DESIGNING MULTI-BENEFIT TRANSMISSION CORRIDORS

NORTHEAST / MID-ATLANTIC

WORKSHOP BRIEFING DOCUMENT

WORKSHOP DATE - AUGUST 15, 2025

DESIGNING MULTI-BENEFIT TRANSMISSION CORRIDORS

NORTHEAST / MID-ATLANTIC

WORKSHOP BRIEFING DOCUMENT

WORKSHOP DATE - AUGUST 15, 2025

Prepared by:
Nicholas Pevzner, University of Pennsylvania
Chesney Floyd, University of Pennsylvania
Shreya Mehta, University of Pennsylvania

Reviewed by:
Rebecca O'Neil, Pacific Northwest National Laboratory
Irena Netik, Pacific Northwest National Laboratory

Penn
University of Pennsylvania

Pacific Northwest
NATIONAL LABORATORY

contents

workshop objectives

The *Designing Multi-Benefit Transmission Coridors* workshop invites landscape architects, design practitioners, engineers, energy professionals, and utility stakeholders to imagine strategies for the design of the next generation of electrical transmission, where the transmission corridor is thought of as an integrated element of the landscape, woven into the fabric of land use, the needs of local communities, and the functioning of ecosystems.

Participants will explore how strategies for combining multiple functions and benefits within the corridor might be deployed, and elaborate some initial landscape principles for multi-benefit corridor design. The workshop will test the premise that the design of multi-benefit transmission corridors can transform the relationship of people to infrastructure through a combination of multifunctionality, legible benefits, and engaged modes of stewardship. *Please sign up for the workshop here*.

participants can expect to

Learn about the the need for expansion and upgrading of the transmission system as part of the energy transition, and constraints and opportunities of designing landscapes that interface with the transmission system

Gain an understanding of transmission corridors as a unique landscape typology with infrastructural, ecological and experiential dimensions

Participate in a series of collaborative, multi-disciplinary group exercises exploring various aspects of the design of multi-benefit corridor landscapes

Consider the application and potential of an initial set of landscape principles applicable to the multi-benefit corridor design challenge

goals

Identify novel design opportunities for multi-benefit transmission corridors

Elaborate design strategies that test the multi-benefit framework in context

Test initial landscape principles through multi-disciplinary discussion

Synthesize the most promising strategies for combining uses, achieving multiple benefits, or changing perception of transmission corridors

This workshop is being funded by the **U.S. Department of Energy's Grid Deployment Office** through the **Pacific Northwest National Laboratory (PNNL)**, in support of the Connecting Transmission Corridors (ConCord) Initiative, which is focused on investigating the full range of public benefits enabled through tranmsission corridor investments.

introduction

A CRITICAL LANDSCAPE TYPOLOGY

Electrical transmission corridors – high-voltage power lines – are an essential missing piece of the energy transition. As electricity demand grows and new sources of renewable energy production come online, new and upgraded transmission lines are needed to move that electricity and get it to consumers and load centers. Over the next two and a half decades, the country will need to build over 200 gigawatts of interregional transmission, and expand capacity along the most congested corridors. There is an urgent need to think about how transmission design and planning can be accelerated, how it can minimize disruption, and maximize co-benefits.

However, the expansion of the transmission system faces headwinds. Transmission lines often need to cross a variety of land uses, property boundaries, and land ownership types. Transmission expansion is driven by a variety of disparate utilities, each with their own needs and usually without coordination. There isn't currently a set process for incorporating secondary uses and programs along the corridor, with each utility determining its priorities and comfort levels within its service territory. And for residents and neighbors, electrical transmission is often seen as undesirable, attitudes that can slow or prevent its construction. Partly this is because neighbors and communities don't often see tangible benefits from hosting large transmission infrastructure in their area. And in part, existing models of transmission line design and planning prioritize the infrastructure's needs above those of the landscape, place, or context -- rather than treating the transmission line as yet one more functional layer in a complex, multi-layered cultural landscape.

In imagining the next generation of transmission landscapes, the moment of designing and developing new and upgraded transmission lines presents an opportunity to treat the whole of these corridors as landscapes that operates in more multifunctional and multi-benefit ways, that include an expanded suite of benefits for stakeholders, and that feature an expanded array of ecosystem services and ecosystem function.

In thinking about multi-benefit transmission corridors, the aspiration of this workshop is not only to imagine ways of mitigating the disruptions and harms caused by transmission line construction, but to actively expand the menu of benefits to communities and ecosystems through novel forms of transmission line design and development -- from offering recreation infrastructure, to ecological infrastructure, to economic benefits, to comporting with a sense of place. This workshop will test a series of landscape principles for the design of multi-benefit transmission corridors, and seek to articulate discrete design opportunities that make this premise tangible.

Urban farm located in the transmission right-of-way in Los Angeles, CA. Photo: Judi Gerber, UC ANR

Utility-installed beehives in ComEd's right-of-way in Des Plaines, IL, as part of its pollinator habitat program

