

# Facility for Low Carbon Technology Deployment



## An Overview



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



## UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

**Specialized agency of the United Nations**

**Promote and Accelerate Sustainable Industrial Development**

**171 Member States**

**48 Regional and Country Offices**

### **Mandated Functions**

- Technical Cooperation
- Action-oriented research & policy advisory
- Normative standard-related activities
- Partnerships for knowledge & tech-transfer

# Government Counterpart

## Bureau of Energy Efficiency Government of India



- ❖ Set up on 1<sup>st</sup> March 2001 under Energy Conservation Act
- ❖ Develops Policies and Strategies to Reduce Energy Intensity of Indian Economy

### Flagship Programmes

<b>ECBC</b>  Energy Conservation Building Code	<b>Star Label</b>  Standards and Labeling
<b>PAT</b>  Energy Efficiency in Large Industry	<b>SME</b>  Energy Efficiency in Small & Medium Industry
<b>SDA</b>  Energy Efficiency in States	<b>DSM</b>  Energy Efficiency Through Demand Side Management

# Facility for Low Carbon Technology Deployment

## Project Activities

Component 1

Component 2

Commercialization Support for Innovations

Strengthening the Technology  
Transfer Ecosystem

Accelerator Program

Innovation Challenge

Financial Due-diligence  
and Fundraising support

Training Need  
Assessment of Tech  
transfer Offices

Capacity Building  
Program

# Facility for Low Carbon Technology Deployment (FLCTD)



UNITED NATIONS  
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## ABOUT:

- Programme to identify Low Carbon Technologies (for Industrial and Commercial Sectors)
- US \$ 8.7 m project funded by Global Environment Facility (GEF)
- Emission Reduction Target: 2.3 million tons CO<sub>2</sub>eq
- Targets: – 120 innovations identified/demonstrated;  
40 – Commercialized

## OBJECTIVES:

- Identify technology-gap areas having scope for energy saving
- Select innovative technology solutions that address the gap
- Support demonstration and validate efficacy
- Facilitate Scale-up

# Project Partners / Technology Areas for Innovation



#startupindia



Waste Heat  
Recovery &  
Thermal Efficiency



Pumps &  
Motors



Space  
Conditioning



Industrial Resource  
Efficiency



Industrial  
IoT



Electrical Energy  
Storage Systems



# What FLCTD Project Offered



Financial support  
up to  
**US \$ 50,000** for  
Field trials &  
Validation of  
efficacy  
( $\beta$ -testing)



Technical  
Mentoring by  
CII-GBC and  
Subject Experts



'De-risking' of  
innovation  
before  
commercial  
launch



Industry  
Linkages



Financial  
Mentoring and  
Fund Raising  
Support

Trials with technology end-users at 248+ locations across India

Large Industries - 20

MSME units - 93

Dairy units - 35

Building - 36

Agriculture - 64



# FLCTD – A Vehicle for Technology Validation / Commercialization



**Support for fund raising / Commercialization**

**Support to Innovation Challenge Winners**



Sangam AIC  
Energy | Innovation | Capital

**Accelerator Programme Support**



Department of Science & Technology



NITI Aayog



ATAL INNOVATION MISSION

**#startupindia**

<b>TRL 9:</b> Commercialization & post market studies
<b>TRL 8:</b> Pre-commercialization
<b>TRL 7:</b> Late stage Validation
<b>TRL 6:</b> Early stage validation
<b>TRL 5:</b> Early stage validation
<b>TRL 4:</b> Proof-of-concept established
<b>TRL 3:</b> Proof of Concept Demonstrated
<b>TRL 2:</b> Proof of Principle
<b>TRL 1:</b> Ideation stage

