

Green Windows of Opportunity in Developing Countries?

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Opening green windows

Technological opportunities for a low-carbon world: the role of green industrial policies

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Green Windows of Opportunity

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Green windows of opportunity: latecomer development in the age of transformation toward sustainability

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Abstract

The world is in the early stages of a paradigm transition toward a global green economy. In this article, we propose the notion of green windows of opportunity, highlighting the importance of institutional changes in the creation of new opportunities for latecomer development. We emphasize how demand and mission-guided technical change influence the directionality of latecomer development and highlight the important role emerging economies may attain in the global green transformation. We provide important insights regarding opportunities for green development in emerging economies, how these opportunities emerge in different renewable energy sectors and their implications for the global green economy.

JEL classification: L10, L50, O10, O20, O30, O20, Q40

1. Introduction

Although the transformation toward a global green economy is still in its early stages, there is little doubt that a major disruption in the capitalist world economy is under way. As popular pressure increases in line with the mounting global effects of climate change, the transformation agenda and associated investments in the green economy are likely to accelerate (Mazzucato and Perez, 2015; Roberts and Geels, 2019; Schmitz and Scoones, 2019).

Until recently, the idea of green growth was limited to the advanced economies, with developing countries reluctant to take up the challenge of sustainability. Today, the dichotomic relationship between green transformation and latecomer development, inherent in the environmental Kuznets curve (Stern, 2004), has been turned on its head. The “clean up later” model where developing countries wait for the environmental Kuznets curve to set in (Altenburg and Pegels, 2020) is being replaced by a leapfrog strategy, which offers an alternative way to bypass the high pollution models of growth. Countries such as China, India, Brazil, and South Africa, are not only reacting to the paradigm change but also are actively contributing to the green transformation, adopting environmental transformation policies and supporting the emergence of domestic sustainability-oriented industries (Mathews, 2013; Harrison *et al.*, 2017).

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Background documents to the Technology and Innovation Report 2023

Green Windows of Opportunity in the Global South

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UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

Special issue of *Industrial and Corporate Change* (2021)

- Renewables
- China

Background Paper for the UNCTAD *Technology and Innovation Report 2023*

- Expanding the list of technologies/sectors
- Examining experiences from a wider array of low and middle-income countries

