CU Boulder, Masters of the Environment Capstone Project Colorado Electric Transmission Authority (CETA)



Students: Annalisa Teleha, Jacob Oleyar, Sarah Harrison Advisor: Derek Fehrer Partner: Maury Galbraith



Purpose

The power grid is under significant pressure as its current capacity and projected growth is not keeping pace with growing power demands, stemming from increased rates of: electrification, clean energy integration, manufacturing, data processing, and population growth.

Capstone students collaborated with CETA to investigate ways in which Colorado can increase its transmission capacity more rapidly, apart from the traditional method of expansion via greenfield projects. Solutions include siting new project on existing rights-of-way (ROW) and implementing grid-enhancing technologies (GETs) and advanced conductors on the existing grid.

Methods

Literature Review and Research

- Co-location in Existing ROW
 - Existing Transmission
 - Highways
 - Railways
- Advanced Transmission Technologies
 Grid Enhancing Technologies
 - Dynamic Line Ratings
 - Advanced Power Flow Controls
 - Topology Optimization
 - Advanced Conductors
 - Advanced Reconductoring

Industry Professionals Interviews

- Cathy Boies, Gridworks
- Brooks Clingman, NextEra Transmission
- Randy Satterfield and Matthew Prorok, NextGen Highways & Great Plains Institute
- Ryan Hubbard, Tri-State Generation and Transmission
- Daly Edmunds, Audubon Society
- Larry Milsoshevich
- Emilia Chojkiewicz, Lawrence Berkeley National Laboratory
- Rob Gramlich, Grid Strategies (FERC)
- Julia Selker and Zachary Zimmerman, WATT Coalition
- Lucas Monteiro and Dan Ryall, TS Conductor

Deliverables

• Policy Brief and Technology Review for Increasing Transmission Capacity Within Existing ROWs,

Presentation to CETA's Board of Directors

Key Findings

- 1. Engineering is not the problem! Solutions exist, but they are not being deployed at scale.
- 2. The current investor-owned utility financial model in Colorado and the U.S. is not conducive to incentivizing the deploying these technologies.
- 3. Each technology, ROW type, and tool should be considered on a case-by-case basis.
- 4. There is a lack of education on the part of many utilities and PUCs on many of these transmission technologies, as there have not been many studies or deployments of these technologies in the U.S.



Recommendations

Category	Number	Title
Policy	1	Consideration of Advanced Transmission Technologies (ATTs)
Policy	2	Priority Siting Order for New Lines
Studies & Demonstrations	3	CETA-Supported Demonstrations of ATTs
Education	4	Public Education and Transmission Workshops
Financial	5	Shared Savings Cost Model & Performance Based Ratemaking
Financial	6	"Maximum Net Benefits" Framework
Other	7	Data Sharing of Existing Transmission Infrastructure
Other	8	Non-Wires Alternatives (NWAs)

