High Technology Roadmap

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Energy Vision

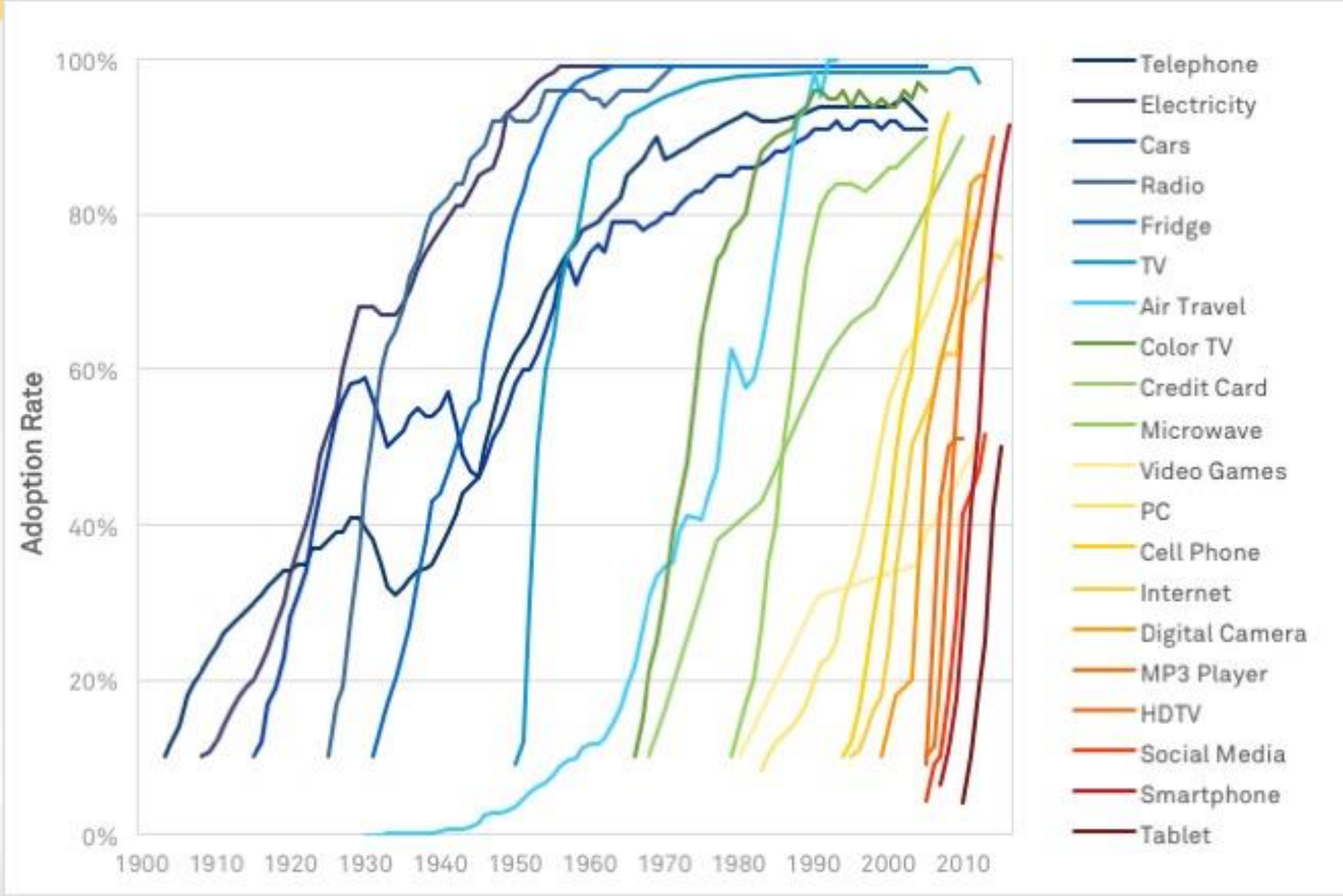
> "To have access to adequate volumes of reliable, affordable, financially sustainable, and environmentally sound commercial energy for all."

CAREC

i. **energy security** through balanced development of the region's energy resources, infrastructure, and institutions.

ii. **stronger integration** of the region's energy markets and supply chain for emerging high technologies.

iii. **economic growth** through energy trade.

