Korea's only innovative growth engine
for the environmental industry!

ICT Convergence Environmental Technology Commercialization Mecca

Incheon Innovation Cluster and Collaboration

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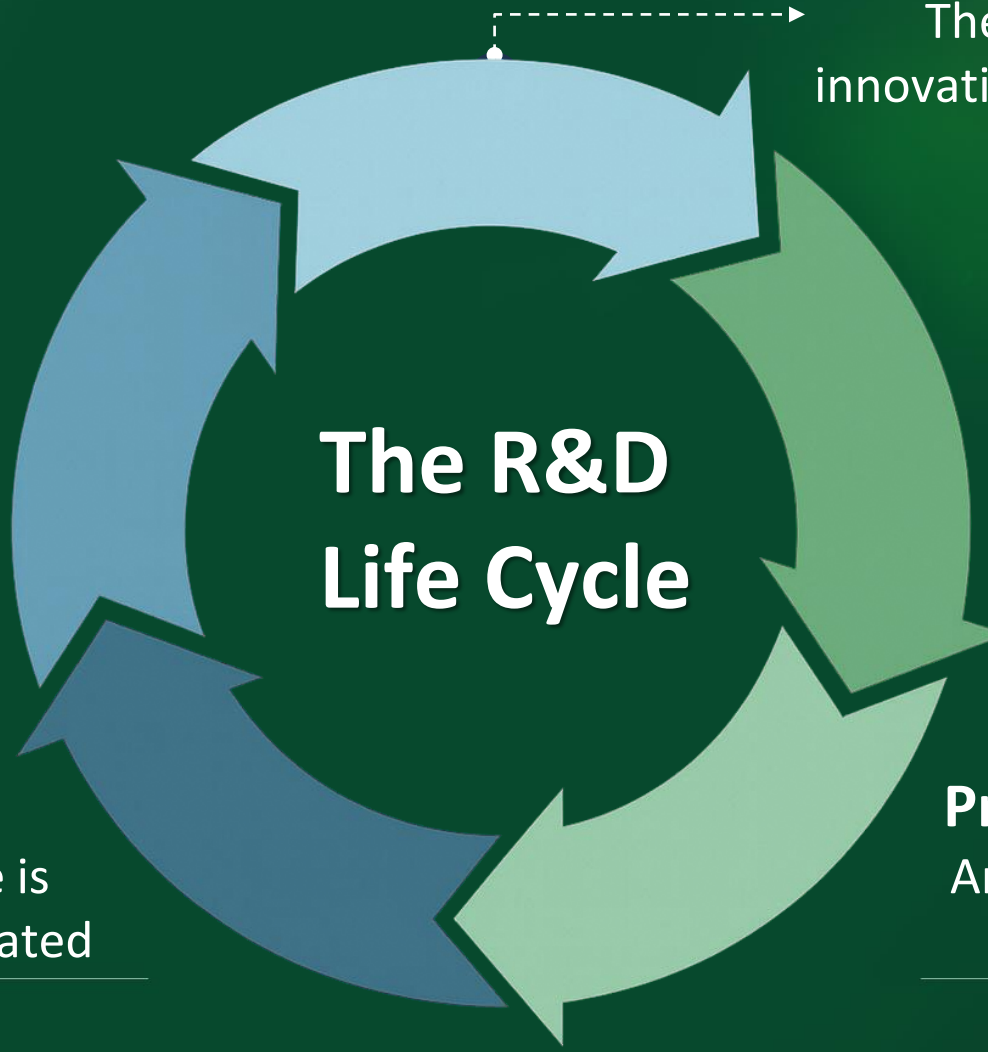
Synopsis

- *Research & business development*
- *Review of triple helix model*
- *Incheon innovation cluster*
- *Korea – Central Asia Science & Technology Center*
- *INU – KOICA Climate / Environment Training Program*
- *Lesson for environmental R&BD*

INNOPOLIS
인천강소특구

General concept of R&BD



Idea Generation
The seeds of innovation are planted

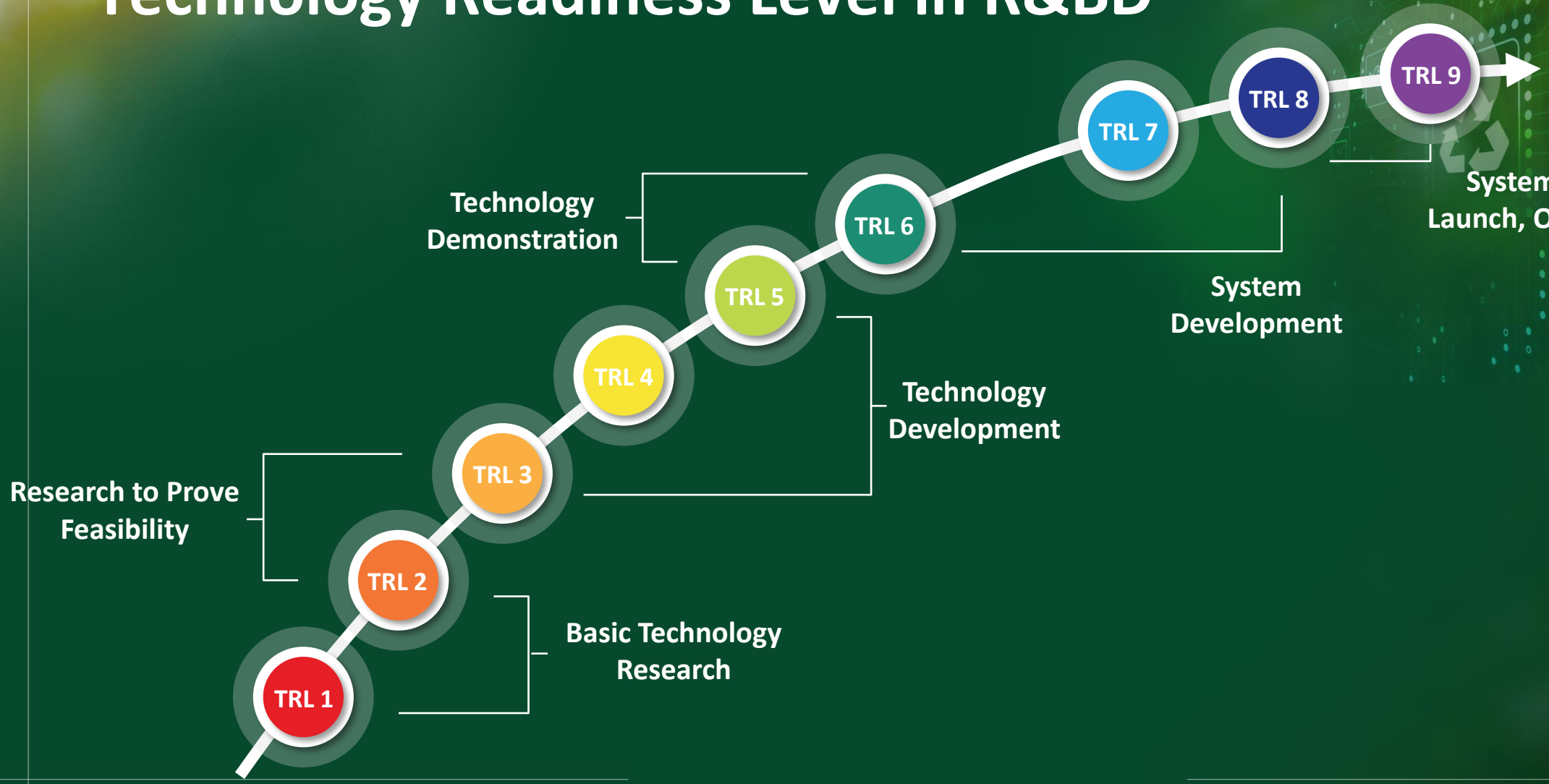
Feasibility Analysis
Technical, market, and financial feasibility are assessed

