

# The shifting landscape of public revenues in the age of electric vehicles

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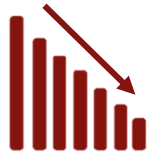
CSFM Seminar Series, 24 October 2023



# The EV transition is here!



We are rapidly moving towards higher shares of electric vehicle sales, but we could be moving even faster



Public transport revenues are steadily declining

- Increasing EV + PHEV shares
- Decreasing gas car efficiencies
- Unadjusted fuel tax rates

# Who's addressing this?

POLITICS

## Japan to weigh raising tax on EVs as it fears revenue decline

Policymakers look for flat-tax alternatives to ensure infrastructure funding

NIKKEI Asia

## Electric car drivers must pay tax from 2025

B B C

## Norway Became an EV Paradise, Now It's Imposing a Weight Tax and Bringing Back the VAT

autoevolution

## Texas Proposes \$200 Annual Fee For EV Owners To Make Up For Lost Gas Tax Revenues

CARSCOOPS

## Swiss plan tax on electric vehicles to help finance roads

REUTERS

28 OCT 2021

## NSW passes Australia's second distance-based EV road user charge legislation

CLAYTON UTZ

## Controversial electric vehicle tax has taken 243 EVs off the roads

THE DRIVEN  
Australia's most-trusted and well-read electric vehicle news site

## Road User Charges shock on the way for electric vehicle owners

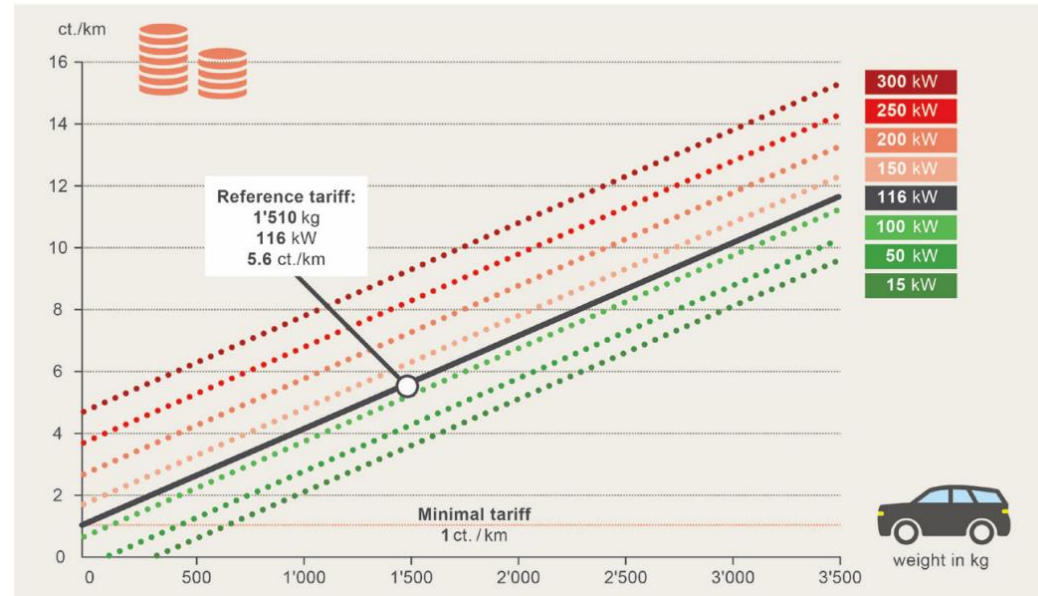
The New Zealand Herald

# Who's addressing this?

29 June 2022

## Concept for the substitution of mineral oil taxes (alternative tax)

Report to the Federal Council

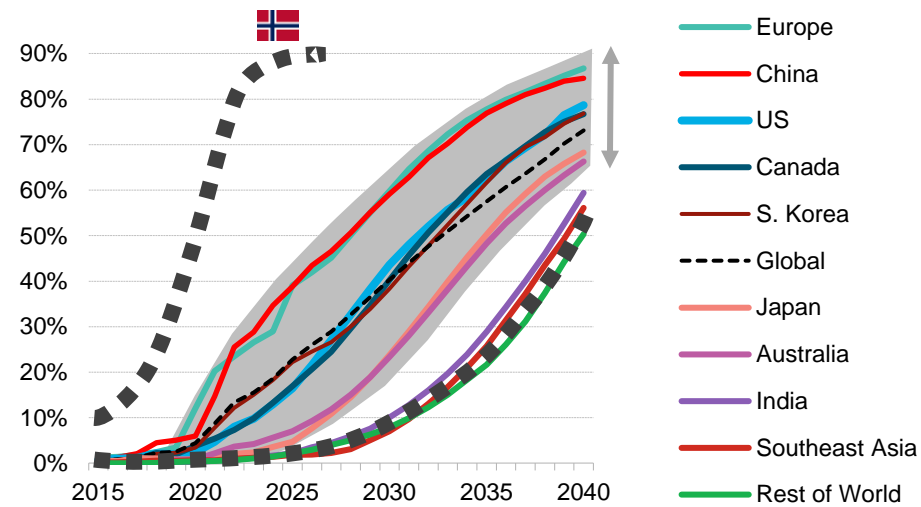


Recommendation: Alternative tax should be introduced by 2030 at the latest.

How can policy-makers design effective tax policies that balance the need for revenue with the need to accelerate the EV transition?

# Case Selection

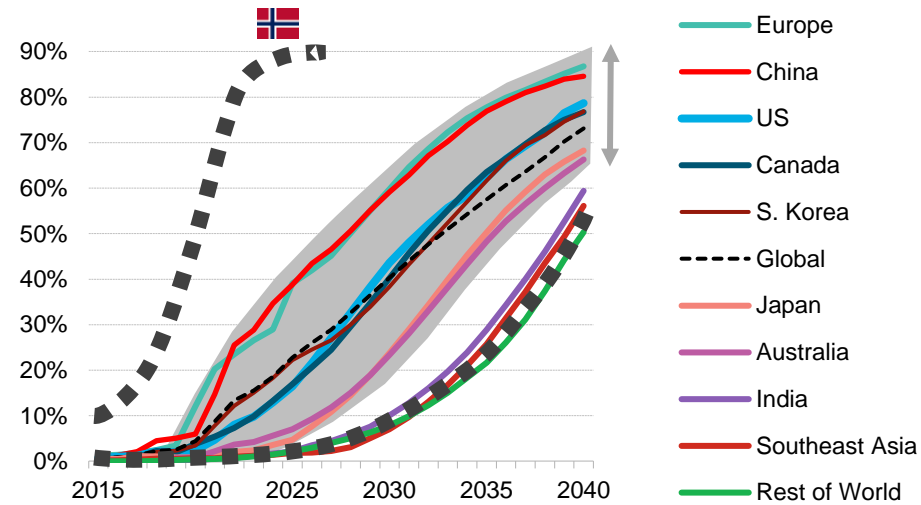
Global long-term EV share of new passenger vehicle sales by market – ETS



