

Understanding implementation barriers in energy and climate policy:

Applying frameworks from implementation science

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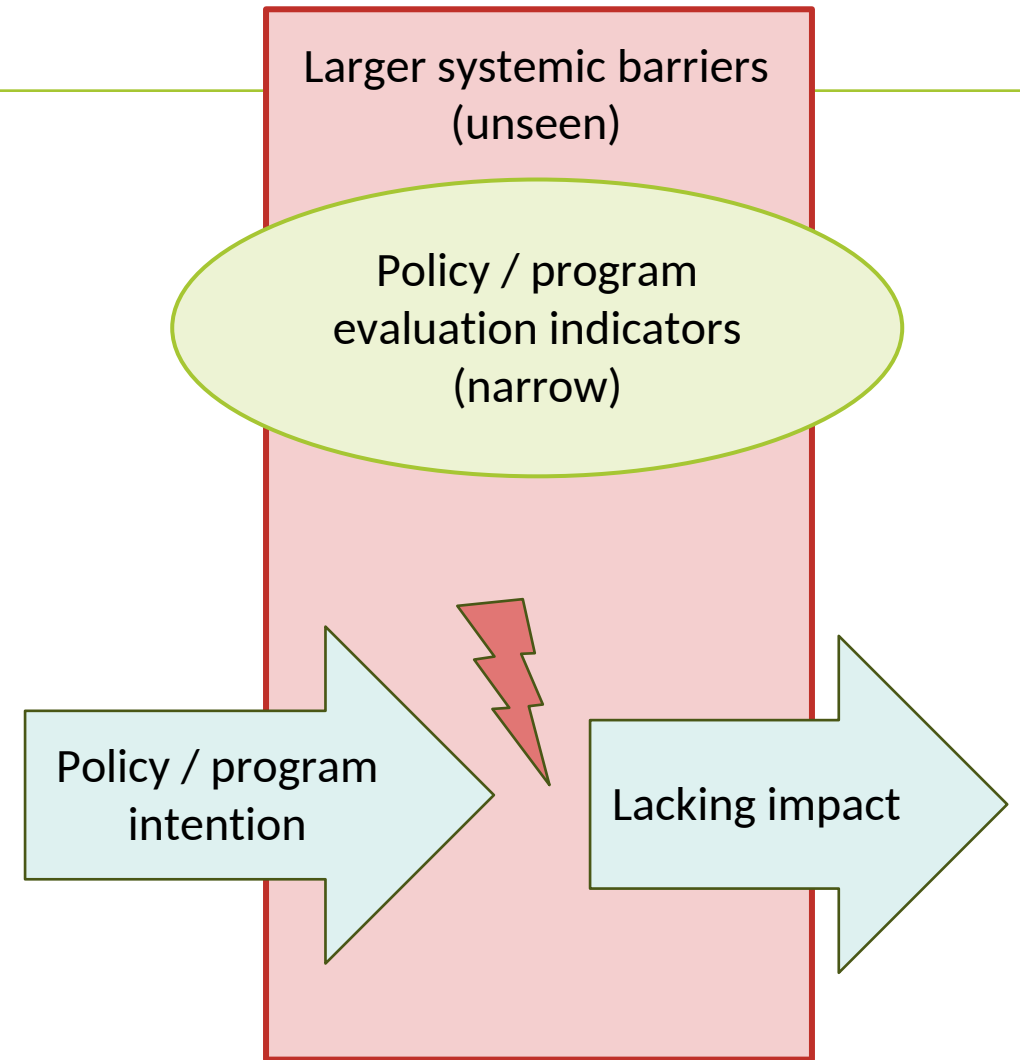
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25.09.2025



Why implementation matters

- Climate & energy evaluations often focus on **outputs**
(e.g., subsidies disbursed, retrofits completed)
- But they often miss - ***why do policies underperform and don't lead to impacts?***
- Need to account for **wider context**:
 - systemic, behavioral, financial barriers



