The Climate Emergency and Bus Electrification

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Institute for Transportation and Development Policy

ITDP: global impact for 30+ years

Mexico · US · Brazil · Africa · India · Indonesia · China

- 🟢 ITDP Office
- ⚪ Current engagement

125+ staff | 10+ offices | 7 countries
50+ cities with projects | $10M+ annual funding

Transportation emissions soaring

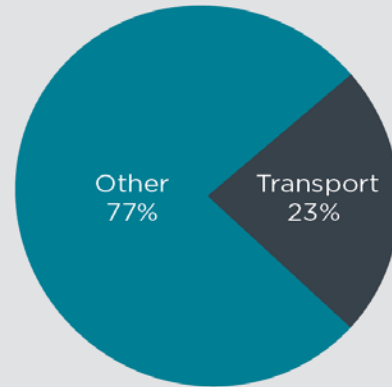Fastest-growing source of climate emissions

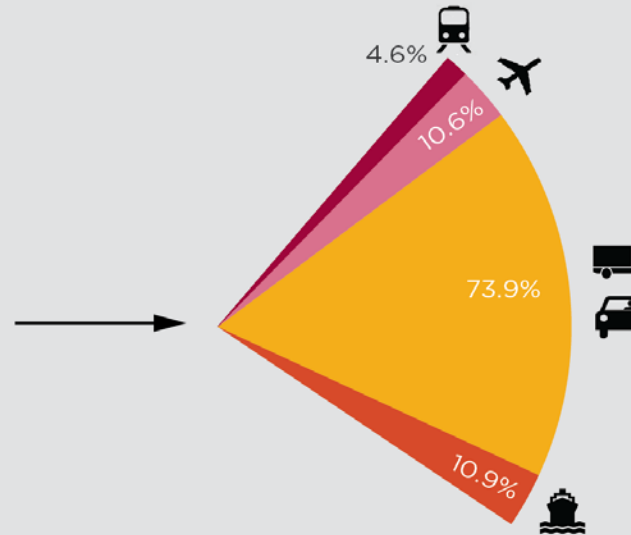~30% of all GHG emissions

Single largest source of black carbon

THE TRANSPORTATION SECTOR
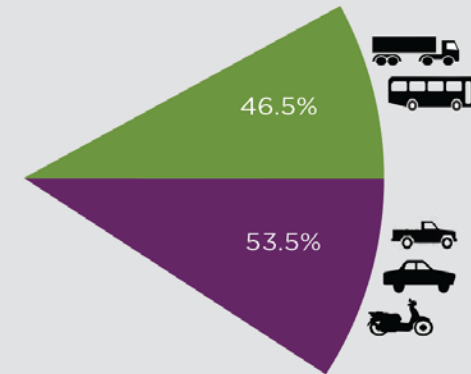A major contributor to global anthropogenic CO_2 emissions

GLOBAL ANTHROPOGENIC EMISSIONS ≈ 38 Gt CO_2

Other 77% Transport 23%

TRANSPORT EMISSIONS ≈ 8.8 Gt CO_2

4.6%
10.6%
73.9%
10.9%

ROAD TRANSPORT EMISSIONS ≈ 6.5 Gt CO_2

46.5%
53.5%

LEGEND

RAIL AVIATION ROAD MARINE HEAVY-DUTY VEHICLES LIGHT-DUTY VEHICLES

Sources:
ICCT (2014). Global Transportation Roadmap Model. Available from http://www.theicct.org/global-transportation-roadmap-model
IPCC (2014). Summary for Policymakers. Climate Change 2014, Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

