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TRB TRANSPORTATION RESEARCH BOARD

TRB Webinar: Legal Considerations of Renewable Energy Production in State Right-of-Way

November 22, 2022

11:30 AM – 1:00 PM

CLE Credit Information

1.25 Continuing Legal Education Credits from the American Bar Association

You must attend the entire webinar

TRB did not seek approval for this workshop from the state board, we advise you contact your state board to see if credit would be accepted

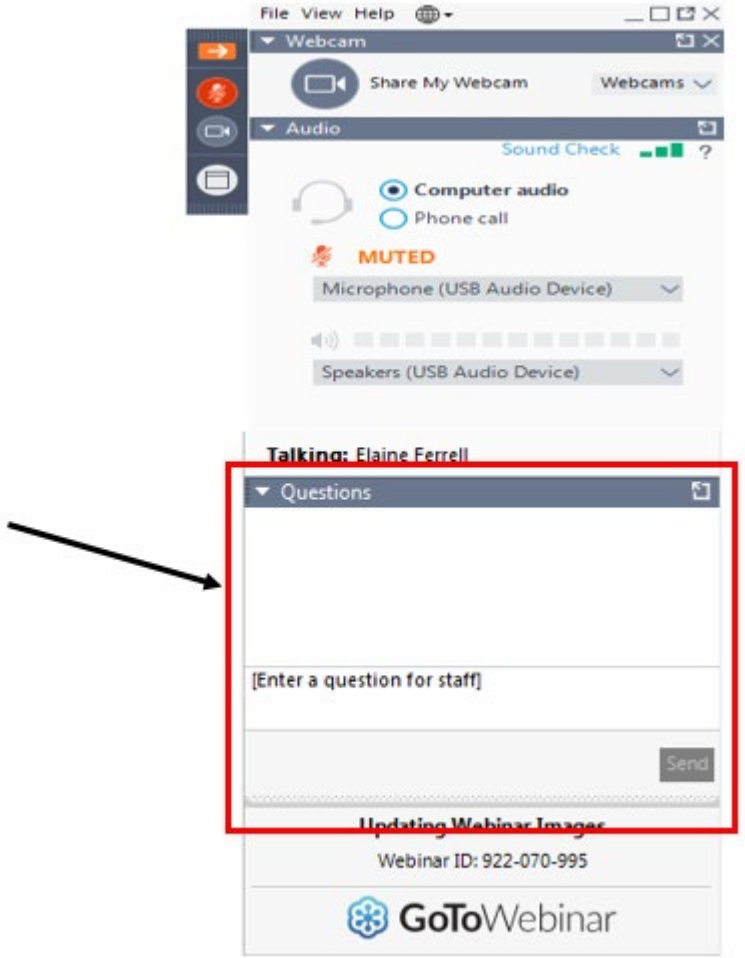
See email following webinar for the certificate to provide to your board

Learning Objectives

- Make objective economic and planning decisions based on the impact of a pandemic on impaired driving behaviors
- Evaluate the potential impact of decisions designed to mitigate pandemic-related impaired driving behaviors
- Assess areas where additional research on the topic is needed

Questions and Answers

- Please type your questions into your webinar control panel
- We will read your questions out loud, and answer as many as time allows



Today's presenters

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THE FEDERAL HIGHWAY ADMINISTRATION

PRESENTS:

ALTERNATIVE USE OF THE HIGHWAY RIGHT-OF-WAY

TRB

November 22, 2022

Key Topics

- Regulatory Environment
- April 2021 State DOTs Leveraging Alternative Uses of the Highway Right-of-Way Guidance
- FAQs
- Resources
- Questions?

Disclaimer

- Except for any statutes or regulations cited, the contents of this presentation do not have the force and effect of law and are not meant to bind the public in any way. This presentation is intended only to provide information to the public regarding existing requirements under the law or agency policies.

Federal Statutory and Regulatory Requirements

23 CFR 1.23(b)

- Real property acquired for highway purposes within the boundaries of a federally-assisted highway project…**shall be devoted exclusively to public highway purposes**.
- **Other use or occupancy.** Subject to **23 U.S.C. 111**
  - Non-highway use may be approved by the Administrator if the use is
    - in the **public interest**,
    - will not impair the highway, or
    - interfere with the free and safe flow of traffic thereon.

Subject to 23 U.S.C. 111

- **(a) Prohibited commercial activity within the <u>Interstate ROW</u> Other use or occupancy.** Subject to **23 U.S.C. 111**
  - prohibits commercial establishments for serving motor vehicle users;
  - **Grandfathers** commercial establishments prior to 01/01/1960; and
  - Allows the use of **airspace** but no access from the interstate right-of-way
- **(b) Rest areas**
  - Limited commercial activities for serving motor vehicle users.

Utility or Alternative Use

- **ROW Use Agreement**

  (23 CFR Part **710** Subpart D)

- **Utility Accommodation** Policy/Plan

  (23 CFR Part **645** Subpart B)

- **Basic requirements for both options**
  - Must be in the **public interest;**
  - Must not affect **safety** or **operation** of the facility;
  - Must consider **Environmental effects;**

State DOTs Leveraging Alternative Uses of the Highway ROW

- **April 27, 2021** Memo from Acting Administrator – "State DOTs Leveraging Alternative Uses of the Highway ROW Guidance"
  - Renewable energy generation;
  - Electrical transmission and distribution projects;
  - Broadband;
  - Vegetation management;
  - Inductive charging (wireless or cordless charging);
  - Alternative fueling facilities.

See the memo at https://go.usa.gov/xtekh

April 27 Memo, continued

- "CEC Projects" – Clean Energy and Connectivity Projects
  - Discusses benefits of CEC projects.
  - Outlines two methods for addressing CEC projects.
  - First method - Utility under State UAP
    - Encourages the accommodation of CEC projects as utilities, to the extent practicable and consistent with State law.
    - For States that define these facilities as utilities, FHWA encourages States to update their UAP to clarify that CEC projects are utilities.

April 27 Memo, continued

- Second method – FHWA may approve alternative uses of the ROW
  - FHWA will consider CEC projects as acceptable alternative uses of the Interstate or non-Interstate highway ROW if they comply with Federal property management regulations at 23 CFR 1.23, 23 CFR Part 710, and 23 U.S.C. 111.
  - Qualify for Fair Market Value (FMV) exception based on environmental benefits (https://www.fhwa.dot.gov/real_estate/right-of-way/corridor_management/alternative_uses_guidance.cfm)
- Note that the approval of both still needs to be documented

FHWA FAQ on Electric Vehicle (EV) Charging

1. In general, can a State department of transportation (State DOT) or other State or local agency with jurisdiction over a highway, utility, or any other public or private party assess a fee for Electric Vehicle (EV) charging at any location outside of the Interstate Right of Way (ROW)?

2. Can a State DOT or other State or local agency with jurisdiction over a highway, utility, or any other public or private party assess a fee for EV charging when the EV charging station is located within Interstate ROW?

3. Can a State DOT or other State or local agency with jurisdiction over a highway, utility, or any other public or private party assess a fee for EV charging when the EV charging station is located within non-Interstate ROW?

4. Can a State DOT or other State or local agency with jurisdiction over a highway, utility, or any other public or private party assess a fee for EV charging when the EV charging station is located at a Park and Ride lot?

5. Can a State DOT or other State or local agency with jurisdiction over a highway, utility, or any other public or private party assess a fee for EV charging when the EV charging station is located on a federal postal road under 23 U.S.C. 111?

- https://www.fhwa.dot.gov/real_estate/right-of-way/corridor_management/ev_charging_faq.cfm

FHWA FAQ on Electric Vehicle (EV) Charging

6. Can installation of an EV charging station be accomplished through utility accommodation procedures?

7. If an EV charging station is accommodated in the ROW as a utility, does the Fair Market Value (FMV) requirement in 23 U.S.C. 156 apply to the utility's use of the ROW?

8. Can a State department of transportation or other State or local agency with jurisdiction over a highway, utility, or any other public or private party charge the owner of the EV charging station for their use of the ROW for the installation and operation of the EV charging station?

9. If EV charging stations are considered a utility under State law, but not covered by the State utility accommodation policy (UAP), may the installation be allowed as a utility without updating the UAP?

FHWA FAQ on Electric Vehicle (EV) Charging

10. Can the State contract with a private company for the installation or operation and maintenance of EV charging?

11. Can the operation of an EV charging station be considered as a State operation carried out through a contractor, and thereby eliminate FMV requirements?