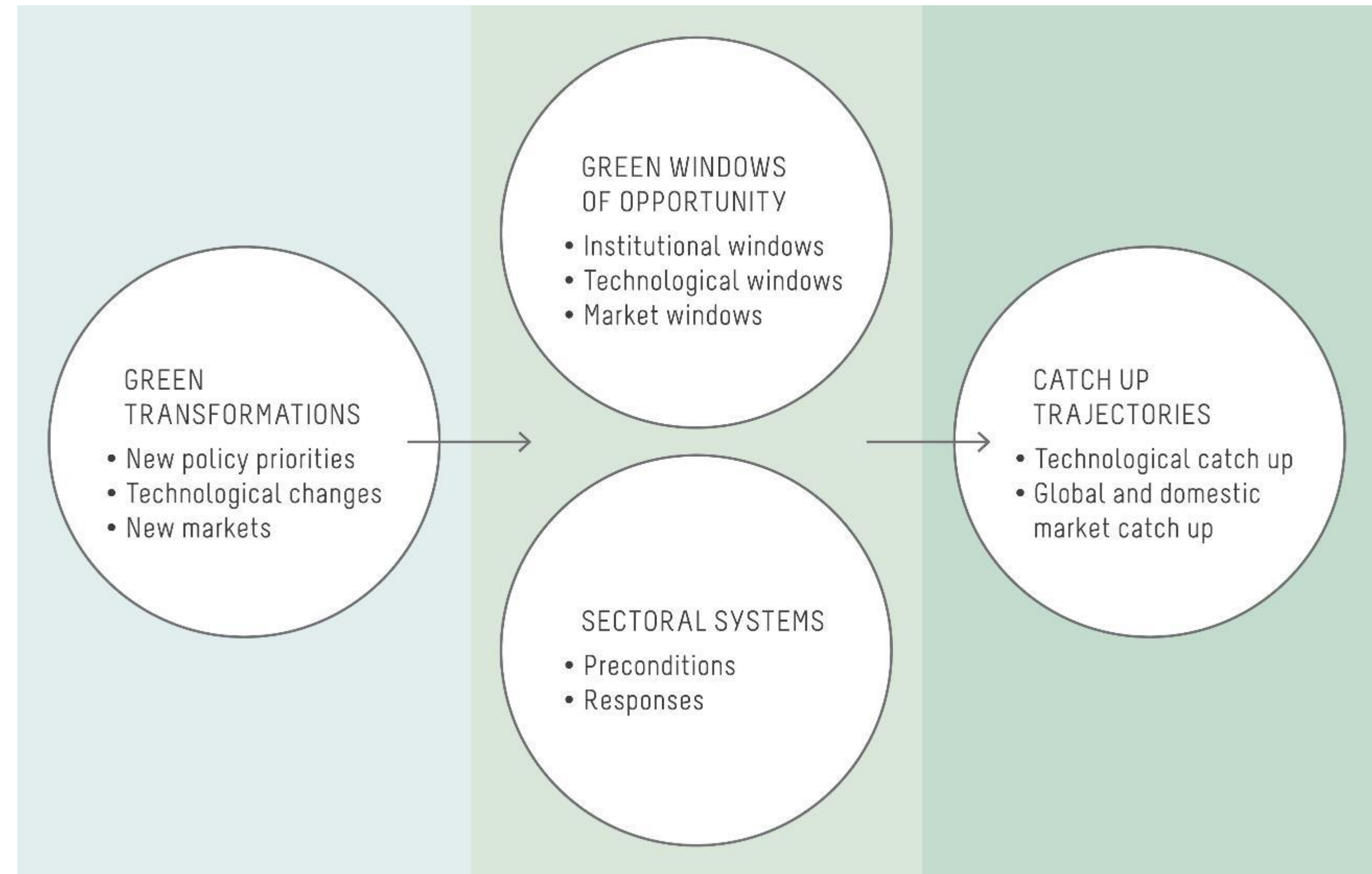


<https://doi.org/10.1093/icc/dtaa044>

https://unctad.org/system/files/non-official-document/tir2023_background2_en.pdf

What are these green windows of opportunity (GWOs)?

- Favourable but temporary conditions for industrial development associated with the green transformation
- Institutional, technological and market dimensions
- They are very often (but not always) internal and driven by institutional change



The key is to create and appropriate economic co-benefits of green initiatives

There is nothing automatic GWOs!

Exploiting GWOs depend on sectoral systems of production and innovation:

