders who are experts in infrastructure challenges with students, who are still learning about the complexity of these systems. It may be helpful to add an expert panel and pre-read materials to support dialogue. We also considered other models, such as deliberative democracy and World Café, for supporting dialogue in diverse groups.

For the mini-Summit, we had tables focused on either broadband or energy challenges. Ultimately, they focused on very high-level challenges that did not provide new insight. One strategy is to give each group a specific problem to focus on, based on what the professionals want to organize student projects around. This way, the Summit could be more of a kick-off for semester-long projects that are integrated in courses. We also identified potential strategies to incentivize participation (e.g., certificate of completion, LinkedIn badges). We determined that recruitment needed to start much earlier for the Fall event to increase participation. We sent Save-the-Dates for the September 13th event in May.

In terms of logistics, a better system than wall space for displaying post-its and groupwork is needed. Round tables would be preferred, but the Phelps County Courthouse did not have any. For the September Summit, we shifted to a venue on campus to have more flexibility and control of the room layout.

In addition, we conducted a pre, post, and post-post evaluation. The pre-survey was conducted when they first arrived, the post-survey was conducted at the end of the event, and the post-post survey was conducted 3 months later (June 2024). In the pre-survey, 9 students, 5 professionals and 1 rural resident participated. In the post-survey, 9 students, 4 professionals and 1 rural resident participated. In the post-post survey, 5 students participated. External participants received $50 for participating in the pre and post-surveys. Students received $25 for participating in the post-post survey.

In the pre-survey, participants were asked about the primary challenges for broadband expansion and energy development in rural communities. They focused on economic (cost, return-on-investment, funding), capacity (human capital, aging infrastructure, planning), geographic (low population density, land use), and awareness (education campaigns, reluctance to change) factors. Post-survey responses suggested more integration across these factors (e.g., investing in the right technology for a community, rather than the cheapest one) and a recognition that there are multiple factors at play. In the post-post survey, students emphasized that they valued the opportunity to examine these issues from multiple perspectives.

As summarized in Table 1, both student and professional participants found the brainstorming exercise (step 1) to be the most valuable. They largely agreed about the value of different activities. However, students enjoyed the icebreaker exercise (brainstorming the worst ideas popular) and the root cause

exercise (step 2) noticeably more than the professional participants. In addition, students expressed that they were more likely to share what they learned - likely because they learned more.

Table 1. Value ratings for each element of the Mini-Summit, where the scale ranges from 1 (lowest) to 7 (highest).

Item	Overall Mean	Student Mean	Professional Mean
Likely to participate again	5.9	6	5.8
Sharing what I learned	5.5	5.8	5
Team building exercise (terrible ideas)	5.3	5.6	4.8
Step 1: State issues and prioritize list (brainstorming)	6.3	6.4	6
Step 2: Determine root cause (five whys)	6.1	6.4	5.6
Step 3: Draft problem statement	6.1	6.1	6
Step 4: Describe principal adopters and generate user stories	5.7	5.8	5.6

In the pre-survey, both external and student participants felt positively about collaborative work (student mean = 5.7 vs. professional mean = 5.8 out of 7). For empathy and perspective-taking, both external and student participants felt like they had these skills in the pre-survey (student mean = 4.7 vs. professional mean = 5.0 out of 7). However, they felt like these skills increased in the post-survey (student mean = 5.3 vs. professional mean = 5.3 out of 7). For societal engagement, both external and student participants felt very positively in the pre-survey (student mean = 5.9 vs. professional mean = 6.3 out of 7) and these feelings remained consistent in the post-survey (student mean = 6.0 vs. professional mean = 6.2 out of 7).

We also requested feedback in the post-survey. Participants recognized that it was challenging to have a discussion with such high variation in understanding/background on the issues. It was also recognized that this event was a good networking opportunity and it would be valuable to focus on that more. The external professionals were very interested in the opportunity to challenge students and push them to think more broadly about infrastructure issues. Students also expressed interest in having more preparation before the event as well as take-away materials.

September 2024 Summit

Activities

The Summit included two main components, a Mingle and Mentor fair as well as an Energy Resilience Workshop.

- **Mingle and Mentor Fair**: The purpose of this event was to bring professionals, faculty, and students together for an informal networking lunch. Professionals could share information about their work and potential job opportunities. The event would also allow students to make professional connections, meet potential mentors and learn about opportunities to make a difference in the energy industry and public sector. Faculty could connect with potential research collaborators and learn about real world challenges for energy resilience in rural communities. Time allotted for the M&M Fair was 1.5 hours including lunch.
- **Energy Resilience Workshop:** The workshop had several activities designed to engage all participants to work toward a goal of focusing on training needs for specific groups in energy resilience. The activities include a Fishbowl activity, small group discussions, a call to action and reception.
    - **Fishbowl Activity:** In this activity, we had five industry experts discuss energy resilience challenges and skills needed. These experts were sitting in the inner circle around a table. The rest of the workshop attendees were in the outer circle surrounding the experts. Our facilitator asked each participant three questions concerning the current state and future needs of the energy industry in the rural communities. Each was given time to respond before passing the microphone to the next person. Afterward, the outer circle participants were given a chance to ask questions. Time allotted for the Fishbowl activity was 45 minutes. This event was recorded and is publicly available on YouTube: https://www.youtube.com/channel/UCqJwt5jnCwQ1S3OCbwny0mA.