BloombergNEF

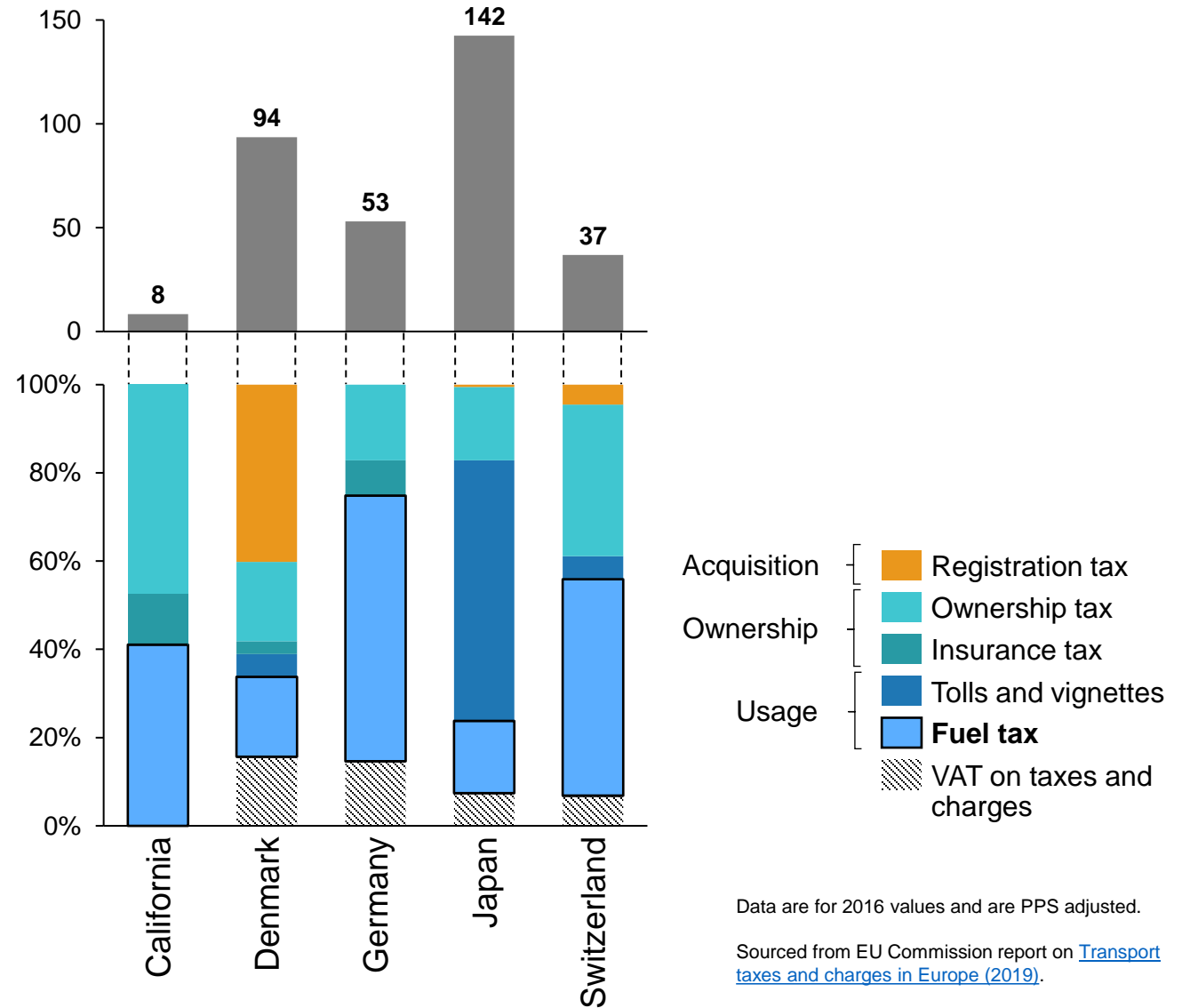
# Case Selection

Global long-term EV share of new passenger vehicle sales by market – ETS



BloombergNEF

[USD/1000vkm]



Data are for 2016 values and are PPS adjusted.

Sourced from EU Commission report on [Transport taxes and charges in Europe \(2019\)](#).

# Modelling policy interventions for revenue recovery



- ✓ Techno-economic adoption model
  - Technology selection (ICE, BEV) based on total cost of ownership for passenger vehicles
    - Detailed tax components
  - Exogenous technological learning (price projection inputs from BNEF)
  - Endogenized “switching” cost
  - *Policy interventions*