issues and opportunities

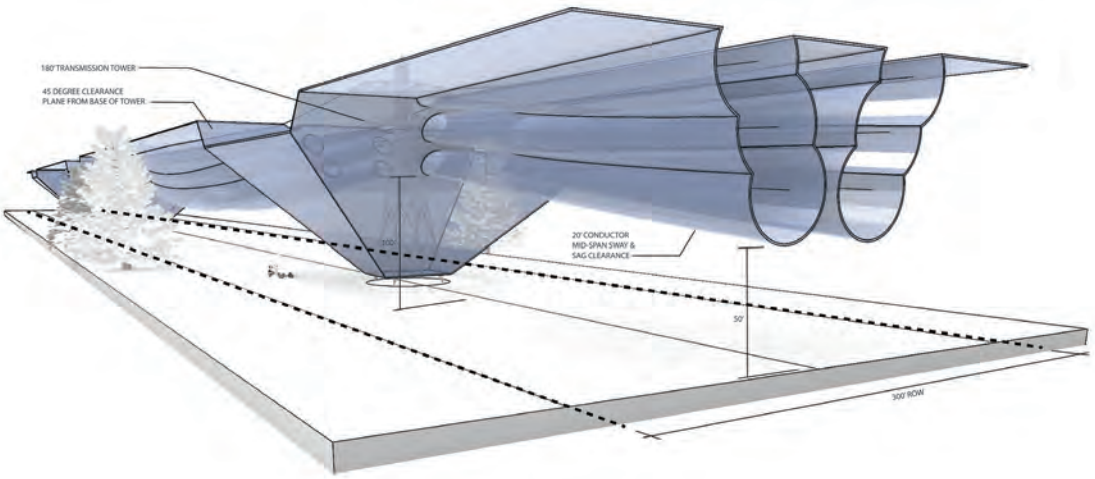
Transmission corridors present a set of stringent constraints related to their safe and reliable operation that any transmission landscape design will need to accomodate, but also an array of opportunities for reimagining aspects of the transmission corridor in new ways. Here we briefly list of some of these issues and opportunities.

ENGINEERING & SAFETY

The engineering and safety requirements of electrical transmission infrastructure create certain constraints to what can happen within and around a transmission corridor that designers need to be mindful of.

Tower Clearances - Starting at the tower base, a 45-degree plane defines the maximum height of nearby vegetation. The intent of this plane is to ensure that falling trees do not collide with the tower or its conductors. Projecting from the tower base in all directions, this clearance establishes a building- and vegetation-free zone around each tower.

Wire Sag and Sway - The NESC and Rural Utility Office require conductor clearances that account for the potential sag of wires between towers, swaying under wind load, as well as distance to prevent induction of current in surrounding objects, and additional safety factors. Wire clearances may be visualized as a tapered cylindrical volume with a smaller diameter at the tower where the wire is restrained (less movement) and a larger diameter at the mid-span (most movement).



Visualizing Tower Clearances

Three-dimensional modeling of tower set-backs and wire clearances illustrates the volumetric space of the corridor as it changes throughout the span. Taller elements may be safely incorporated closer to the towers where wire sag and sway is minimized. In the cross-section, corridor edges allow larger vegetation and vegetation management can control species to taper down into the wire zones as needed.

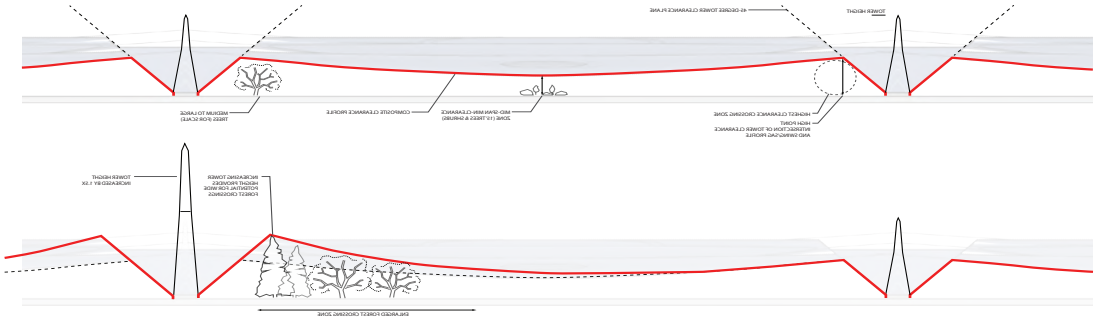
Right-Of-Way Width - For lines with voltages of less than 230kV, the right of way width may be 100-160 feet wide. Larger line voltages require greater clearances and larger towers, with corridors reaching up to 250' in width.

ENGINEERING & SAFETY *continued*

Maintaining a Clear Right of Way - Transmission lines require a clear right of way, free of structures or vegetation that could touch or fall onto the wires causing electrical arcing, short circuits or fires. In addition to clearances around towers and conductors, access for maintenance and repairs requires unobstructed passage for utility vehicles along the length of the right-of-way. While the National Electrical Safety Code the Rural Utility Office and OSHA establish basic safety clearances to conductors, individual utilities and operators publish their own right-of-way standards. Additionally tower spacing and span lengths, tower height, tension and wind loading affect local conditions.

Firebreaks - Transmission corridors present an elevated fire risk, with continual vegetation maintenance along the corridor being required to reduce the chance of fire being sparked by a transmission line. Intentional vegetation management strategies such as Integrated Vegetation Management (IVM), both reduce the risk of fire, and have the potential of advancing ecological performance goals.

Maintenance Access - Utility operators require a minimum 30' wide clear area that is continuous along the length of the corridor for access by maintenance vehicles. In some cases, this clear area may include a graded service road.



Corridor Clearances

Longitudinal corridor sections showing the changing tower and conductor clearance heights above ground (red line). Increasing tower height (bottom) can allow larger trees to cross the corridor at strategic locations, reducing fragmentation of adjacent forest habitat..

NEXT GENERATION SYSTEMS

As transmission corridors are upgraded and new corridors designed and built, emerging technological advances are changiing the constraints and opening new opportunities for multi-benefit corridor design.

Monopole Structures - While steel lattice towers currently support most high voltage overhead lines, single-pole (or monopole) towers require a smaller footprint, while increasing resilience to wind stresses. As existing transmission corridors undergo replacement of lattice towers with monopole structures, the clearances and aesthetic impacts of the transmission corridor. undergo a major change.

High-Tensile Carbon Fiber - Carbon fiber composite wires that are lighter and stronger than steel cables result in both reduced line losses and reduced sag. High tensile conductor cables may also allow for a greater distance between towers, and the reduction in the overall number of towers, with implications for the route geometry of the transmission corridor.

Underground & Direct Current (DC) Systems - While currently higher-cost than overhead systems for shorter runs, underground high voltage direct current (HVDC) transmission is cost-effective over longer distances and offers advantages such as reduced current induction in nearby objects. Opportunities include more easily bundling new transmission lines with existing transportation right-of-ways, reducing visual impact due to eliminatino of towers, and minimizing fragmentation of forests and other landscapes due to reduced need for vegetation clearing and maintenance.