Figure 3. Industry experts in the center of the fishbowl.

○ **Small Group Discussions:** The goals of the small group discussions were to bring together a diverse small group of students, professionals, and faculty to work together in identifying who needs training for energy resilience, select a group identified to focus on and then discuss the training needs of that group.

■ **Stakeholder knowledge mapping:** In this activity, the small tables brainstormed using sticky notes and an easel to map out stakeholders that might need more training to become more energy resilient. The facilitator recorded the different groups of stakeholders. After the list of stakeholders was identified, the group narrowed down one group to focus on. This selection was completed using dot voting. Time allotted for the stakeholder knowledge mapping was 35 minutes including time for the facilitator to introduce the technique.

■ **Role-Playing:** After the stakeholders had been identified, the facilitator introduced the role-playing activity in which the participants put themselves into the roles of the different stakeholders to determine their training needs. Time allotted for the role-playing was 35 minutes including instructions given by the facilitator.

Figure 4. Photos of the teams working on the design exercises.

- ○ **Call to Action:** After the workshop activities had concluded, a call to action was issued to the entire group to consider the next step and opportunities to engage. For professionals, this included (a) sharing your problems with S&T, (b) sponsoring S&T student design projects in various areas such as energy, broadband, transportation, healthcare, (c) hiring S&T students for internships, and (d) supporting students to work on their thesis/dissertation. For students, this included (a) exploring avenues to create an S&T student club like "Tech for Change," (b) spreading awareness amongst your peers about the critical need for STEM students to work on topics such as community resiliency, and (c) considering pursuing a professional career in solving complex and high impact community problems. Attendees also completed a post-survey. Time allotted for the call to action was 15 minutes.
- ○ **Closing Reception and Voting:** Time was allotted to allow attendees to connect to others over drinks and snacks. Attendees were also encouraged to view each group's work, ask questions of the facilitators and vote on the idea that they felt had the highest value. Time allotted for the Reception was 1 hour.

We aimed to engage at least 125 participants. Overall, 104 registered and 81 individuals participated in either the M&M networking lunch or the workshop (78%). Of the 77 individuals who registered for the workshop, 51 participated (66%). This included 23 students and 28 professionals. Professionals received $75 as a thank you for participating. The Fishbowl panel received an additional $100. Student gift cards were tied to completing the post-survey.

Evaluation

The evaluation included both quantitative and qualitative feedback from students and external stakeholders via a post-survey. This simplified the more complex design piloted in the mini-Summit to boost participation. Key metrics included:

A. diversity of participation
B. interest in participating again
C. interest in PIT careers
D. societal engagement
E. perspective-taking

Of the 51 workshop participants, 38 completed the post-survey (75% response rate). This exceeded our target of a 50% response rate. All participants (students and professionals) received $25 to complete the post survey.

Diversity of Participation

Our sample included 12 external professionals (32%), 23 students (61%), and 3 others (community member, faculty, did not respond). Of those, 15 (39%) identified as rural and an additional 5 were unsure if they identified as rural (53% total). In addition, 9 participants (24%) identified as racial minorities and 13 (34%) were women. We aimed for at least 50% of the participants to self-identify as rural, low-income, or a racial minority. Although we did not ask participants to report income, we did find that 21 (55%) identified as rural or a racial minority and 3 (8%) as both.

Interest in Participating Again & Interest in PIT Careers

In the post-survey, we asked 3 qualitative questions:

- What was your biggest takeaway from the event?
- What was your favorite part of the Summit?
- What feedback do you have to improve the Summit?

Overall, both students and professionals' biggest takeaway was the complexity of the rural energy resilience problem. Students were especially impressed with the extent and diversity of the stakeholders involved. They saw energy resilience as important and believed that more educational events like these provide value. Some example student quotes include:

- "There are a lot of different facets to these issues with lots of different groups of people involved."
- "The biggest takeaway from the event is this is something people are not educated on and it is hard to pinpoint how to achieve this. I think if people could get educated on the topic and show them why they should care things could get improved."
- "Energy resilience is an incredibly diverse topic which involves many groups of people. Furthermore, developing solutions for problems affecting the public is a difficult process because of the sheer number of problems involved. For example, beginning to identify a problem and establishing a cause-and-effect can take a lot of time and involvement."

Professionals tended to focus on the way this event emphasized intersectionality and provided value via in-person networking and discussions. Come example quotes from professional participants include:
- "The issues discussed are complicated, interrelated, and often the subject of disagreements"
- "Challenge of mass communication - fostering collective empathy"

Overall, we got strong positive feedback on the value of the in-person networking activities and small group discussions. As reported in Table 2, participants tended to strongly agree that they are likely to participate in another Rural Infrastructure Challenge Summit. Participants also strongly agreed that they anticipate sharing what they learned at the Summit with others. In general, students reported being slightly more likely to attend again and share what they learned. Participants generally gave higher scores for this event compared to the Mini-Summit, suggesting that the changes we made were effective. In addition, there was high interest in learning about and/or sharing about Public Interest Technology careers.