12. What are the considerations for determining what property is within the Interstate ROW?

13. If a State DOT acquires property adjacent to the Interstate ROW and uses it as a rest area, does it become part of the Interstate ROW?

14. What advertising/signage is permissible in connection with EV charging installations on and off the Interstate?

Resources

- **FHWA Quick Guide**
  - https://www.fhwa.dot.gov/environment/sustainability/energy/publications/renew_energy_row_guide/index.cfm
- **ROW Use Agreement Guidelines**
  - https://www.fhwa.dot.gov/real_estate/policy_guidance/qa710.cfm
- **FAQs on EV Charging**
  - https://www.fhwa.dot.gov/real_estate/right-of-way/corridor_management/ev_charging_faq.cfm
- **Joint Office of Energy and Transportation**
  - https://driveelectric.gov/
- **MUTCD**
  - https://mutcd.fhwa.dot.gov/

Strategies for State DOTs Developing Solar Projects in State Right-of-Way

Edgar Kraus, Brianne Glover, and Jacqueline Kuzio
Texas A&M Transportation Institute

TRB Webinar Series
November 22, 2022

Developing Solar Projects in State Right-of-Way

- Driving factors
  - Renewable portfolio standards, clean energy standards, and incentives
- Key concepts
  - Right-of-way use agreements
  - Power purchase agreements
  - Net metering
- Take-aways

Renewable Portfolio Standards, Clean Energy Standards, and Incentives

Renewable Portfolio Standards, Clean Energy Standards and Incentives

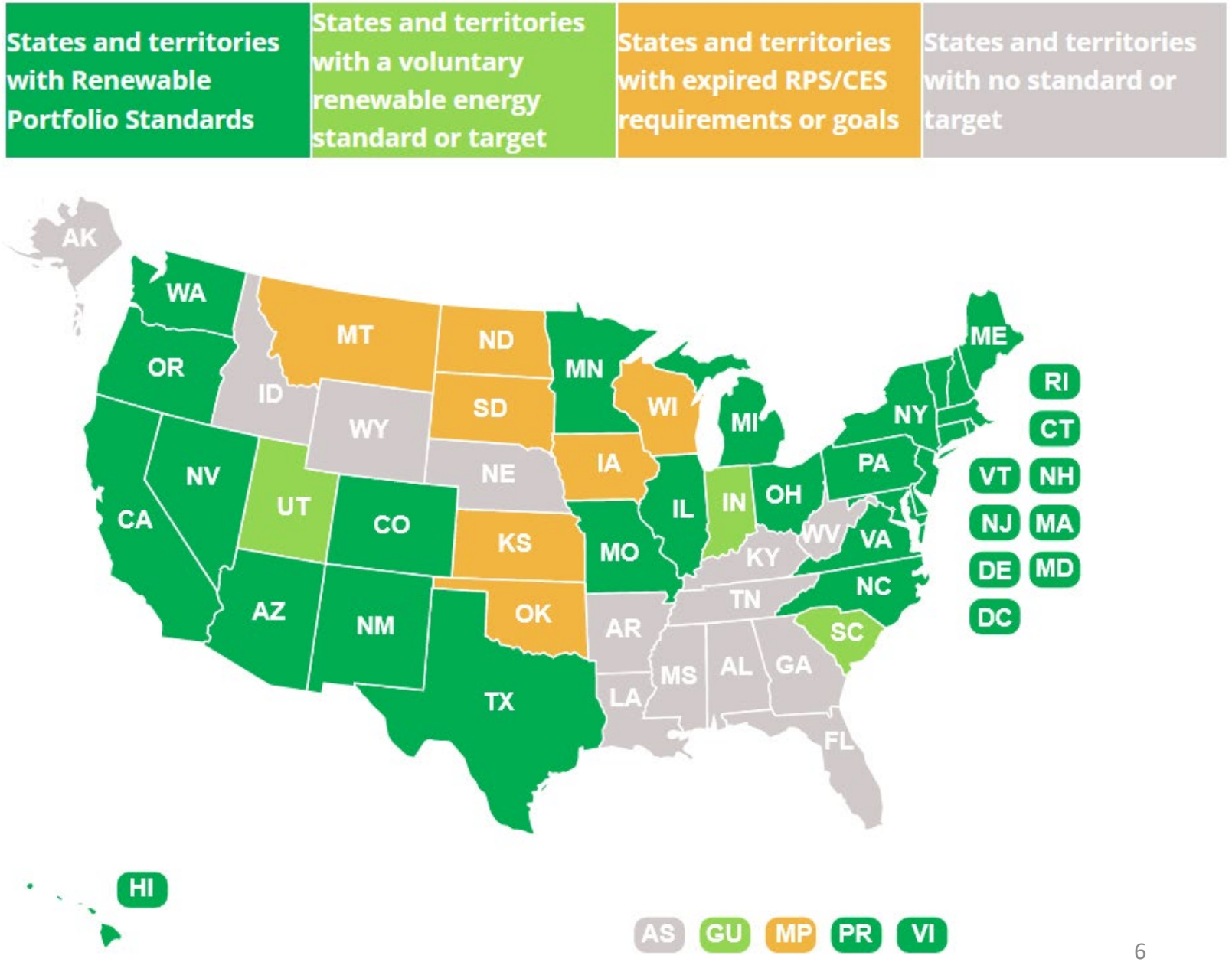
- Mandate a certain percentage of energy be generated from renewable sources
- CES very similar, except for definition of “clean” energy
- Some CES policies include RPS requirements
- Targets vary, but typically at least 40% renewable energy requirement
- 10 states have 100% renewable energy requirement, deadlines ranging from 2030 to 2050

Renewable Portfolio Standards, Clean Energy Standards and Incentives

- RPS can apply only to investor-owned utilities, many states include municipalities and electric cooperatives
- Utilities must obtain renewable energy credits (RECs) to show compliance
  - Agreements that provide renewable electricity generation
  - Generate renewable electricity
- Financial incentives, such as tax credits, might be available to eligible businesses

Renewable Portfolio Standards or Voluntary Targets

- As of 2022, 37 states plus the District of Columbia have RPSs or goals



Source: National Conference of State Legislatures https://www.ncsl.org

Options to Accommodate Renewable Energy Facilities in Federal-Aid Right-of-Way

Accommodation as Utility

- 23 CFR 645

Accommodation as Alternative Use

- 23 CFR 710

FHWA Memorandum *State DOTs Leveraging Alternative Uses of the Highway Right-of-Way Guidance* (04/27/2021)
https://www.fhwa.dot.gov/real_estate/right-of-way/corridor_management/alternative_uses_guidance.cfm

