

T H E



# Net-Zero Transportation

# WHO WE ARE

## **Ray C. Anderson (1934-2011)**

- “America’s Green Industrialist”
- Global pioneer of corporate sustainability
- Circular economy now mainstream

## **The Ray Highway**

- A publicly accessible living laboratory
- A proving ground for the transportation infrastructure of the future

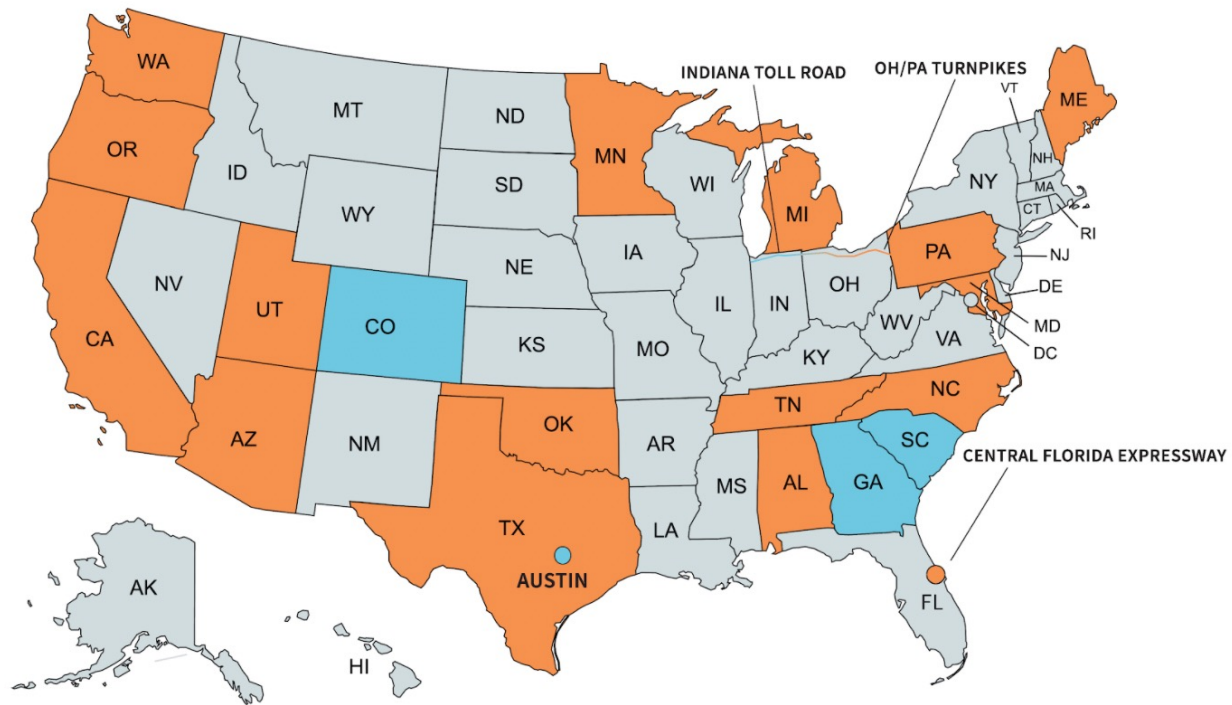




# THE RAY TODAY



ZERO WASTE. ZERO CARBON. ZERO DEATHS.