The knowledge mapping and role-playing activities were perceived as most valuable. In the qualitative data, the knowledge mapping activity was most often mentioned as a favorite part of the Summit. Despite the high rating for the closing reception, there was overall low engagement during that activity as people left to get home on a Friday afternoon. The M&M fair and fishbowl activity were perceived as valuable, but less so than the other elements. Interestingly, the professionals and students disagreed on the most valuable elements. While students found the role playing most valuable, professionals perceived the fishbowl activity as most valuable. Both groups rated the knowledge mapping activity highly.

When asked to provide feedback on the event, some of the main ideas included:

- providing more structure and/or activities for the Mingle & Mentor Fair

- having more time for Q&A during the Fishbowl and minimizing jargon
- pre-arranging topics for tables with specifically recruited professionals
- allowing for more time to share the outcomes of group discussions

Table 2. Value ratings for each element of the Summit, where the scale ranges from 1 (lowest) to 7 (highest).

Item	Overall Mean	Student Mean	Professional Mean	Overall Number of Responses
Likely to participate again	6.2	6.3	6.2	38
Sharing what I learned	6.3	6.5	6	38
Interest in PIT careers	5.9	5.9	6.1	33
Mingle & Mentor (M&M) Fair	5.5	5.4	5.5	27
Fishbowl Activity	5.5	5.3	6.0	36
Knowledge Mapping	6.1	6.4	5.6	37
Role Playing	6.1	6.6	5.1	35
Closing Reception	6.0	6.2	5.8	29

Societal Engagement & Perspective-Taking

We evaluated societal engagement via 4 questions. All questions were rated on a 7-point Likert scale that ranged from strongly disagree (1) to strongly agree (7). As reported in Table 3, all participants strongly agreed that it is important to be informed of community issues and they should make a difference in their community. There was also high commitment to serve in their community and volunteer.

We evaluated perspective-taking ability via 2 questions derived from the 31 item questionnaire of cognitive and affective empathy scale developed by Reniers and team[2]. As reported in Table 4, students were slightly more optimistic about their perspective-taking abilities but overall both students and professionals rated themselves similarly high.

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[2] Reniers, R. L., Corcoran, R., Drake, R., Shryane, N. M., & Völlm, B. A. (2011). The QCAE: A questionnaire of cognitive and affective empathy. Journal of personality assessment, 93(1), 84-95.

Table 3. Societal engagement ratings, where the scale ranges from 1 (strongly disagree) to 7 (strongly agree).

Item	Overall Mean	Student Mean	Professional Mean	Overall Number of Responses
I believe I should make a difference in my community.	6.6	6.5	6.7	37
I am committed to serve in my community.	6.2	6.1	6.4	37
I believe that it is important to be informed of community issues.	6.7	6.7	6.8	37
I believe that it is important to volunteer.	6.3	6.4	6.2	35

Table 4. Perspective-taking ratings, where the scale ranges from 1 (strongly disagree) to 7 (strongly agree).

Item	Overall Mean	Student Mean	Professional Mean	Overall Number of Responses
I sometimes find it difficult to see things from the other person's point of view.	3.4	3.2	3.8	37
I believe that there are two sides to every question and try to look at them both.	6.1	6.1	6.1	37

Integrating with Existing Courses and Projects

As part of the development of the mini-Summit, we hosted a Kummer Colloquium, which was attended by 3 students, to support the design and development of the Summit. Kummer Colloquiums are extra-curricular educational activities that target Kummer Vanguard Scholars but are open to all students. These students gave feedback on the design and implementation of the mini-Summit. The syllabus is included in the Appendix.

Some students received course credit for attending the Summit. Specifically, the students in Environmental and Natural Resource Economics (Econ 4440/Econ 6440) received course credit, which was effective in encouraging participation.

In addition, we investigated strategies for connecting the September Summit event to existing project courses. We selected Engineering Management Senior Design course (ENG MGT 4907) as a course in

which students could work on a rural infrastructure challenge project. The course objectives are as follows:

- Open-ended design projects will be addressed with small teams.
- Emphasis will be on solving real-life projects that are broad in nature and which will require the students to incorporate the knowledge and skills acquired in earlier course work in the solution of the problems.
- The projects focus on the process of devising a system, component, or process to meet desired needs and specifications within constraints.
- Iterative, creative, decision-making process in which the basic sciences, mathematics, and engineering sciences are applied to convert resources into solutions.

During the first week of the Fall 2024 semester, Dr. Nicole Annis presented the rural infrastructure project related to community resilience to the ENG MGT 4907 class. Dr. Annis presented the project background, project problems, and the potential project deliverables. Ultimately, there was low student interest in the project topic and it was not selected to move forward. We plan to offer senior design students the opportunities to possibly work on a semester-long rural infrastructure project like the one presented by Dr. Annis in the future.