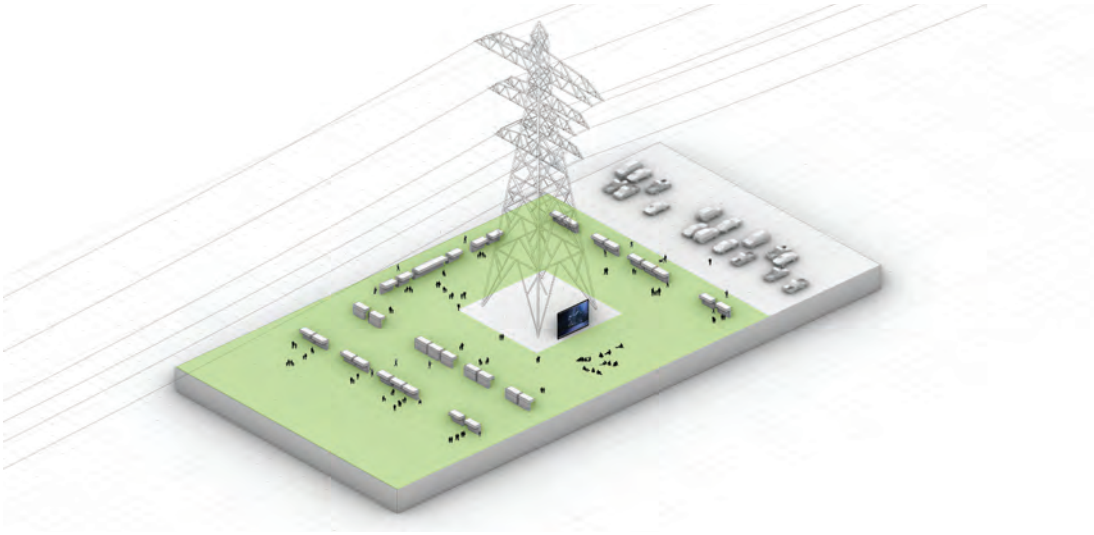
EXPERIENCE

Transmission corridors designed as public spaces have the potential to accommodate a variety of social functions, including outdoor recreation, cultural events and social gathering.

Recreation - The creation of trails along transmission corridors can increase the public's access to outdoor recreation.. Maintenance roads can be designed to serve a second role as public trails, taking experience into account. The trails can serve generalized biking and/or hiking, but can also be developed for specific users like mountain biking, snowmobiles or cross-country skiing, taking advantage of topographic preferences for these different types of users.

Events and Gathering - Transmission corridors can act as both thoroughfares and destinations for communities. The corridors, where appropriate space is available, can accommodate gathering and event spaces. Examples include playgrounds, parkways and water parks; the urban corridor can also support civic gatherings and performances - as well as more permanent uses such as community gardens and spaces for public art.

Civic Infrastructure - Layering novel infrastructure over existing community infrastructure can help change the perception of the former in the community. Portions of the transmission corridors which run over public lands could house civic facilities, like post offices, clinics and government offices.



Farmers Market

While the Farmers' Market may be placed anywhere in the corridor, it should be located adjacent to an existing roadway and provide space for loading and parking. Permeable edges allow entrance from more than one direction. In combination with other modules, Farmers Markets can help to anchor multi-use public spaces

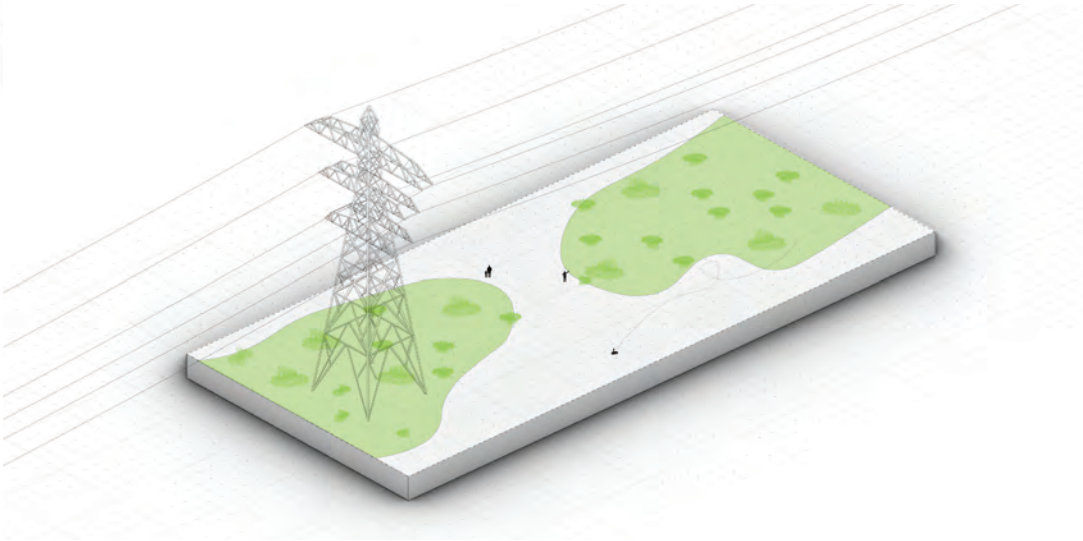
ECOSYSTEM

The introduction of transmission corridors carries ecological impacts, but through intentional design moves can mitigate impacts or increase ecological function.

Wildlife Movement - Transmission corridors can facilitate wildlife movement along the corridor. Design of long, linear, continuous, and interconnected habitat bands at landscape and regional scales could allow greater and safer freedom of movement for animals with large ranges and movement requirements, when the species' habitat preferences are aligned with the corridor's regime of vegetation management. To ensure wildlife movement, places where the corridor crosses roadways and other barriers require special attention.