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Avoid

Shift +

Improve

>>>>>>

Cars

Buses +

Bikes

2 Degree Scenario in Urban Transport
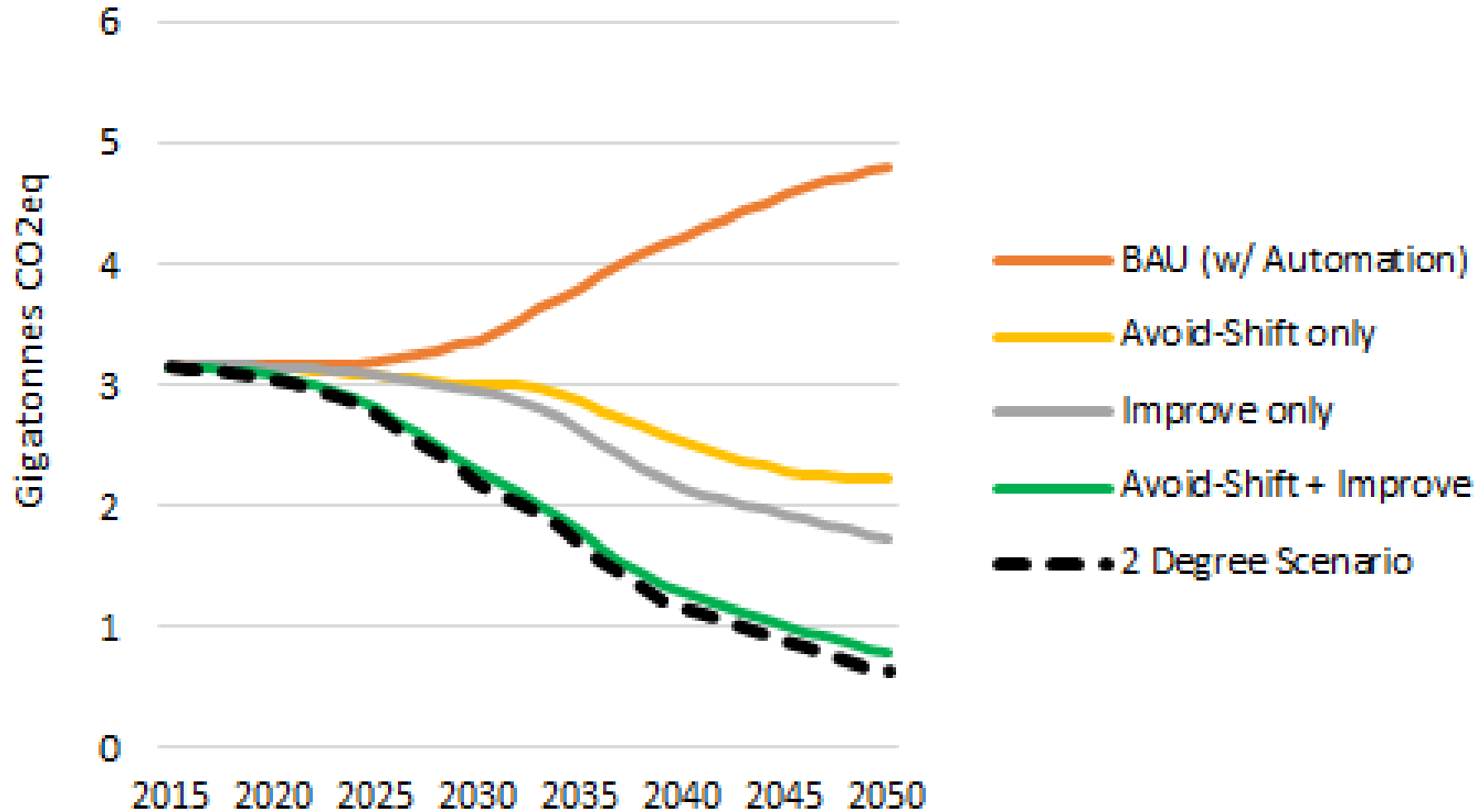
Gigatonnes CO2eq

Legend:
- BAU (w/ Automation)
- Avoid-Shift only
- Improve only