Inviting Participants

The project team compiled a list of potential invitees that were categorized as industry, students, or rural residents. Each category represented a unique segment of the target audience, each with distinct needs, communication preferences, and expectations. This segmentation was essential to ensure that invitations were tailored and that outreach efforts resonated effectively with each group. We assigned specific members to oversee each category, allowing them to concentrate on personalized outreach strategies. Example invitations are included in the Appendix.

By categorizing the invitees and adapting outreach strategies to each group's specific context, we ensured an inclusive and well-received invitation process. Through these efforts, they not only maximized attendance but also fostered a diverse and engaged audience, enriching the event's overall impact.

External Participants

For industry professionals, team members focused on leveraging professional networks and partnerships. They attended networking events and industry gatherings, where they could meet potential invitees face-to-face, creating a more personal connection. Additionally, they reached out through professional email lists and social media platforms, sending formal invitations and highlighting the event's alignment with industry trends and professional growth opportunities.

Rural residents required a more localized and community-centered approach. Team members connected with local community leaders such as elected officials and Extension councils. Methods included email and direct phone calls. Information distributed by email included the event flier, agenda, and parking information. An event registration site was used for RSVPs to allow for headcount planning for table and chair setups and food arrangements.

University Participants

We recruited students by targeting specific courses highly relevant to energy resiliency and environmental concerns. For example, we had professors who teach Energy Economics and Environmental and Natural Resource Economics engage their students about the Summit. In addition, we distributed the Summit flier to economics, environmental science, and environmental engineering majors through their respective program Directors. As a final push for student participation, we asked the University's Career Opportunities and Employer Relations to email all students to participate in the Mingle & Mentor Fair portion of the summit. For faculty participation, we sent invitations to all faculty members through our department chair councils.

Planning for Logistics

It is critical to consider logistics for selecting a venue and date for the event. Considering what we learned during the Mini-Summit, we chose a different location for the September Summit. We shifted from the Sky Room at the Rolla Courthouse to an on-campus venue, the Innovation Lab. We identified a location that would seat up to 90 people and have round tables to enhance discussions. Easels were also added, which allowed the group facilitator to act as a scribe for brainstorming activities. The location was ADA, with adequate parking for participants and facilitators who needed it for the event. This was ensured before the event to create an atmosphere of inclusion for both participants and facilitators. The chosen location for the Summit was successful in meeting the needs of the group offering both a space for networking and the workshop.

The date was chosen to accommodate elected state and local leaders considering the state legislative session and state meetings for local elected officials. To accommodate both students and external participants, we selected Friday, September 13, 2024. The day was planned in three parts:

- 11am-12:30pm Mingle and Mentor Fair
- 12:30-3pm Energy Resilience Workshop
- 3-4pm Closing Reception

The Mingle and Mentor (M&M) Fair aimed to connect University students with mentors who are professionals in energy resilience. Professionals were invited to bring handouts to distribute to students who might be interested in pursuing a career within the profession or organization of the potential mentors. This portion of the summit could be easily adapted as a Career Fair, which could increase the participation of both students and professionals.

Appendix

Summit Agenda

11:00 am Mingle & Mentor (M&M) Fair
Innovation Lab Atrium

- Professionals share the type of work they do, current/future projects, and job opportunities
- Students make professional connections, meet potential mentors, and learn about opportunities to make a difference in the energy industry and public sector
- Faculty connect with potential research collaborators and learn about real world challenges for energy resilience in rural communities
- Lunch buffet in the Forum

12:30 pm Energy Resilience Workshop Kick-off
Innovation Lab Forum

12:35 pm Fishbowl Activity
Innovation Lab Forum

- Experts discuss energy resilience challenges and skills needed to address in inner circle
- Outer circle asks questions

1:20 pm Break

1:30 pm Implementing Energy Resilience Training (small group discussions)
Innovation Lab Forum

- Conduct stakeholder knowledge mapping to identify stakeholder groups who could use a training and/or technical assistance program
- Use role-playing to generate ideas for selected stakeholder group

2:45 pm Call to Action
Innovation Lab Forum

- Discussion of next steps and additional opportunities to engage
- Attendees complete post-survey

3:00 pm Closing Reception and Voting
Innovation Lab Forum

- Attendees are encouraged to view each group's work, ask questions of facilitators, and vote on the idea they feel has the highest value
- Connect with other attendees over drinks and snacks

Facilitator's Guide

9:00 am Set up (1 hour)
- transport supplies
- set up registration table
- arrange supplies for activities

9:30 Set up morning snacks
Trail Mix, Cheese display and fruit trays

10:00 am Facilitator Training (1 hour)
- review materials

11:00 am Mingle & Mentor Fair (1.5 hours)
Innovation Lab Atrium

> Staff registration table (Kristi)
> > Participants sign photo release

11:15 Lunch is served
- ○ Foor: Beef chili, Vegetarian Chili, Sour cream, Baked Potatoes, Vegan `sour cream`, Cheddar cheese, Green onions, French fried onions, Jalapeno peppers, Lime wedge
- ○ Drinks: Iced Tea, Water, Lemonade, Coffee

12:30 pm Introductions and description of the problem (Casey)
Innovation Lab Forum