ECOSYSTEM *continued*

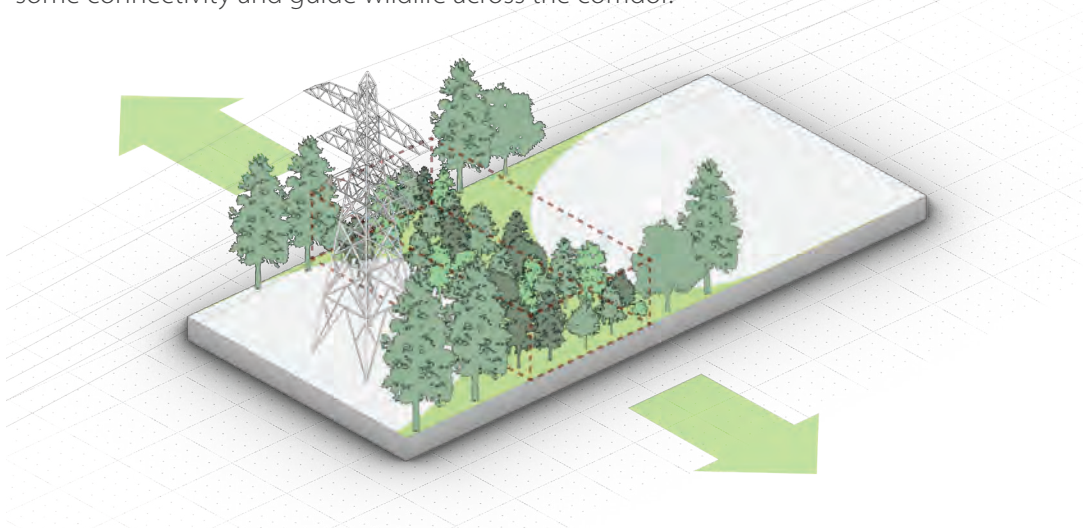
Habitat Creation & Restoration - Transmission rights of way can function as habitat for wildlife, especially grassland and meadow species like many birds and pollinator insects which rely upon early successional ecosystems. Habitat restoration using native vegetation or pollinator mutualist species can create specialized habitats catering to species of interest. Some restored habitats along the corridor can also be set aside as experimental landscapes for long- term scientific ecological research.



Pollinator Habitat

This module provides pollinator habitat of mixed meadow and shrubs, and requires a minimum area of two acres. Pollinator habitats may be placed anywhere in the corridor and have no minimum clearances to overhead conductors. Open, permeable edges allow free movement of pollinator species.

Forest Fragmentation - Due to their broad right-of-ways, transmission corridors can cause habitat fragmentation, especially when they are built through forested lands. Transmission corridors block wildlife movement (perpendicular to their direction), but designed crossing structures, overpasses, underpasses, or specially designed "forest crossings" can help restore some connectivity and guide wildlife across the corridor.



Forest Crossing

Linking fragmented forest patches adjacent to the corridor, the Forest Crossing module identifies zones established by tower and conductor clearances that allow larger trees and vegetation to cross the corridor. The width of the crossing determines the range of species that can use and benefit from the vegetated bridge.

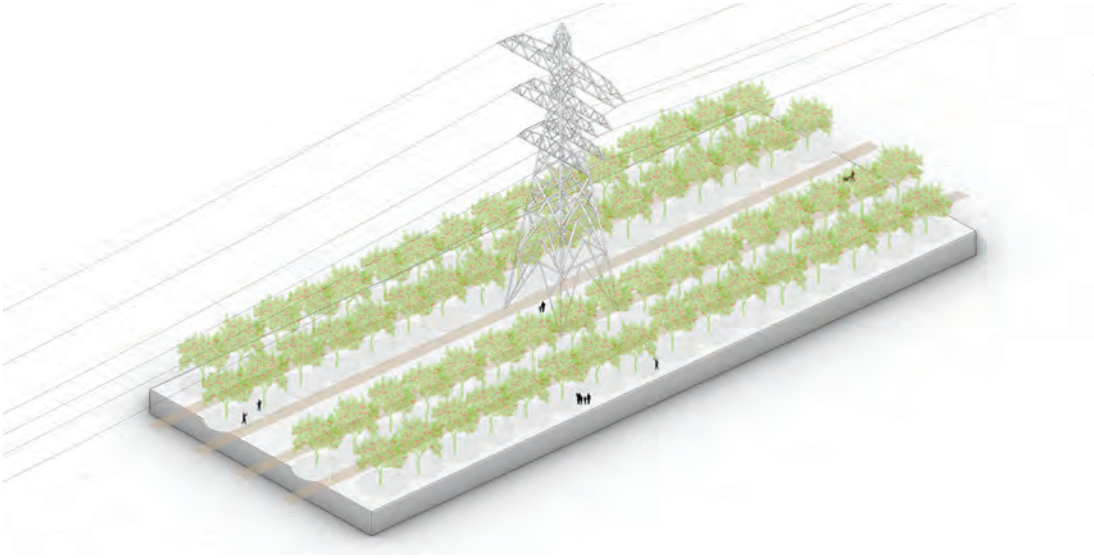
Stormwater Management - By virtue of their extensive area and pervious land cover, transmission corridors can support stormwater management at large scales. Land clearing for construction can increase stormwater runoff and exacerbate erosion. Transmission corridors can collect rainwater runoff, and reduce flood risk for downstream land uses.

ECONOMY

While public access to private land under transmission lines is subject to permission from the landowner, compatible activities taking place within transmission right-of-ways can benefit landowners, third parties, and local economies. Frequently located close to small towns or mid-size cities, corridors in agricultural areas can also provide public amenities that can benefit farmers, such as farm stands and farmers markets, "pick-your-own" access, shops, wine- and cider-tasting rooms, and other direct farm-to-consumer retail businesses.

Productive use by landowners - Programs such as plant nurseries, orchards, Christmas tree farms, or active farming or grazing provide active stewardship of the corridor, preventing unwanted tree growth, while making use of the space for their business operations.