- Avoid-Shift + Improve
- 2 Degree Scenario
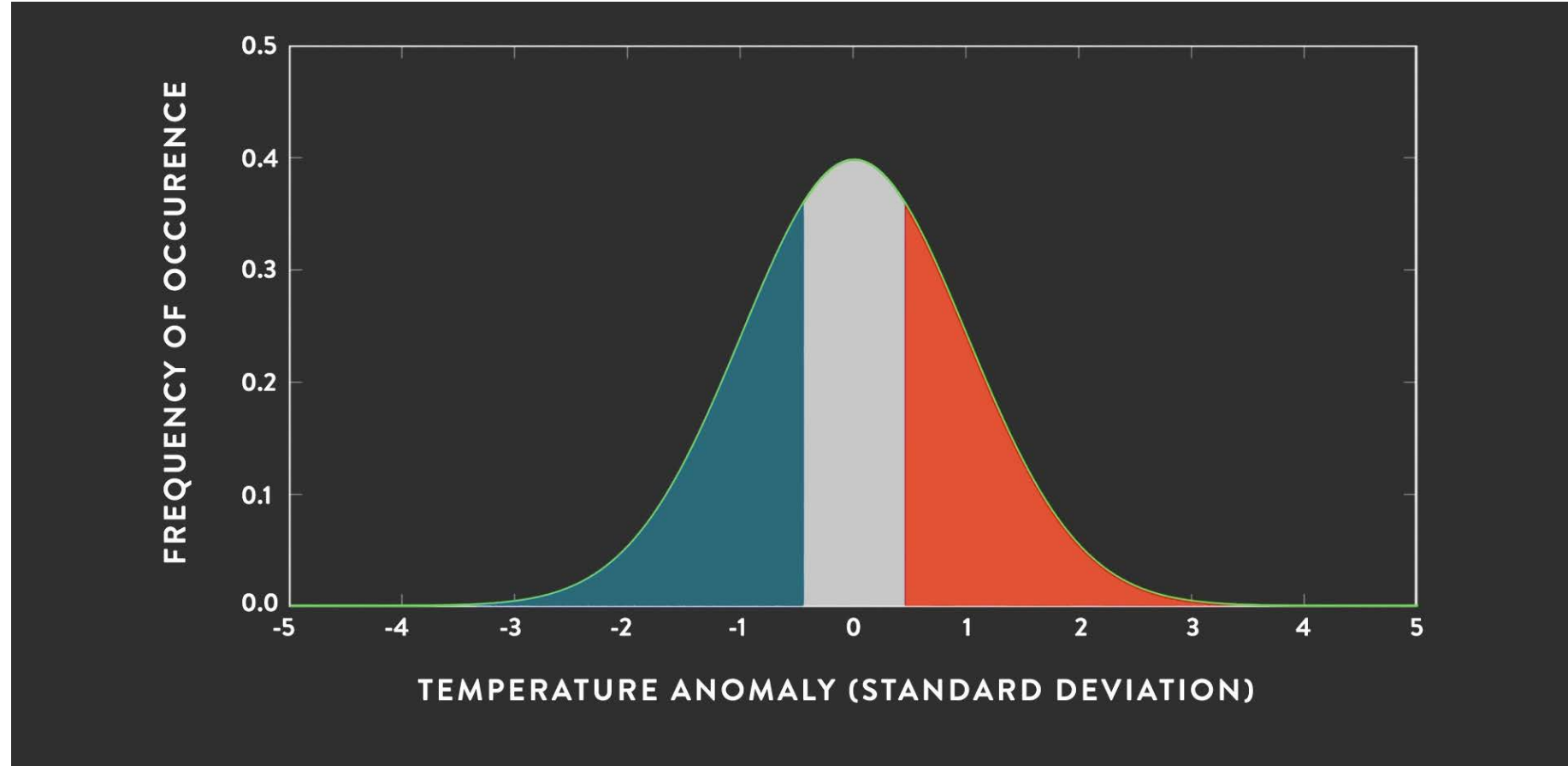
The extremes become the norm.

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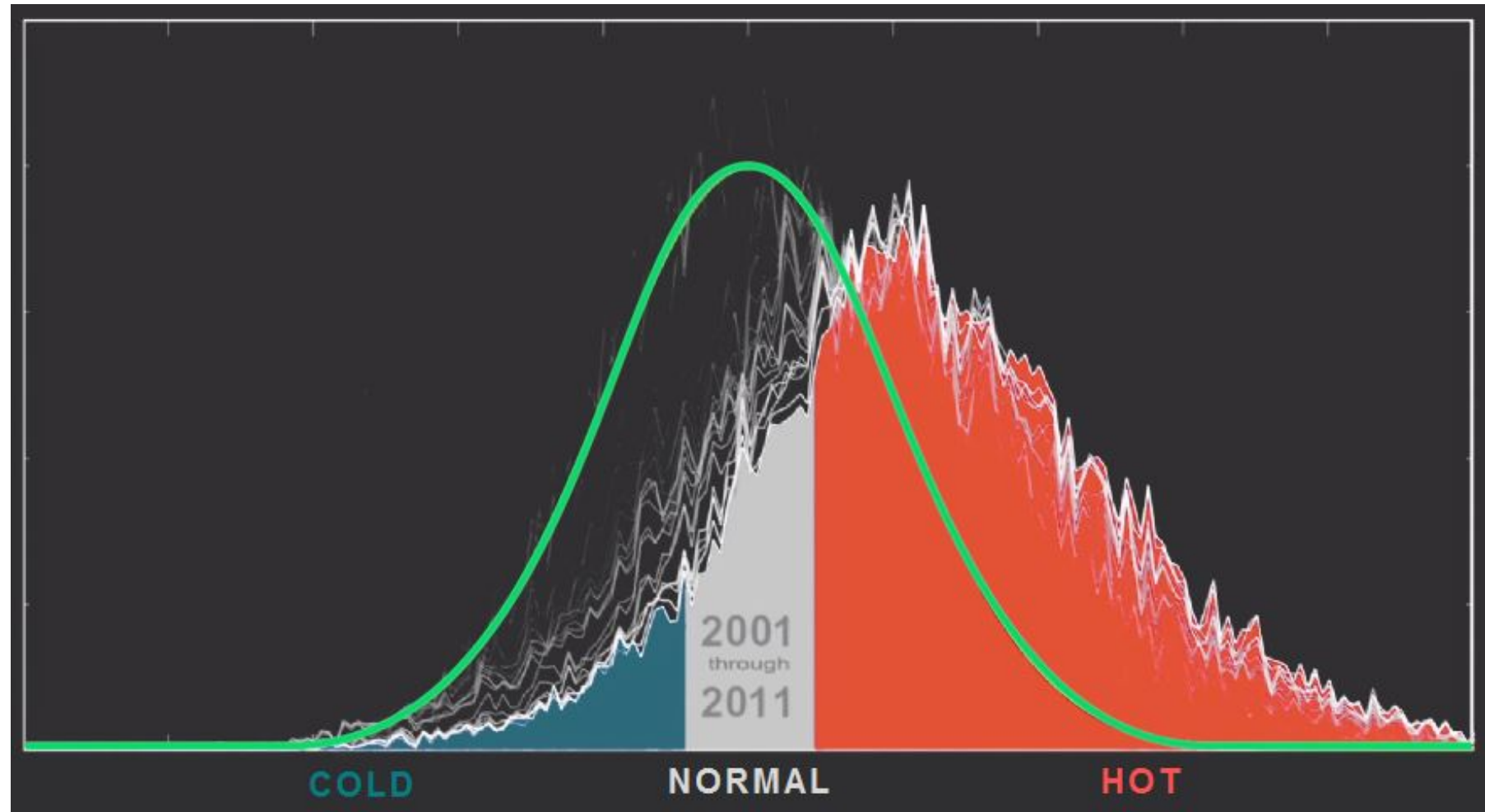
The coldest year in the future will be hotter than the hottest year in the past.