System Test, Launch & Operations

System/Subsystem Development

Technology Demonstration

Technology Development

Research to Prove Feasibility

Basic Technology Research

TRL 9

TRL 8

TRL 7

TRL 6

TRL 5

TRL 4

TRL 3

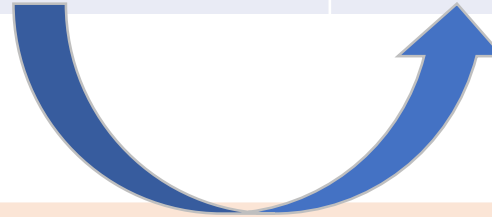
TRL 2

TRL 1

Govt. Support -  
Ideation to Lab. POC

# Technology Validation & Commercialization

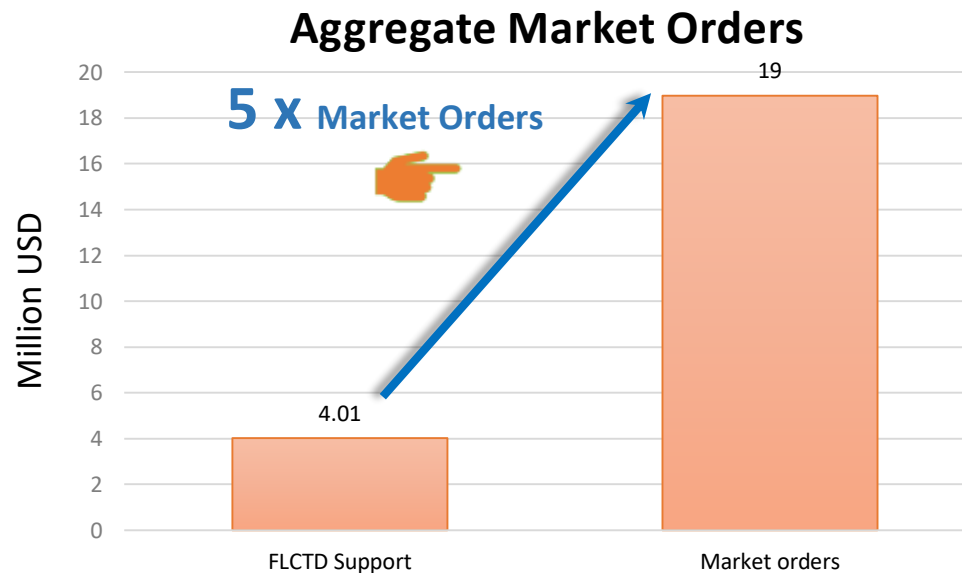
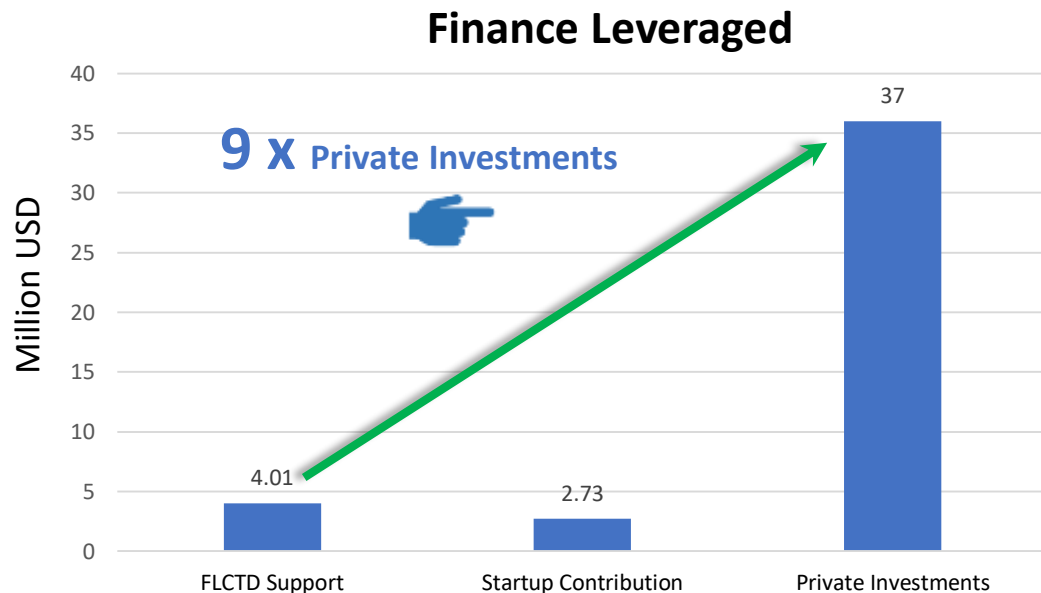
Total Applications	Shortlisted	Selected	Mentoring and Technology validation Support	FLCTD Financial Support	Validation Completed	Innovative technologies Commercialised
1476	430	162	140 (Target: 120)	88	53	38 (Target:40)
			9.4% of total applications	63% of the portfolio	At 250 site locations	27%* of Start-ups supported



