



Pathways to systems change



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Outline

1. Net zero: A paradigm shift
2. Systems and transitions
3. Defining pathways and acting strategically

Net zero: A paradigm shift

Why is net zero a challenge?

- Fossil fuel dependence but also 'process' emissions
- Energy, materials, agriculture
- Negative emissions technologies are uncertain

Getting as close as possible to zero everywhere

This requires significant change to systems of social provisioning

So, we need to shift from a pollution control paradigm (finding lowest cost short term emissions reductions) to a focus on system change.

Systems and transitions

Incremental and more dramatic change

Transitions:

- are multi-dimensional and multi-actor
- involve both innovation and decline
- are uncertain and messy
- display distinct stages
- are guided by visions and narratives
- have significant distributive impacts
- typically involve government

Key implications for the response to climate change

Not one transition but **many**

Importance of paying attention to **what else is going on** in the system

Patterns of change will differ by **sectors** and **regions**

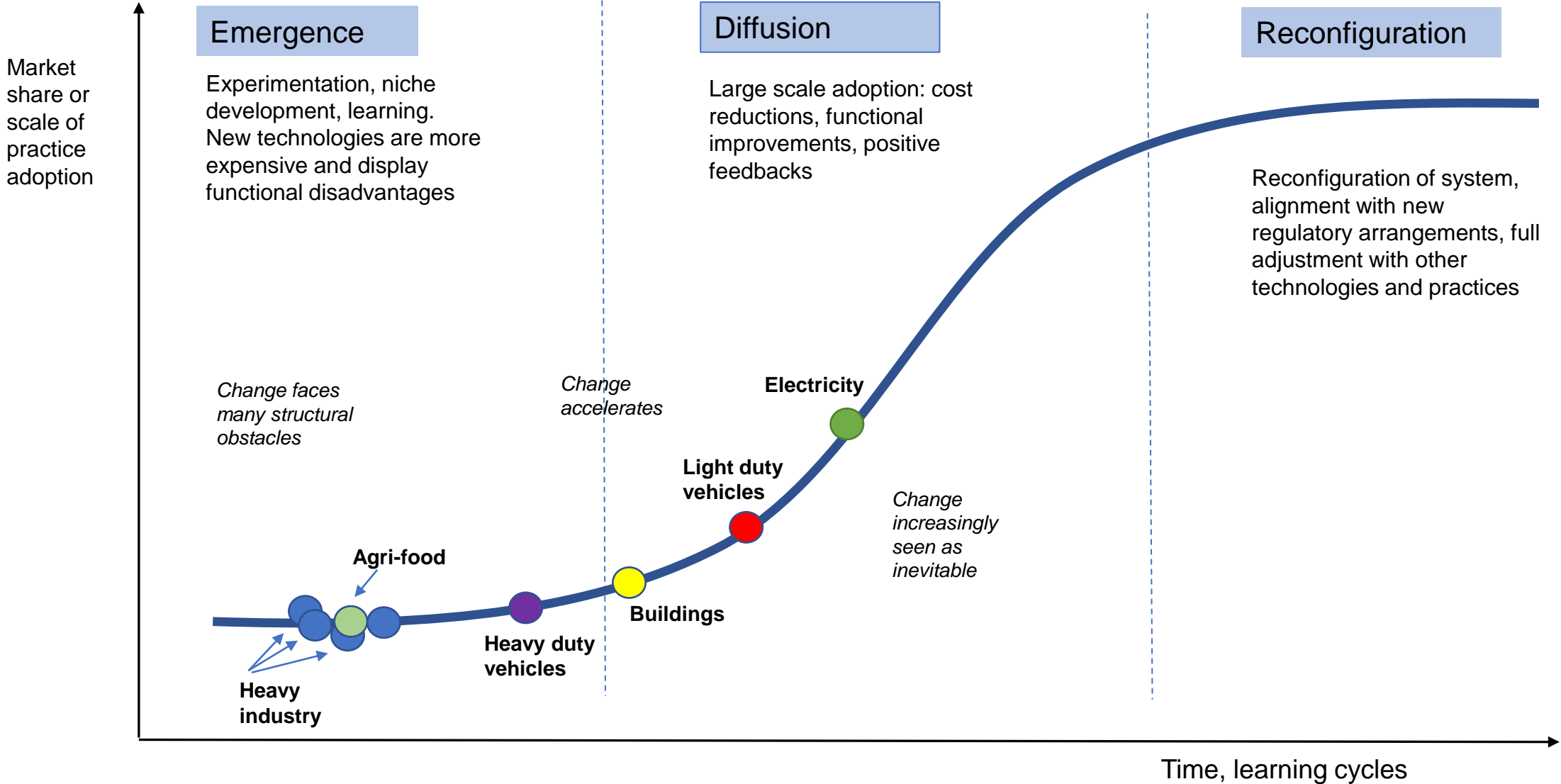
Policy should take account of these differences and of the **phases** of transition.