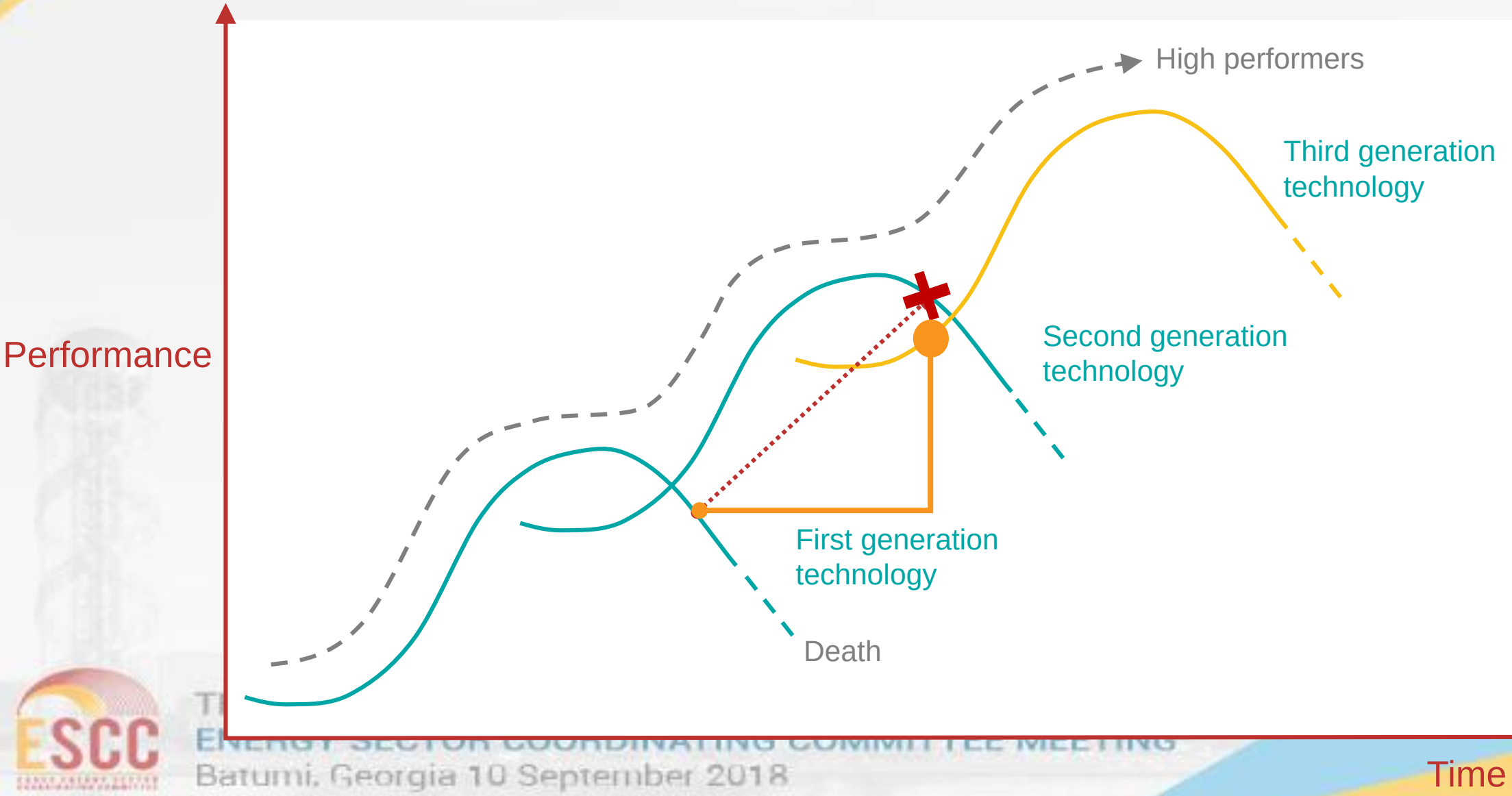


Source: Asymco

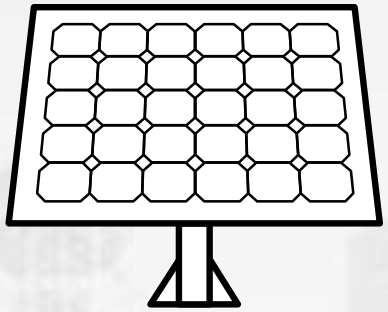
BLACKROCK®

Leapfrogging

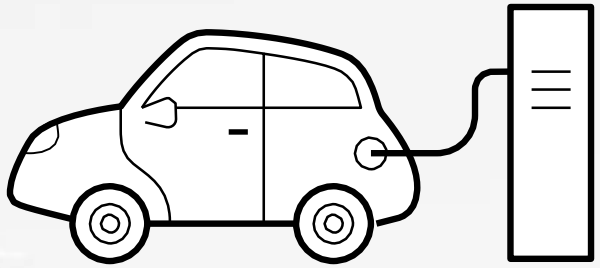
Leapfrogging



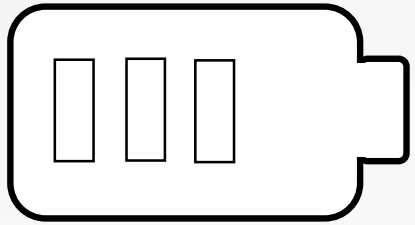
Four Pillars of High Technology



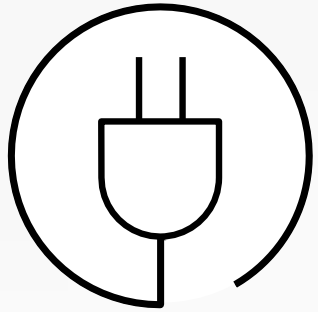
Solar Power



Electric Vehicles



Energy Storage



Energy Efficiency