Productive use by third parties - With permission from the landowner and the electrical utility, third parties can take advantage of the space under transmission lines for economic benefit. Examples include grazing of sheep, cattle, or other livestock; beekeeping; hunting; or the temporary use of parts of the corridor as laydown yards for forestry operations on adjacent land..



Apple Orchard

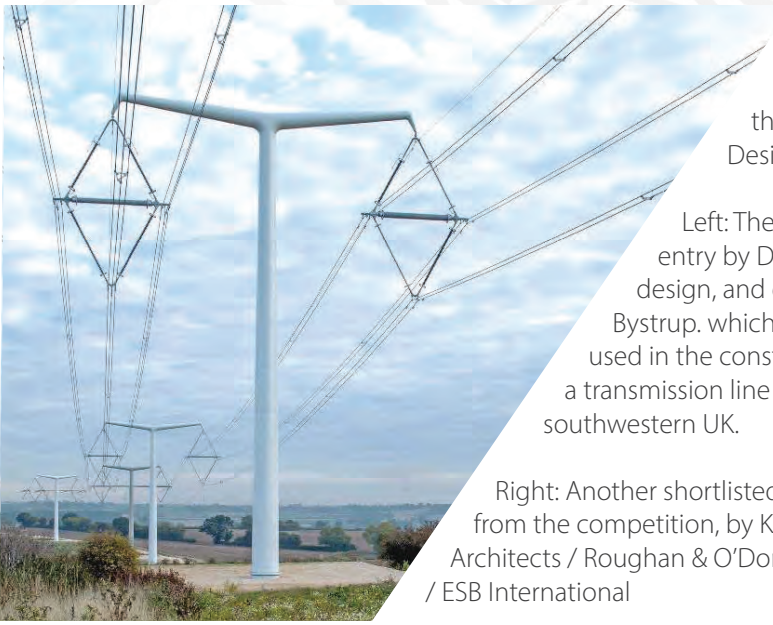
Commercial apple growing requires a vertical clearance of 30' for trees and harvesting. As a result, wire clearances should be evaluated in the mid-span, but zones near towers will provide sufficient clearance in most cases. Edges may require fencing to limit damage caused by deer. Limited public access avoids conflicts with orchard operations (harvesting, irrigation, pest control). The Orchard provides opportunities for public engagement through "Pick-your-own" or other farm to consumer models.

DESIGN MODULES

The issues and opportunities briefly outlined here will be further elaborated in the workshop in the form of "design modules".

Workshop participants will receive a collection of prepared design modules to discuss and deploy on an imagined site. Modules will consist of descriptions and depictions of the constraints and opportunities presented by each, from a technical, physical, or experiential sense. Within the multi-benefit framework, participants will look for mutually beneficial overlaps between modules, explore tradeoffs and tensions, and look for opportunities for productive co-location or hybridization.

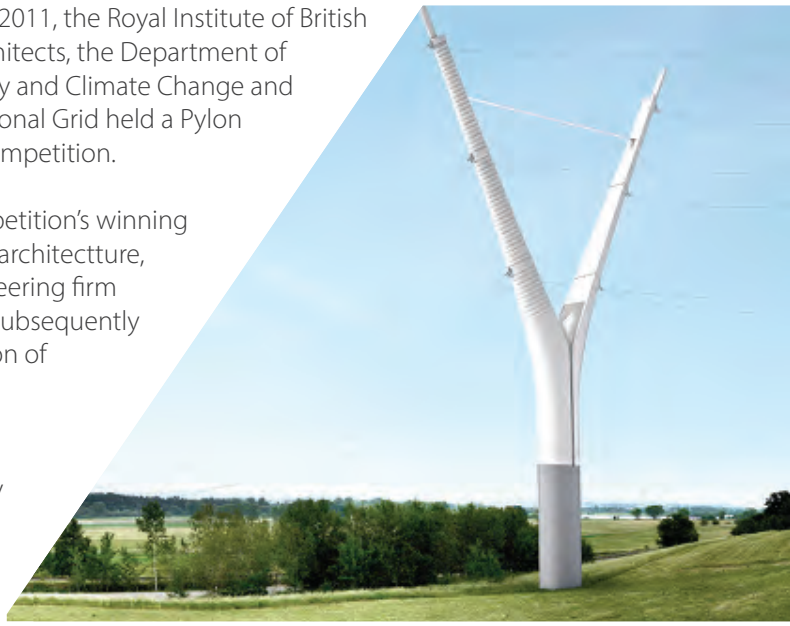
design precedents



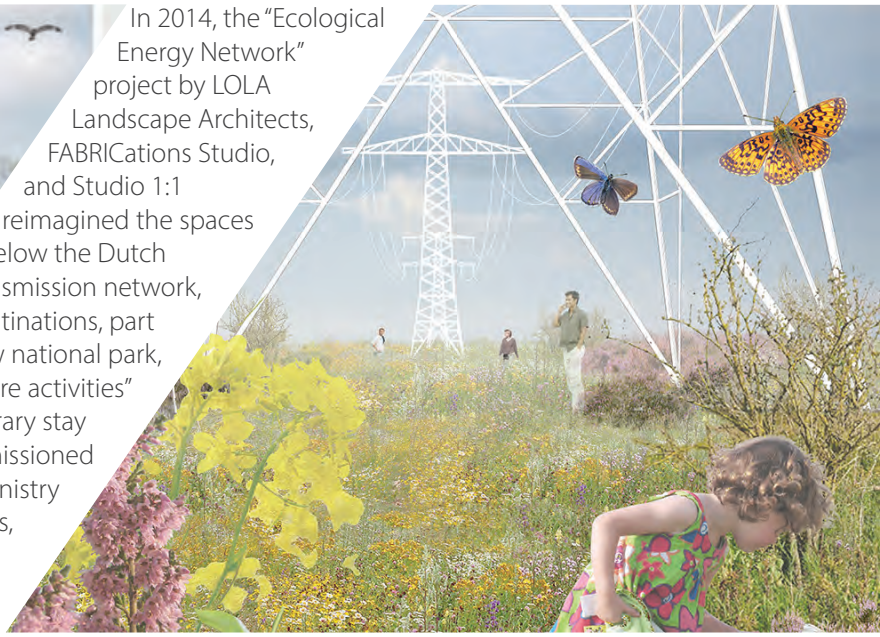
In 2011, the Royal Institute of British Architects, the Department of Energy and Climate Change and the National Grid held a Pylon Design Competition.