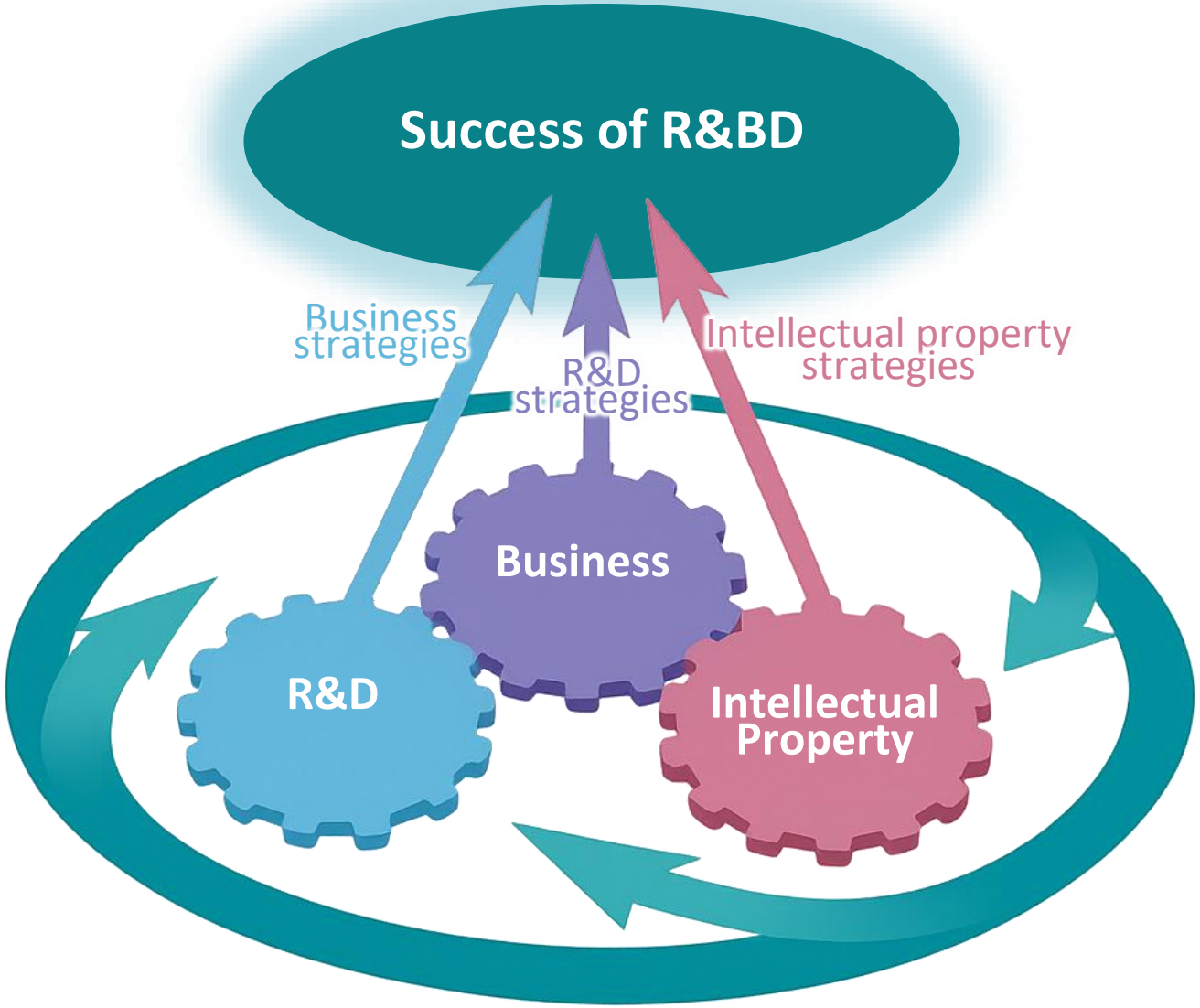
Prototype Development
An idea is transformed into a tangible prototype

Testing
The prototype is rigorously evaluated

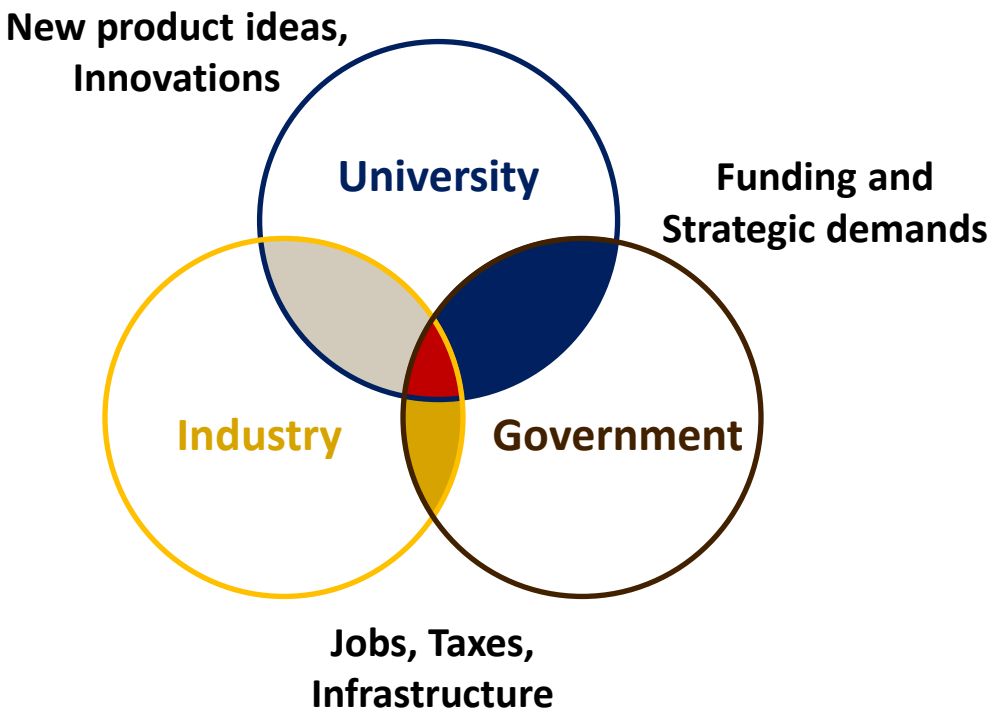
Commercialization
The successful prototype is ready to go to market