Solar Power

WHY?

The case for investment:

- Huge generation potential
- Access to electricity and development in off grid
- Energy poverty
- Economic opportunities

Trends and opportunities:

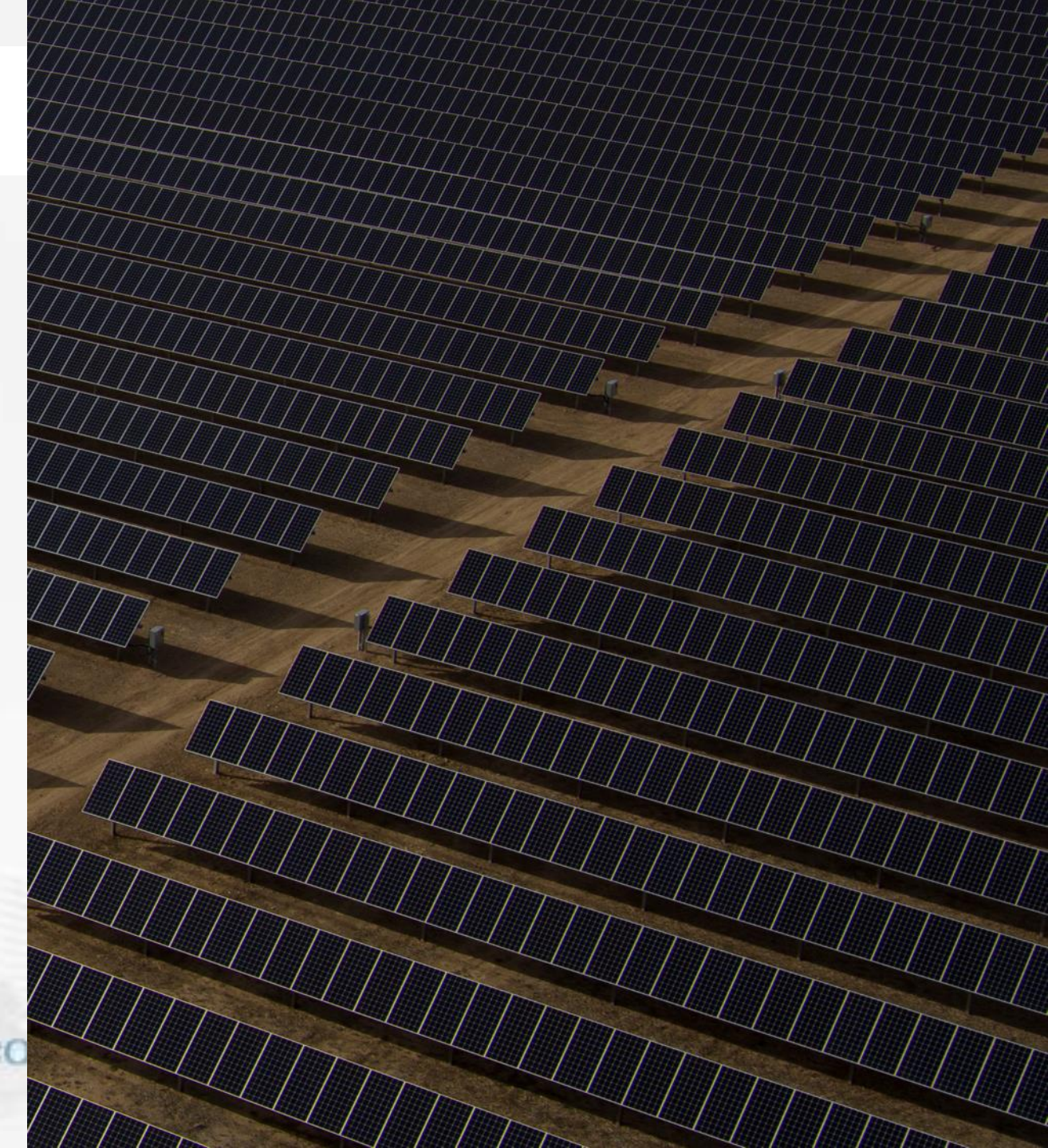
- Global shift to renewables
- Increasing efficiencies
- Decreasing costs
- Competitive auctions
- Going off-grid
- Tipping point

