NARUC Innovation Webinar
The Energy-Transportation Nexus: Solar Highways and the Road to a Cleaner Grid

November 9, 2023 | 3:00-4:00pm (ET)

NARUC thanks the U.S. Department of Energy for its support of this event.
• The National Association of Regulatory Utility Commissioners (NARUC) is a non-profit organization founded in 1889.

• Our Members are the state utility regulatory Commissioners in all 50 states & the territories. FERC & FCC Commissioners are also members. NARUC has Associate Members in over 20 other countries.

• NARUC member agencies regulate electricity, natural gas, telecommunications, and water utilities.
NARUC’S CENTER FOR PARTNERSHIPS & INNOVATION

Background & Focus

• NARUC staff dedicated to providing technical assistance to members.

• CPI identifies emerging challenges and connects state commissions with expertise and strategies to inform their decision making.

• CPI builds relationships, develops resources, and delivers trainings.

• All CPI support is federally funded via cooperative agreements with DOE and NIST.
NARUC Innovation Webinar Series

One webinar, most months
All NARUC members and stakeholders are invited

Join us next month for...

Powering the Future: Transforming Energy Distribution with Artificial Intelligence
December 14, 2023 | 3:00-4:00pm (ET)

https://www.naruc.org/cpi-1/innovation-webinars/

NARUC thanks the U.S. Department of Energy for its support of this series.
NARUC Innovation Webinar
The Energy-Transportation Nexus: Solar Highways and the Road to a Cleaner Grid

Moderator: Jamie Barber – Director of Energy Efficiency and Renewable Energy Unit, Georgia PSC

- Allie Kelly – Executive Director, The Ray
- Terry Bills – Global Transportation Industry Director, Esri
- Julie Peacock – Advisor, Joint Office of Energy and Transportation
WHO WE ARE

Ray C. Anderson (1934-2011)
• “America’s Green Industrialist” at Interface
• Global pioneer of corporate sustainability
• Circular economy now mainstream

The Ray Highway
• West Georgia I-85 renamed “Ray C. Anderson Memorial Highway”
• More than 12 projects since 2015
• A test bed for net-zero infrastructure
Subject: State DOTs Leveraging Alternative Uses of the Highway Right of-Way Guidance

From: Stephanie Pollack
Acting Administrator

Date: April 27, 2021

To: Directors of Field Services
Division Administrators
Division Directors

PURPOSE

The purpose of this guidance document is to provide clarification to FHWA Division Offices who work with State departments of transportation (State DOTs) on certain uses of the highway right-of-way (ROW) that can be leveraged by State DOTs for pressing public needs relating to climate change, equitable communications access, and energy reliability. This guidance document supports the consistent utilization of the ROW for renewable energy generation, electrical transmission and distribution projects, broadband projects, vegetation management, inductive charging in travel lanes, alternative fueling facilities, and other appropriate uses as identified herein. FHWA Division Offices should share this memo with their State DOTs for their consideration for these alternate uses of highway ROW.

These uses of the highway ROW, including the development of renewable energy projects, enable breakthrough transportation technology related to electrification and connected and autonomous vehicles. These uses of the highway ROW also better utilize the full value and productivity of the existing asset while also reducing or eliminating the ongoing maintenance expenses for State
ROW Siting and Permitting

• States own the rights-of-way
  No eminent domain
  Neutralize community opposition

• Streamlined permitting
  Categorial exclusion for “Projects... entirely within the existing operational ROW” (23 CFR 771.117(22))

• Streamlined “accommodations policy”

• Fair Market Value Exception for Renewable Energy Facilities
WisDOT Badger-Coulee overhead transmission in I-90 / I-94 ROW

Italy-France Interconnector: four 320 kV HVDC transmission cables laid just outside the road surface
HVDC Macrogrid on Right-of-Way

Blue lines are parts of the existing federal highway system that could be used for installing a nearly equivalent HVDC grid.

Design and Valuation of High-Capacity HVDC Macrogrid Transmission for the Continental US
ROW Solar
This area has 2,744 solar panels (343 points) on 3.7 ac that can generate 300 watts each. The total system size capacity is 0.82 MW.

This system has the potential to generate 1,163 MWH/Yr of electricity valued at $129,977/Yr.

Using Peak Sun Hours calculation. Using the Georgia March 2023 commercial electricity price of 11.18 cents/KWh.

<table>
<thead>
<tr>
<th>Homes powered for 1 yr</th>
<th>109 homes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric cars powered for 1 yr</td>
<td>237 electric cars</td>
</tr>
</tbody>
</table>

**Equivalencies**

Based on the EPA Greenhouse Gas Equivalencies Calculator

Carbon reduction from 1,163 MWH/Yr of solar electricity:

824 Metric tons of CO2 avoided

<table>
<thead>
<tr>
<th>Reduction in pounds of coal burned</th>
<th>911,429 pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in passenger vehicles driven for 1 yr</td>
<td>178 cars</td>
</tr>
<tr>
<td>Reduction in gallons of gasoline consumed</td>
<td>92,712 gallons</td>
</tr>
<tr>
<td>Carbon sequestered by acres of US forests in 1 yr</td>
<td>981 acres</td>
</tr>
</tbody>
</table>
ROW Transmission
Highlights

- GIS presents complex data simply (data driven)
- Designed to develop a common understanding
- Evaluation of Alternatives
- Preliminary analysis and costing
Suitability at Scale
Corridor Analysis
Costing Analysis
3D Visualization

In partnership with esri

ZERO CARBON. ZERO WASTE. ZERO DEATH.
Next Steps

• Federal position is to encourage and facilitate “Clean Energy and Connectivity" projects

• What is needed:
  Interagency coordination in the States
  Geo-mapping of potential ROW projects

• Contact: Allie Kelly, allie@theray.org
  Terry Bills, tbills@esri.com
Supporting Clean Energy and Connectivity in ROWs

November 9, 2023

driveelectric.gov
Mission and Vision

Mission
To accelerate an electrified transportation system that is affordable, convenient, equitable, reliable, and safe.

Vision
A future where everyone can ride and drive electric.
Joint Office of Energy and Transportation

Established in the Bipartisan Infrastructure Law to address areas of joint interest to the Departments of Energy and Transportation

$300M

in FY22 funds to DOT with transfer authority to DOE

9

major areas of emphasis
Areas of Emphasis Summary

1) Technical assistance for zero emission vehicle charging and refueling infrastructure
2) Data sharing
3) Performance of a national and regionalized study vehicle charging
4) Training and certification programs
5) A program to promote renewable energy generation, storage, and grid integration in transportation rights of way
6) Study and planning for high-voltage transmission; and pilots for medium and high-voltage transmission in the interstate rights-of-way
7) Research, strategies, and actions to mitigate the effects of climate change
8) Development of a streamlined utility accommodations policy for transmission in the transportation right-of-way
9) Any other issues that the Secretary of Transportation and the Secretary of Energy identify as issues of joint interest
BIL Language on ROWs

(5) establishment and implementation of a program to promote renewable energy generation, storage, and grid integration, including microgrids, in transportation rights-of-way;

(6) studying, planning, and funding for high-voltage distributed current infrastructure in the rights-of-way of the Interstate System and for constructing high-voltage and or medium-voltage transmission pilots in the rights-of-way of the Interstate System;

(8) development of a streamlined utility accommodations policy for high-voltage and medium-voltage transmission in the transportation right-of-way.
Federal Government Coordination
Thank You

Contact: Julie.Peacock@ee.doe.gov