1960-1979

2090-2099

Number of Days

<10   20   30   45   60   75   90   105   >120
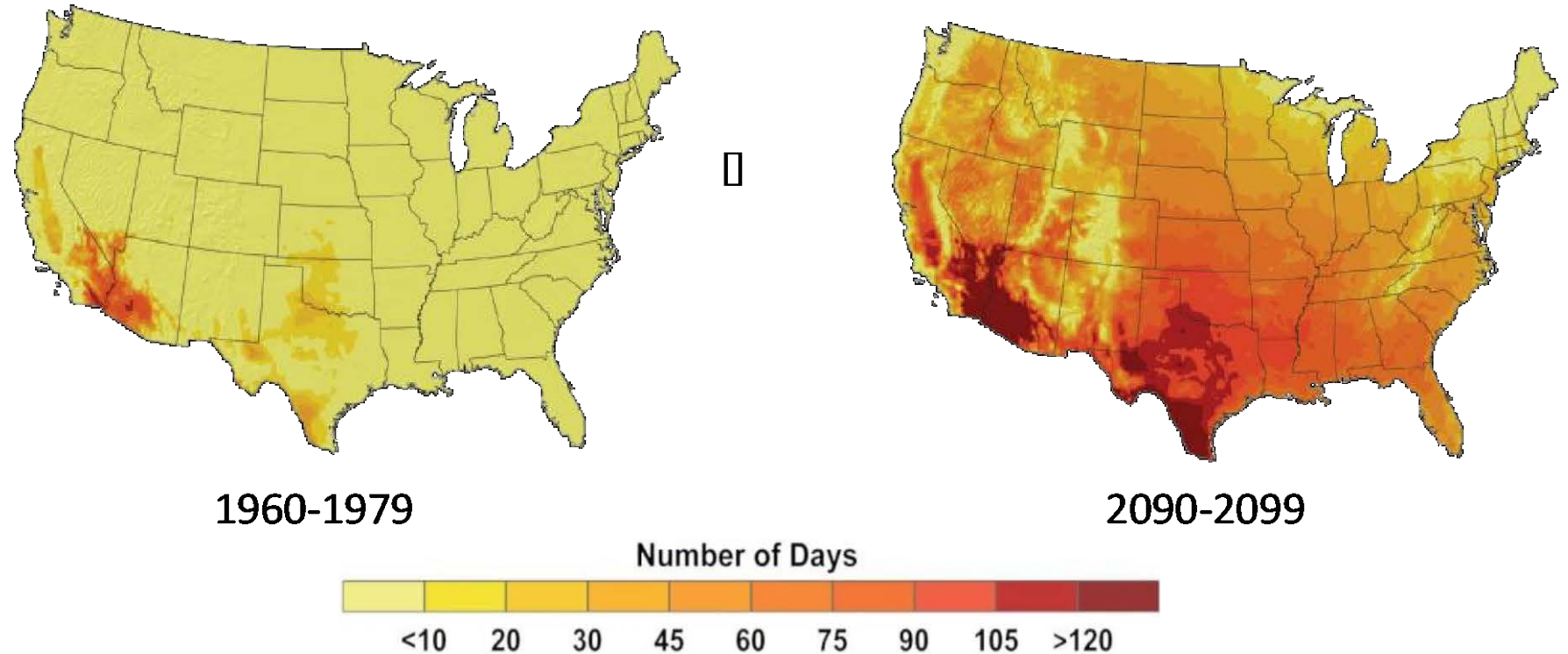