Technology Readiness Level in R&BD




Success of R&BD
Business strategies
R&D strategies
Intellectual property strategies
Business
R&D
Intellectual Property

Concept of triple helix model

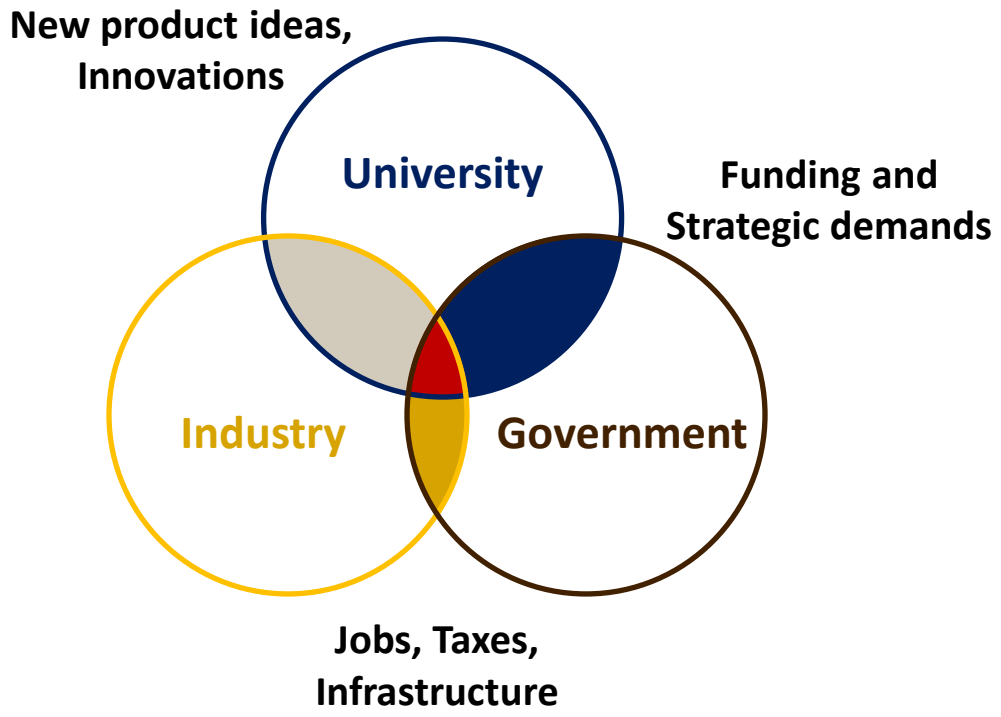


- Framework developed by Henry Etzkowitz and Loet Leydesdorff (1990s)
- Explains innovation through dynamic interaction of universities, industry, and government
- Emphasizes overlapping relationships and institutional role transformation
- Key driver of innovation in knowledge-based economies
- For example, regional innovation systems (Silicon Valley, science parks)

Principal of triple helix model

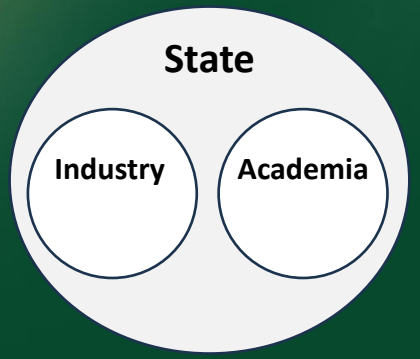
- Overlapping spheres:
  - Create hybrid organizations (research centers, technology parks, public-private partnerships)

- Role transformation:
  - Universities become entrepreneurial,
  - Industry invests in knowledge,
  - Government fosters innovation networks

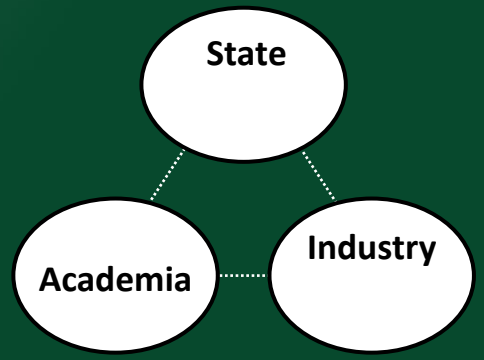


Three triple felix models

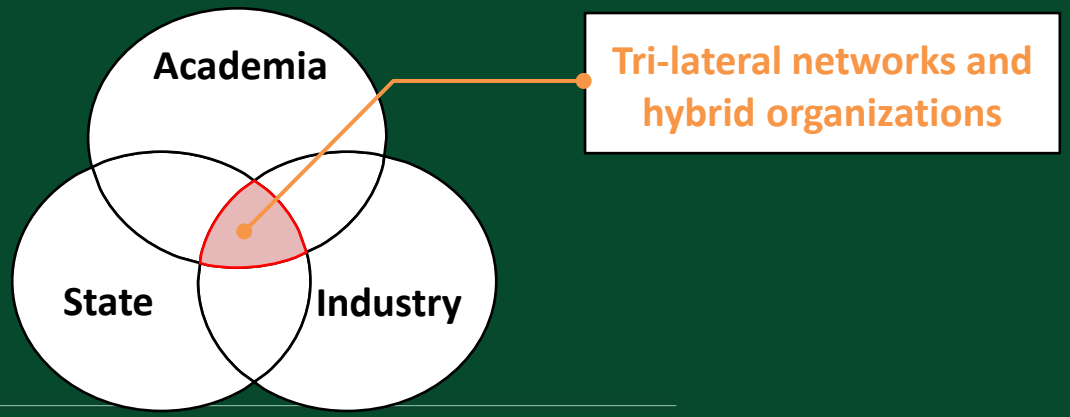
(1) A 'statist' model



(2) A 'laissez-faire' model



(3) The Triple Helix Model



- **Three configurations**
  - **Triple Helix I**: Government-dominated (statist model) - Historical in centralized economies
  - **Triple Helix II**: Separate spheres with limited interaction (laissez-faire) - Traditional Western industrial model
  - **Triple Helix III: Balanced collaboration with strong linkages (ideal model) - Modern knowledge economy goal / Tri-lateral networks and hybrid organization**