Accommodation as Utility

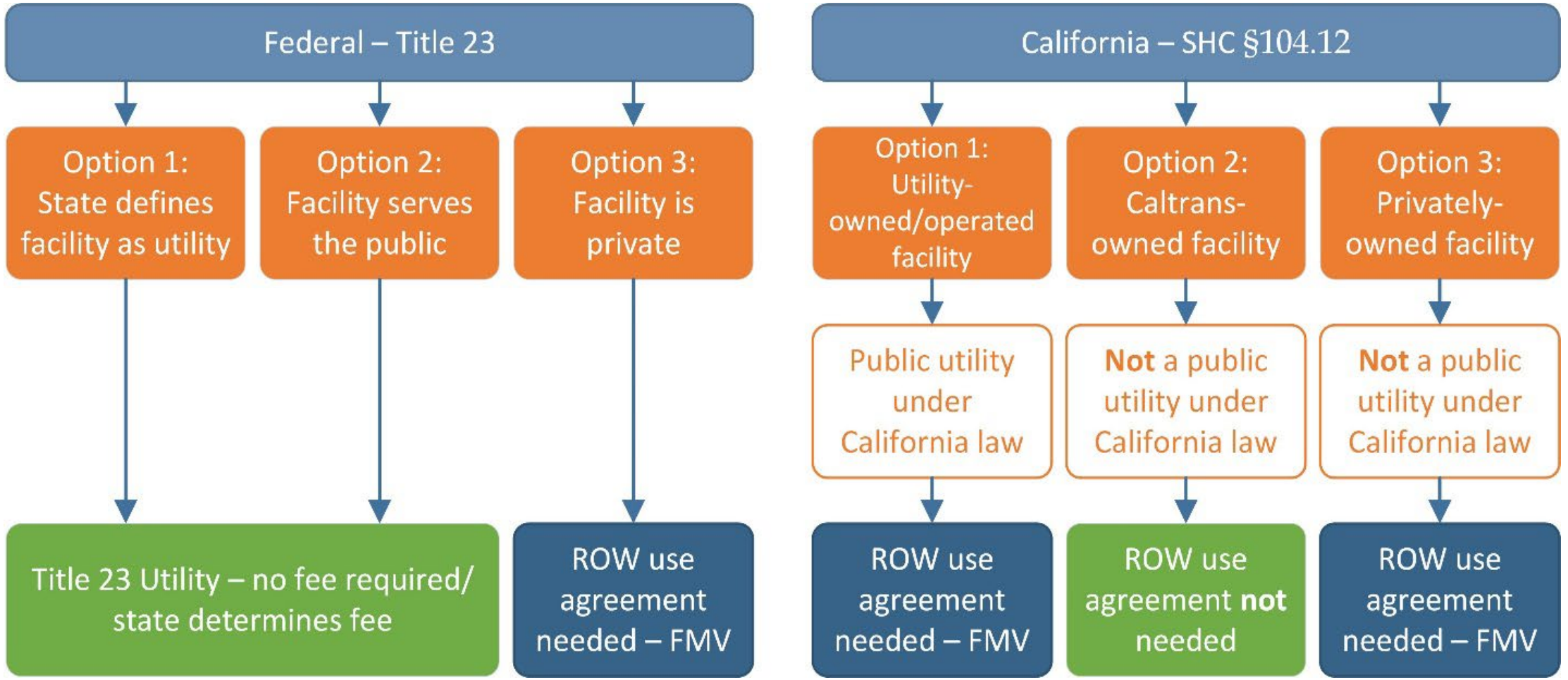
- Must not adversely affect highway and traffic safety
- Must not impair aesthetic quality
- Federal definition of “utility” is broad, solar facility must fall under state definition of “utility”
- Accommodation should be reflected in state UAR
- No FMV or fee requirement (may be set at state discretion)
- No secondary access requirement
- No commercial activity restriction

State Examples

- Oregon: solar and wind resources are not included under the state's definition of a public utility, regardless of the number of customers served by that resource.
- Some states specifically declare that ownership of renewable energy facilities does not make the corporation or owner a public utility unless the entity otherwise conforms to the definition of a public utility. (see Colorado, North Carolina, Kansas)

Accommodation as Alternative Use

- Must not adversely affect highway and traffic safety
- Must be in public interest – FHWA determined CEC projects apply
- Must comply with federal property management regulations
- Need Right of Way Use Agreement (23 CFR 710.405)
- FMV requirement – FHWA determined CEC projects qualify for exception



Electricity Production from Renewable Sources in State Right-of-Way

Power Purchase Agreements and Net Energy Metering

Power Purchase Agreements

- Developer installs, operates, and maintains the solar facility on land owned by DOT and sells generated electricity to host customer or a partnering utility
- Developer is third party in addition to utility and public agency, which is the reason PPAs are sometimes called “third-party PPAs”
- Typically required in situations where renewable energy facility is owned and operated by entity other than a utility
- Typically range from 10 to 25 years

PPA Incentives

- Developer takes on financial burden of designing, building, and operating the facility
- Developer receives income from generated electricity and incentives (tax credits, renewable energy certificates)
- State receives electricity at a predictable, potentially lower rate

State Policies for PPAs

- Third-party solar PPAs are allowed in 28 states plus D.C.:
  - Arizona (limited), Arkansas (limited), California, Colorado, Connecticut, Delaware, Georgia, Hawaii, Illinois, Iowa, Maine, Maryland, Massachusetts, Michigan, Nevada (limited), New Hampshire, New Jersey, New Mexico, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Texas (limited), Utah, Vermont, Virginia (limited), West Virginia, District of Columbia.
- Not allowed in 6 states:
  - Alabama, Florida, Kansas, Kentucky, North Carolina, South Carolina.
- Unknown or unclear status in 16 states:
  - Alaska, Idaho, Indiana, Louisiana, Minnesota, Mississippi, Missouri, Montana, Nebraska, North Dakota, Rhode Island, South Dakota, Tennessee, Washington, Wisconsin, Wyoming.

Net Energy Metering

- NEM is a billing arrangement to provide credit for electricity generated by solar system
- Meter tracks the customer's electricity consumption as well as energy delivered into the utility grid
- NEM agreements are required with an interconnection to manage the exchange of electricity between facility owner/operator and the electric utility
- NEM agreements establish billing standards and ensure generator of electricity receives credit or payment at the retail value of the electricity

Net Energy Metering: California

- Electric Rule 21 governs interconnections under CPUC jurisdiction, including all net metering facilities, and establishes a tariff for customers wishing to connect their energy-generating facility with the grid.
- As a result of Rule 21, each major utility keeps its own version of the tariff, which guides the process for customers to safely and reliably connect with the distribution and transmission systems.

Take-Aways

- Federal rules provide two options for development of solar projects
- Interconnection and net metering rules and agreements can be barriers to development
- Utility-scale projects completed by a utility eliminate the need for net metering and interconnection agreements
- Current state legislation largely aimed at regulating residential solar facilities - can restrict ability of entities to install larger scale solar facilities
- The utility-scale or non-residential solar market in the United States is still relatively small
- As the non-residential solar market grows, there is potential for additional rules and regulations regarding these installations

Acknowledgements

- Research funded by Caltrans Department of Research, Innovation and System Information
  - Project management: Sean Campbell, Tori Kanzler, Caltrans
- Research team
  - PI Sarah Kurtz, UC Merced
  - Edgar Kraus, Brianne Glover, Kristopher Harbin, Jacqueline Kuzio, William Holik, and Cesar Quiroga, TTI
  - David Ross and Liam Kelly, KPMG
- Full report available at https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/final-reports/ca20-3177-finalreport-a11y.pdf