# OUR PARTNERSHIPS



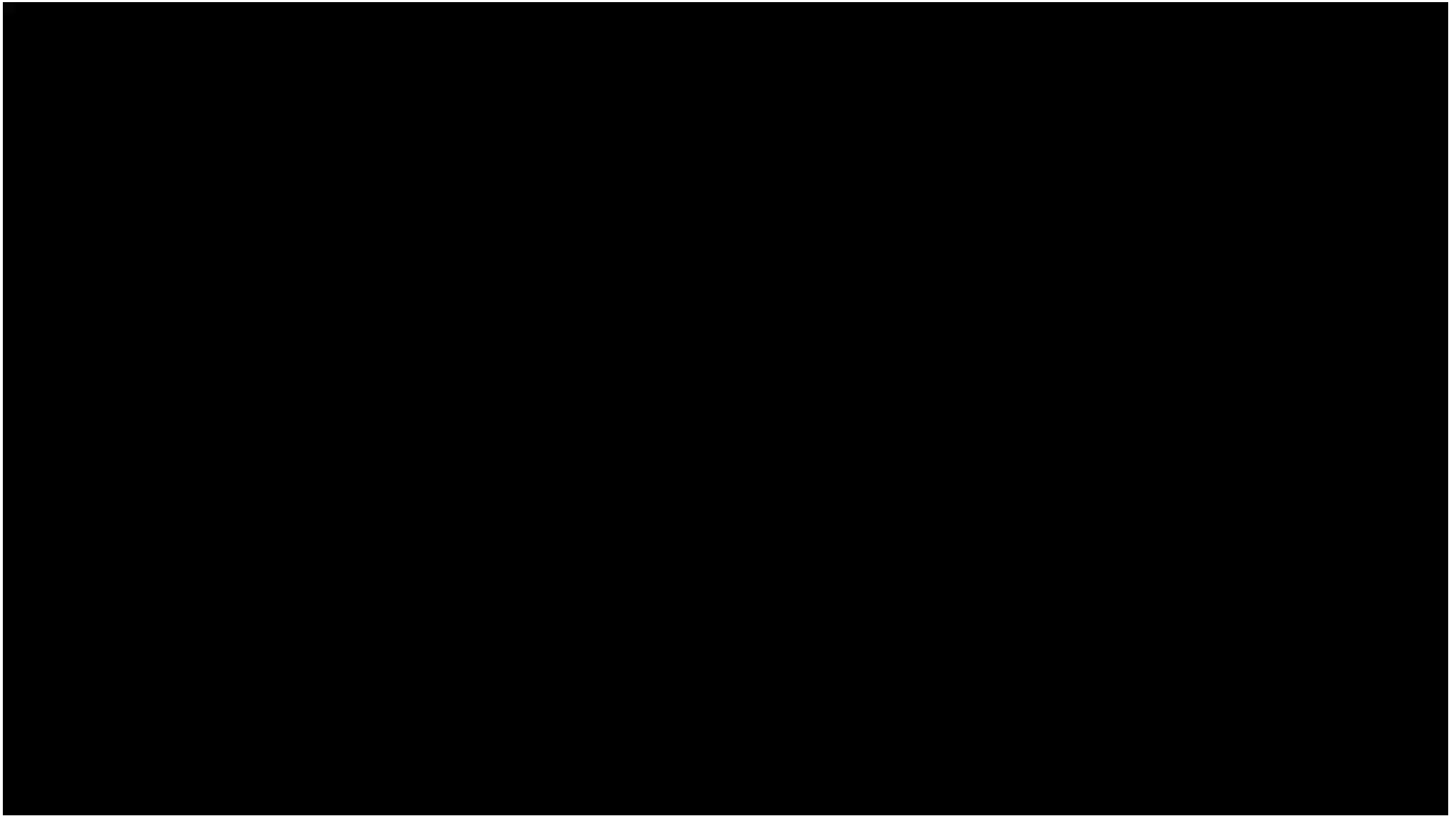
-  The Ray Partners
-  Friends of The Ray



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# EV CHARGING

- First public PV4EV in the Southeast US
- 175kW scales to 350kW
- Interstate EV charging gap – connects Atlanta & Montgomery