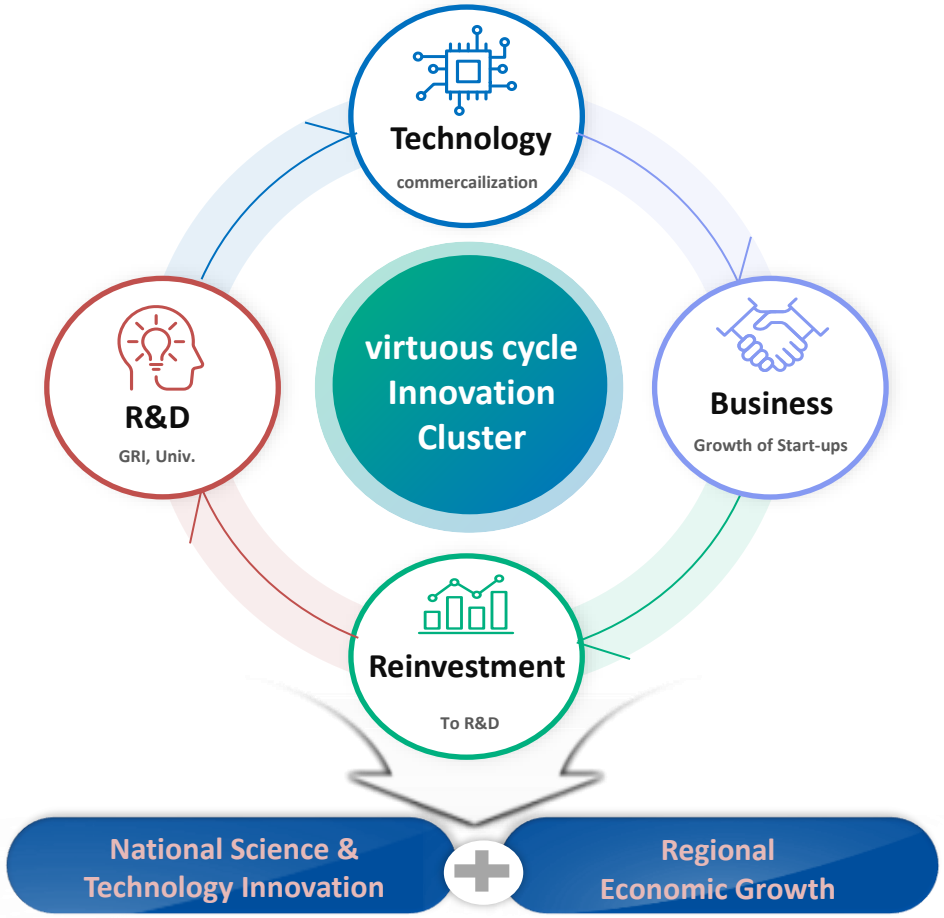
- **Temporal pattern**
  - **Many regions evolve from I or II toward III**

INNOPOLIS in Korea

Missions

Make the innovation eco-system in INNOPOLIS

Facilitate technology commercialization to drive innovation and growth



History

2023
Daedeok INNOPOLIS 50th Anniversary

2022.05
Designation of INNOPOLIS
Incheon(Seo-gu), Chuncheon, Gangwon Province

2020.08
Designation of INNOPOLIS
Gumi, Hongneung, Ulju, Naju, Gunsan, Cheonan and Asan

2019.08
Designation of INNOPOLIS
Ansan, Gimhae, Jinju, Changwon, Pohang, Cheongju

2015.08
Designation of Jeonbuk INNOPOLIS

2012.11
Designation of Busan INNOPOLIS

2011.01
Designation of Gwangju, Daegu INNOPOLIS

2005.09
From Daedeok Research Complex to Daedeok INNOPOLIS
Enactment of the Special Act on Promotion of Special R&D Zones

1973.12
A Basic Plan for the Construction of Daedeok Research Complex

Designation of 14's INNOPOLIS

Designated in 2019
Designated in 2020
Designated in 2022

Designated in 2019

Category	Space	Specialized areas
Ansan	1.73㎢	ICT components & materials
Gimhae	1.13㎢	Biomedical · medical devices
Jinju	2.17㎢	Aerospace components · materials
Changwon	0.65㎢	Intelligent electronics-based machinery convergence
Pohang	2.72㎢	New high-tech materials
Cheongju	2.20㎢	Smart IT components · systems

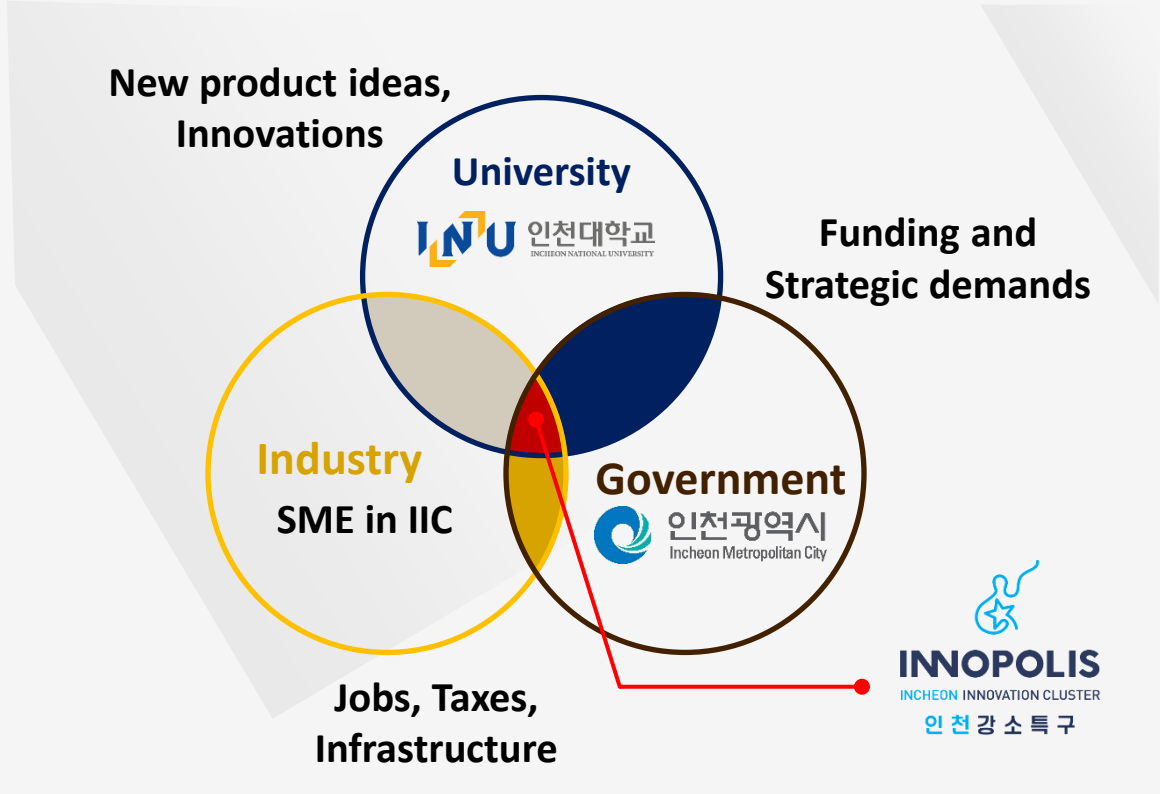
Designated in 2020

Category	Space	Specialized areas
Gumi	2.57㎢	Smart manufacturing systems
Hongneung	1.36㎢	Digital healthcare
Ulju	3.01㎢	Futuristic cells
Naju	1.69㎢	Intelligent solar light · energy storage
Gunsan	2.70㎢	Eco-friendly EV components and materials
Cheonan · Asan	1.32㎢	Next-generation automobile components

Designated in 2022

Category	Space	Specialized areas
Incheon	1.49㎢	ICT Convergence Environmental Pollution Treatment and Management
Chun Cheon	0.93㎢	New biopharmaceutical material