Legal Considerations Renewable Energy Production in State Right of Way

Transportation Research Board Webinar

22 November 2022

Jim Thiel & Chris Huffman

The Intersection of Market and Regulation

Implications for Highest and Best Use

and

Regulatory Compliance

Highest and Best Use of ROW

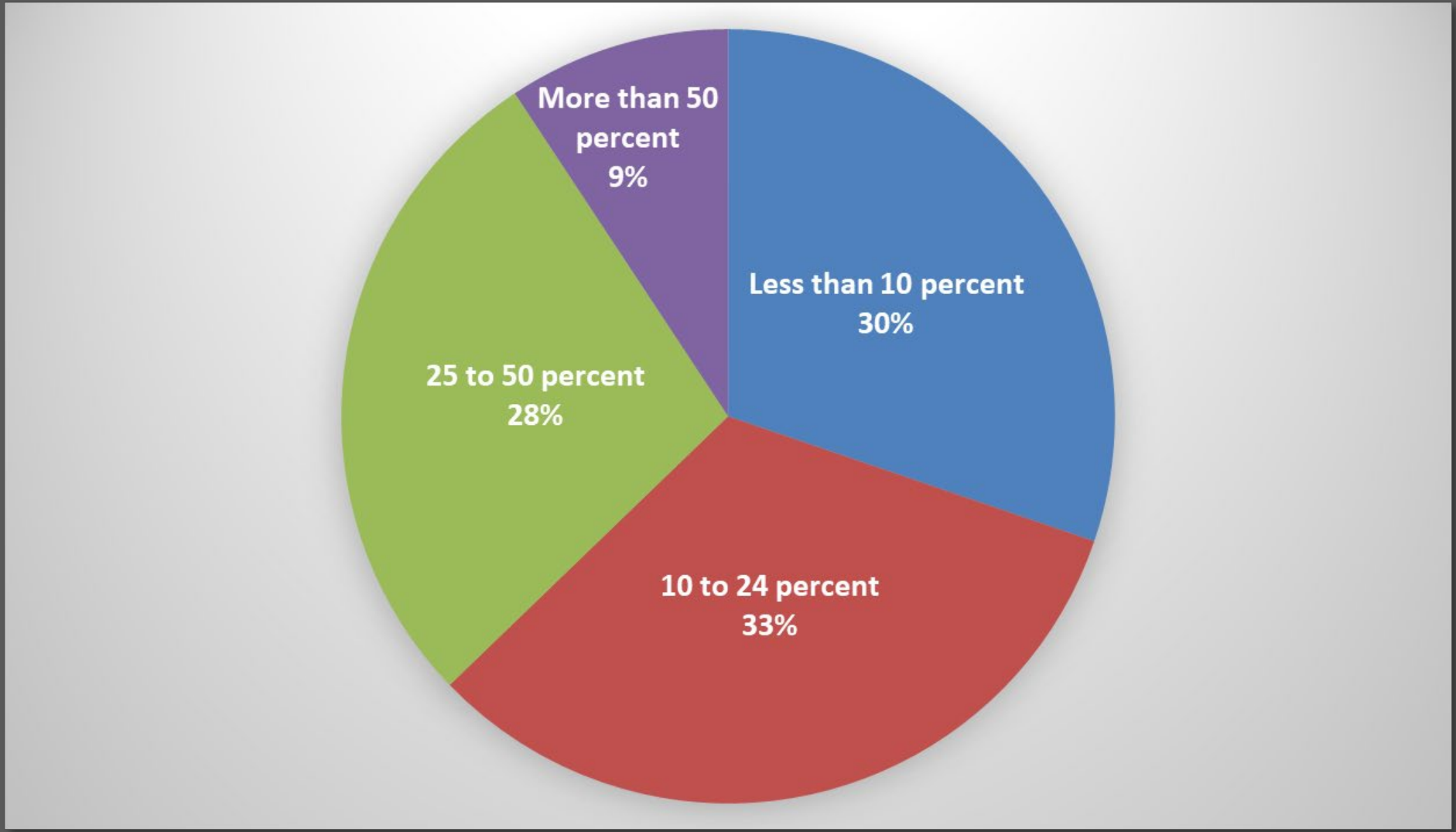
Dictionary of Real Estate Appraisal

1. **The reasonably probable use of property that results in the highest value. The four criteria that the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum productivity.**

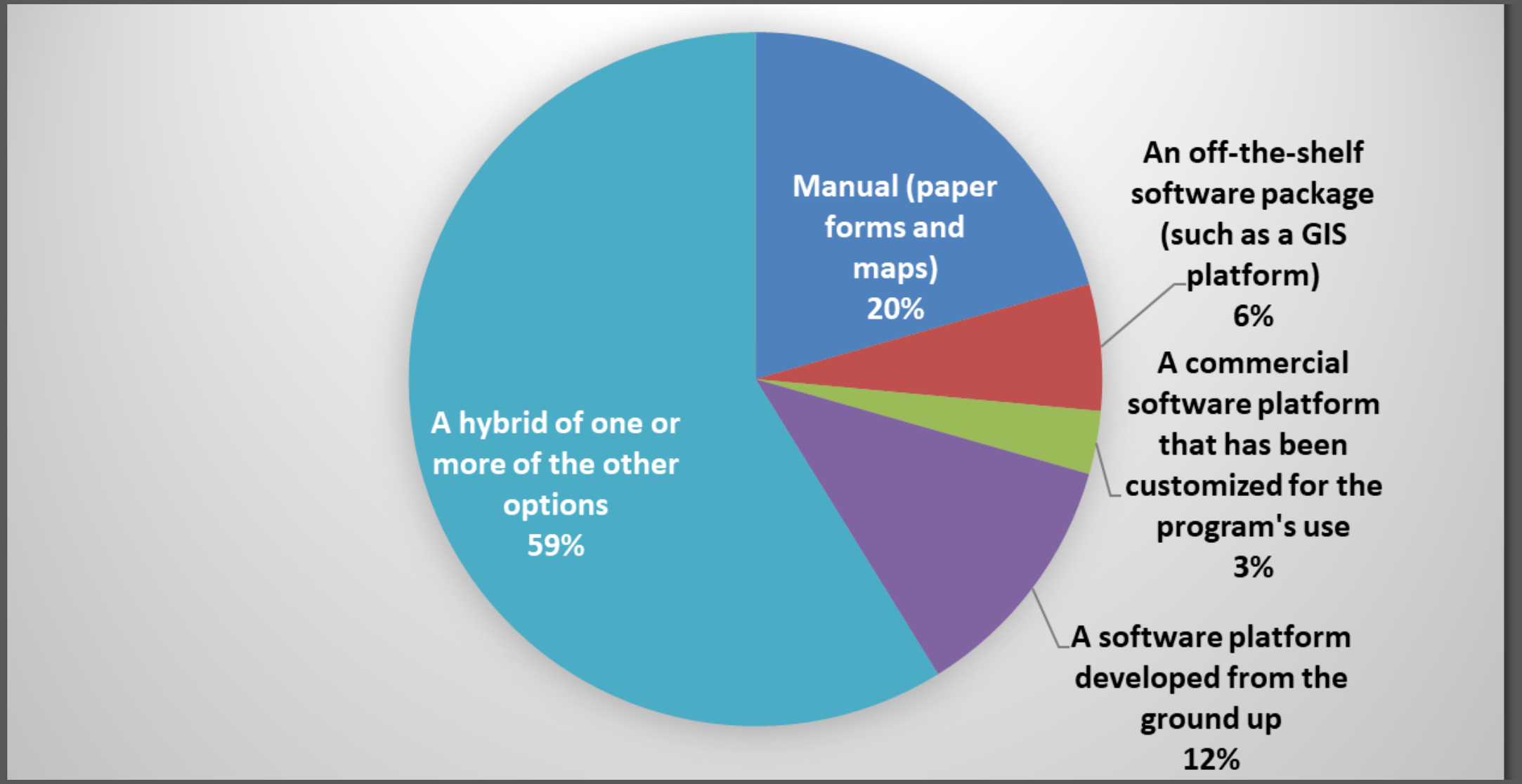
2. **The use of an asset that maximizes its potential and that is possible, legally permissible, and financially feasible. The highest and best use may be for continuation of an asset's existing use or for some alternative use. This is determined by the use that a market participant would have in mind for the asset when formulating the price that it would be willing to bid. (IVS)**

3. **[The] highest and most profitable use for which the property is adaptable and needed or likely to be needed in the reasonably near future. (Yellow Book)**

Property Management – Resource Intensive



Property Management – Tools Available



Reactive vs. Proactive Paradigms

- Most SDOTs report that they only respond to requests to dispose / accommodate alt uses (reactive paradigm).
- A few SDOTs report a program that actively identifies and markets opportunities (proactive paradigm).

Property Management as Asset Management

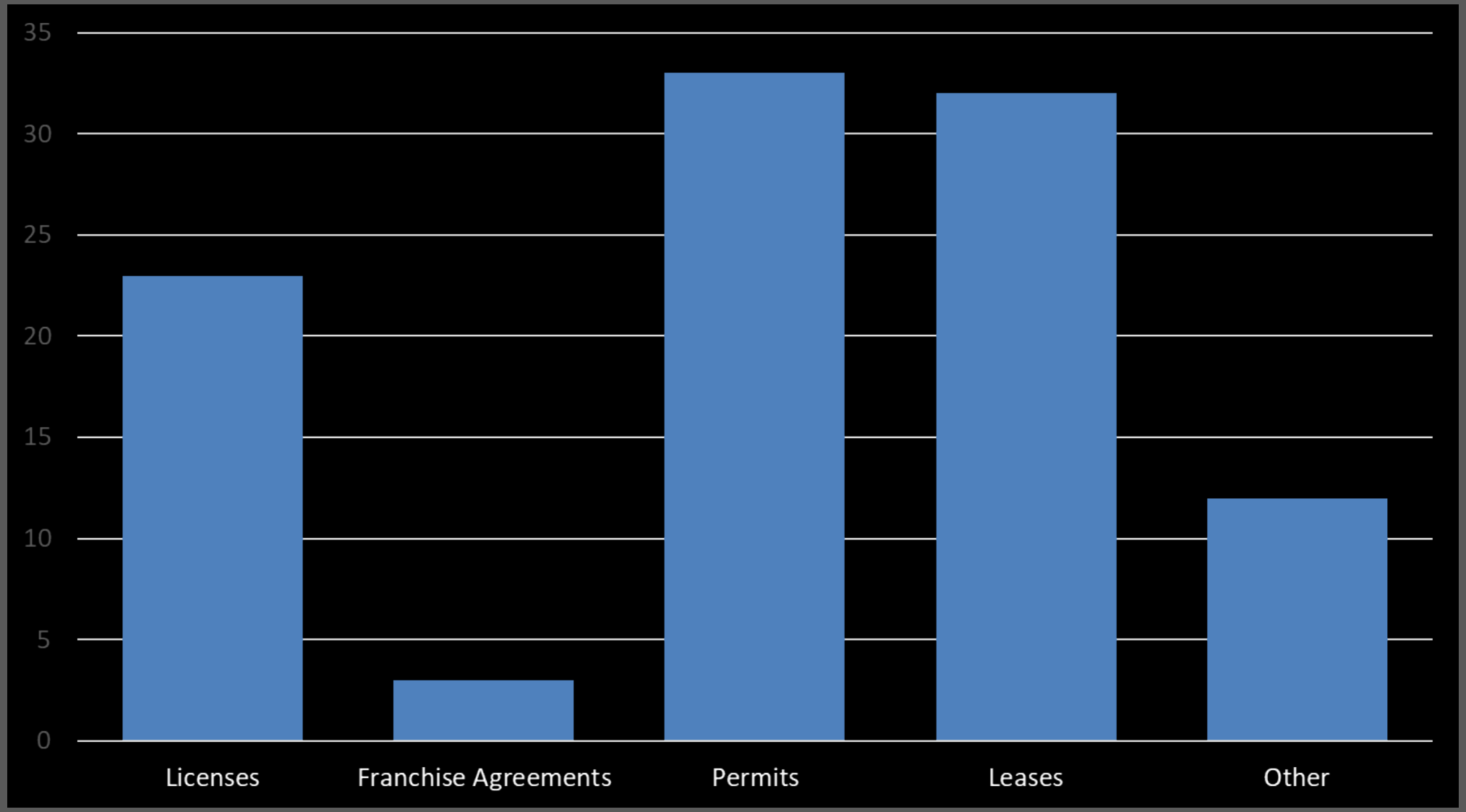
- **Asset Management has been applied to the improvements to the land.**
- **Asset Management has not been applied to the single appreciating asset.**
- **Alternative uses requires robust property management and careful legal analysis.**