<i>Simple Payback on investment in new technologies</i>	<i>1-2 years</i>
<i>Estimated annual electricity savings from 1% penetration in the market by innovative technologies commercialized</i>	<i>2558.8 GWh</i>
<i>Estimated annual reduction in CO<sub>2</sub> emissions from 1% market penetration</i>	<i>3.8M tons CO<sub>2</sub> /year</i>

# Technology Validation & Commercialization – FLCTD Impact

**2017-2023: 140 Start-ups selected for Technology Validation, Mentoring & Fundraising ~ USD 4m**



## Investors



## COMPONENT 2: Technical Support for Technology Transfer Support Facility

### Study of the Technology Transfer Ecosystem to Increase Commercialization of Innovation

*Implementing partner:*



### Development of a Training Program on Technology Transfer

*Implementing partner:*

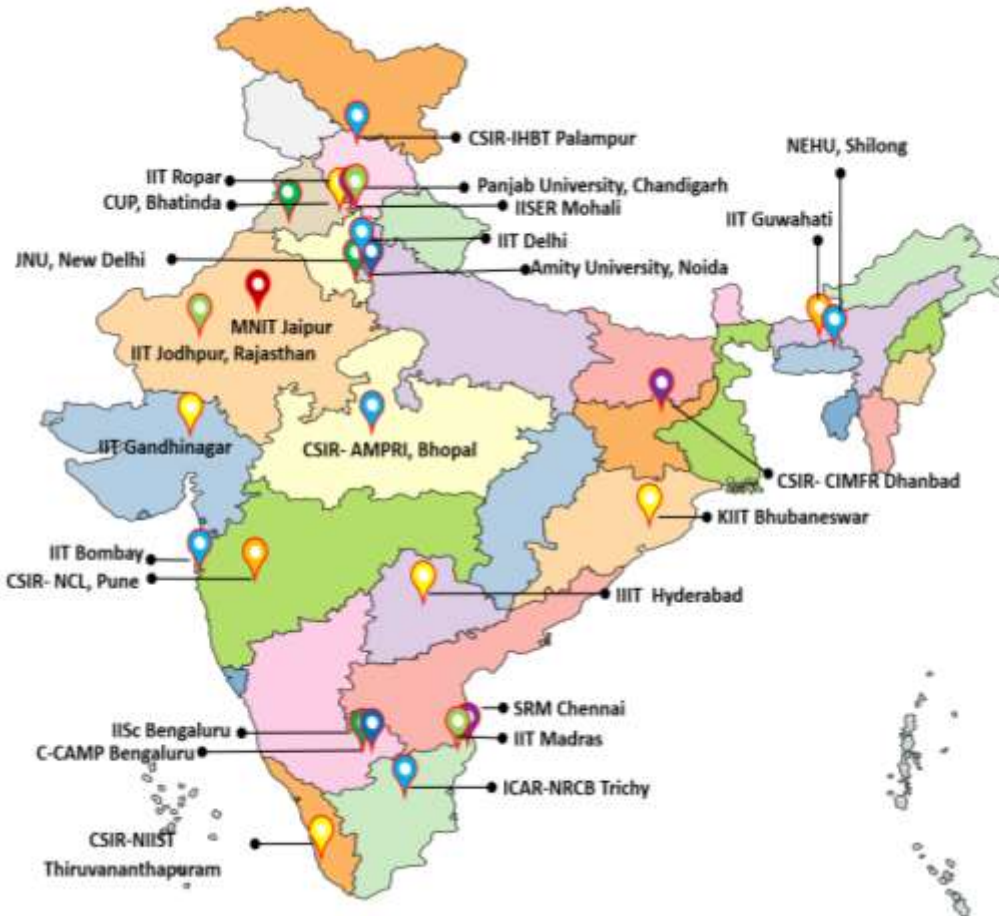


# Training Need Assessment of Tech. Transfer Offices

1. Mapping and characterisation of the 'as-is' Indian technology transfer ecosystem.
2. Insights into the bottlenecks and inhibitors of the technology transfer process in the country.
3. Good practices framework developed from studying five international ecosystems.
4. Insights into the kind of Capacity Building efforts that can be provided to strengthen the low-carbon tech transfer ecosystem.



# Mapping of Technology Transfer Ecosystem



## Coverage of National Ecosystem (25 institutes)

- Central Universities
- State Universities
- IITs – older IITs and new-generation IITs
- NITs
- Private Education Institutes
- National Research Laboratories
  - CSIR
  - ICAR