1. Baseline market share projections (2020-2035)



2. Policy interventions for “full” revenue recovery



# Modelling policy interventions for revenue recovery

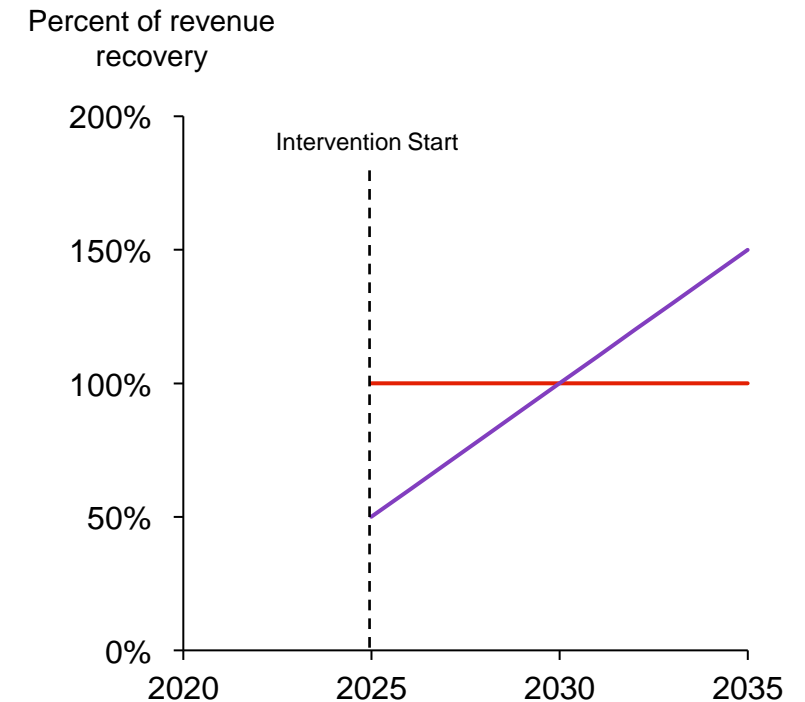


## 2. Policy intervention for “full” revenue recovery

- *Impose a tax on BEVs equivalent to the fuel tax or excise duty charged for ICEs over the lifetime of the vehicle*
- Intervention types
  - Acquisition charge, annual charge, distance-based charge
- Intervention timing
  - Instantaneous, phased-in with overshoot



How does this “thwart” the transition?



— Instantaneous  
— Phased-in w/ overshoot

# Key Takeaways



## Results

- Taxing EVs can have dramatic delaying effects on the transition
- Effect sizes vary depending on vehicle taxation structures and projected BEV transition speeds
  - Annual/distance-based tax fares better than acquisition tax



## Distance-based tax: the theoretically “best” option

- Highly flexible: can promote reduced road usage; best accounts for externalities that vary with location (air pollution, congestion, noise); in line with “user/polluter-pays” principle; able to differentiate urban vs. rural rates; eliminate road toll infrastructure
- Regressive (though doesn’t have to be); administratively costly (potentially); data protection concerns
- “Window of opportunity” for policy change



## Important for policy-makers

- Have a sense of your EV transition speed for informed taxation decisions!
- Start the conversation now to establish familiarity with users/drivers

Thank you!