Not one policy tool but many with the **mix** changing over time.

Issues of **equity** are unavoidable

The test for policy (or action generally): does it accelerate desired **system change**?

Stage of transition

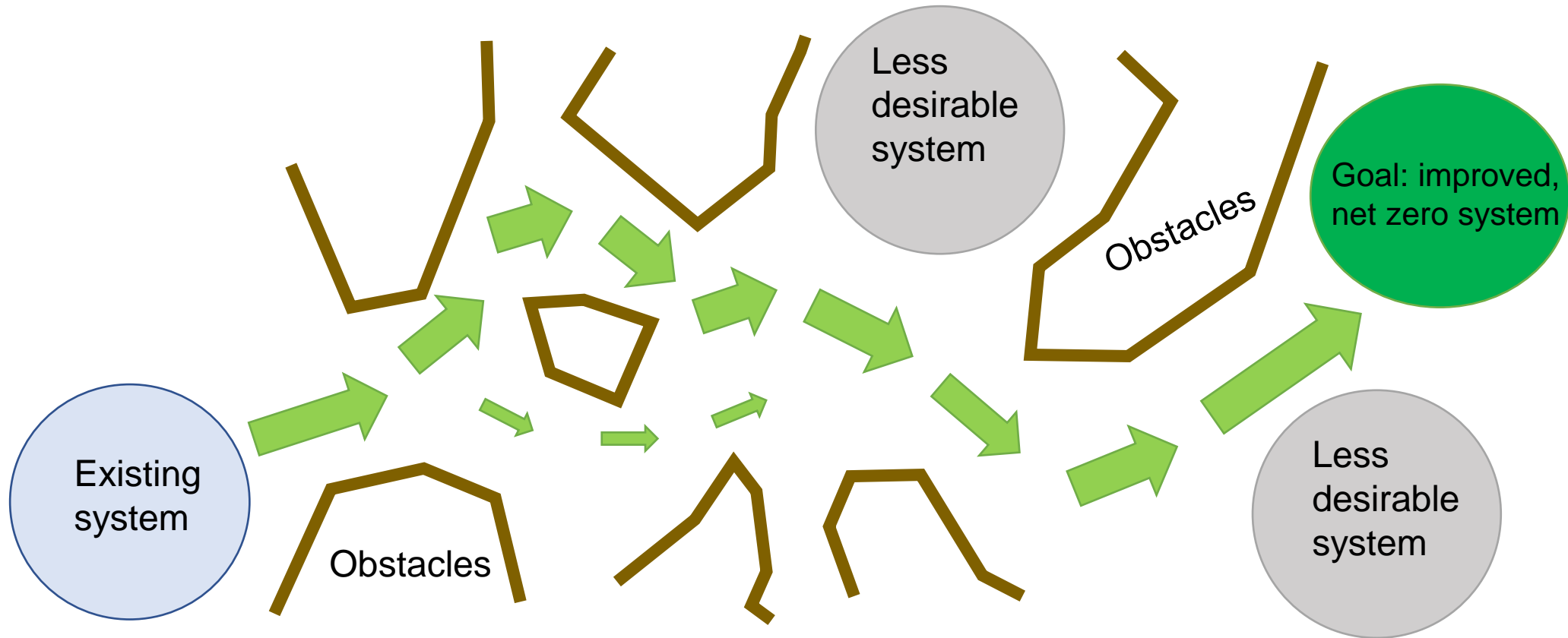


Defining pathways and acting strategically

Pathways

- Connect where we are today with a desirable net zero future
- Involve multiple social and technological elements required to transform a system
- Based on shared aspirations. Grounded in data and analysis, Include narratives
- Sequences of steps that can be refined over time based on learning
- Can be codeveloped by change oriented coalitions

Pathways are about getting from here to there . . .



Sequences of innovation to technology, business models, regulation, social practices to overcome obstacles to system transformation