Questionnaire for primary data collection prepared based on the **Oslo Manual**

## Benchmarking Good Practices from

- Switzerland
- USA
- Germany
- South Korea
- Isreal

# Focused Capacity Building Programme for TTO

Training and Capacity building programs focusing on TT-specific skill sets

- ◆ Technology Transfer handbook for establishing a new Tech. Transfer Office
- ◆ Development of training programme for researchers, practitioners and decision makers

## Introductory Modules

- Importance of Tech. Transfer and steps involved in Tech. Transfer

## Technology Readiness Levels

- Technology Readiness Level assessment; technology valuation; marketing

## Tech. Transfer Function

- Core TT skills such as negotiation, deal design, term sheet

## Tech Transfer Administration

- Budgeting
- Reporting and performance evaluation of TTO functioning

## Transferring Clean Technologies

- Identification of Clean technologies and their USP.
- Special emphasis on Clean technologies.

# Recognition to Entrepreneurs & FLCTD

# National Energy Conservation Award 2022



**ENCON** - Regenerative Burner  
(Winner of 2019 Innovation Challenge –WHR category)



CEEP – WHR from dyeing effluent



AFECO –Aluminum holding furnace



## **Cancrle Private Limited**

National Energy Efficiency Innovation  
Award 2023



• **Zerocircle Alternatives Private Limited**  
International Vienna Energy and Climate Forum  
2023

# National Award for Excellence in Energy Management 2024

23<sup>rd</sup> Energy Efficiency Summit, Hyderabad 10-12 September, 2024



UNIDO showcases 18 “MADE IN INDIA” Innovative Climate Technology Solutions for Industry