Solar Power

WHAT?

Available technology

- Rooftop solar
- Solar thermal
- Floating solar
- Off-grid solar



Solar Power

HOW?

Policy actions:

- Large-scale public procurement
- Loans for end-users
- Direct incentives
- Tax discounts
- Households and community tax rebates
- Taxes on high emissions technologies
- Awareness raising campaigns

Electric Vehicles

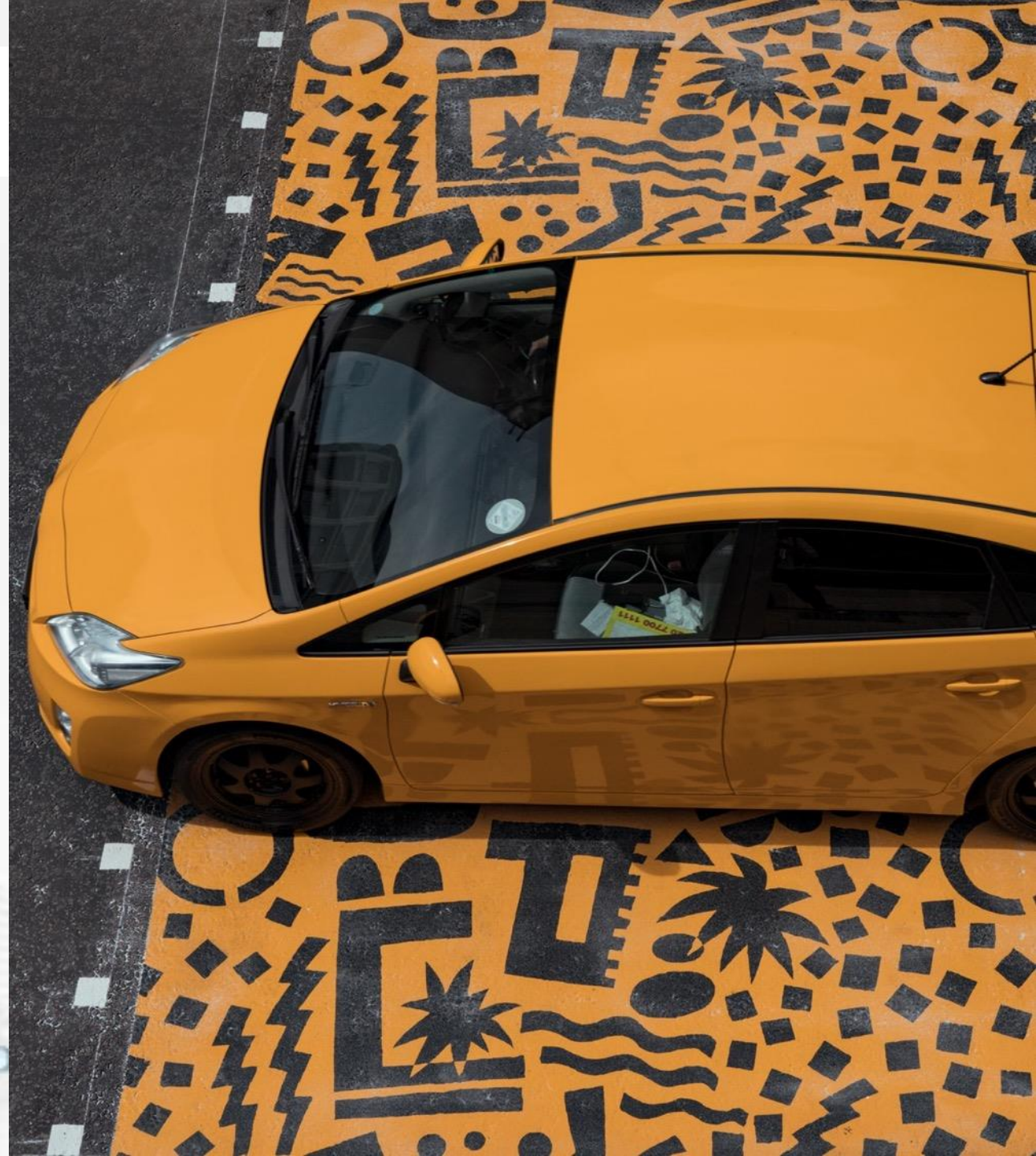
WHY?