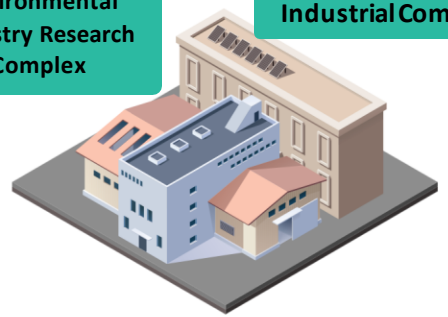
Incheon Innovation Cluster



- **University**
  - Incheon National University / Institute of Environmental Convergence Technology
- **Government**
  - Incheon Metropolitan City (including sub districts)
- **Industry**
  - Approximately 180-220's SME
  - Additional 120-150's SME for new industrial zone
- **Main sector:**
  - **Environment / Climate Technology**

Environmental Industry Research Complex

Geomdan 2 General Industrial Complex



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「ICT Convergence Environmental Pollution Treatment and Management」

Establishment of an Environmental Industry Infrastructure

Support for fostering and commercialization of global research institutes

Incheon National University

INU "All-in-One" R&BD Platform

INNOPOLIS 인천가스트그

Specialize Graduate School

Domain Knowledge

- Incheon National University Startup & Venture Green Convergence Cluster, Professional Talent Training Institute (for corporate practitioners)
- Environment-Focused Specialized Graduate School – Entrepreneurship & Venture Track (for full-time graduate students)

Technology Development / Lab Validation

- Research capability, lab-level development, academic outcomes

Incheon Innovation Cluster

Productization Stage

- PoC & prototype fabrication, securing R&D funds, securing patents/IP

• Startup & Venture Green Convergence Cluster (Ministry of Environment in-house program)

Commercialization Preparation

- Prototype enhancement, performance testing, design & user feedback

• INU Startup Center

Startup / Market Entry

- Business planning, business-model design, team building, fundraising

• INU Partners – Investment Corporation

Growth & Expansion

- Company incorporation, product launch, marketing, sales & customer acquisition

• Incheon Innovation Cluster Business Association

Scale-up / Global Expansion

- Additional investment, revenue growth, expansion of staff & partnerships

• Department of International Climate Cooperation /
• KOICA Climate Degree Training Project

제 2023-001 호

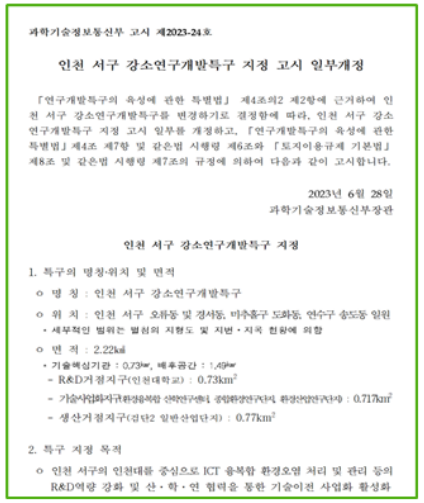
전문인력 양성기관 지정서

1. 기관(단체)명: 인천대학교 산학협력단
2. 사업자등록번호(법인등록번호): 121-82-10382 (120171-0003404)
3. 대표자 성명: 김 규 원
4. 기관(단체) 소재지: 인천광역시 연수구 아카데미로 119(송도동)

「녹색융합클러스터의 조성 및 육성에 관한 법률」 제19조제3항, 같은 법 시행령 제13조제4항 및 같은 법 시행규칙 제7조제3항에 따라 위와 같이 녹색융합클러스터 전문인력 양성기관으로 지정합니다.

2023 년 6 월 23 일

환경부장관



과학기술정보통신부 고시 제2023-24호

인천 서구 강소연구개발특구 지정 고시 일부개정

「연구개발특구의 육성에 관한 특별법」 제4조의2 제2항에 근거하여 인천 서구 강소연구개발특구를 변경하기로 결정함에 따라, 인천 서구 강소연구개발특구 지정 고시 일부를 개정하고, 「연구개발특구의 육성에 관한 특별법」 제4조 제7항 및 같은법 시행령 제6조와 「토지이용규제 기본법」 제8조 및 같은법 시행령 제7조의 규정에 의하여 다음과 같이 고시합니다.

2023년 6월 28일
과학기술정보통신부장관

인천 서구 강소연구개발특구 지정

1. 특구의 명칭·위치 및 면적
   - ㅇ 명 칭 : 인천 서구 강소연구개발특구
   - ㅇ 위 치 : 인천 서구 오류동 및 경서동, 마추홀구 도화동, 연수구 송도동 일원
     - 세부적인 범위는 법원의 지형도 및 지번·지목 현황에 의함
   - ㅇ 면 적 : 2.22㎢
     - 기술혁신기관 : 0.73㎢, 배후공간 : 1.49㎢
     - R&D거점지구(인천대학교) : 0.73㎢
     - 가속사업화지구(환경융복합 산학연구센터, 공업환경연구지원, 환경산업연구지원) : 0.717㎢
     - 생산거점지구(검단2 일반산업단지) : 0.77㎢
2. 특구 지정 목적
   - ㅇ 인천 서구의 인천대를 중심으로 ICT 융복합 환경오염 처리 및 관리 등의 R&D역량 강화 및 산·학·연 협력을 통한 기술이전 사업화 활성화

Specialized Fields

ICT-based technical base for treating and managing environmental pollution and contributing

Measurement and Treatment of Environmental Pollution Monitoring

- **Post-treatment and pre-prevention technology for possible environmental pollution by environmental agents**

Major Tech.

- Advanced water purification treatment
- Ship air pollution
- Fine dust control technology

Waste Recycling and Alternative Material Development

- **Waste recycling and energy conversion for carbon neutrality and energy reduction & Development of eco-friendly substitute materials using biomass**

Major Tech.

- Recycling of waste plastic
- Anaerobic digestion of bioplastic and food waste

AI-based Environmental Management

- **Environmental management through prediction and decision-making applying environmental technology, 4th industrial revolution, digital new dill based AI and IoT**

Major Tech.

- Measurement and analysis of marine environment
- Environmental information monitoring technology
- Recyclable resource recovery robots

INNOPOLIS 인천강소특구

IICE Cluster Promotion strategy i- ESP* Cluster

* Incheon/Integrated - Environment, Science, InnoPolis

Commercializing technology of ICT convergence evironmental pollution treatment and management

Exploring demand of technology and business

IICE Cluster Community (Lead by INU)

- Exploring demand of technology (Environ tech Information system)
- Exploring business on tech
- Verifying business valus

ICT Convergence E tech

Technology Institution

Incheon National University (INU)
(INU Indust univ Cooperation/INU IICE Cluster Team)

Platforming Technology Commercialization

Manufacturing (Industrial Complex)

Gumdan1 IC
- Malodor prevent tech

North east National IC
- Wastewater disposal tech

Gyeongseo Casting Complex
- Dust collection tech

Technology Transfer (INU Industry & Business Foundation)

Commercializing Ttechnology & Business

Technology Development

INU (ECTI)
- 한국환경공단
- 국립환경과학원
- 국립생물자원관

Original & Applied technology

Reserch

IH (Manufacturing cluster management)