# FLCTD – A Suite of Support for Climate-tech Startups



## Technology Validation and Commercialization

Sector-specific solutions developed with industry partners

**53** Innovative solutions validated  
**38** technologies commercialized  
**16** solutions under validation

## Mentoring for Fund Raise and Scale-up

**Bespoke Enterprise Development Plan** prepared for **25** startup post technology validation

**19** Startups scale up operations and setup production facility



## FLCTD Accelerator - Mentoring and Business Strategy

**67** climate-tech startups trained



## Financing for Technology Trial and Industry Linkages

**88** Innovation Challenge winners receive US\$4m

**250** technology trials in industrial sectors



Confederation of Indian Industry

CII-Sohrabji Godrej  
Green Business Centre

1476 Applications

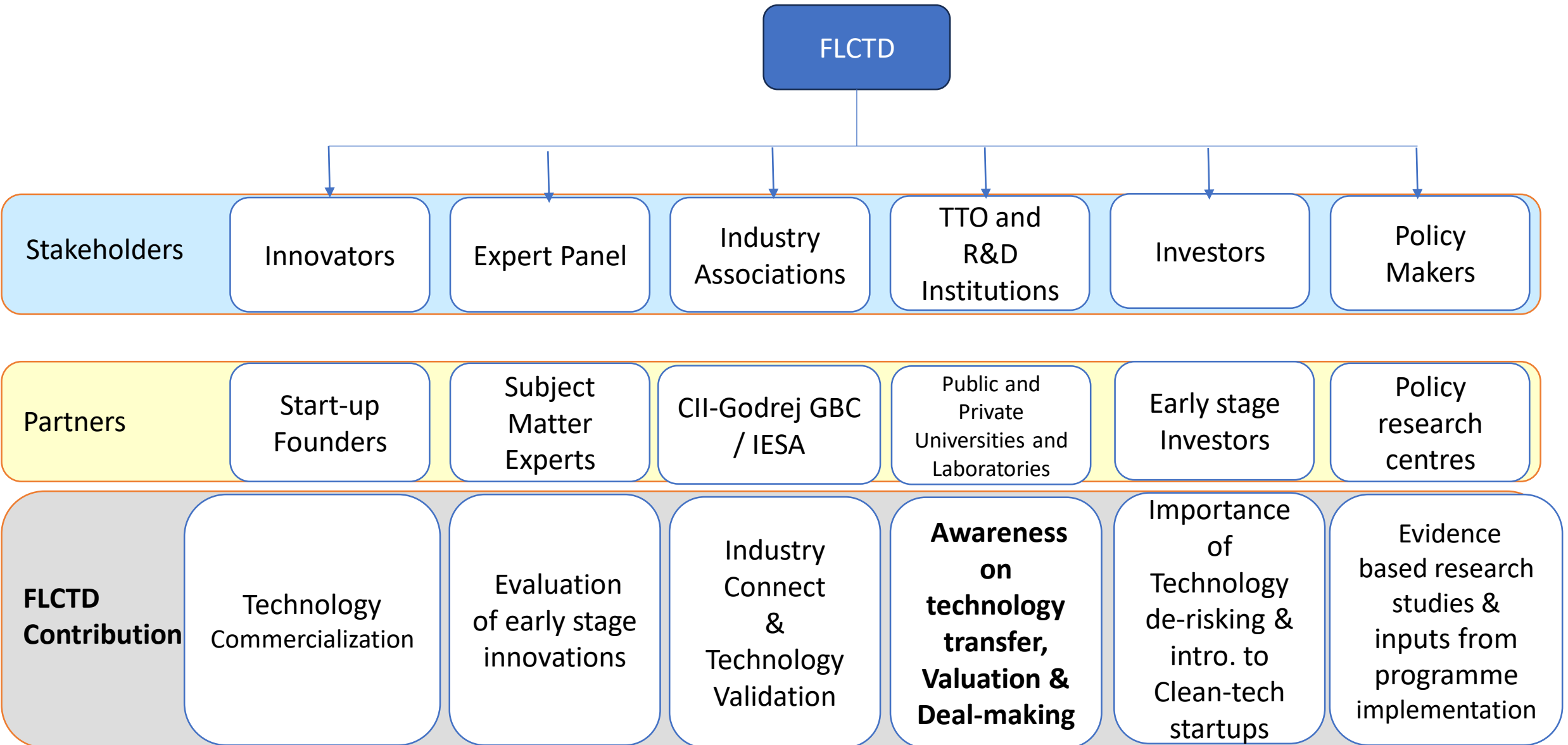
140 Selected

**Annual Innovation Challenge** -Identification and Winners Selection

Focus on **cleantech** solutions with **high** commercialization potential



# Capacity Building of Program Stakeholder



# THANK YOU

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[www.low-carbon-innovation.org](http://www.low-carbon-innovation.org)