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From Climate Innovation to Market – Commercialization Pathways



Regional Capacity Building Workshop

Climate Innovation and Market Readiness

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Presenter

Dr. Akanksha Jain

Deputy Manager & Group Head – Business Development
National Research Development Corporation (NRDC), Government of India

Registered Technology Transfer Professional & Certified Innovation Manager

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Session Journey



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Context

Climate innovation

New or improved solutions designed to reduce emissions, support adaptation and strengthen climate resilience.

Energy & Materials

Renewable energy
Energy efficiency
Low-carbon materials

Water & Circular Resources

Water conservation and treatment
Waste-to-resource solutions
Circular-economy technologies

Agriculture & Ecosystems

Climate-resilient agriculture
Bio-inputs and food-system innovations
Nature-based solutions

Risk Intelligence & Resilient Systems

Early-warning systems
Geospatial tools and climate monitoring
Disaster-risk technologies
Resilient infrastructure



Intended climate outcomes

- Lower emissions and resource intensity
- More sustainable production and consumption
- Reduced vulnerability
- Enhanced adaptive capacity
- Greater resilience

Climate benefits must be demonstrated in the intended application.

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The Impact Illusion

When is climate impact created?



Developed



Validated



Commercialised



Adopted



Sustained & Scaled

Benefits can begin during effective pilot use.

Sustained adoption maintains benefits. Scale expands them.

Commercialisation

Process of **transforming innovation** into a **market-ready solution** & bringing into **commercial use**.

Technology Transfer

Transferring **technology, know-how or rights** to another capable party. An ***optional route, not a compulsory stage***.

Market / User Adoption

A user or institution **deploys and integrates** the solution into **regular use**.

Scale

Expanding **successful adoption** while **maintaining performance**, value and **climate benefits**.

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Where Do We Stand Today?

Technology Availability ≠ Real-World Deployment

Global Energy Technologies

IEA, July 2026

Commercial availability does not ensure adoption

Almost 1 in 5

Of 600+ energy technologies tracked by IEA, almost one-fifth are commercially available but not yet adopted.

Only 20%

Of technologies already commercially available in 2020 (TRL 9), only around one-fifth have since progressed toward wider deployment.



Southeast Asia

IEA, 2026

Financing conditions affect deployment

Around 3%

Share of global energy investment, compared with 5% of global energy demand.

Around 2×

In much of Southeast Asia, the cost of capital can be around twice that in advanced economies and China.

Energy financing context, not a technology adoption rate.



Deployment requires market demand, finance and delivery capability.

Sources: IEA, Energy innovation has a commercialisation problem, 23 July 2026.
IEA, Southeast Asia Energy Outlook 2026 (investment data for 2025).

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Institutional Insights — NRDC

25%

10 of 40
licensed technologies reached the market

Key institutional observations

- **Early-stage maturity:** Many technologies offered at TRL 4–5
- **Long adoption timelines**
- **Licensee/start-up challenges:** Application testing, production capability, scale-up and investment

Cardanol-Based PUDs


Cashew shell


Cardanol / CNSL


Bio-based PUD

Applications


Leather coating


Hygiene coating


Adhesives / Sealants


Surface coating

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TRL 4
Lab process validated

Licensed
Know-how transferred

Next gap
Application validation + pilot scale-up

Licensing can begin the journey; validation and scale-up enable wider adoption.

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Why Promising Innovations Get Stuck

A Practitioner's Perspective

1. Fatal Assumption

The assumption:

~~Successful Technology + Successful Pilot = Market Adoption~~

Adopter Fit
User needs and buyer incentives do not align.

Implementation
New workflows or skills are required.

Economics
Total ownership cost is unviable.

Integration
Poor fit with existing operating conditions.

Delivery
Reliable production and service are missing.

Regulation
Required permits or approvals are missing.

Ecosystem
Supply chains or off-takers are missing.

Repeatability
Performance depends on founder supervision.

Innovators often design the technology, but not the complete adoption system, leading to a readiness disconnect.

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Why Promising Innovations Get Stuck

A Practitioner's Perspective

2. Technology Push, Weak Adoption Pull

Technology development advances before demand and adoption requirements are validated.

Technology First, Demand Later

- Develop technology
- Build prototype
- Then search for users and buyers

⚠ Adoption questions arise after major design decisions.

Why Adoption Pull Remains Weak

- **Unvalidated need**
  The problem's priority for users is unclear.
- **Unclear buyer**
  Who pays—and why—is untested.
- **Operating mismatch**
  User workflows and infrastructure are overlooked.
- **Unproven value**
  Benefits may not justify the cost of switching.

Technical progress can outpace evidence of demand and adoption fit.

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WHAT INNOVATORS CAN DO

ACTS: A Systems Approach



Apply Systems Thinking
Design for adoption from the beginning

Check System Readiness
Identify what is ready and what is missing

Sustain Adoption & Scale
Move beyond initial sales or deployment

Tackle Gaps & Enable Adoption
Move from assessment to action

From innovation to real-world impact.