Regulatory Considerations

Federal Regulatory Landscape

- 23 USC § 111
- 23 CFR § 1.23
- 23 CFR § 710.403 Management
- 23 CFR § 710.405 ROW use agreements
- 23 CFR § 710.409 Disposal of excess real property
- USC §156. Proceeds from the sale or lease of real property
- 23 USC §137
- 23 USC §142
- 23CFR § 810

Types of Agreements Utilized



Common Alternative Uses

- Recreation trails
- Cell towers
- Parking
- Park and ride
- Solar
- Storage

Emerging Alternative Uses

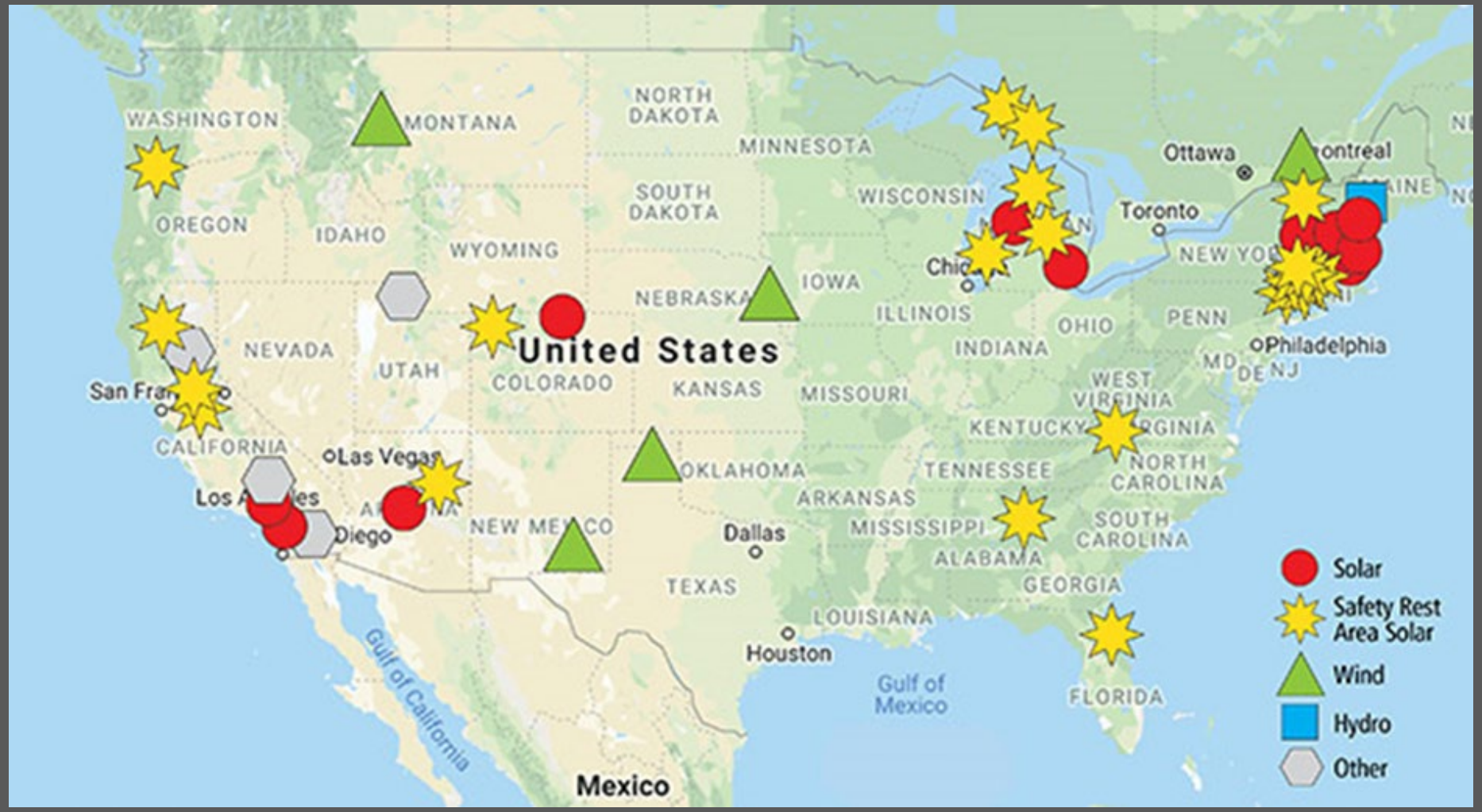
- Broadband and fiber optics
  - Especially rural
  - Backbone of telecommuting
  - Utility or not? State dependent.
- Truck parking
- Electrical distribution
- Airspace leasing

Utilities vs. Alternative Uses

- **Some States define certain uses as utilities.**
- **Other States define those same uses as NOT utilities.**
- **FHWA has issued guidance acknowledging either definition.**

Alternative Uses

https://www.fhwa.dot.gov/real_estate/right-of-way/corridor_management/alternative_uses.cfm



Electrical Vehicles

SEC. 11129. STANDARDS. Section 109 of title 23, United States Code, is amended—

‘‘(s) ELECTRIC VEHICLE CHARGING STATIONS.— ‘‘(1) STANDARDS.—Electric vehicle charging infrastructure installed using funds provided under this title shall provide, at a minimum— …

SEC. 40414. DATA COLLECTION ON ELECTRIC VEHICLE INTEGRATION WITH THE ELECTRICITY GRIDS. (a) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Administrator shall develop and implement measures to expand data collection with respect to electric vehicle integration with the electricity grids …

SECTION 41007

Provided further, That there is established a Joint Office of Energy and Transportation (referred to in this paragraph in this Act as the ‘‘Joint Office’’) in the Department of Transportation and the Department of Energy to study, plan, coordinate, and implement issues of joint concern between the two agencies, which shall include: …

Some Overarching Regulatory Considerations

Applicability: 23 USC 101(a)(6) - "Federal-Aid Highways"

23 USC 111 - Interstate System Restrictions – No Auto Service or Commercial

23 CFR 1.23 – Exclusive Public Highway Purposes

23 CFR 710.403 – Management for Highway Purposes

23 CR 710.405 – ROW Use Agreements for Non-Highway Use -FHWA Can Delegate

23 CFR 710.409 – Restrictions on Disposal and Alternative Use

23 CFR 156 - Proceeds from Sale or Lease - Minimum Charge

Exceptions

23 USC 111 - Airspace and Subsurface

23 USC 137 - Fringe and Corridor Parking Facilities

23 USC 142 – Public Transportation/Transit Facilities (23 CFR 810)

23 CFR 652 - Bike and Pedestrian

23 CFR Part 645 - Public Utilities

23 CFR Part 646 - Railroads

23 CFR Part 710 – Subpart G - Concession Agreements

Typical State Regulatory Law Issues

Zoning, Tax, Liability, Real Property Interest Held, Advertising, Enviornmental

Public funds for Private Purposes, Competition with Private Sector

https://www.fhwa.dot.gov/real_estate/right-of-way/corridor_management/alternative_uses_guidance.cfm