Cluster resident business tech demand

Startup Business (INU Startup Business Support Platform)

Following Development Support

Exploring and developing start-up

- Incheon Seo gu Keco Infra
- INU Incheon City start up fund
- INU Incheon City start up program

Domestic and global marketing

Support to Enter Domestic & Global Market

Strategy to marketing → Marketing to Local Government

Global marketing → Global Networking with INU

Development direction

COS Strategy

: Core area
: Operation area
: Supporting area

Technology institution
R&D base district
Core

- Area: 731,868m²
- District: Technology core institution
- Function: R&D, technology commercialization, human resource training, technology startup, corporate growth support institution
- Agency: Incheon National University

Industrial Facility Area
Production base district
Operation

- Area: 770,361m²
- District: Back space
- Function: Korean Industrial Convergence New Technology Test Production base space, technology commercialization and production
- Agency: Entrepreneurship of environment technology transfer company
  Start up space/startup company

Commercialization Promotion Organization
Technology commercialization district
Supporting

- Area: 717,892m²
- District: Back space
- Function: Technology commercialization, technology development, human resource training, trial certification, corporate support
- Agency: NIER, National Institute of Biological Resources, NIEHRD, KEITI, KECO

+ Establishing an ICT-Convergence Hub for Environmental Pollution Treatment & Management + Technology Commercialization

Production Base District

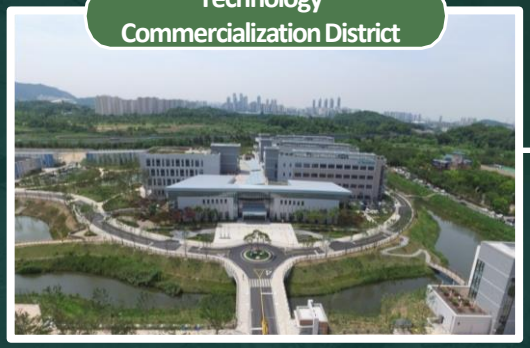
Geomdan 2nd General Industrial Complex

Integrated Environmental Research Complex

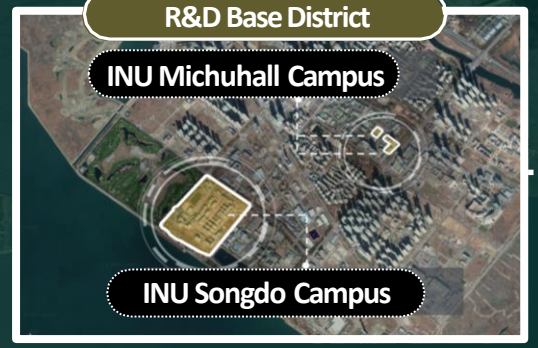
Environmental Industry Research Complex

Environmental Convergence Industry-Academia Research Center

Technology Commercialization District



R&D Base District



INU Jemulpo Campus

- Specialized in the Environmental Industry
- The only participation of central government departments
- Participation in Incheon National University, a leading start-up in Korea
- Korea's Largest Environmental Industry Infrastructure Area

Innopolis Innovation Cluster’s vision

Link

IIC Confex & I.NERGY Symposium

Korea - Central Asia Science & Technology Center

Final Goal

"Promote Mid-to Long-Term international Cooperation on S&T Development

Establish a sustainable cooperation system linking technology, human resources, and industry via the K-CAST Center

Establish a Sustainable Korea-Central Asia Future Platform through an S&T-Based Dev. Cooperation Model

Networking | Talent Exchange | Tech Coop.

Three Strategic Objectives

01 Foundation & Outreach	02 Cooperation & Execution	03 Expansion & Sustainability
Initial Structure Formation : talent discovery, conferences, platform building	Implementation of cooperation projects : joint research, ODA linkage, tech trend analysis	Settlement Stage : Demo Cooperation, Platform Use, Sustainability

Detailed Implementation Objectives

1. Establish and Build an Operational Base for the Center (Including Platform)
- Establish branch/cooperation centers in 6 partner countries
- Hold regular ops committee meetings (6)
- **Build tech business platform**

2. Host annual international conference
- Operate Central Asia special sessions (3)
- Invite 10 outstanding Central Asian researchers

3. Support talent exchange and recruitment activities
- Hold promotion sessions in major cities of partner countries (3)
- Select 10 trainees for KOICA degree programs

4. Tech Trends & Domestic Expansion
- Conduct tech trend surveys & publish result-sharing reports (3)
- R&BD surveys at INU & IIC

5. Strengthen Networks for Joint Research & Tech Cooperation
- On/offline joint workshops & forums (4)
- MOUs with research institutes & universities in each country (15)

6. Joint ODA Project Identification & Linkage
- Plan joint research projects (6)
- Identify & propose ODA-linked projects (3)

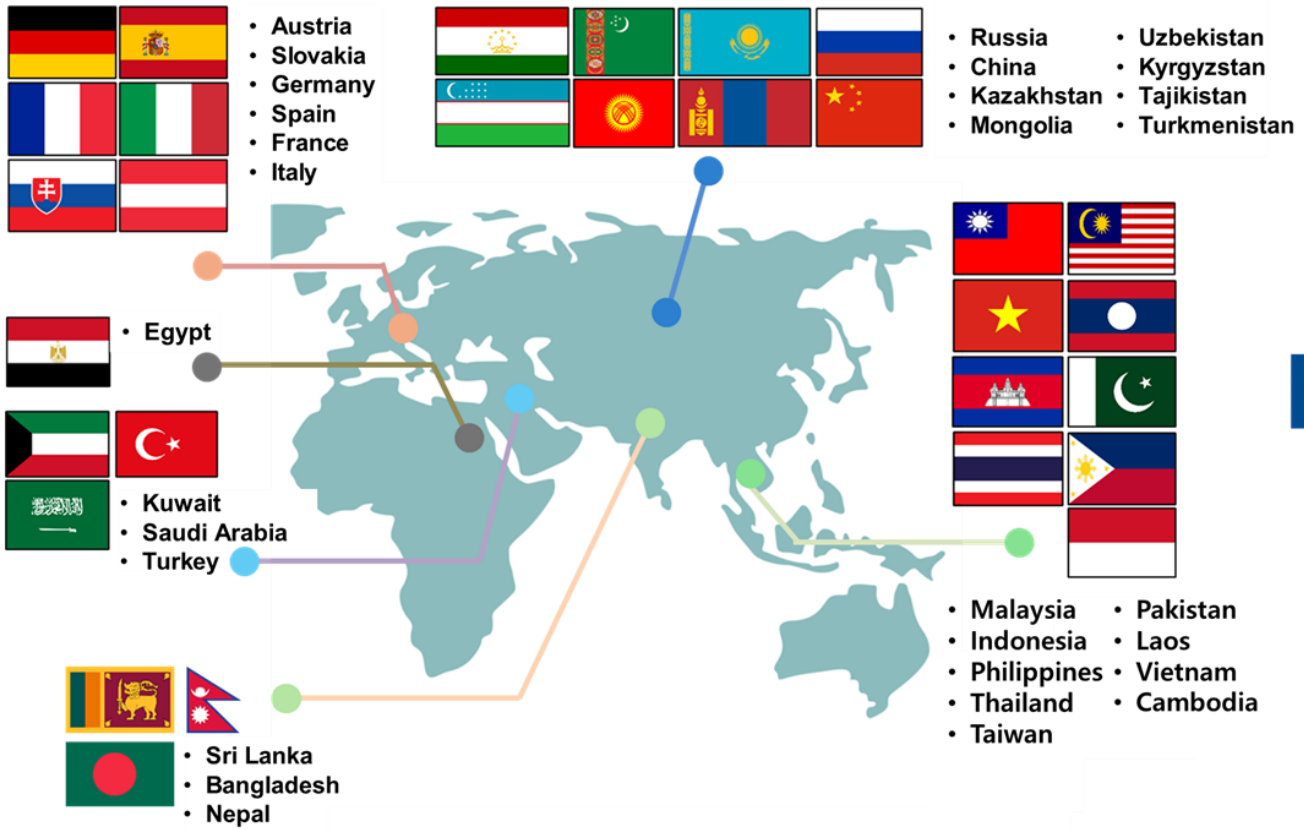
7. Develop Sustainable Operation Strategies & Foundation
- Implement demonstration projects through tech cooperation (3)