Implementation science

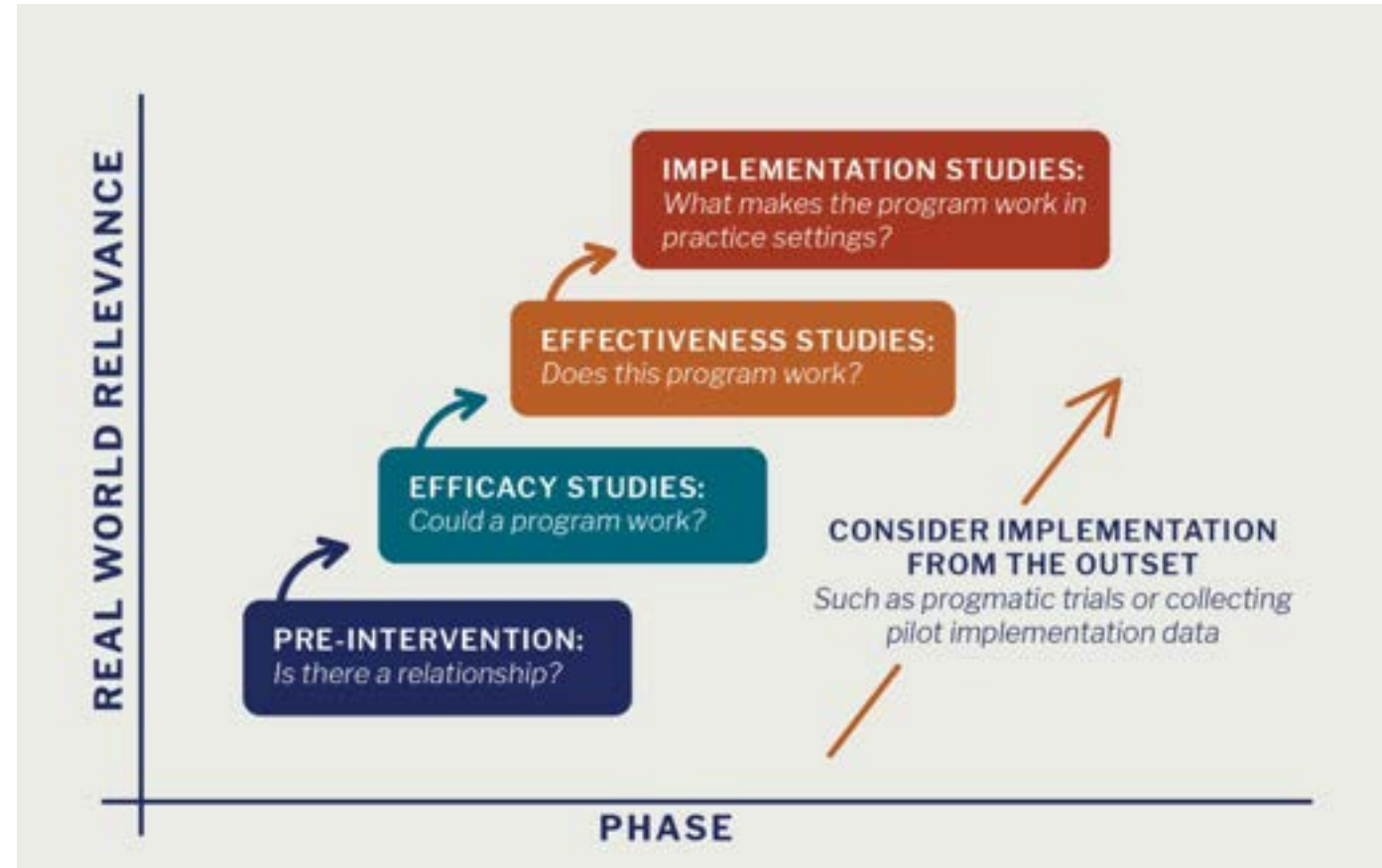
Origin: public health and science

Focus: *barriers to implementation*, not just policy effectiveness

Structured frameworks for diagnosing challenges



Stages of research and phases implementation research



Source: Figure adapted from Landsverk et al, Chapter 12, figure 12-1.