Defining pathways and acting strategically

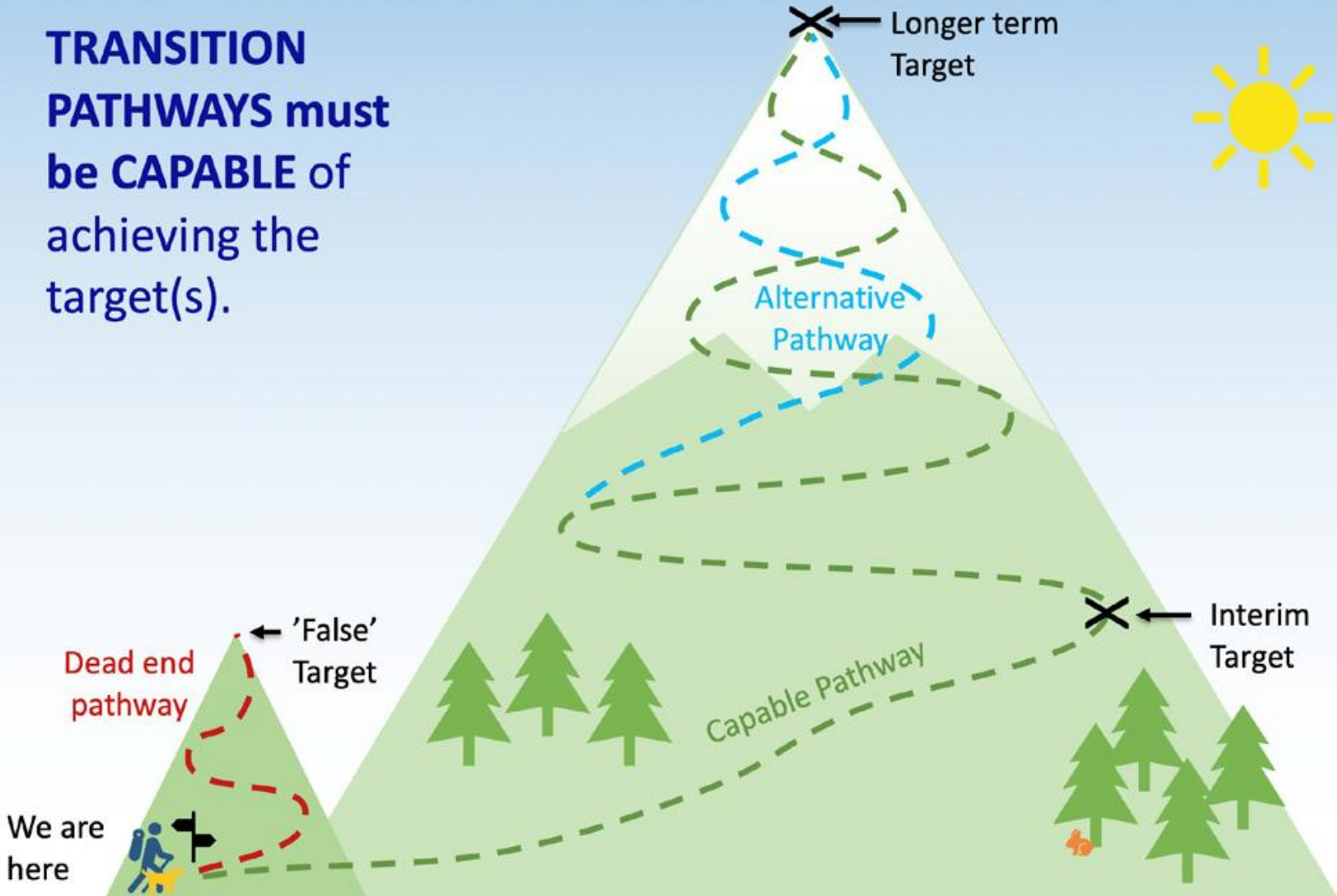
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Avoiding dead end pathways

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TRANSITION PATHWAYS must be **CAPABLE** of achieving the target(s).



Defining pathways and acting strategically

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Avoiding dead end pathways

A transportation example: ethanol blending in gasoline

system change / emissions reductions

Combined CO2e Emissions Savings Annually by 20% Ethanol Blending in Gasoline for ICE Vehicles and Replacement of ICE Vehicles with an EV



Acting strategically

- Establish priorities: for example, light duty vehicle electrification
- Network innovators
- Focus on promising niches
- Target weaknesses of the old system
- Build material coalitions: ‘Industrial policy’
- Not an exercise in optimization
- Anticipate turbulence . . .

Turbulence of transitions

New York Times

Hertz Will Shrink Electric Fleet After Being Burned by Tesla's Price Cuts

The rental car company blamed the sharp drop in the value of electric vehicles and higher repair costs for its decision to sell 20,000 cars.

January 11, 2024

ARS TECHNICA

THE OPPOSITE OF WHAT YOU'VE BEEN TOLD —

EVs have 79% more reliability problems than gas cars, says Consumer Reports

November 29, 2023

Reuters:

EU to investigate 'flood' of Chinese electric cars, weigh tariffs

September 13, 2023

Fortune

Carmakers are struggling to make electric vehicles affordable for pinched consumers—and rethinking their investments amid sagging demand

November 4, 2023

The Globe & Mail

Electric vehicle production mandates, like Canada's, are so wrong on so many levels and could backfire

January 13, 2024

Money

EV Sales Are in a Slump — Why Aren't More Car Buyers Going Electric?

November 1, 2023

Pushback is a sign of success . . .

Acting strategically

- Establish priorities
- Network innovators
- Focus on promising niches
- Target weaknesses of the old system
- Build material coalitions: 'Industrial policy'
- Not an exercise in optimization
- Anticipate turbulence and political headwinds
- Transitions play out over decades

Thank you!