12:35-1:20 pm Fishbowl Activity (Heath)
Innovation Lab Atrium/Forum

Part 1: Fishbowl Activity

Time allocated: 45 minutes

Supplies: Chairs around the center table. Others standing around for an outer circle. 3 prepared questions. Index cards/pens for the outer circle to write questions. Microphones. Stopwatch

Instructions*: One facilitator (Heath) will ask each expert to introduce themselves and discuss the rules of how much time per answer for each person. Experts will be asked questions while in the fishbowl and given 1 minute to answer each one: Every expert should be allowed to answer each question prior to moving to the second question. For the first question, each will answer around the room taking a few minutes. For the second and third questions, the idea is to have more of a conversation with the group. About 10 minutes is allotted for each question with 15 minutes for questions from the outer circle*

12:35pm (30 min) Insights to energy resilience challenges and skills needed to address them discussed by experts using an Inner circle with experts each given up to 3 questions

1. Introduce yourself and briefly state your job. How has your job changed over time?
2. What makes energy resilience hard in rural Missouri communities?
3. If you could wave a magic wand, what would you do?

1:05pm (15 min) Outer circle can ask questions
-    assign people to workshop tables of 8 people

1:20 pm Break (10 minutes)

1:30 pm Implementing Energy Resilience Training (1.2 hours)
Innovation Lab Forum

1:30pm **Framing Discussion** (Nicole) 10mins

<mark>**Each Facilitator needs to write down the names of the people at their table**</mark>
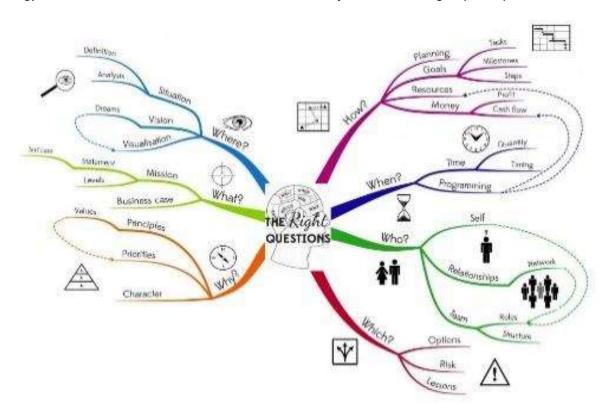
Part 2: Brainstorming groups that need training:

🕐   *Time allocated: 30 minutes*

✂   *Supplies: White boards, dry erase markers of different colors, sharpie markers, sticky notes*

Instructions: *Teams will use Mind Mapping technique which is a visual way of organizing information that the team brainstorms. Teams start with a central idea of "stakeholders that need training on energy resilience" and create branches and sub-branches for each related group or topic.*

1:40pm (5 min) Facilitators introduce technique

First, we are going to individually do some brainstorming on relevant stakeholder groups. You want to be as specific as possible. I want you to write each stakeholder group on a separate sticky note using a sharpie. Then, we'll organize these into a mindmap. Facilitators will draw the map and group sticky notes on the branches.

1:45pm (25 min) Stakeholder knowledge mapping – groups determining stakeholder groups who need training
- 1 min of silent individual brainstorming, use separate sticky note for each stakeholder group
- Organize the sticky notes into groups and sub groups
- Draw map and group sticky notes on giant sticky note.
- Consider who is missing from this mindmap
    - Have we covered supply side (electricity generators) and demand side (electricity users) stakeholders?
    - Have we covered critical infrastructure? (finance, food, government, health, information and communication technology, manufacturing, safety, transportation, water)
    - Have we covered vulnerable populations? (age, disability, health conditions, socioeconomic status, mental health, homeless, English as a second language, prisoners, minorities)

Part 3: Teams will select the groups that they see as the top priority.

Time allocated: 10 minutes

Supplies: Mapping of work from part 1, dots for voting.

Instructions: *Facilitator will allow some discussion and then team members will vote on which group they see as the top priority by placing a dot on the diagram*.

2:10pm (10 min) Selection of stakeholder segment to focus on for training by groups and introduction of the role-playing technique for the second part

Part 4: Teams will select the groups that they see as the top priority.

Time allocated: 25 minutes

Supplies: White boards, dry erase markers.

Instructions: Facilitator will describe the process. They will explain that the people on the team will be in the role of the stakeholder group. For example, if the team said that the community members were the group they decided needed the training first, then they would think about the challenges of those people by putting themselves into their shoes. The facilitator should then lead the discussion and record the ideas of what that training would involve.

2:20pm (20 min) Groups to determine training needs using role playing
Group members, who are role playing as the identified stakeholder, will consider what areas they would need training and what type of training might be most effective for them. An example might include rural city administrators. For that group of individuals, what information needs to be conveyed to them to allow them to best make decisions on providing services, resilience to their communities?
- What are you expecting to get out of the training?