Electric vehicle sales are growing quickly
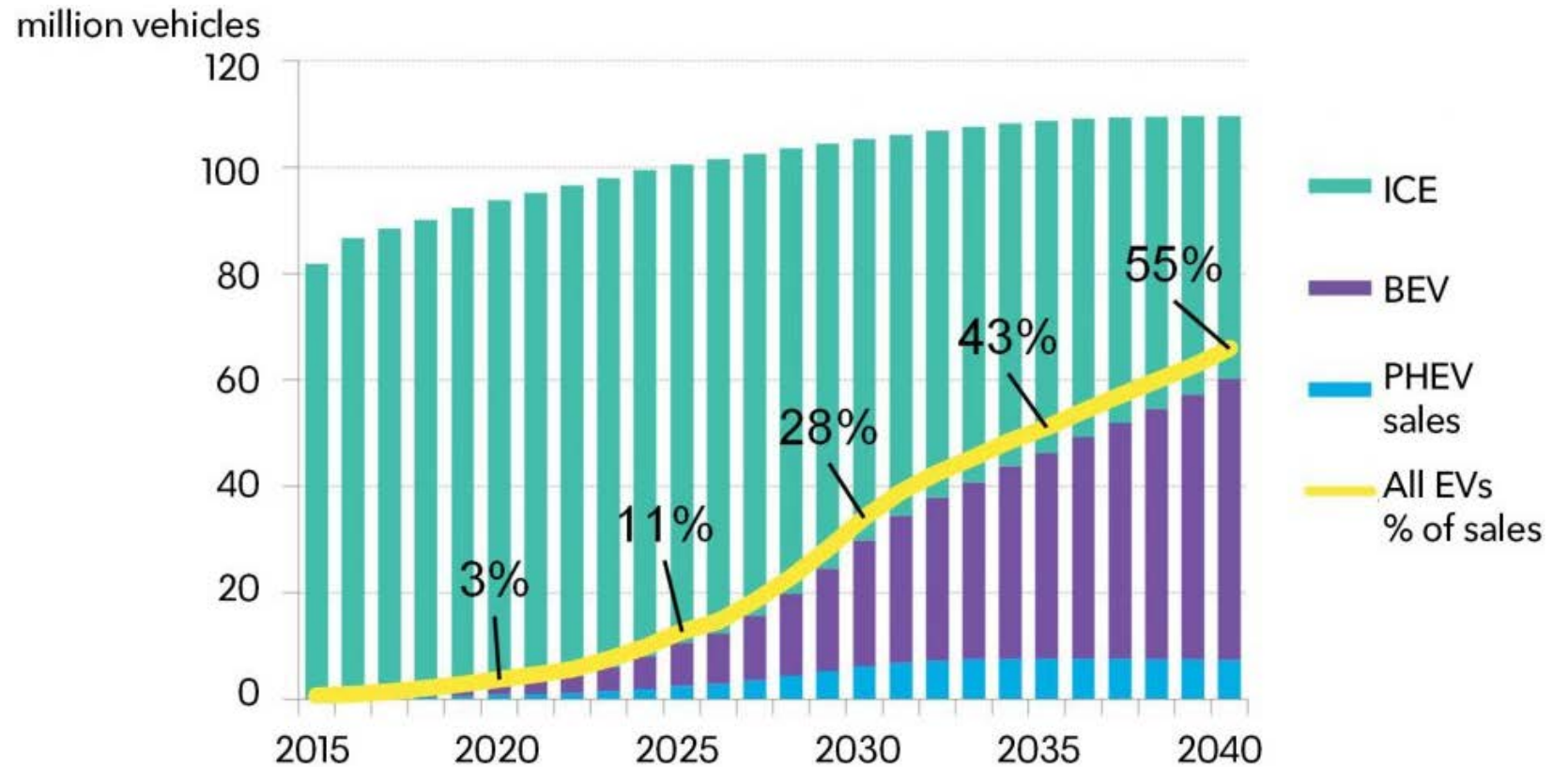
EVs currently 3% of global light duty vehicle sales