*In partnership with*



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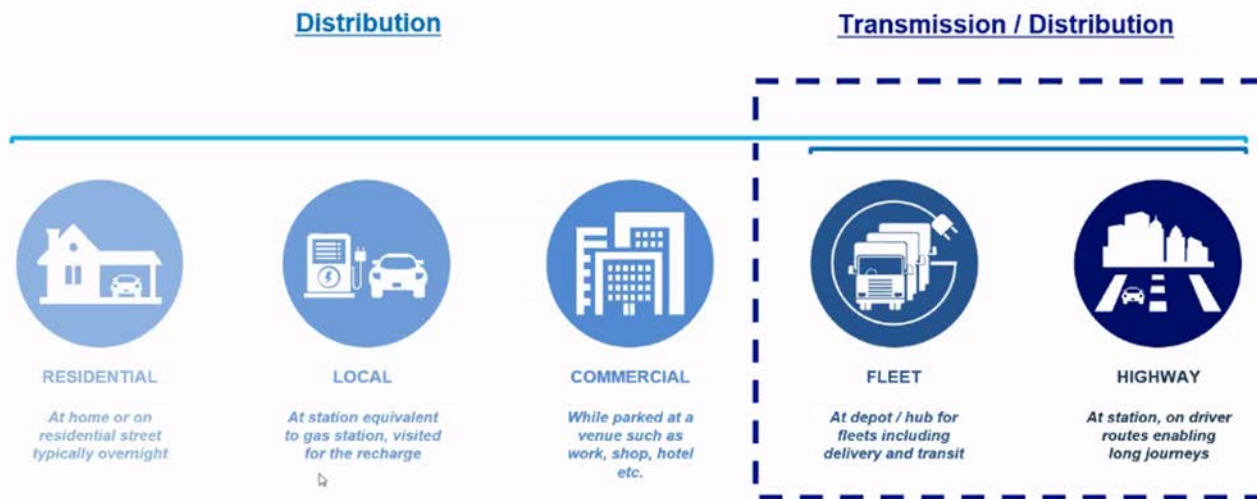
# FLEET ELECTRIFICATION STUDY

- MHDV movement
- 2 corridors:
  - I-20 Dallas to Atlanta
  - Port of Savannah to inland port in Atlanta
- Data visualization



# NEW TRANSMISSION IS NEEDED TO SUPPORT FLEET & HIGHWAY ELECTRIFICATION

**Why fleets and highways:** The scope and scale of fleet & highway charging loads will require both T&D solutions



Source: National Grid.

‘Full Speed Ahead: Enabling Future Fleet and Highway Electrification.’

D-TECH+ Series, July 22nd, 2021

National Grid

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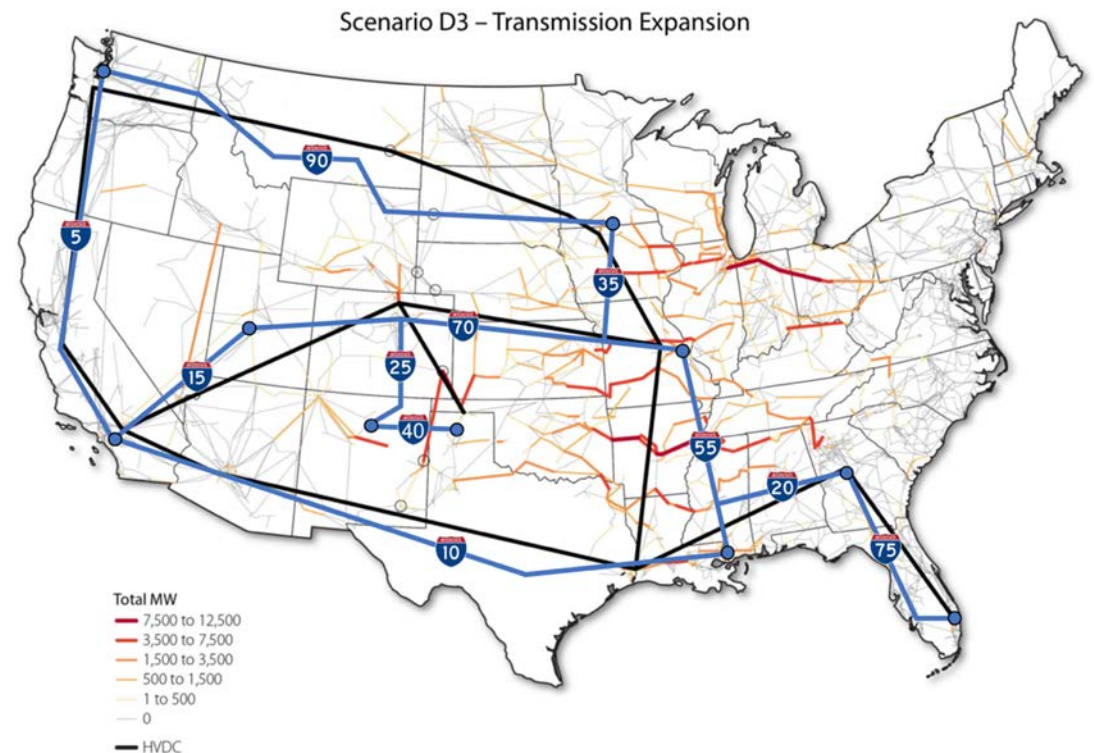
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# THE HIGHWAY SYSTEM OFFERS A NATIONAL NETWORK