Analytical frameworks

Three families of frameworks

1. Process-based

- Stages of implementation
- stage-specific barriers across the policy cycle

2. Actor-centric

- Actor roles, perspectives and relationships in implementation process
- analyze related factors (authority and capacity)

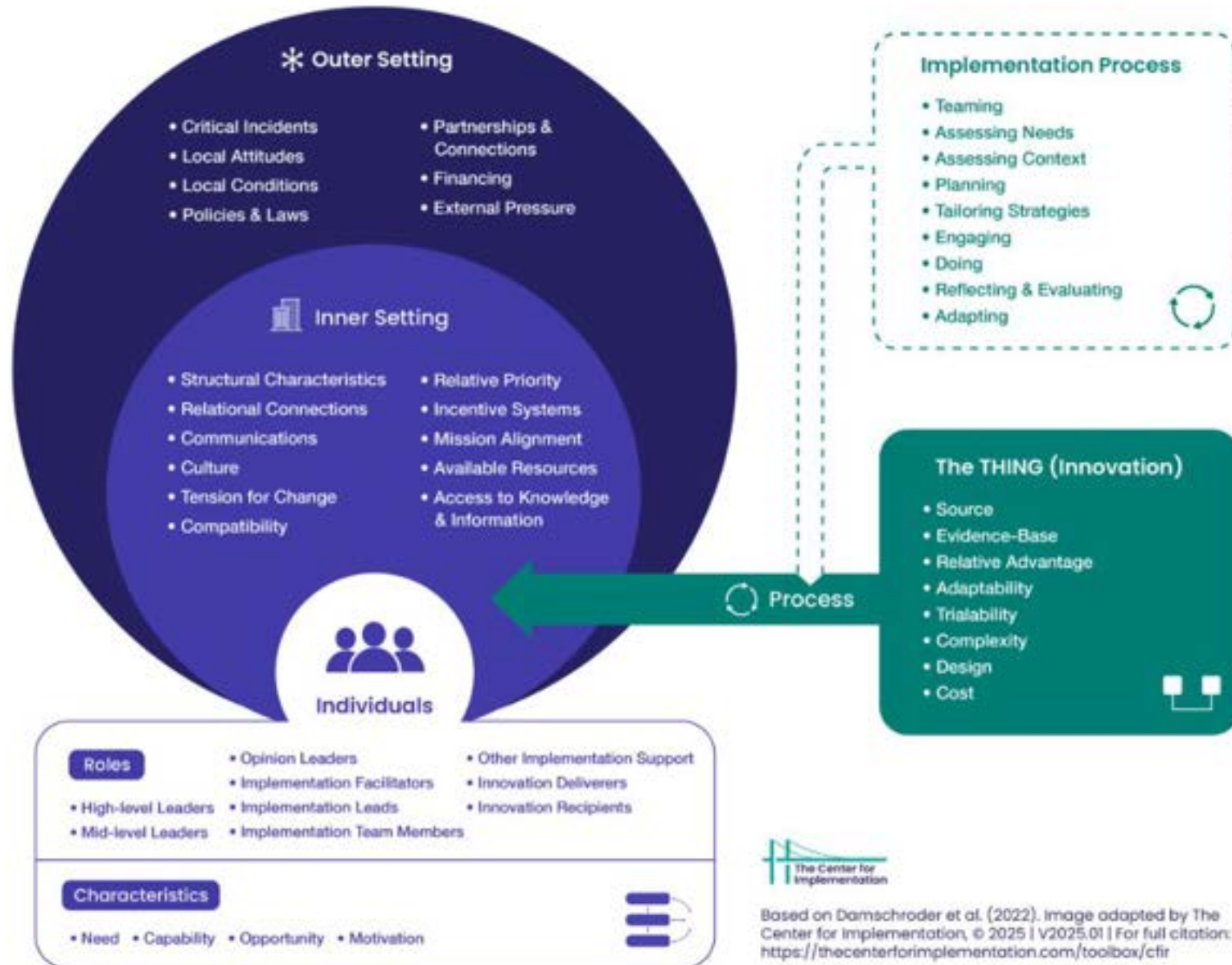
3. Typological

- Categorization of barrier types
(e.g., lack of resources, limited communication...)