EVs expected to overtake conventional ICE light duty sales by 2040

Annual Light Duty Electric Vehicle Sales
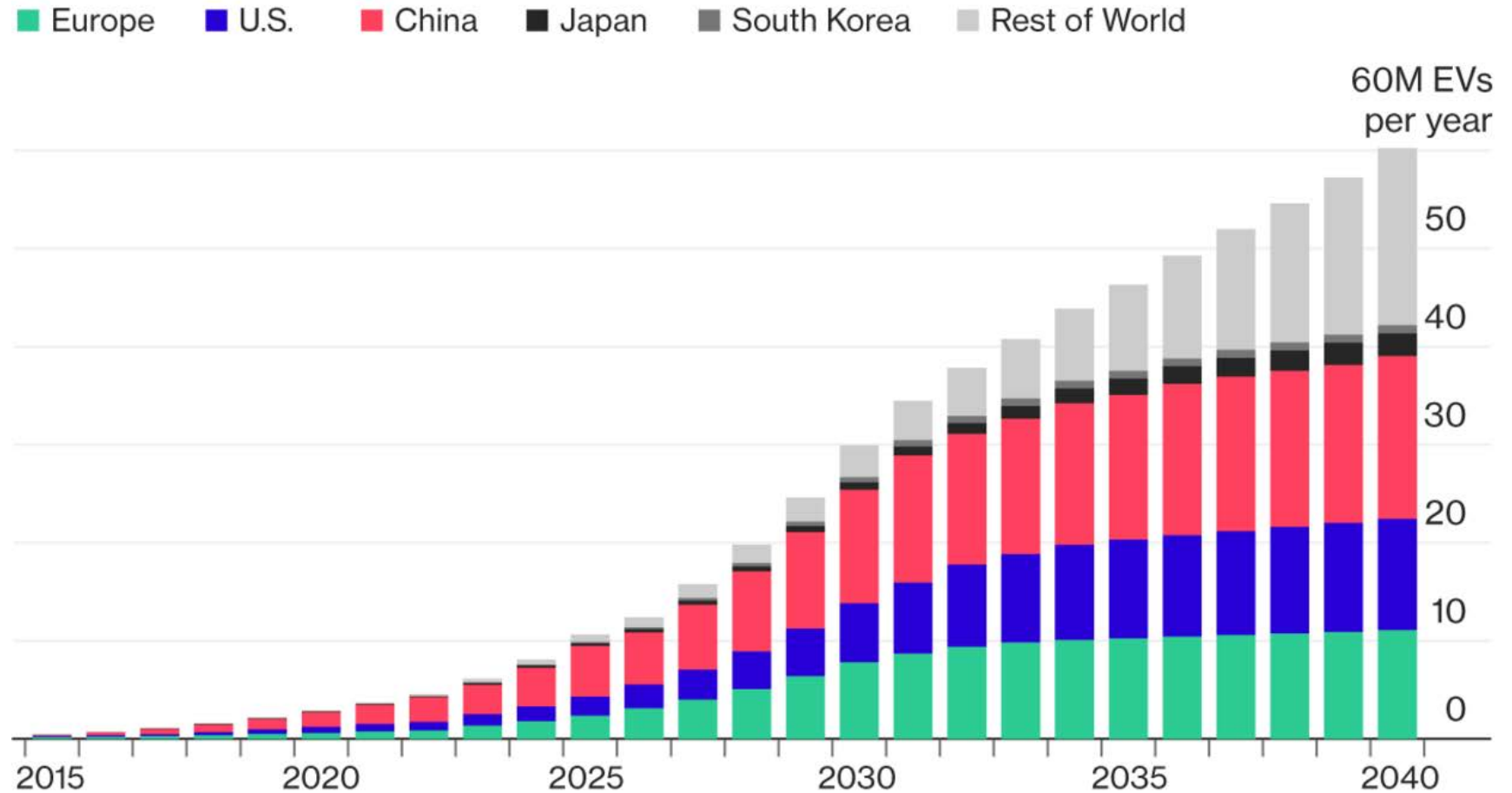
million vehicles