Left: The competition's winning entry by Danish architectture, design, and engineering firm Bystrup. which was subsequently used in the construciton of a transmission line in the southwestern UK.

Right: Another shortlisted entry from the competition, by Knight Architects / Roughan & O'Donovan / ESB International



In 2014, the "Ecological Energy Network" project by LOLA Landscape Architects, FABRICations Studio, and Studio 1:1 reimagined the spaces below the Dutch transmission network, as destinations, part of a new national park, with "leisure activities" and "temporary stay zones." Commissioned by the Dutch Ministry of Economic Affairs, Agriculture and Innovation and Dutch Architectural Institute.

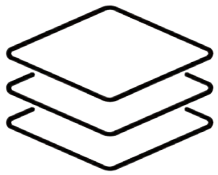


landscape principles

LANDSCAPE PRINCIPLES FOR DESIGNING MULTI-BENEFIT TRANSMISSION CORRIDORS

Landscape principles provide a framework for both generating design ideas and evaluating results. Here we offer four initial overarching principles: *multifunctionality, connectivity, legibility* and *participation*. The workshop will test and elaborate these principles within specific sites and settings, with participants considering how various design strategies might support or advance these principles within their sites.

MULTIFUNCTIONALITY



The principle of multifunctional landscape design suggests that co-benefits can be achieved and landscape function improved when multiple programs or land uses are combined in place. In a multi-functional landscape, design thinking and design interventions help functions to co-exist and co-locate successfully, avoiding conflict and increasing co-benefits.

With enough of an understanding of the requirements and objectives of each of the multiple functions, design as a medium can help landscapes achieve multiple overlapping objectives.

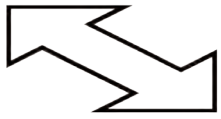
Examples of multifunctionality may include:

Spatial Multifunctionality - leveraging the linear space of the corridor to support connectivity along the length of transmission lines by providing linear recreational trails or linking habitats with wildlife corridors.

Material & Programmatic Multifunctionality - designing individual corridor elements to meet performance requirements for multiple uses and positive experience for a range of users; for example, designing maintenance roads to also provide public access, with design considerations for creating attractive experiences for hikers or cyclists.

Multifunctional Uses - combining productive economic uses, such as pasturing or tree farming, that double as vegetation stewardship within the corridor; vegetation management practices that provide habitat or maintain experimental settings for ecological research.

CONNECTIVITY



Facilitating connections both along and across the corridor that mitigate the fragmentation of people, neighborhoods, ecosystems, and animal movement. Examples may include:

Linking - Trails that connect people to nature, enabling nature access, exploration, and immersive experiences; Wildlife Corridors providing access along local movement and migration paths of animals by connecting habitat areas along the corridor

Bridging & Stitching - Neighborhood connections that stitch together fragmented portions of neighborhoods through a trails and crossings along or across the corridor. Opportunistic deployment of designed crossings for navigating over/under/around obstacles and infrastructural barriers

Social Cohesion - Programmatic adjacencies and overlaps that provide new public experiences within the corridor and opportunities for communities to gather.

landscape principles *continued*

LEGIBILITY

Promoting awareness and understanding of the transmission system and its benefits at multiple scales, as well as of the systems that it traverses. Examples may include::

Function - building public awareness of the multifunctionality of the transmission layer, and an appreciation of sharing space with a critical infrastructure

Continuity and connectivity - revealing connections between urban places, and with their peripheries and hinterlands

Nested scales - providing a simultaneous sense of the larger network but also the unique characteristics of the immediate environment

Management - making visible the processes of maintaining the corridor through vegetation management and other activities, possibly even making vegetation management events into public spectacles

Education - interpreting both the infrastructural components and the natural or cultural features of the corridor with educational programs and/or interpretive signage

PARTICIPATION

Enabling active uses that give both visitors and nearby residents a sense of care and ownership in shaping the corridor, actively maintaining and stewarding it, or utilizing it for productive purposes. Examples may include::

Management & Maintenance - public participation in ongoing and periodic vegetation management, trail and facility maintenance

Economic Production - providing places for making, gathering, transporting resources materials and products that benefit the local community

Community Gardens - self-managed spaces providing community access in which individuals can control and steward small plots

Exercise & Athletics - providing spaces for health, wellbeing, sport, and play

Events / Event Spaces - incorporation of designated gathering spaces at specific nodes along the corridor, such as reservable and multifunctional spaces that allow local people to hold collective events

prototypical sites

The workshop will consider how transmission corridors interact with some of the most prevalent landscape types within the Northeast / Mid-Atlantic region; teams will recieve one of three **prototypical sites,** each consisting of a patchwork of representative site types and unique landscape features. Teams will consider the issues and opportunities afforded by the site context to test the applicability of design modules and landscape principles.

NATURAL LANDSCAPES

From urban margins to remote and protected wilderness, natural landscapes feature large areas of predominantly undisturbed ecosystems, whose vegetation and soils are sensitive to disturbance.

Large contiguous natural areas have the greatest diversity of plant and animal species and provide extensive ecosystem functions at local, regional and global scales. Holistic transmission corridor design can mitigate the impacts of fragmentation, and facilitate animal migrations, leverage vegetation management to support key species. Corridor design can also provide infrastructure for conservation and programming for environmental education.