**The black lines in the figure represent an HVDC grid** that could deliver \$1-2 of net benefits for every \$1 invested and enable 85% renewable penetration.

**The dark blue lines represent the parts of the existing federal highway system** that could be used for the construction of a nearly equivalent HVDC grid.

**As can be seen, there is a strong overlap between the two.**



A. Figueroa Acevedo, et. al., “Design and Valuation of High-Capacity HVDC Macrogrid Transmission for the Continental US,” IEEE Transactions on Power Systems, IEEE Xplore Early Access. DOI 10.1109/TPWRS.2020.2970865, 2020.

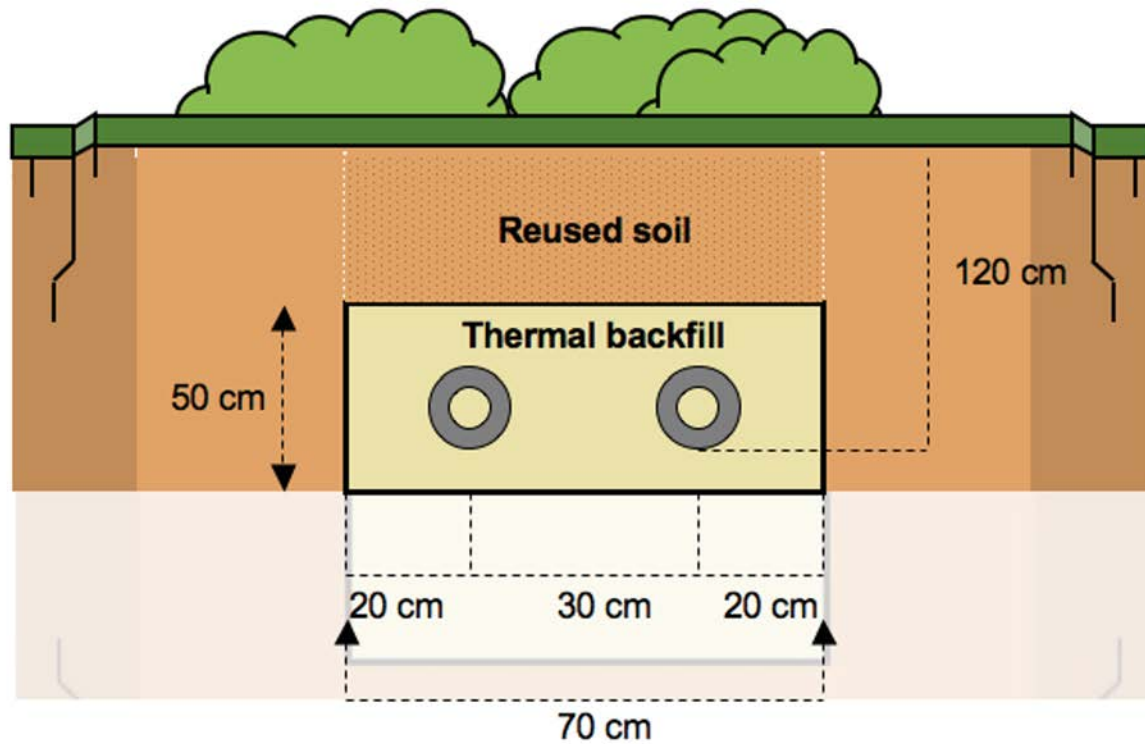


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# BURIED HVDC LINES



Europacable. An Introduction to High Voltage Direct Current (HVDC) Underground Cables. (2011).

# CONNECTED FREIGHT

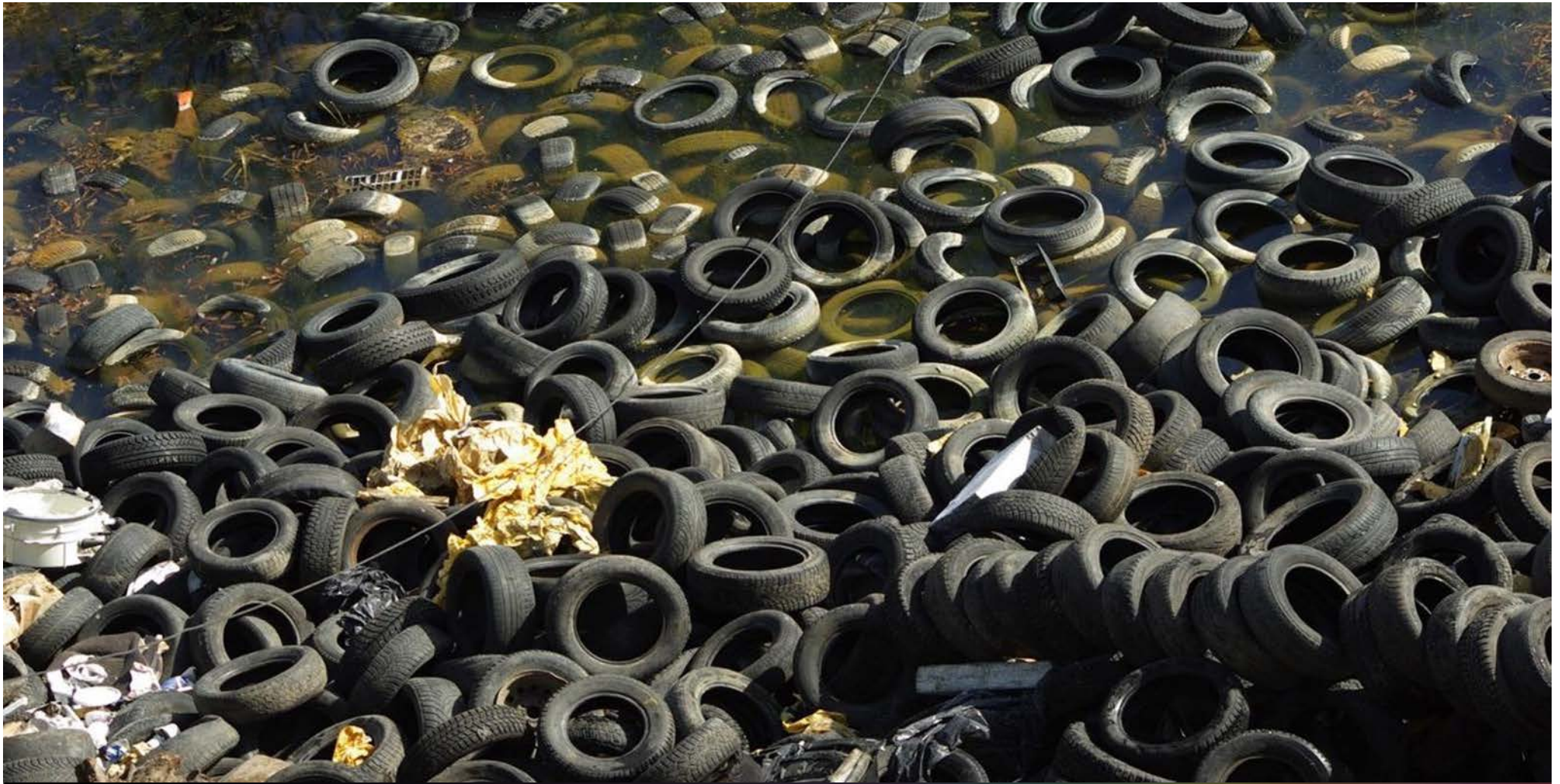
- 3M Connected Road Striping
- Phase 1: 6 RSUs, 4 OBUs, Cirrus dashboard
  - Crash detection & warning, weather conditions, throughput
- Phase 2: +7 RSUs around Kia plant, +10 OBUs on Kia executive fleet, HUD
  - Work zone warning, freight signal priority