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@floegli

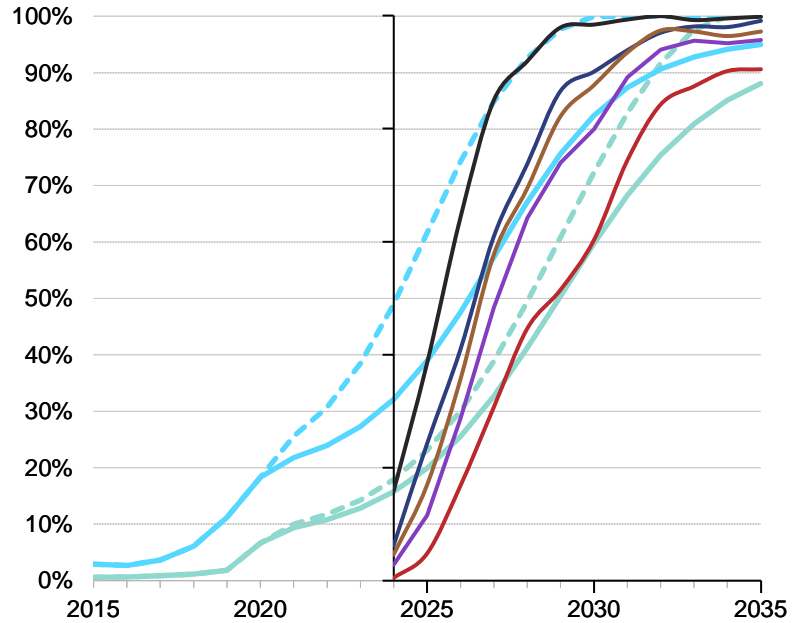


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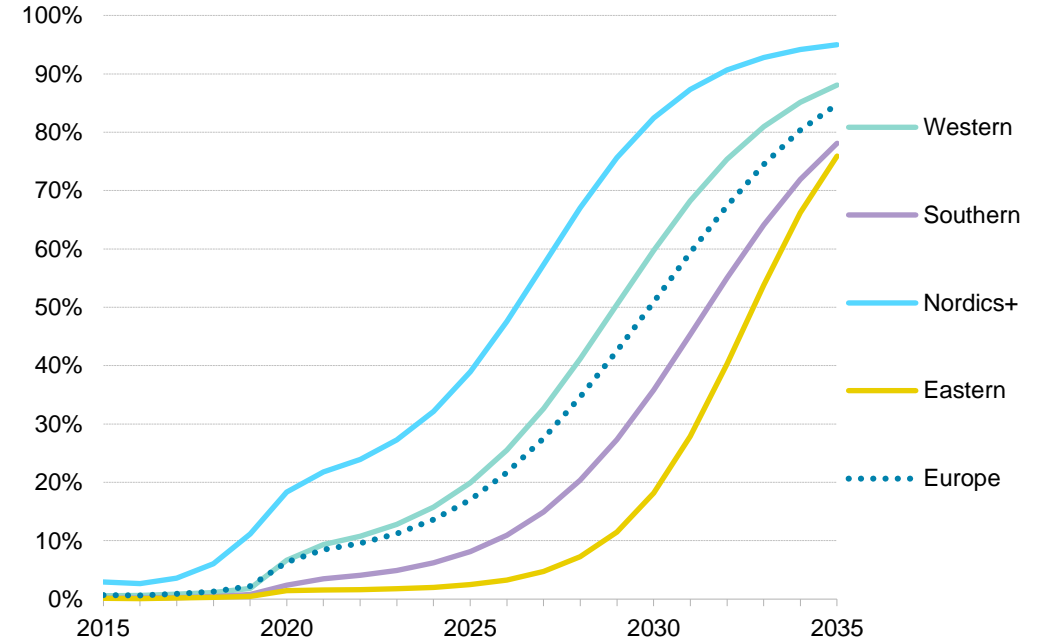
Backup Slides

# Case Selection Rational – European Adoption Projections (BNEF)

BEV share of sales



BEV share of sales



## BloombergNEF

### Electric Vehicle Price Parity in Europe - Data and Figures

NOTE: Nordics+ includes Norway, Sweden, Finland, Iceland, Denmark, Netherlands; Western Europe includes France, Germany, Switzerland, Belgium, Austria, Luxembourg, UK, Ireland.

# Framework for taxing EVs under competing policy objectives

## (1) Evaluating taxation options

### Taxation Types:

#### Acquisition

- Registration Tax
- Sales Tax/VAT
- Environmental Tax
- Import tax
- Luxury tax

#### Ownership

- Annual vehicle tax
- Periodic inspections
- Insurance tax
- Weight tax

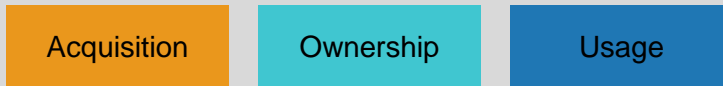
#### Usage

- Fuel tax/Excise duties
- Electricity tax
- Road tax (tolls, vignettes)
- License tax

# Framework for taxing EVs under competing policy objectives

## (1) Evaluating taxation options

### Taxation Types:

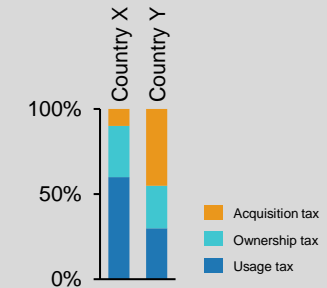


### Evaluative Dimensions:

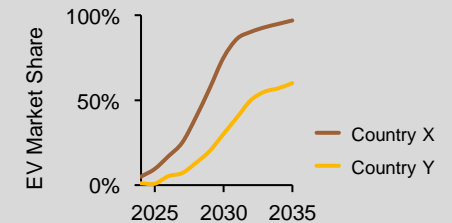
- ▶ **Rational**
  - Financing roads and public infrastructure (public good)
  - Internalizing negative externalities
- ▶ **Implementation**
  - Ease of administrative implementation (cost)
  - Ease of political implementation
- ▶ **Side-effects**
  - Fairness and equity

## (2) Country-specific revenue exposure

Current passenger vehicle taxation structure



Projected EV transition speed



# Financing Switzerland's transport infrastructure.

Around 80% of infrastructure financing in the transport sector comes from mineral oil taxes.