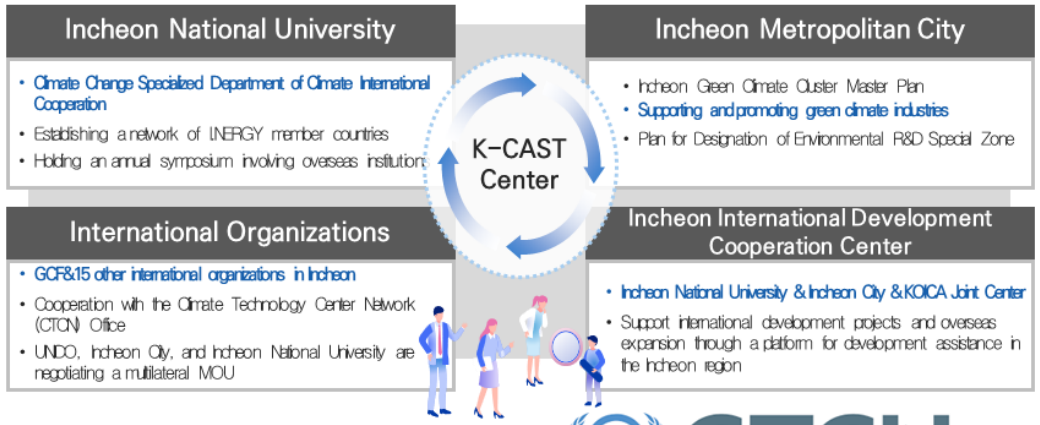
8. Match Korean Tech Companies with Central Asia Tech Needs & Demonstration Cooperation
- Match excellent technologies based on local demand (3)

9. Utilize Tech Business Platform & Support Local Expansion
- Secure partners and participants: sign 20 MOUs

Korea - Central Asia Science & Technology Center

- The project's principal investigator, Prof. Heekwan Lee, established I.NERGY in 2011, building a coop. network spanning 30 countries worldwide
- Sustain active academic & tech exchanges on environment, energy, climate with I.NERGY and International organizations (KOICA, GCF, CTCN, UNDP, UNIDO).





KOICA

CTCN
UN Climate Technology Centre & Network
UNFCCC Technology Mechanism

I·NERGY

환경융합기술연구원
Institute of Environmental Convergence Technology

INNOPOLIS
인천강소특구

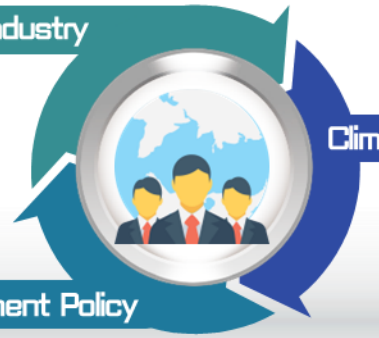
UNDP

GREEN CLIMATE FUND

UNIDO

INU-KOICA Degree Program

Training Convergence Climate Environment Infrastructure Experts Focused on Partner Countries



Technology & Industry

- Strengthen capabilities to understand climate-environment technologies and develop strategies based on scientific evidence

Climate Finance & Enterprise

- Enhance professional capacity for global climate-finance mechanisms to address climate change

Climate-Environment Policy

- Build capacity to formulate and implement climate-environment policies that reflect the specific contexts of partner countries

Domestic Cooperation

Incheon Innovation Cluster

- Activation of industrial technologies
- Overseas technology transfer

Incheon International Development Cooperation Center

- Strengthened collaboration with KOICA

Songdo Global Campus

- Strengthen research-exchange cooperation with universities such as Ghent and George Mason

Foundational Courses	Advanced/Professional Courses
Understanding climate environment	Industrial infrastructure inventory
Climate big-data statistics	Training on PCP preparation (Project Concept Paper)
AI-based climate / environment modeling	Understanding climate finance
Environmental economics	

International Cooperation

GCF (Green Climate Fund)

- Enhance educational capacity (invite adjunct faculty)
- Build a project-discovery network among INU–KOICA–GCF

CTCN (Climate Technology Centre & Network)

- Technology transfer via PCPs and filing international patents
- Discover new research focused on technology upscaling (TA projects)

Dissemination of K-Climate & Environment Industrial Technologies

Improvement of Climate-Environment Governance Systems

Linkage with Climate Finance

Operation of Capacity Building Professional Track

Master's Training Program for Climate-Environment Capacity Building

Climate Environment Core

Existing Courses
- Climate-change assessment & modeling
- Climate-environment information analysis

Planned Courses
- Climate-resilient urban infrastructure policy
- Climate-environment economics

Climate Change Mitigation

C&E Technology	C&E Policy	Climate Finance
Existing Courses • GHGs emission inventory	Existing Courses • Climate change law / policy	Existing Courses • Green finance & sustainable investment
Planned Courses • Sustainable carbon capture & storage	Planned Courses • AI-based early response to climate risks	Planned Courses • Evaluation and responses in climate finance

Climate Change Adaptation

Existing Courses	Existing Courses • Climate change adaptation policy	Existing Courses
Planned Courses • Low-carbon environment & health impacts • Sustainable water resources/ infrastructure management	Planned Courses • Climate-change vulnerability assessment	Planned Courses • Carbon finance market mechanisms • Climate change adaptation investment strategies

AI Basics

AI Basics (Non-credit program: AI fundamentals & understanding)

Planned Courses
- Foundations of machine learning
- Foundations of deep learning
- AI-based image analysis