Subject: State DOTs Leveraging Alternative Uses of the Highway Right-of-Way Guidance

From:
Stephanie Pollack
Acting Administrator

To:
Directors of Field Services
Division Administrators
Division Directors

Date: April 27, 2021

Reply to: HEPR-40

Figure 1-1: Planning Process Timeline

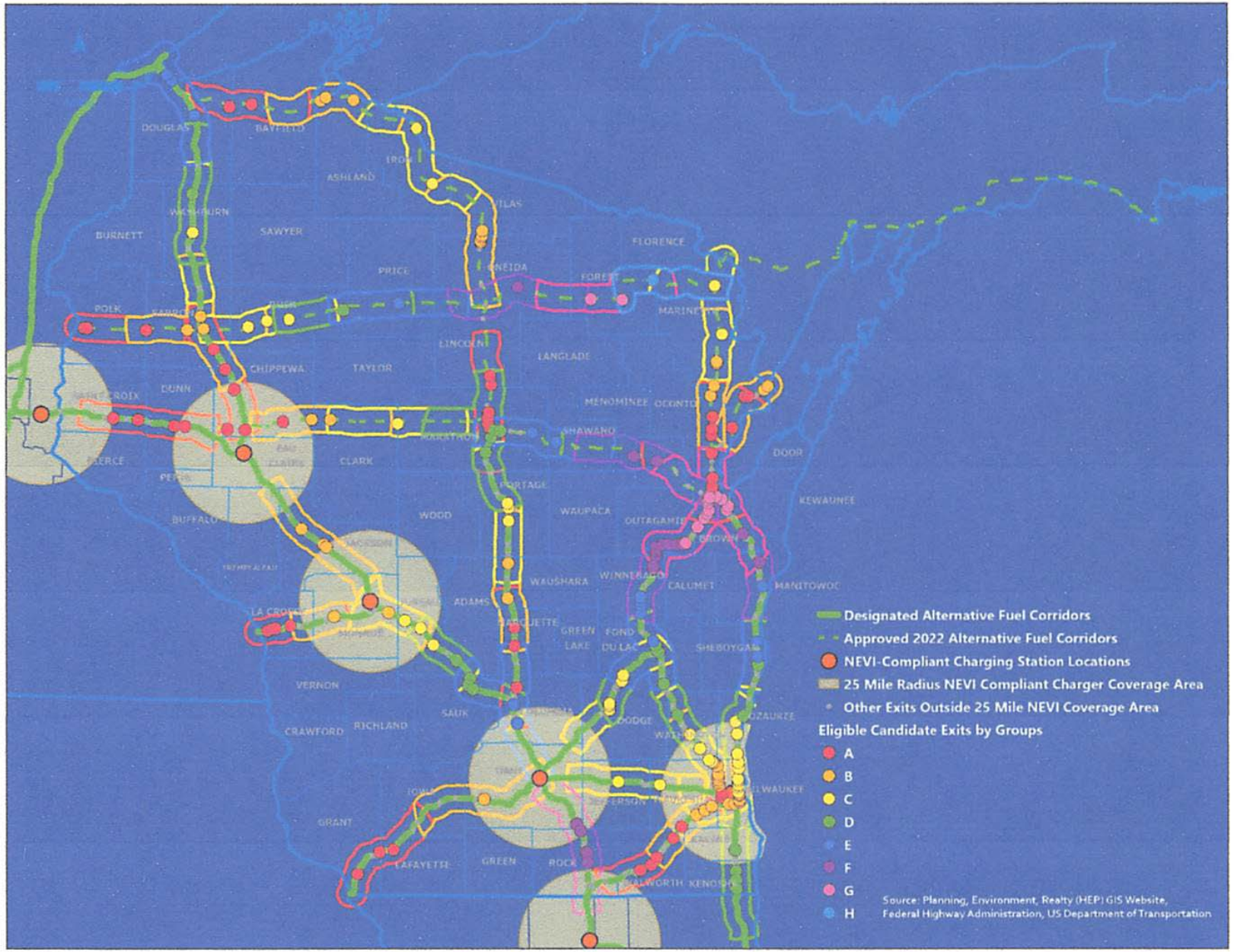
Figure 3-2: Wisconsin's Existing EV Infrastructure

Table 3-3: Projected Wisconsin Electric Vehicle Registrations

Year	Projected Wisconsin EV Registrations	Percent of Total Fleet
2022	9,039	0.1%
2027	217,048	4.1%
2030	334,097	6.1%
2035	553,686	9.9%
2040	843,623	14.7%
2050	1,863,585	31.0%

Sources: *DMV Registration reports: vehicle type by fuel type and plate types by vehicle weight; Woods & Poole Economics: Wisconsin population forecast by age group; IHS Markit National unit sales data for light vehicles, light trucks, and heavy & medium trucks; U.S. Energy Information Administration*

Figure 4-9: Wisconsin Full NEVI-Compliant EV Charging Station Build-Out Coverage Map



§ 680.106 INSTALLATION, OPERATION, AND MAINTENANCE

- *(a) Procurement Process Transparency*
  - Public disclosure on procurement process, number of bids, awardees, contract terms, project financial cost and award amounts, disclosure of how fees for charging will be set by awardee.
- *(b-d) EVSE Details*
  - DCFC Four (4) x 150kW continuous with permanently fixed CCS 1 connectors
  - AC LII at 6kW continuous J1772 connector, can participate in managed charging
- *(e) Available Access*
  - 24 hours, 7 days a week
- *(f) Payment Methods*
  - Contactless payment method accepting all major debit/credit cards, and Plug and Charge payment capabilities using the ISO 15118 standard
- *(g) Equipment Certification*
  - EVSE certified by an Occupational Safety and Health Admin National Testing Lab
  - LII EVSE must be Energy Star Certified
- *(h) Security*
  - *Physical Security*: "strategies may address" lighting, siting, driver and vehicle safety, fire prevention, tampering, charger locks, and prevention of illegal surveillance
  - *Cybersecurity:* "strategies may address" identity and access, encryption, malware detection, event logging/reporting, software updates, secure operation with no comms
- *(i) Long-Term Stewardship*
  - EVSE maintained in compliance for at least five years after install date
- *(j) Equipment Certification*
  - All electricians installing, operating, maintaining must have EVITP or similar credential
- *(k) Customer Service*
  - EVSE customers must have "mechanisms" to report issues with ADA multilingual access
- *(l) Customer Data Privacy*
  - Only gather personal info "strictly necessary" to provide charging service
  - Must take all reasonable measures to safeguard data
- *(l) Use of Program Income*
  - "A reasonable return on investment of any private person financing the EVSE project, as determined by the State DOT"
  - Also, debt service, O&M costs, necessary improvements, or other title 23 eligible costs

Contact Information

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TRB Webinar Legal Considerations of Renewable Energy Production in State Right of Way. November 22, 2022

MassDOT-Highway ROW Solar Development

Driving Forces for Developing Renewable Energy in MassDOT ROW

Reduce GHG emissions

Generate green power and reduce grid demand

Create energy savings & lease revenue.