- ● What do you want to know about energy resilience?
- ● What conversation should be happening? Who needs to talk to each other?
- ● When or how might the training be most effective?

output = outline of what training would look like

2:40pm (5 min) Groups wrap up and display their work

2:45 pm Call to Action Venkat (15 min)
Participating students will be called to action with opportunities to work on research for the coming year. And then each group will give a 30 second teaser as to why other participants should visit their work and vote for them.
- - Ask all participants to complete the post-survey

Reception set up before 2pm

- ○ Assorted freshly baked cookies, House-made fudge brownies, Rice Krispies cereal treats
- ○ Bar: Beer, Wine, Mixed Drinks, Soda (This will be set up before 2 and can be used at any time)

3:00 pm Reception and Voting (1 hour)
Final reception: refreshments will be served, and attendees will be encouraged to view each group's work, ask questions of facilitators, and vote on the idea they feel has the highest priority.

Part 5: Everyone is invited to visit and vote on the top priority of the work shown.
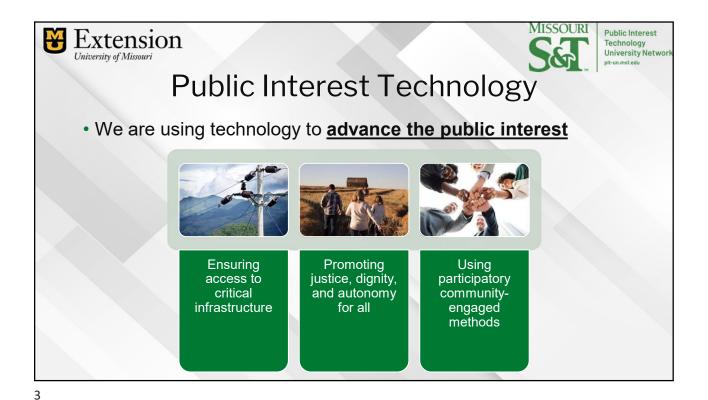
Time allocated: 1 hour

Supplies: Dots for voting.

Instructions: Facilitators will get some refreshments but then go back to their whiteboard to answer any questions of participants. They will encourage dot voting.
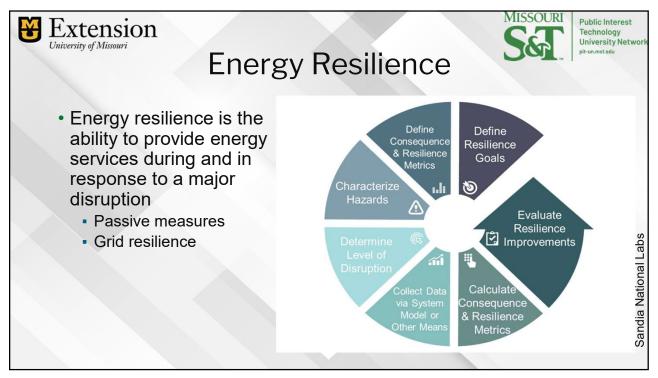
1

2

Public Interest Technology

- We are using technology to **advance the public interest**

| Ensuring access to critical infrastructure | Promoting justice, dignity, and autonomy for all | Using participatory community-engaged methods |

3

Community Resilience

Community Resilience Framework™

"Community resilience is the ability to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

Activities, such as disaster preparedness—which includes prevention, protection, mitigation, response, and recovery—are key steps to resilience."

4

Energy Resilience

- Energy resilience is the ability to provide energy services during and in response to a major disruption
  - Passive measures
  - Grid resilience

Sandia National Labs

5

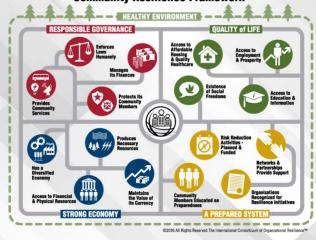Missouri Community Resilience Workforce Development Program

MLTRC

- Missouri Local Training & Resource Center (MLTRC)
  Workforce & Professional Development Training

  - Local Technical Assistance Program (LTAP)
    - Training city/county road crews on construction, maintenance, safety, and technical topics
    - Low (or no) cost trainings
  - Rural Transit Assistance Program (RTAP)
    - Train rural transit providers on safety related topics
    - No cost trainings
  - Community Resilience Workforce Development Program
    - New program, still being developed

Community Resilience

"Community resilience is the ability to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

Activities, such as disaster preparedness—which includes prevention, protection, mitigation, response, and recovery—are key steps to resilience."

3

Community Resilience

- Governor Parson's Administration Focus Areas:
  1. **Workforce & Education**
     to develop the workforce to meet the demands of the future by making substantial investments aimed at giving more Missourians the education and training required
  2. **Infrastructure**
     to strengthen infrastructure system by calling for key investments in Missouri roads, rail, ports, airports, and rural broadband
  3. **Stronger Communities**
     to advocate for numerous investments in public safety to better serve our communities

4

Community Resilience

- Governor Parson's Administration Focus Areas:
    4. **Health Care**
       to ensure all Missourians have access to
       mental health and health care services
    5. **Government Reform**
       to make the state government more efficient
       and accountable by investing in our workforce

5

Program Outcome

- **Purpose**
    - develop training and technical assistance focused on various demographics to support an inclusive workforce in underserved communities for career advancement with pathways to entrepreneurship and business development

- Develop an education program that:
    - generate relevant hands-on content
    - deliver content via strategic partnerships with key stakeholders

6

7

Project Discussion

- What are key problems and focus areas facing communities?