The case for investment:

- Emissions reduction, air quality and noise pollution
- Reducing oil imports and increasing renewables
- Connectivity
- Automotive and battery manufacturing
- Sustainable tourism

Trends and opportunities:

- Shifting consumer demand
- Advances in battery technology
- Fast charging
- Importing used EVs
- EV conversions
- Second-life batteries and battery recycling



Electric Vehicles

WHAT?

Available technology

- Cars and vans
- Motorcycles and tricycles
- Taxis and buses
- Boats
- Charging infrastructure

Electric Vehicles

HOW?

Policy actions:

- Lead customer commitments and joint procurement
- Investing in skills and training
- Tax credits, reduced import duties and vehicle purchase rebates
- Vehicle quotas
- Local incentives and low emission zones
- Low interest loans, co-investment funds and innovation funds
- Targeted support for taxis or buses
- Advocacy
- Public awareness campaigns
- Workplace charging initiatives

Energy Efficiency

WHY?

The case for investment:

- High average energy consumption in CAREC countries
- Emissions reduction from generation
- Safe and reliable energy supply
- Reduced costs to consumers

Trends and opportunities:

- Low cost of savings and potential for negative costs
- National commitments
- Efficient buildings
- Efficient motors

Energy Efficiency

WHAT?

Available technology:

- Efficient building systems
- Insulation
- Combined heating and cooling
- Heating
- Lighting
- Pumps and motors
- Renewable energy
- Large scale energy efficiency

Energy Efficiency

HOW?

Policy actions:

- Closure of inefficient industrial plants
- Energy labelling and conservation standards
- Competitive tenders for energy saving projects
- Green taxes
- Mandatory standards for new buildings
- Phase out inefficient technologies (e.g. incandescent light bulbs and fluorescent tubes)