3% 11% 28% 43% 55%

ICE
BEV
PHEV sales
All EVs % of sales

Source: Bloomberg New Energy Finance

China expected to lead the EV market…

with production in the US and Europe catching-up

Annual Light Duty Electric Vehicle Sales

Source: Bloomberg New Energy Finance

By 2040 80% of global municipal bus fleet is expected to be electric

Currently ~420,000 e-buses on the market

China also expected to lead
e-bus market

Global municipal e-bus fleet

China Europe India U.S. Rest of the world

2019
415,648
2,441
385
676
779

1.5M
1.0M
0.5M
0

2018   2040
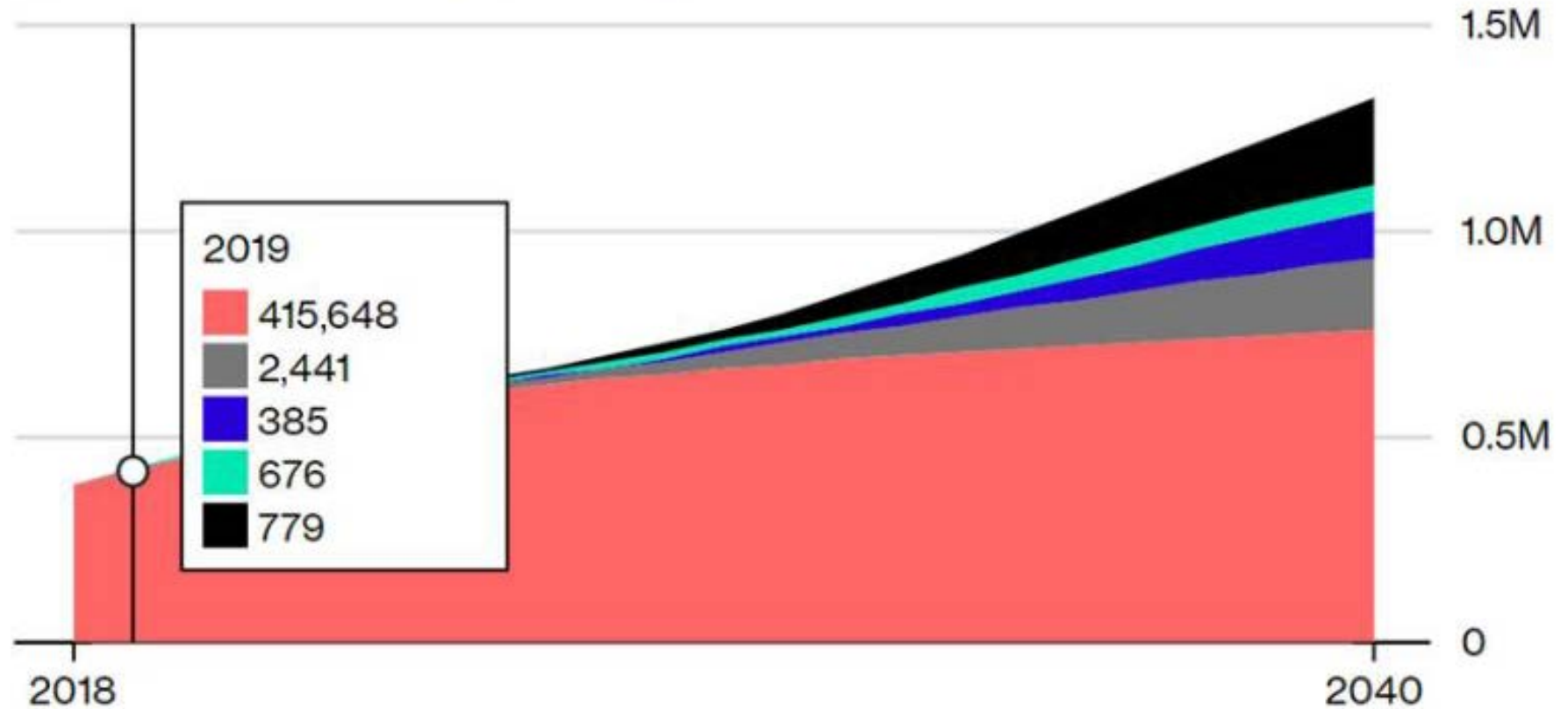
Source: BloombergNEF's "Electric Vehicle Outlook 2019"

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Buses provide an accessible option to move more people sustainably

80% of buses use older, diesel engines and high sulfur fuel

Buses consume 30x more fuel than cars

3-Steps to Electrify Your Bus Fleet

Set a Target

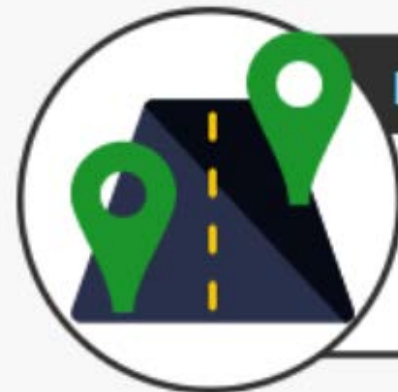- Define a vision with deadline and specific emissions and air quality goals
- Specify immediate emission reduction
- Develop a plan to achieve targets
- Engage with public to gain support

Pilot a Program

- Pick a controlled environment to test new technology on operations
- Test for range, recharging, weather conditions while minimizing variables
- Start making immediate improvements

Implement with care

- Finalize a transition plan based on conclusions from testing
- Align plan with expected vehicle renovation and turnover
- Implement incremental changes in overall fleet

Early leaders in bus electrification

China: 38,000+ electric buses, +9,500 each week

Shenzhen, China: full transit electrification
- 20% reduction in CO_2 emissions
- 75% reduction in black carbon