- How is community resilience engagement initiated?

- What is the connection between community resilience and entrepreneurship?

- How are community resilience and entrepreneurship promoted in rural communities?

8

Call to Action

Rural Infrastructure Summit Closeout

9

Backdrop

- On Oct. 9, 2020, a $300 million donation from June Kummer and her late husband, Fred S. Kummer, a 1955 Missouri S&T graduate, marked the beginning of the transformation of the university, the Rolla region and the state of Missouri.

- This donation is helping to elevate S&T, create broad STEM outreach, and have significant economic impact across the state and nation.

- A number of new opportunities and programs for active student and community engagement have emerged as a result. For example, Kummer Student Programs, Innovation Ecosystem Design Initiative, etc.

10

Innovation Ecosystem Design Initiative

"This Initiative is a project with defined scope and time that will result in the establishment of recommendations for creating a Branded Structure (Crucible) for coordination of Innovation, Entrepreneurship, and Economic Development in Missouri S&T, Rolla, and the state of Missouri."

-- Dean Sterling, Kummer College, S&T

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Innovation Ecosystem Design Initiative

- Active engagement with the region-based innovation ecosystem that will include a strong network of various stakeholders such as companies, universities, angel investors, venture capitalists, patent lawyers, etc.
- Strong focus on the customer discovery process to take ideas to the marketplace

12

Call to Action

- Companies & Agencies
  - **Partner** with S&T and share with us your problems

  - **Sponsor** S&T student design projects
    - ‣ Rural Missourians need help! Help in various areas such as energy, broadband, transportation, healthcare, etc.
    - ‣ Faculty at Missouri S&T, along with our dedicated students want to have deeper engagement with our Missourian communities
    - ‣ Student projects (intensive week-long or a more relaxed semester long project or anything in between) in the Fall 2024 or Spring 2025 semesters
      - ○ Open-ended student projects will be addressed with small teams (approx. 5 students/team)

13

Call to Action

- Companies & Agencies
  - **Why** partner with us and/or sponsor a student project?
    - ‣ Work with motivated students who are eager to contribute
    - ‣ Develop connections with the department and faculty for future long-term collaborations
    - ‣ Have the benefit of looking at your problem from a new perspective

  - **Hire** S&T students for internships

  - **Support** students to work on their thesis/dissertation

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Call to Action

- Contact Information:

  Dr. Venkat Allada
  Professor, Engineering Management & Systems Engineering (EMSE)
  215 Engineering Management Building
  Missouri University of Science and Technology
  Rolla, MO 65409
  (573) 341-4573
  allada@mst.edu

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Call to Action

- Students
  - **Explore** avenues to create an S&T student club like the "Tech for change" (techfc.org); national network of student chapters founded on the belief that technology can be used as a catalyst to foster a better and more equitable society.

  - **Spread** awareness amongst your peers about the critical need to STEM students to work on topics such as community resiliency

  - **Consider** pursuing a professional career in solving such complex but high impact community problems

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Kummer Colloquium Syllabus

Syllabus for Kummer Colloquium, Co-Design a Rural Infrastructure Challenge Summit
Spring 2024, Th 1-1:45pm, Humanities and Social Sciences Building, Room 203

Instructor: Dr. Casey Canfield, Assistant Professor, EMSE
Office: Engineering Management 202
Office Hours: Thurs 12-1pm CT or by appointment
I can meet in person on Tuesdays and Thursdays or via Zoom on other days.
Email: canfieldci@mst.edu

COLLOQUIUM DESCRIPTION
You are helping to co-design a convening on rural infrastructure challenges. This semester, we will host a 1 day mini-summit in preparation for a larger event hosted in Fall 2024. Participants will include students, faculty, rural infrastructure professionals (e.g., rural co-op operators, regional planners, county commissioners), and rural community members (e.g., farmers, business owners, retirees, non-profits). Summit participants will engage in facilitated design exercises to surface rural infrastructure challenges and break down high-level issues (e.g., broadband access) into smaller, more tangible problems (e.g., making it easier to start an internet service provider business).

The Spring 2024 Mini-Summit will focus on energy and broadband infrastructure. The Fall 2024 Summit will focus on energy, broadband, and transportation infrastructure.

Kummer Colloquium Focus Area: Social Responsibility

RESOURCES
- Energy News Mailing Lists https://energynews.us/
- MO Broadband https://mobroadband.org/

SCHEDULE

When?	Topic	Product
1-1:45pm, Thurs 2/1	Introductions & Goals Stakeholder Analysis	Invitations
1-1:45pm, Thurs 2/8	Participatory Research & Facilitation Strategies	Design Exercises
1-1:45pm, Thurs 2/15	Frameworks & Tools	Background Materials
1-1:45pm, Thurs 2/22	Program Evaluation	Feedback Surveys
10am-2pm, Fri 3/1	Mini-Summit	

External Flier

General External Invitation

Please plan to join a diverse group from industry, education, and government for the Rural Infrastructure Challenge Summit on Friday, September 13th at the Missouri University of Science & Technology Innovation Center.