Examples of natural landscapes the workshop will consider include forests, grasslands, steeply sloped sites prone to soil erosion, and sensitive coastal or riverine habitats including beaches, wetlands and mudflats.

AGRICULTURAL LANDSCAPES

Transmission corridors in agricultural settings can play a role in supporting a wide range of economic activities related to adjacent agricultural production. Farming also entails the presence of people, machinery, and farm infrastructure like grain storage structures, irrigation canals, and other small structures.

Typical terrain will match the conditions suitable for agricultural production, with gentle slopes and deeper top soils. Traversing farmland, corridors in agricultural areas can provide space between undeveloped fragments at the margins of fields.

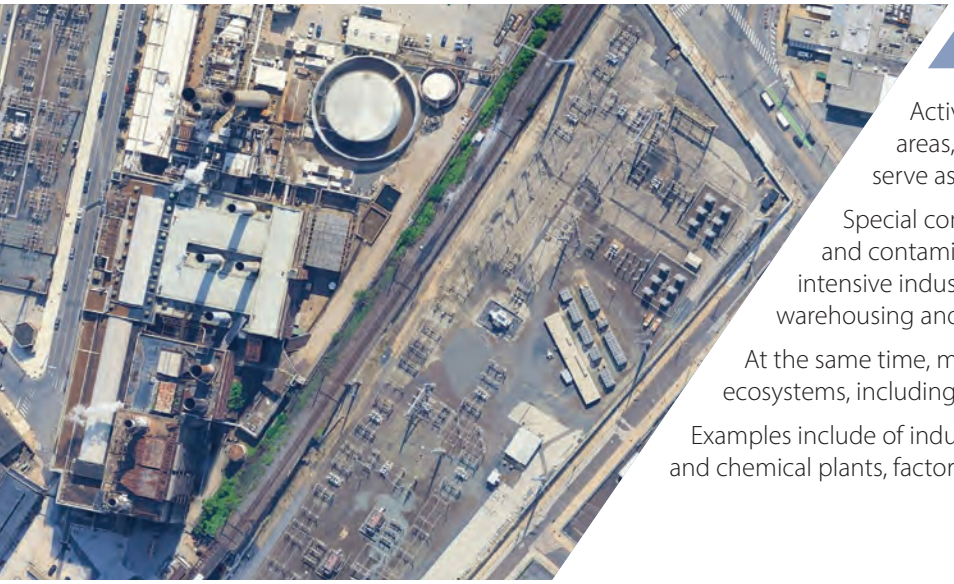
Examples of agricultural landscapes and features include row crops, orchards, pastureland and animal housing/ enclosure, along with utility structures for agriculture.

URBAN & BUILT ENVIRONMENT LANDSCAPES

Density, complexity of land uses and the social life of neighborhoods characterize transmission corridors in urban and suburban areas. Urban corridors have the highest potential to promote public access and community-building and opportunities for stewardship of the corridor itself.

Typical conditions include neighborhood margins with direct adjacencies to residential properties, parks and athletics facilities. The public right of way frequently crosses and interrupts the corridor. Transmission corridors in developed areas can provide ecological links between isolated patches of habitat.

Examples of urban landscapes include residential neighborhoods, commercial areas, parking, warehouse districts, logistics and light industry.



INDUSTRIAL LANDSCAPES

Active industrial areas typically exist at the periphery of urban areas, and as concentrated sources or users of electricity, frequently serve as either the origin or destination for many transmission lines.

Special considerations for corridors in industrial areas include toxic and contaminated water and soils. These corridors interact with intensive industrial environments such as ports and rail terminals, as well as warehousing and manufacturing sites handling hazardous materials.

At the same time, many industrial urban edges also overlap with sensitive ecosystems, including coastal and riverine wetland areas and habitat edges.

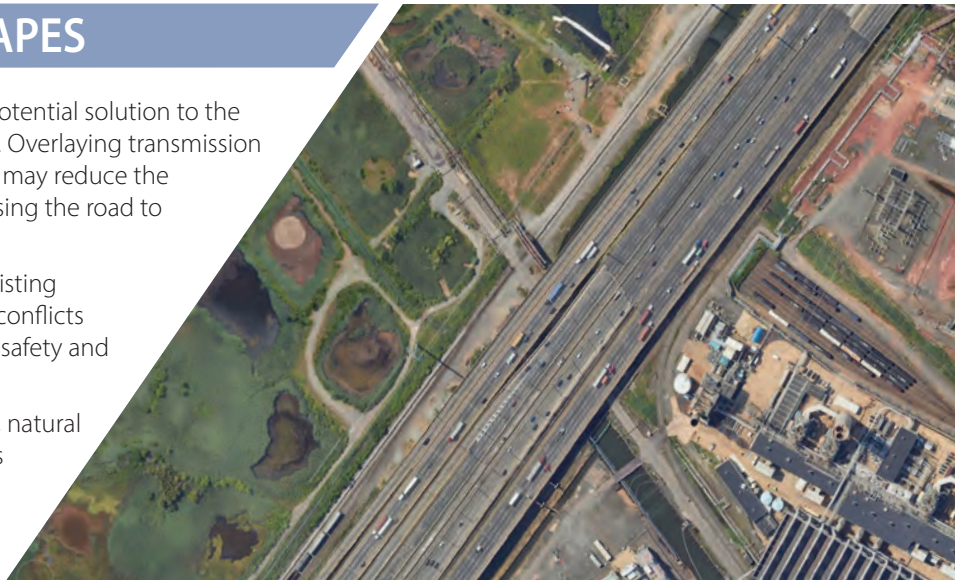
Examples include of industrial landscapes include ports, power plants, fuel refining and chemical plants, factories and manufacturing, logistics hubs, and transport facilities.

INFRASTRUCTURAL LANDSCAPES

Sharing existing infrastructure right-of-ways offers a potential solution to the limited space available for new transmission corridors. Overlaying transmission infrastructure with other linear infrastructural systems may reduce the number of stakeholders and land owners affected, easing the road to construction.