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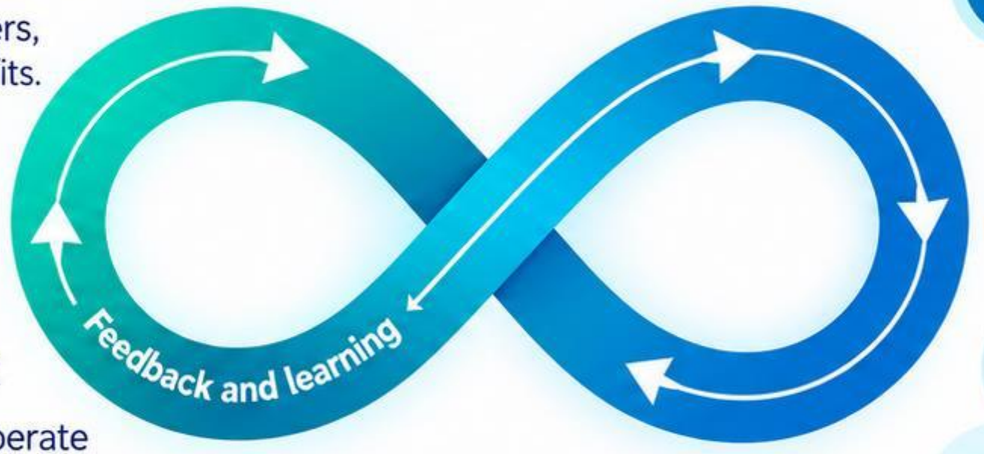
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A — Apply Systems Thinking

Embed systems thinking from the start of technology development.

1 Understand the Need
Identify climate risks, users, payers and intended benefits.

2 Map the System
Connect people, technology, infrastructure, resources and institutions.



3 Design for Real Conditions
Build in affordability, accessibility, compatibility and future scalability.

4 Plan Delivery & Feedback
Involve those who supply, operate and maintain; use their input to improve design.

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Why it matters: Reveals dependencies early, reduces costly redesign and builds a stronger basis for adoption and scale.

Design the technology and the system that will make it work—together.

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C — Check System Readiness

Assess whether the complete solution is ready for real-world adoption — not just technically functional.



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Why it matters: A solution can be technically strong but still fail due to weak demand, poor commercial viability or integration barriers.

Benefits:

- Reveals gaps early
- Guides validation and partnerships
- Prepares for adoption

Check readiness as a system — not in silos.

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T – Tackle Gaps & Enable Adoption

Turn identified gaps into practical actions for real-world use.

01



Secure Know-how & Technical Capabilities

- **IP/licence** access
- **Process** documentation
- **Inventor** support
- **Application** testing
- **Team** capability building

02



Make Adoption Easier

- Lower **upfront cost**
- Simplify **installation**
- Provide **user training**
- Ensure **service & maintenance**
- Offer **technical support**

03



Anticipate Regulatory Requirements

- Identify **standards**
- Engage **testing agencies**
- Plan **approvals**
- Ensure **sector compliance**
- Budget **regulatory costs**

04



Bring in Missing Capabilities

- Partner for **manufacturing**
- Engage **implementation partners**
- Mobilise **finance partners**
- Collaborate for **validation**
- Leverage **government support**

05



Prepare for the Chosen Route to Market

- Define **target customers**
- Assess **market needs**
- Develop **delivery model**
- Plan **deployment milestones**
- Align **internal capabilities**

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Adoption-Ready Solution

From identified gaps to actionable steps for real-world adoption.

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T — Choose the Right Commercialisation Pathway

Match your route to market with your innovation, capabilities and target adopters.



Pathways can be combined.

Why it matters: The right pathway helps bridge capability gaps, share risks and accelerate adoption.

Benefits:
- Faster market access
- Shared resources & risks
- Stronger delivery capacity

Choose or combine pathways that match your innovation and enable sustainable adoption.

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S – Sustain Adoption & Scale

Five practical actions to make successful adoption repeatable and economically sustainable.

Retain adopters › **Standardise** delivery › **Improve** economics › **Build** capacity › **Expand** progressively

Solid-State Food-Waste-to-Biogas System

Compact, scalable and portable unit for decentralised food-waste management.



IMPROVE ECONOMICS

- Secure feedstock supply
- Maximise **biogas output**
- **Reduce** operating costs

BUILD CAPACITY

- **Standardise** installation
- **Train** operators
- **Local servicing** support

EXPAND PROGRESSIVELY

- **Target** suitable sites
- **Replicate** proven units
- **Increase capacity** as demand grows

Plant-based Leather from agro-waste

Licensed technology moving toward wider commercial expansion.



IMPROVE ECONOMICS

- **Improve** material yield
- **Reduce** processing cost
- **Optimise** raw-material use

BUILD CAPACITY

- **Standardise** process & quality
- **Secure** raw-material supply
- **Scale** production line

EXPAND PROGRESSIVELY

- **Start** with targeted applications
- **Build** buyer partnerships
- **Expand** to new markets

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S — Avoid the Illusions of Scale

Do not confuse early signals with evidence of scalable adoption.



Red flags

- Weak service support
- Unclear unit economics
- Expansion faster than capacity

Before scaling, ask:

- Are users still using it?
- Can we deliver consistently?
- Do the economics still work?

Why it matters: Premature scaling can damage quality, trust and financial sustainability.

Scale proven value — not assumptions of success.

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Key Takeaways

Beyond innovation—creating lasting real-world value.

Technical Success Does Not Guarantee Market Adoption

Commercial Viability and Climate Value Go Together

Scale Requires More Than Growing Demand



No Innovation Scales in Isolation

Impact Is Defined by Sustained Outcomes, Not Milestones

The true success of climate innovation lies not in how far technology advances, but in the lasting value it delivers.



THANK YOU

From Climate Innovation to Lasting Impact

Advancing innovation through collaboration, commercialisation and sustained adoption.

Dr. Akanksha Jain, RTTP

National Research Development Corporation (NRDC), India

For contact: **ajain@nrdc.in**