# WHEELRIGHT TIRE SAFETY STATION

- Drive-through system analyzes tread depth, tire pressure & sidewall damage within seconds
- Under-inflated tires waste 2B gallons fuel/yr
- WheelRight (UK) on The Ray Highway was 1<sup>st</sup> public tire safety station in the world





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# RUBBERIZED ASPHALT

- Troup County, GA: Tom Hall Pkwy 2017
  - 4 lane-miles
  - 9.5mm Superpave & 30% RAP
  - Dry Process + additive requirement
  - PG Binder spec equiv. to PG76-22
  - 3,200 tons of mix
  - 39,360 lbs of scrap tires
- The Ray Highway: I-85 GA/AL state line – exit 13 2019
  - 4 lane-miles + rest area parking lot
  - 2,001 tons 12.5mm OGFC
  - 1,519 tons 12.5mm SMA
  - PG Binder spec equiv. to PG76-22
  - Dry process + additive requirement
  - 3,520 tons of mix
  - 42,240 lbs of scrap tires



# RMA STATE OF KNOWLEDGE

- Environment/Sustainability
  - Reduces environmental impact
    - CO2 emissions (-34%)
    - Ozone depletion (-38%)
    - Water depletion (-30%)
  - Reduces leaching potential (-85%)
  - Reduces tire tread emissions (30-50%)
  - Reduces roadway noise, rolling resistance (fuel savings)
  - Reduces heat island effect
- Performance/Safety
  - Extends pavement life
    - Reduces cracking
    - Reduces rutting
    - Up to 2x life extension
  - Improved tire grip (skid resistance)
  - Improved pavement (smoothness)
  - Often used in open-graded friction courses, safer for travel during heavy rain events (reduced hydroplaning)
- Economics
  - Dry process is less expensive than traditional polymer-modified asphalt with comparable performance
  - Thinner designs provide comparable performance to traditional asphalt at lower cost (40-50% reduction)



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# LANDSCAPE LABORATORY

- Pollinator gardens
- Bioswales
- Kernza<sup>®</sup> trial
- Perennial wildflower meadow research
- Slope stabilization research



# Roadmap 2020-2025 summary

## RECOMMENDED PROJECTS (APPROX. TIMESCALE)

### GOALS OF THE RAY

- Reduce net carbon
- Improve road safety
- Reduce maintenance
- Reduce waste
- Improve traffic efficiency
- Improve wellbeing
- Reduce pollution
- Reduce wildlife impact
- Revenue potential
- Publicity / federal impact




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# PARTNERS ON THE RAY



## CONTACT

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FOLLOW US    

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#RideTheRay  
#DriveTheFuture



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# FUNDING PARTNERS



THE MCKNIGHT FOUNDATION



COX AUTOMOTIVE



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