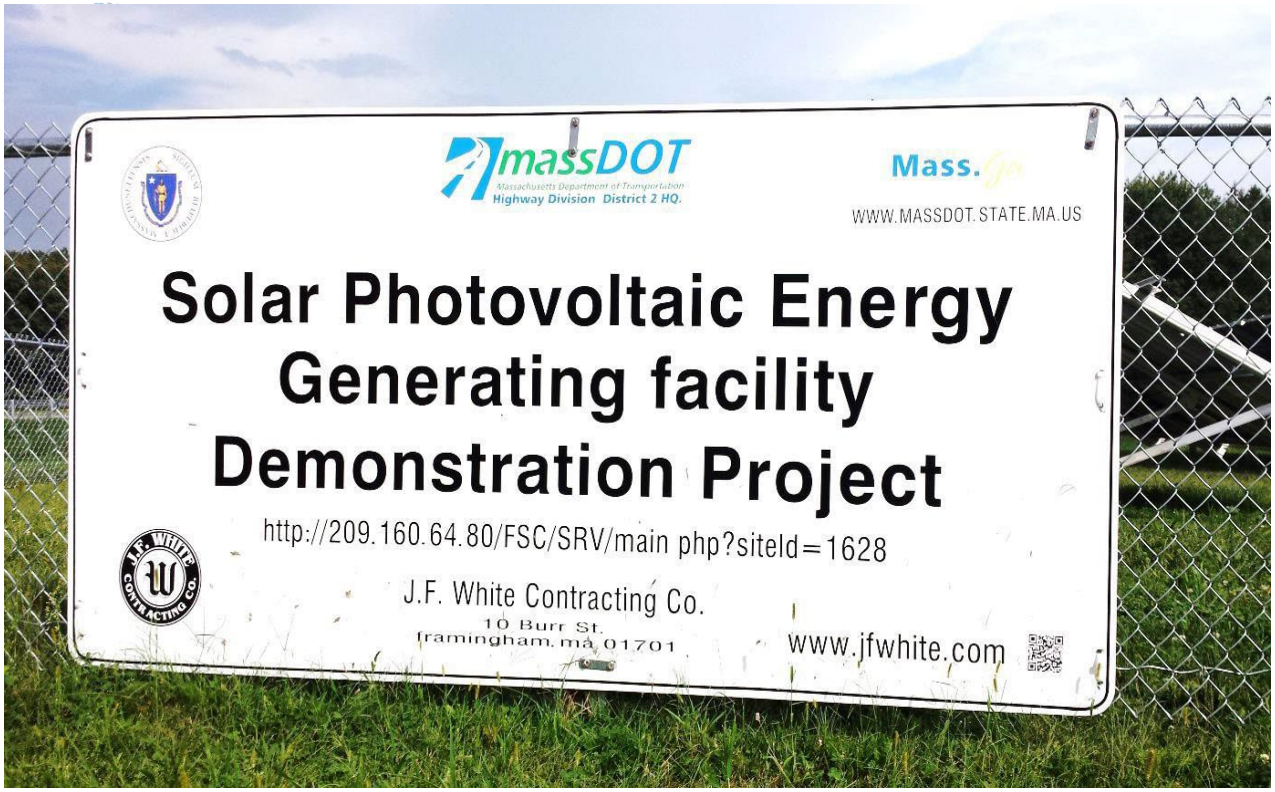
Leverage underutilized ROW parcels

Project Partners

- MassDOT-Highway: Project Proponent
- Ameresco: PV System Developer
- Federal Highway Administration: Regulatory Guidance & Approvals
- Eversource & National Grid: Interconnection Agreements
- Department of Energy Resources: Regulatory Support and Grants
- AECOM: Consultant for site selection
- Various Municipalities: PILOT

Regulatory and Policy Environment

- State incentives:
  - SREC followed by SMART, different incentive types and development targets
    - SREC I/II limited to 649 kW of development per parcel.
  - Net metering policy.
  - Solar rebates and grants, Massachusetts Dept. of Energy Resources.
- Federal incentives
  - Federal Investment Tax Credit (ITC, 30% of EPC)
    - 26% for systems commencing construction between 2020-2022
    - IRA passed in 2022 increased incentives back to 30% +.
- Interconnection standards (grid-connected)
- MassDOT included renewable energy facilities in its Highway Utility Accommodation Policy updated in May2013



- Constructed in 2012
- 76 KW behind-the-meter system
- Supplies about 10% of power consumption at the D2 admin building.
- 8 ¢/kWh (PPA) vs. 15 ¢/kWh (blended utility rate)

Full Scale Rollout

- Site Selection
  - Consultant started with a desk-top review of ~600 properties and visited 47 sites
  - 16 sites vetted through MassDOT's internal canvass process
  - MassDOT sought FHWA's approval of sites involving federal funds. Majority of initial sites were proposed on I-90, a non federalized, toll funded roadway

    Site physical characteristics:
    - Solar generation potential, Shading/vegetation
    - Topography, Distance to 3-phase service, Environmental concerns.

Full-scale program rolled out in July, 2013 with an RFR

- Goal: **a minimum of 6 MW** aggregated solar PV generation capacity
- Two key contract components
  - Master License Agreement
    - Lessons learned from Pilot were incorporated in the MLA.
  - Power Purchase Agreement

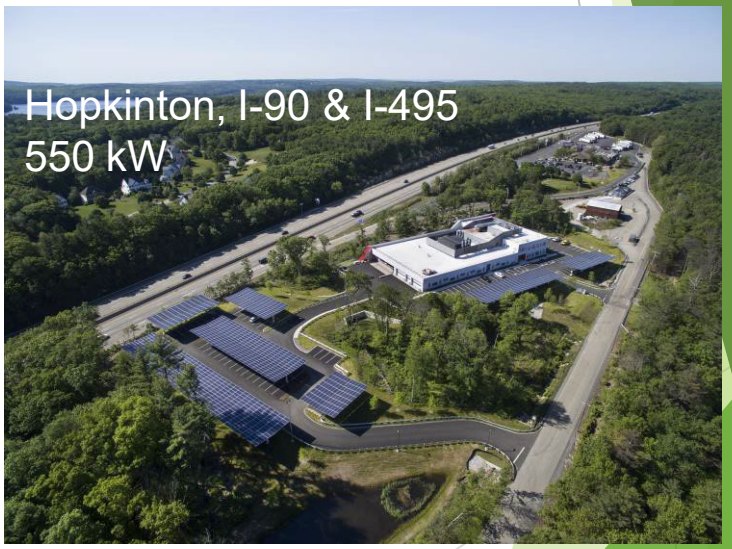
Public-Private Partnership

- The developer is required to: finance, develop, design, construct, commission, operate, maintain and decommission the contracted solar facilities.
- MassDOT leases the parcels, purchases 100% solar power generated, and obtains all net metering credits and annual lease payments based on size of PV. Buy low, sell high.
- The developer receives all SREC's and federal tax incentives, in exchange for favorable PPA rates in return.
- Municipalities are able to assess a property tax on PV system since area is leased and system is owned by developer.


West Stockbridge, I-90
646 kW


Salisbury, I-95
646 kW


Plymouth, Service Plaza,
562 kW


Hopkinton, I-90 & I-495
550 kW

Current Status

- Phase 1A (5 sites, 2.5 MW) in full commercial operation on or before October 2015.
- Phase 1B (3 sites, 1.8 MW) in full commercial operation on or before February 2018.
- Phase 2 (4 sites, 2.1 MW) in the pipeline, 3 Solar Carports at Park & Rides and a Noise Barrier installation. All under SMART Incentive Program.

Program Benefits

Based on Eight Sites: 4.3 Megawatts

- Annual Lease Payments over 20-year period: 1.5 Million
- Estimated Energy Savings over 20-year lease period: $12 Million
- To date, MassDOT has saved an estimated $4 Million in energy costs.
- Production to date: 33,000 mWh.

When all 12 sites are in production, we expect to be generating over 8,000 mWh/year.

That is approx. 10% of our operational needs, also the amount reduced in LED Tunnel Projects

2021 Calendar Year in Review

Location	System Type	System Size kW	Power Generated kWh	CO2 Reduction Tons 872 lbs/MWh	Average PPA $/kWh	Est Average Net Metering Credit $/Kwh	Est. Annual Savings (F-E)*C
Framingham, I-90, Exit 10 North	Ground Mount	649	792,833	346	0.0786	0.2250	$116,071
Framingham, I-90, Exit 10 South	Ground Mount	649	828,966	361	0.0786	0.2250	$121,361
Framingham, I-90, Service Plaza	Ground Mount	318	397,251	173	0.0786	0.2250	$58,158
Natick, I-90, Embankment	Ground Mount	272	582,265	254	0.0786	0.2250	$85,244
Hopkinton, Research & Materials	Carports & Rooftop	550	323,701	141	0.1666	0.2250	$18,904
Plymouth, Route 3, Service Plaza	Ground Mount	562	655,480	286	0.0879	0.1850	$63,647
Salisbury, Rabbit Road, Depot	Ground Mount	646	838,798	366	0.0907	0.2250	$112,651
West Stockbridge, I-90, Former Toll Plaza	Ground Mount	646	726,433	317	0.0907	0.2150	$90,296
Totals		4292	5,145,727	2,244			$666,330
Lease Payments							$75,110
Total Utility Savings and Lease Revenue							$741,440

Lessons Learned

- Agency Leadership support
  - Understand environment
  - Pitch the Benefits
  - Operational/Capital Budgets
  - Report Roadblocks, often need the big stick.
  - Report Successes and Failures, manage expectations.

- Project Team (know the key players, they are likely to change during development)
  - Internal support from all relevant business units
  - Budget/Finance, Procurements, Legal, Real Estate, Schedule Z
  - Consultant(s) various: Design/Legal/other
  - PV Developer

Lessons Learned (cont).