Preconditions

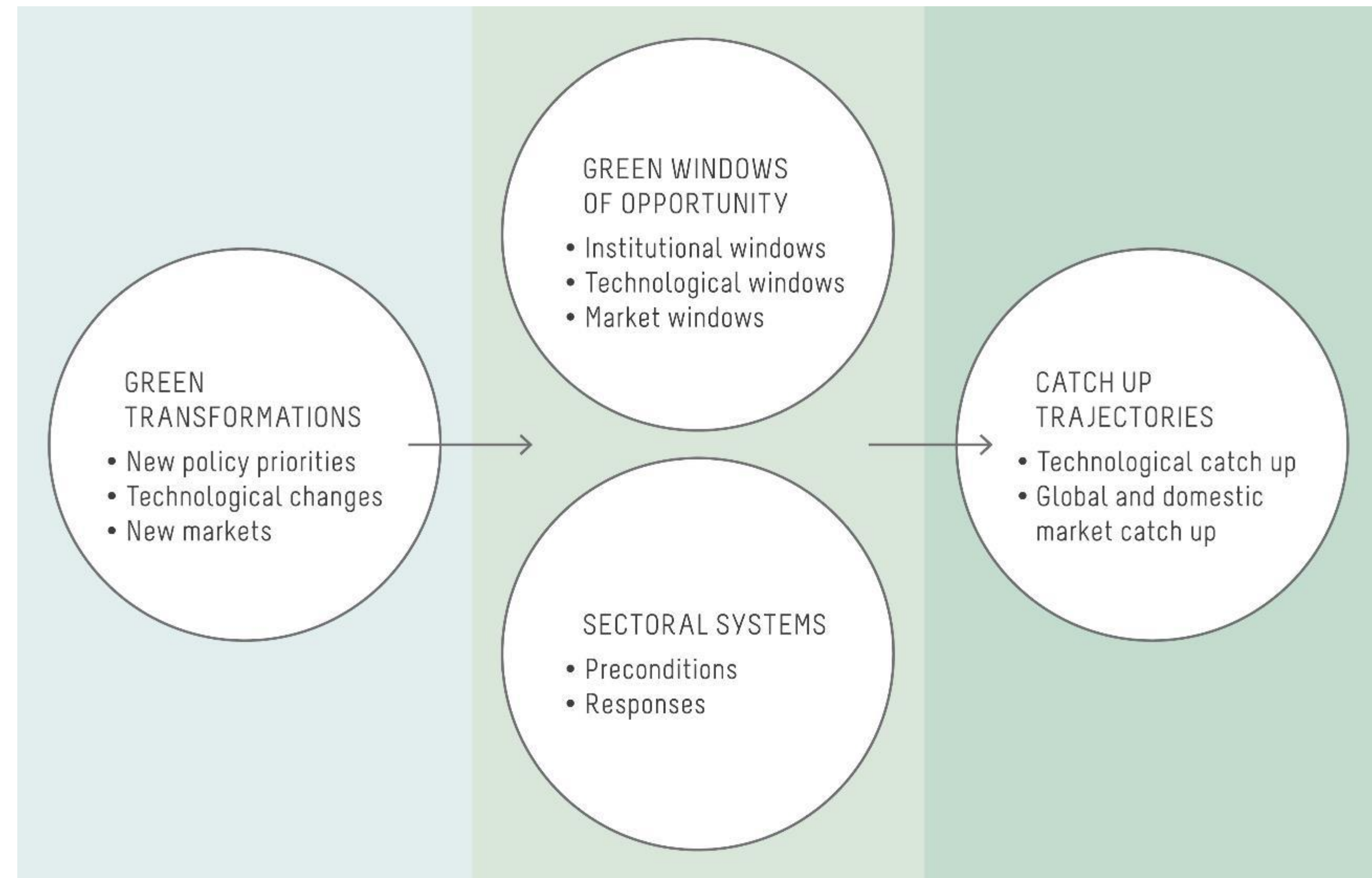
- Natural conditions
- Home market
- Industrial structure and capabilities
- Infrastructure

Responses

- Public sector
- Private sector

Sector characteristics

- Technological maturity
- Tradability



Opportunity and threat may be two sides of the same coin

Seizing green windows of opportunity: four scenarios

Responses Preconditions	<u>Strong</u>	<u>Weak</u>
<u>Strong</u>	Scenario 1: Realised opportunity Effective GWO seizing	Scenario 2: Missed opportunity Insufficient response
<u>Weak</u>	Scenario 3: Actively addressed Opportunity within reach?	Scenario 4: Distant opportunity

The wind energy sector

Responses Preconditions	<u>Strong</u>	<u>Weak</u>
<u>Strong</u>	1. Effective GWO seizing • China (2010)	2. Missed opportunity • China (2020) • South Africa
<u>Weak</u>	3 . Active Approach • Ethiopia	4. Distant opportunity • Kenya

Wind energy sector

China

- Driven by international and domestic environmental policy
- Active industrial policy (e.g., LCRs from 2005)
- Active approach by firms: licensing and co-design
- Catching up close to frontier in 2010
- Now falling behind in post-turbine technology due to insufficient IS response



→ Missed opportunity

Ethiopia

- Wind part of energy policy and planning
- Active role in designing wind projects to guarantee maximum local learning, by ensuring the involvement of professional users in the execution of projects
- Still limited industrial outcome but some local learning secured