1. Process-based frameworks

- Retrospective evaluation of what happened during implementation
- Structured model describing key barriers and facilitators to implementation

Consolidated Framework for Implementation Research (CFIR)



2. Actor-centric frameworks

- Focus on **differentiated roles of actors** in implementation
- Domains cover
 - individual motivation
 - capability factors
 - physical and social environment



Theoretical Domains Framework (TDF)



Sources of behaviour



TDF Domains

Soc	- Social influences
Env	- Environmental context and resources
Id	- Professional role and identity
Bel Cap	- Beliefs about capabilities
Goals	- Goals, intentions and motivation
Bel Cons	- Beliefs about consequences
Em	- Emotion
Know	- Knowledge
Mem	- Memory, attention and decision process
Beh Reg	- Behavioural regulation
Skills	- Skills

NB. **Nature of behaviours** not considered a source of behaviour (see text for details) and therefore removed from the analysis

3. Typological Frameworks

- Identifies **barriers and associated risks** which hold back private sector investment in renewable energy
- Assists policymakers to develop **targeted public interventions** to address these risks



Derisking Renewable Energy Investment Framework (DREI)

Table E.1: Summary table of public instruments to promote investment in solar mini-grids in Kenya

RISK CATEGORY	POLICY DERISKING INSTRUMENTS	FINANCIAL DERISKING INSTRUMENTS
Energy Market Risk	• National off-grid targets, tiered approach to statistics • Build capacity of rural energy agencies • Dual-regulatory regime • <i>Light-touch regime</i> ◦ Minimal self-registration • <i>Comprehensive regime</i> ◦ Well-designed concessions ◦ Regulated tariffs ◦ Technical standards for electricity quality ◦ Technical standards for grid expansion	• <i>Comprehensive regime</i> ◦ Grid expansion compensation scheme
Social Acceptance Risk	• Public awareness campaigns	N/A
Hardware Risk	• Certification and standards for hardware • Streamlined customs procedures	N/A
Labour Risk	• Programmes to develop skilled labour	N/A
Developer Risk	• Government support to improve data sharing and network effects	• Public loans to operators/ credit lines to domestic commercial banks (concessional, hard-currency) • Public guarantees to domestic commercial banks (hard-currency)
End-user Credit Risk	• Facilitate growth of consumer credit data industry • Promote productive use of electricity • Well-designed cellular, mobile money regulations	
Financing Risk	• Reform domestic financial sector to favour green investment • Strengthen investor capacity with solar mini-grids	

Theory of No Change (TONC) Framework

	Barrier	District heading		Geothermal		Coal to Gas		Biomass	
		prior to project	2004	prior to project	2004	prior to project	2004	prior to project	2004
Users	ignorance	1	1	2	1	2	1	1	1
	Lack of expertise	2	2	2	2	2	1	2	2
	Lack of access to technology	1	2	1	1	1	1	1	1
	Lack of cost effectiveness	1	1	1	1	2	2	1	2
	Lack of motivation / interest	1	1	1	1	1	1	1	1
	Lack of affordability	1	1	2	2	1	1	1	2
Business Owners	ignorance	1	1	1	1	1	1	1	1
	Lack of expertise	1	1	1	1	1	2	1	1
	Lack of access to technology	1	1	2	1	2	1	1	1
	Lack of cost effectiveness	1	1	1	1	2	1	1	1
	Lack of motivation / interest	1	1	1	1	1	1	1	1
	Lack of affordability	1	1	1	2	1	1	1	1
Local Government	ignorance	2	1	2	2	1	1	1	1
	Lack of expertise	1	1	1	2	1	1	1	1
	Lack of cost effectiveness	1	1	1	1	1	1	1	1
	Lack of motivation / interest	1	1	1	1	1	1	1	1
Policy Makers	ignorance	1	1	2	1	2	2	1	1
	Lack of expertise	2	1	1	1	2	2	1	1
	Lack of motivation / interest	2	1	1	1	1	1	1	1
	Lack of affordability	1	1	1	1	2	1	1	1

- Developed by Christene Wörlén and Arepo team
- Stakeholder-barrier diagnostic tool for change processes
- Focuses on *why* change did *not* occur

Different...