Bundling electrical transmission infrastructure with existing infrastructure pathways requires mitigating potential conflicts between them, and considering how their respective safety and engineering standards interact.

Examples include roads and freeways, railways, canals, natural gas and liquid fuel pipelines, and telecommunications cable pathways.



workshop format

The workshop will be an in-person event at the University of Pennsylvania on August 15, 2025, with lunch provided. Participants will hear about the problem statement and the aspirations for multi-benefit corridor, some introduction to the issues and constraints of co-designing with transmission infrastructure, and then break out into smaller working groups. Each working group will be given a prototypical site containing a variety of natural, cultural, and infrastructural landscape features common to transmission corridor landscapes of the Northeast / Mid-Atlantic region, along with the initial landscape principles for designing multi-benefit transmission corridors, and a suite of modules -- initial spatial strategies that they may apply to their prototypical site,, exand upon, or hybridize.

Participants will discuss, experiment with, and elaborate how and where these strategies might be actionable, how to make them more responsive to site conditions, or where and how they might be altered or refined. Challenges and trade-offs will be considered, with opportunities to develop additional strategies or modules that can address these challenges. Finally, each breakout group will summarizing the thinking and issues considered, for sharing with the larger group and considering in synthesis discussion. The workshop will aim to create space for multidisciplinary discussion, capturing aspects of landscape design thinking, energy infrastructure considerations, and input from the full array of stakeholder perspectives.

TIME & LOCATION

The workshop will be held August 15, 2025 at Meyerson Hall. University of Pennsylvania
Stuart Weitzman School of Design
210 South 34th Street
Philadelphia, PA 19104

AGENDA

10:00 am - 10:30 am	Welcome, Introduction, & PNNL/DOE Kickoff
10:30 am - 11:00 am	Overview of Principles, Strategies, Opportunities
11:00 am - 12:30 pm	Group Breakout Working Session
12:30 pm - 1:30 pm	Lunch
1:30 pm - 3:00 pm	Working Session 2 & Key Points Summaries
3:00 pm - 4:00 pm	Discussion and Synthesis: Principles and Strategies
4:30 pm - 5:00 pm	Final thoughts & Closing

CONTACT

Nicholas Pevzner, Assistant Professor, Department of Landscape Architecture
University of Pennsylvania, Stuart Weitzman School of Design
pevzner@design.upenn.edu

references

Albany-Hudson Electric Trail. (2025). Hudson River Valley Greenway. https://hudsongreenway.ny.gov/albany-hudson-electric-trail

An Introduction to Transmission Infrastructure. (2025). Pacific Northwest National Laboratory. PNNL-SA-211723. https://www.pnnl.gov/sites/default/files/media/file/Introduction%20to%20Transmission%20Infrastructure-Revised.pdf

Belanger, P. (2016). Landscape as Infrastructure. Taylor And Francis.

BYSTRUP Power Pylon Design. (2017). BYSTRUP. https://www.powerpylons.com/t-pylon

Davis, B. (2013, December 8). Easements: Index of Landscape Typology. Landscape Archipelago. https://landscapearchipelago.wordpress.com/2013/12/08/easements-index-of-landscape-typology/

Davis, B., Stokowski, P. A., & Capen, D. E. (2006). Easement-based Land Conservation and Recreational Access in the Northern Forest.

Duke Energy Trails at RCC - Rockingham Community College. (2025, March 26). Rockingham Community College. https://rockinghamcc.edu/duke-energy-trails-at-rcc/

Ecological Energy Network — FABRICations. (2025). FABRICations. FABRICations. https://www.fabrications.nl/work/ecological-energy-network

Vegetation management best practices for Transmission System Operators. (2017, December). LIFE-Elia RTE. http://life-elia.doitwithfun.com/en/Vade-mecum-Best-practices-for-Transmission-System-Operators

Meyer, R. (2021, July 28). Unfortunately, I Care About Power Lines Now. The Atlantic. https://www.theatlantic.com/science/archive/2021/07/america-is-bad-at-building-power-lines-lets-fix-that-transmission-climate/619591/

Morgan, A. (2021). Oncor to donate 110 acres in S.E. Dallas for city's park and trail initiative. Oncor-Www. https://www.oncor.com/content/oncorwww/wire/en/home/newsroom/Oncor-to-Donate-110-Acres-in-S-E-Dallas-for-Citys-Trail-Park-Initiative.html

NYPA Vegetation Management. (2025). New York Power Authority. https://www.nypa.gov/power/transmission/vegetation-management

O'Neil, R., Preziuso, D., Arkema, K., Ko, Y., Pevzner, N., Diamond, K., Gore, S., Morrice, K., Henderson, C., & Powell, D. (2022). Renewable Energy Landscapes: Designing Place-Based Infrastructure for Scale. OSTI OAI (U.S. Department of Energy Office of Scientific and Technical Information). https://doi.org/10.2172/1961993

Pevzner, N., Ko, Y., & Dimond, K. (2021, June 8). POWER PLAYER. Landscape Architecture Magazine. https://landscapearchitecturemagazine.org/2021/06/08/power-player/

Protecting trees and power lines. (2023). SMUD. https://www.smud.org/Corporate/Environmental-Leadership/Protecting-Trees-and-Power-Lines

RIBA Pylon Design Competition. (2014). Royal Institute of British Architects. https://www.ribapylondesign.com/home/

Route of the Badger - Rails to Trails Conservancy. (2025, March 7). Rails to Trails Conservancy. https://www.railstotrails.org/trailnation/route-of-the-badger/

Thün., Fishman, R., & Mcmorrough, J. (2015). Infra Eco Logi Urbanism : a project for the Great Lakes megaregion. Park Books.

Trees & Vegetation | Vermont Electric Power Company. (2024). Velco.com. https://www.velco.com/trees-and-vegetation

Wildlife Protection at APS. (2020). Aps. https://www.aps.com/en/About/Our-Company/Our-Commitment-to-Safety/Wildlife-protection