Modular Curriculum

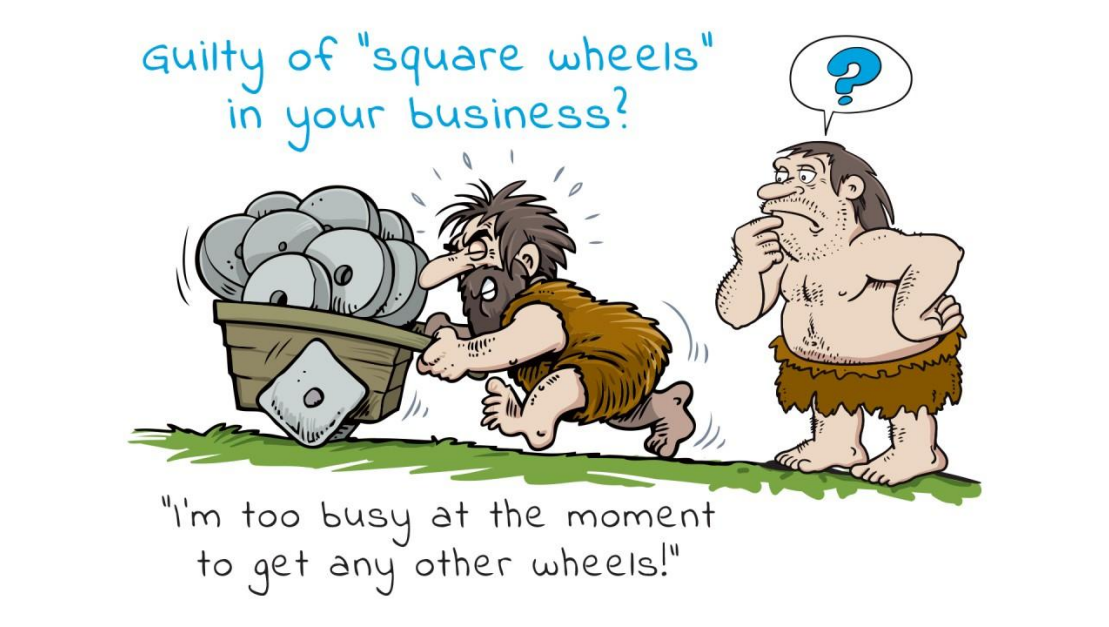
- Learner-centered, capacity-building modular program, combining the pillars

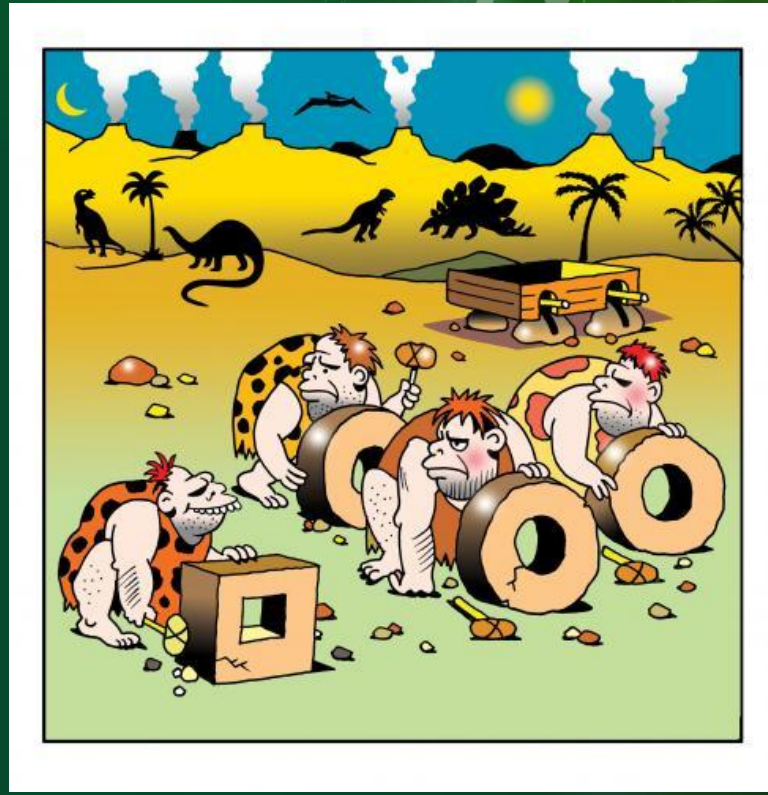
  (Climate-Environment Technology + Climate-Environment Policy + Climate Finance)with focus areas Climate-change Mitigation and Climate-change Adaptation

Thesis Supervision & Degree Conferment

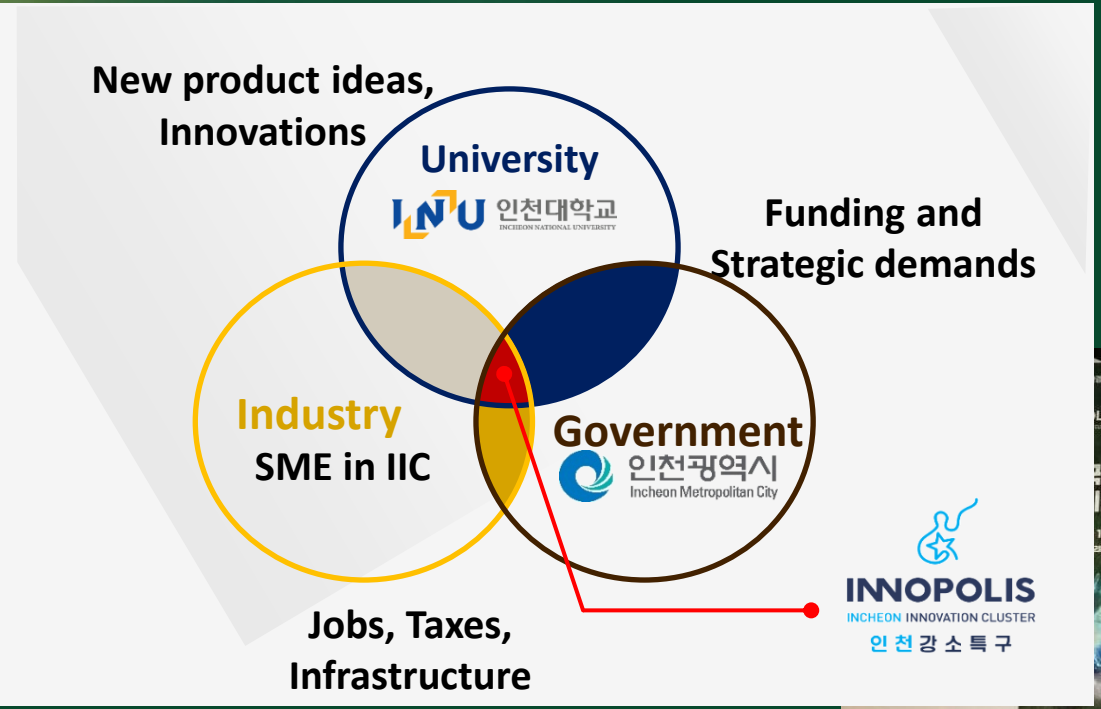
- One-to-one thesis advising with ad-hoc meetings with the advisor
- Thesis topics selected to align with each participant's country needs in climate change and the environment
- Build research networks that connect advisors and their home institutions
- Degree awarded according to thesis-committee composition and academic regulations.

Innovation & team work ??





Incheon Innovation Cluster for Environment / Climate Technology



Korea ICT convergence environmental technology based Incheon Environment Innovation Cluster will lead …

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