Stakeholder types

Barrier types

Strength of barrier and trend

	Barrier	District heating		Geothermal		Coal to Gas		Biomass	
		prior to project	2004	prior to project	2004	prior to project	2004	prior to project	2002
Users	Ignorance	↑	↑	↗	↘	↗	↑	↘	↑
	Lack of expertise	↗	↗	↗	↗	↗		↘	↗
	Lack of access to technology	↘	↗	↓	↑	↘	↑	↘	↑
	Lack of cost effectiveness	↘		↑	↘	↗	↗	↘	↘
	Lack of motivation / interest	↘	↑	↘	↘	↘	↑	↘	↑
	Lack of affordability	↓		↗	↗	↓	↘	↘	↗
Supply Chain	Ignorance	↑	↑	↘	↑	↗	↑		↑
	Lack of expertise	↑	↑	↑	↑	↘	↗	↘	↑
	Lack of access to technology	↑	↑	↗	↑	↗	↑		↑
	Lack of cost effectiveness	↑	↑	↑	↓	↗	↑		↑
	Lack of business model	↑	↑	↓	↘	↘		↘	↑
	Lack of affordability	↑	↑	↘	↗	↘		↑	↑
Local Financiers	Ignorance	↗		↗	↗	↘	↑	↘	
	Lack of expertise	↓		↓	↗	↓	↑	↘	
	Lack of cost effectiveness	↓		↘	↓	↘	↓	↓	
	Lack of business model	↓	↓	↘	↓	↘	↘	↓	↓
Policy Makers	Ignorance	↑		↗	↑	↗	↗		
	Lack of expertise	↗		↓	↑	↗	↗	↗	
	Lack of motivation / interest	↗		↑	↑	↑	↑	↘	↑
	Lack of affordability	↘		↑	↓	↓	↗	↑	↑

Theory of No Change (TONC) Applied

Further development of the Rhineland-Palatinate state climate protection concept

Subsector target strategy “substitution of fossil-fueled heat generators“ among owners of single- and multi-family houses (not complete!)

Barrier type	Stakeholder: Users / Owners
<i>Lack of awareness/ ignorance</i>	Private building owners are not reached with public information campaigns
<i>Lack of motivation/ interest</i>	Insufficient awareness of information and counseling services
<i>Lack of expertise</i>	Uncertainty due to information diffusion in public debate Perceived complexity of funding applications Uncertainty about cost savings from energy efficiency measures
<i>Lack of access to technology / lack of infrastructure and personnel resources</i>	Regional availability of energy consultants and craftsmen unclear
<i>Lack of affordability/ lack of financial resources</i>	Difficult access to capital for private owners: 15–30% of private owners have problems accessing capital Aversion to long-term loans among private building owners
<i>Cost-effectiveness</i>	Landlord-tenant dilemma leads to different priorities for tenants and landlords

➔ **Basis for policy development to overcome barriers**

Comparative Insights

- Frameworks have different foci and are complementary
- Can be used at different phases of the policy cycle
- ✓ **TONC**: pragmatic, sector-specific, systemic perspective, full chain of actors
- ✓ **CFIR**: process-oriented, „why“ barriers exist
- ✓ **TDF**: contextual depth and process understanding - psychological, institutional, or contextual drivers



Ⓟ Leveraging frameworks from implementation science can significantly enhance the diagnosis and mitigation of barriers to energy and climate policy implementation!

Discussion

- Have you used any approaches in practice?
- In evaluation practice, which framework do you find more useful?
- In which type or phase of evaluation would you choose which?
 - Ex. Mid-term vs final evaluation?



Thank you for your attention!

A partial view of the arepo logo, showing the green circular icon and the dark red plug symbol on the left side of the slide.

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