→ Active approach

Kenya

- Driven largely by global finance and support
- Ad-hoc project approval with no industrial conditionalities attached
- Virtually zero local content and learning
- Small number of local jobs in O&M

→ Distant opportunity

Key takeaways

- New green windows of opportunity can be opened by institutional (policy) changes but may also arise with external technological change
- The seizing of GWOs depends on the country's preconditions and the response patterns of public and private actors
- There is significant variability in catch up trajectories at the sector and country level
- Active industrial policy and the co-design and sequencing of policy packages across domains is key
- Tradability and technological maturity of green technologies has important implications for policy strategy and design

DANKSCHEEN
 SPASSIBO
 SMACHALHUYA
 NUHUN
 CHALTU
 YAQHANYELAY
 YUSPAGARATAM
 HUI
 TASHAKKUR ATU
 WABEEJA MAITEKA
 SUKSAMA
 EKHMET
 UNALCHEESH
 HATUR
 TINGKI
 BIYAN
 SHUKRIA
 GRACIAS
 ARIGATO
 SHUKURIA
 MERASTAWHY
 GAEJTHO
 GOZAIMASHITA
 EFCHARISTO
 AGUYJE
 FAKAAUE
 KOMAPSUMNIDA
 LAH
 MAAKE
 GRAZIE
 MEHRBANI
 PALDIES
 YOU
 BOLZİN
 MERCI
 HATUR
 EKOJU
 SIKOMO
 MAKETAI
 MINMONCHAR

Policy implications

Benefitting from GWOs is a sequential and dynamic process comprising two steps:

- 1. Open and augment GWO**
- 2. Assess, address and sustain the relevant sectoral systems to seize GWOs**

Open and augment GWOs

- Combine relevant policy instruments and calibrate the policy design for the different objectives and features of the local context (i.e., feed-in-tariffs vs auction and tendering systems).
- Support policy interventions with external contributions.
- Invest in demonstration programs.

Assess, address and sustain sectoral systems

- Align environmental and energy, STI and industrial policies.
- Access external knowledge.
- Invest in domestic R&D.
- Build domestic capabilities along the value chain.
- Invest in human capital.
- Get involved in international collaboration projects.

China in Wind – The time-sensitive view

Responses Preconditions	<u>Strong</u>	<u>Weak</u>
<u>Strong</u>	Effective GWO seizing • China (2010)	Missed opportunity – falling behind • China (2020)
<u>Weak</u>	Active Approach • China 2005	Distant opportunity • China 1995



The electric vehicle sector

Responses Preconditions	<u>Strong</u>	<u>Weak</u>
<u>Strong</u>	1. Effective GWO seizing • China	2. Missed opportunity <div data-bbox="2125 990 3125 1253" style="border: 1px solid #0070C0; border-radius: 15px; padding: 10px; background-color: #ADD8E6;"> <ul style="list-style-type: none"> • South Africa • Brazil </div>
<u>Weak</u>	3 . Active Approach • India • (Turkey/Vietnam)	<div data-bbox="2125 990 3125 1253" style="border: 1px solid #0070C0; border-radius: 15px; padding: 10px; background-color: #ADD8E6;"> <ul style="list-style-type: none"> • South Africa • Brazil </div> 4. Distant opportunity

Electric vehicles

China

- Green industrial policy, infrastructure, subsidies, public procurement etc.
- Strong response by both existing OEMs and pure-players (experimentation and many failures)
- New and important competitive advantages for leadership in battery technology and software integration



→ Effective seizing

India

- 2020 National Electric Mobility Mission Plan.
- Substantial domestic automotive sector
- Strong response by domestic OEMs
- Dependent on lithium imports
- Relatively weak electricity grid

→ Active approach

South Africa

- Key auto hub for exports
- Rich in natural resources used in auto and EV production
- No response by the foreign OEMs for locating EV production in SA, nor local suppliers
- Small market and mainly private infrastructure solutions
- Weak grid (loadshedding)
- Real risk of falling behind

→ Missed opportunity