Latin American cities: with 50% power from renewables, well-poised to electrify bus fleets

Colombia: intends to reach 600,000 EVs by 2030, including 100% of its buses

Santiago, Chile: largest electric bus fleet in the Americas; transitioning to fully-electrified by 2050

India: plans to make 30% of bus fleet electric by 2030 with up to 60% subsidy provided
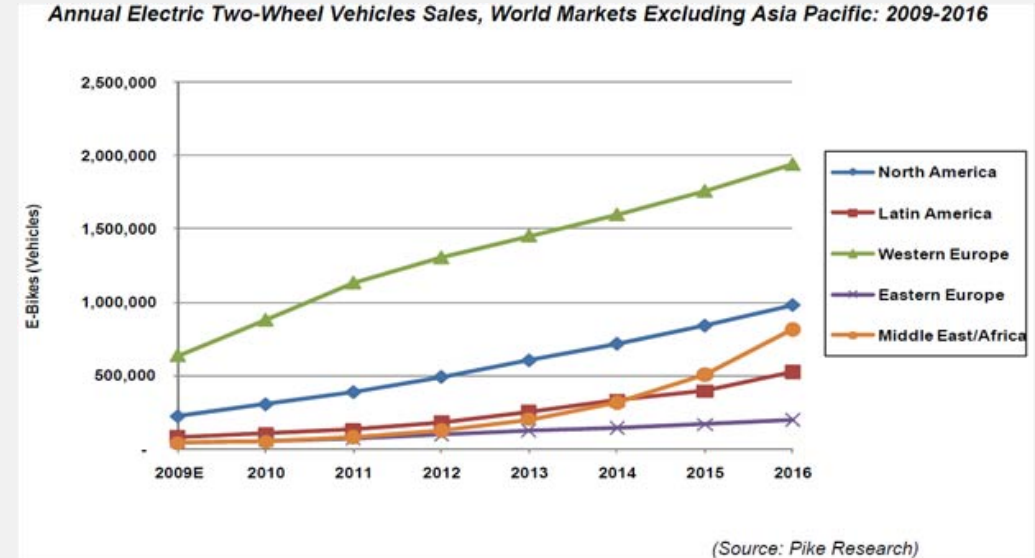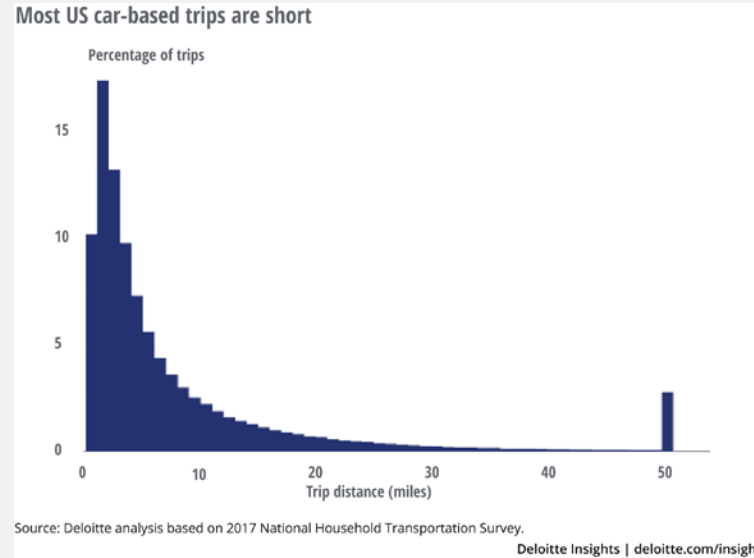
E-bikes & scooters are also important

One of the fastest growing transport markets

34 million E-bikes sold in 2017

Shared E-bikes are used 2x as much as pedal bikes

Cover short city distances and connect transit

Most US car-based trips are short
Percentage of trips
Trip distance (miles)
Source: Deloitte analysis based on 2017 National Household Transportation Survey.
Deloitte Insights | deloitte.com/insights

Annual Electric Two-Wheel Vehicles Sales, World Markets Excluding Asia Pacific: 2009-2016
E-Bikes (Vehicles)
North America
Latin America
Western Europe
Eastern Europe
Middle East/Africa
(Source: Pike Research)

Key success factors for electrification

Government Mandates

At the federal, state, and city levels to encourage adoption, especially for public buses and taxi fleets

Subsidies & Financing

At the federal and state levels to cover higher upfront capital costs, especially for buses which provide more public benefit

Charging Infrastructure

By cities in the right locations to maximize charging flexibility and optimize time of day charging

Electricity Tariffs

At the state level to set preferential prices to incentivize electrification and optimize time of day charging

Thank you!

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