The Summit includes the following events:

- 11:00 am – 12:30 pm: Mingle & Mentor (M&M) Fair (lunch will be provided)

  Networking opportunity with professionals, faculty and students discussing working experiences and potential career paths. You are welcome to bring handouts or props with information about job openings and recent projects.

- 12:30 pm – 3:00 pm: Energy Resiliency Workshop

  Fishbowl Activity to gain insights into energy resilience challenges in Missouri communities and the skills needed to address them.

  Discussion session to collaborate on a vision for energy resilience and identify key priorities.

- 3:00 pm – 4:00 pm: Closing Reception

  Light refreshments as well as beer and wine will be served while we reflect on the day.

Register by 9/4 for one or both events and access more information at: https://cvent.me/aEQvL3. As a thank you, we are able to provide an honorarium for participants.

Additional information about the event, including parking information, etc. will be provided.

For any inquiries, please contact: canfieldci@mst.edu.

Fishbowl Speaker Invitation

I hope you are doing well! We are in the process of putting together an event at S&T called the Rural Infrastructure Challenge Summit. It is a mentoring event and workshop focused on energy resilience in rural communities. If you're available on September 13th, we would love to have you join us! If you are unavailable, please let me know if there is someone else at [ORG] that you recommend.

In particular, I was wondering if you would be interested in being a speaker at the event. As part of the workshop, we are planning to do a Fishbowl activity. We are recruiting a few experts, like yourself, to be in the middle of the "fishbowl" circle. This small group of experts will answer prepared discussion questions related to their careers and energy resiliency while everyone else listens in a circle outside of the fishbowl circle. Then there will be an opportunity for the listeners to ask questions prompted by the discussion. We will work with you to finalize the discussion questions and can provide an honorarium to cover your travel and time. Please let me know if this is of interest!

Even if you're not interested in being a Fishbowl speaker, we would love to have you there. There are two main components:

- **Mingle & Mentor (M&M) Fair (11am-12:30pm)**: Chat with students, faculty, and other colleagues working in energy resilience and rural communities about your career path, job opportunities, potential research collaborations, and ongoing challenges in the industry. Lunch will be provided for all registered attendees. If you have handouts related to jobs/projects, this is a good opportunity to share.
- **Energy Resilience Workshop (12:30pm-3pm)**: Professionals and students will work together to refine our collective understanding of energy resilience and the particular challenges in rural communities. In a series of facilitated activities, we will collaborate on a vision for an energy resilience training and technical assistance program. All participants are invited to stay for the closing reception from 3-4pm.

More information is available here: https://sites.mst.edu/pitun/rural-infrastructure-challenge-summit/

This is a new/experimental event, so we'd love any advice you have to make it a success!

Student Flier

Evaluation Post-Survey

Part 1. Feedback on Rural Infrastructure Challenge Summit

1. What was your biggest takeaway from the event?

2. What was your favorite part of the Summit?

3. Please share your overall thoughts about the Summit event:

Question	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
I am likely to participate in another Rural Infrastructure Challenge Summit.	○	○	○	○	○	○	○
I anticipate sharing what I learned at the Summit with others.	○	○	○	○	○	○	○

4. Please share your overall thoughts about the value of each specific activity.

Question	Not at all Valuable				Extremely Valuable			Did Not Attend
	1	2	3	4	5	6	7	
Mingle & Mentor (M&M) Fair	○	○	○	○	○	○	○	○
Fishbowl Activity	○	○	○	○	○	○	○	○
Knowledge Mapping	○	○	○	○	○	○	○	○
Role Playing	○	○	○	○	○	○	○	○
Closing Reception	○	○	○	○	○	○	○	○

5. What feedback do you have to improve the Summit?

Part 2. Engagement

1. Please read each statement very carefully and rate how strongly you agree or disagree with it.

Question	Strongly Disagree				Strongly Agree			Not Sure
	1	2	3	4	5	6	7	
I believe I should make a difference in my community.	○	○	○	○	○	○	○	○
I am committed to serve in my community.	○	○	○	○	○	○	○	○
I believe that it is important to be informed of community issues.	○	○	○	○	○	○	○	○
I believe that it is important to volunteer.	○	○	○	○	○	○	○	○
I sometimes find it difficult to see things from the other person's point of view.	○	○	○	○	○	○	○	○
I believe that there are two sides to every question and try to look at them both.	○	○	○	○	○	○	○	○
I am interested in learning about and/or sharing about Public Interest Technology careers.	○	○	○	○	○	○	○	○

Part 3. Demographics

1. What role are you? ○ Student ○ Faculty ○ Professional ○ Community Member

2. Do you identify as rural? ○ Yes ○ No ○ Not Sure

3. How would you describe yourself? Please check all that apply.

   □ African, African American
   □ Asian, Asian American
   □ European, European American (Caucasian)
   □ Latino, Latino American, Chicano
   □ Native American
   □ Middle Eastern
   □ Multiethnic
   □ Other, please specify _____
   □ Prefer not to answer

4. What is your gender?

   ○ Female/Woman ○ Male/Man ○ Gender non-binary ○ Other ○ Prefer not to answer