Energy Storage

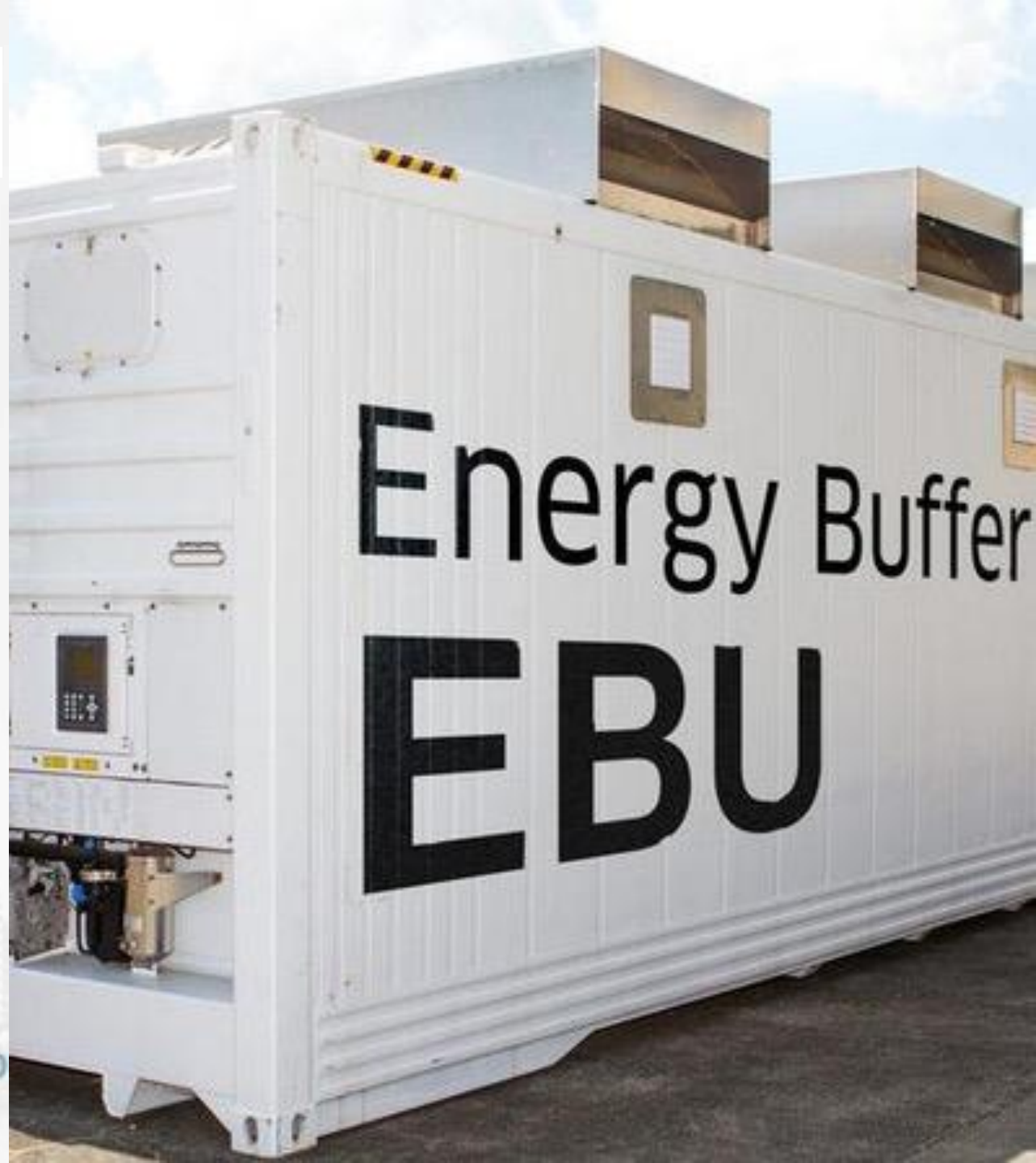
WHY?

The case for investment:

- Economic opportunity
- Modernizing and expanding grids
- Support renewables uptake
- Resilience

Trends and opportunities:

- Decreasing costs
- Increasing competition
- Increasing deployment
- Increasing storage capacity
- Supply side opportunities



Energy Storage

WHAT?

Available technology:

- Li-ion technology
- Flow batteries
- Aqueous ion
- High temperature liquid metal
- Sodium

Energy Storage

HOW?

Policy actions:

- Large-scale public procurement
- Energy storage targets
- Network investment tests
- Direct incentives
- Innovation grants
- Concessional finance
- Tax discounts and credits
- Removal of fossil fuel subsidies
- Regulatory incentives and reforms
- Peak demand or time of use pricing
- Capacity building and technical assistance programs

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Things we hope to achieve with the roadmap

#1. Increase awareness of emerging tech

#2. Create a framework of possibilities

#3. Create a living document that is updated

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