- State regulatory/policy environment.
  - Stay abreast of changes and opportunities.
    - Incentives, grants, programs, etc.
- Changes in Federal Policies that impact development/benefits
  - Tax Incentives, Federal Regulations,
- External Factors
  - Utility interconnection (unknowns)
  - Municipal Permitting & Property Tax Assessment (unknowns)
- Timelines
  - Project planning and development takes time
  - Be nimble – adjust to changes when necessary
  - Be in a position to take advantage of opportunities quickly.
    - RFR's, MLA's, PPA's,

Thank you!

MassDOT Highway ROW Solar project summary:

https://www.mass.gov/info-details/massdot-renewable-energy-projects

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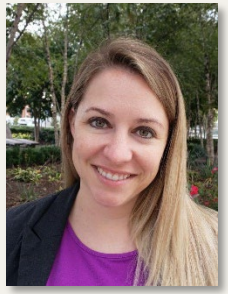
Today's presenters



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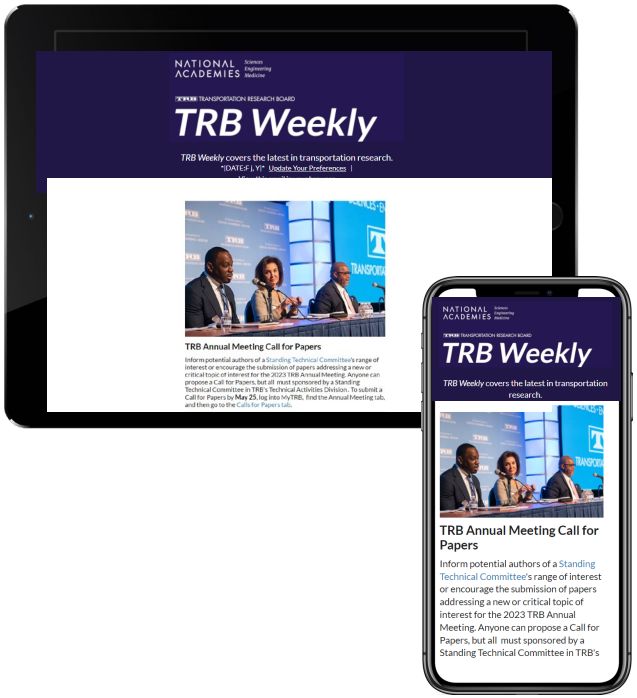

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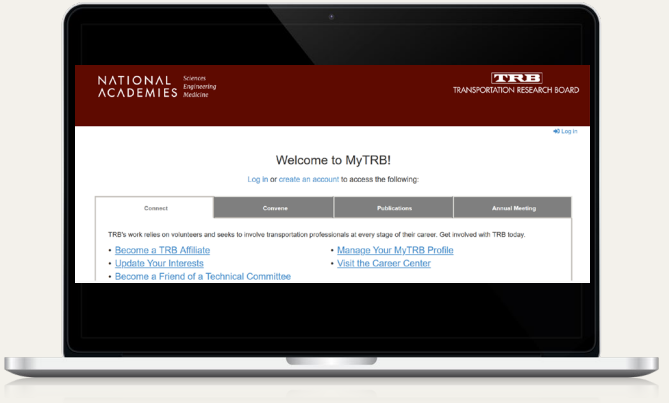

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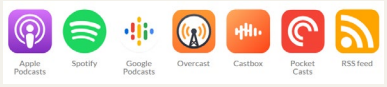

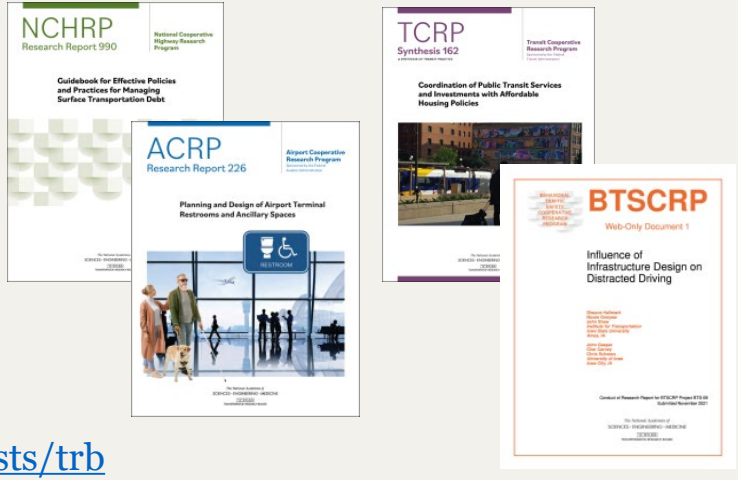

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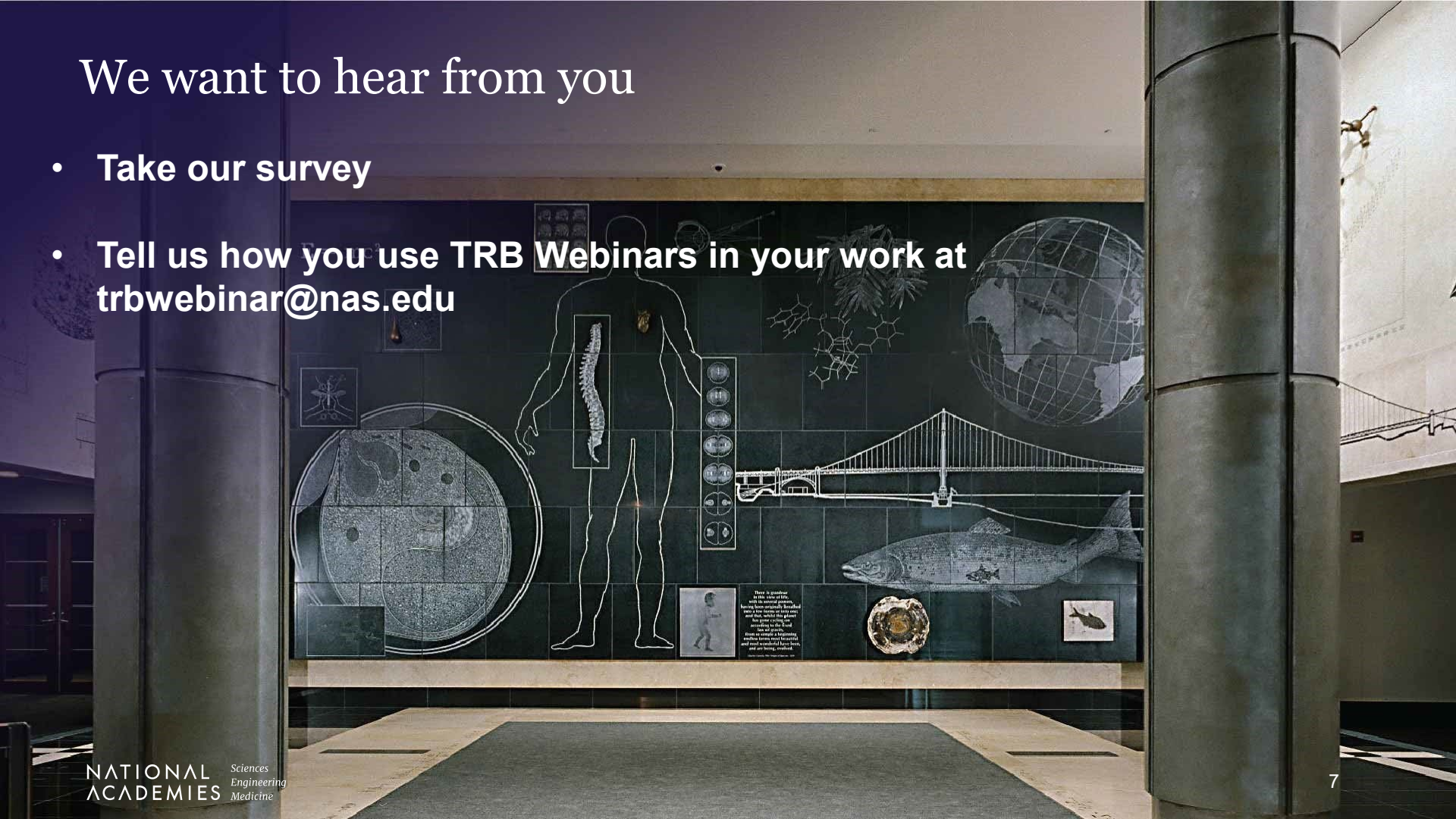

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