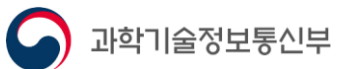


AI-Based Carbon Reduction Assessment System for Climate Technologies and National R&D Projects

Junbeum Kim, Professor
University of Technology of Troyes, FRANCE

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주태국 대한민국 대사관



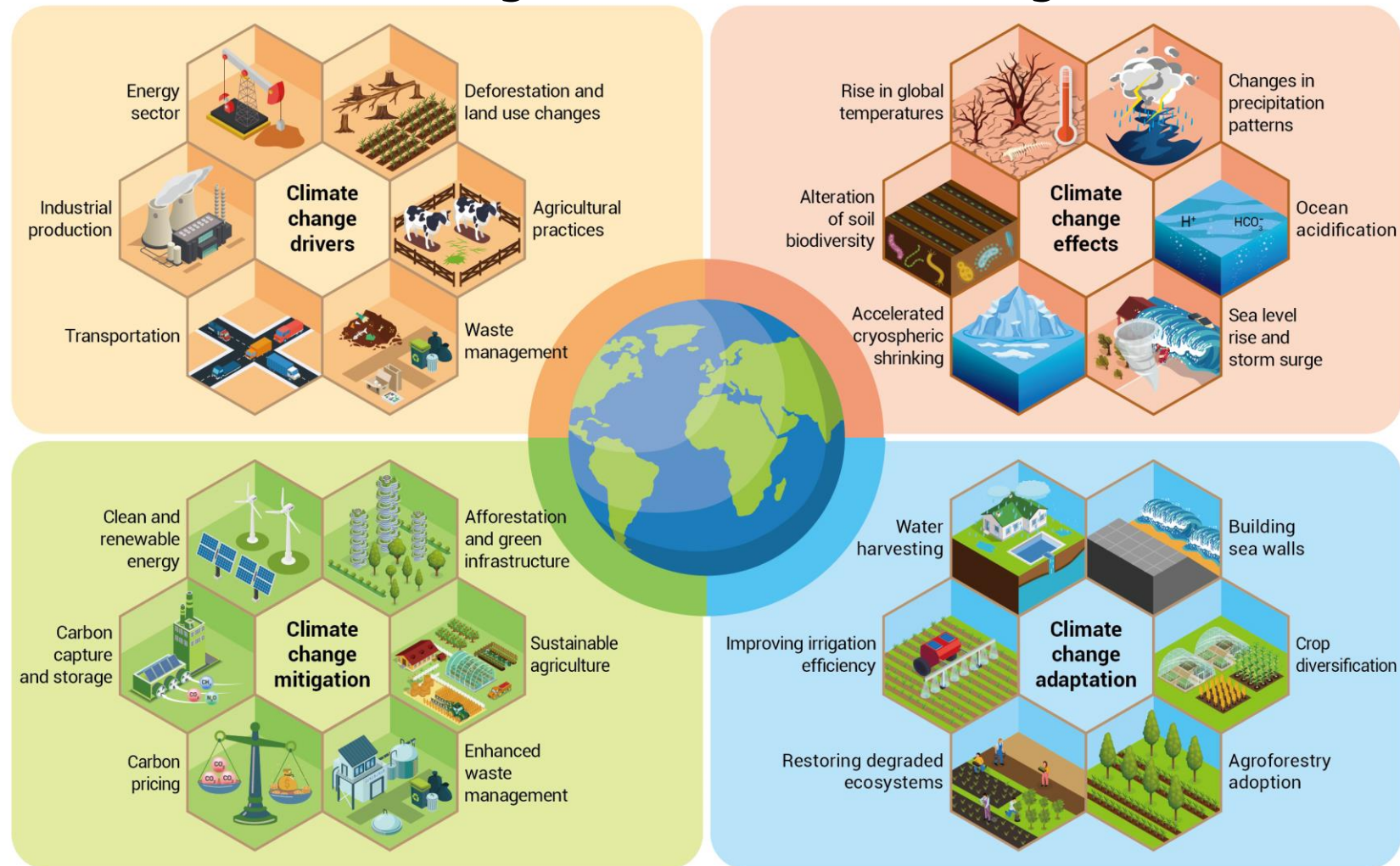
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APCTT
Asian and Pacific Centre
for Transfer of Technology

01. Background

✓ R&D for Climate Change and Global Warming

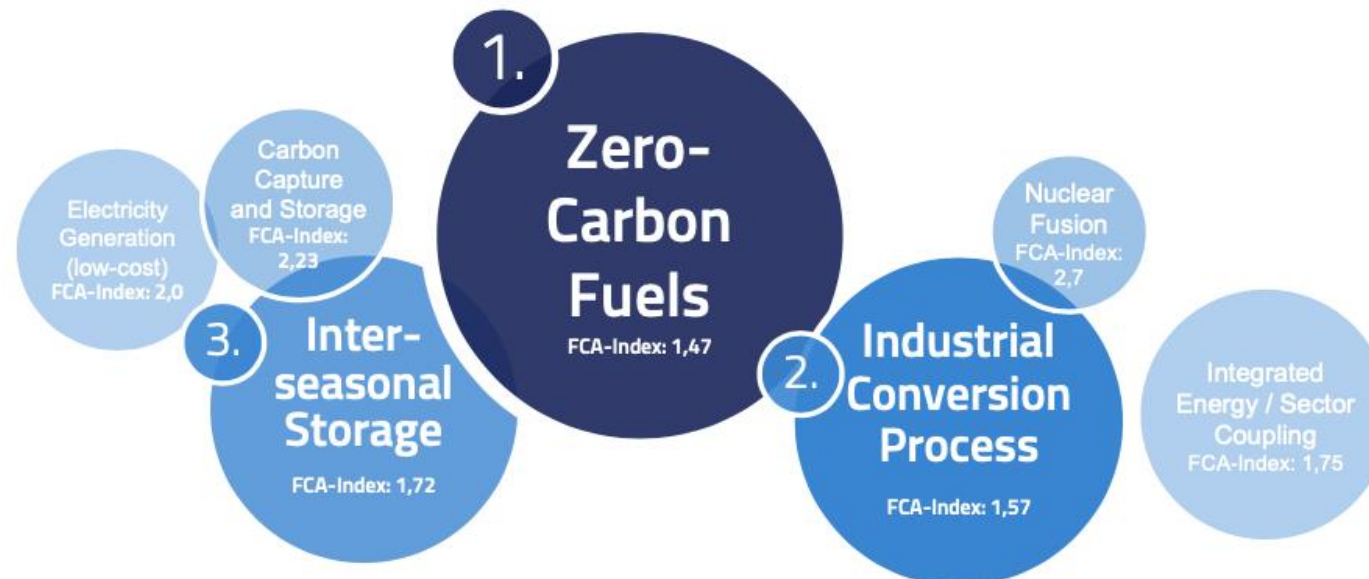


01. Background

✓ R&D for Climate Change and Global Warming

> Top cleantech R&D priorities to help tackle climate change (FCA survey)

3 | R&D Priorities: 2026 - 2030



01. Background



Global Climate Financial Flow

LANDSCAPE OF CLIMATE FINANCE IN 2019/2020

Global climate finance flows along their life cycle in 2019 and 2020. Values are average of two years' data, in USD billions.

SOURCES AND INTERMEDIARIES

Which type of organizations are sources or intermediaries of capital for climate finance?

PUBLIC

PRIVATE

INSTRUMENTS

What mix of financial instruments are used?

653 BN USD ANNUAL AVERAGE

Government funds to other public sources are not estimated

USES

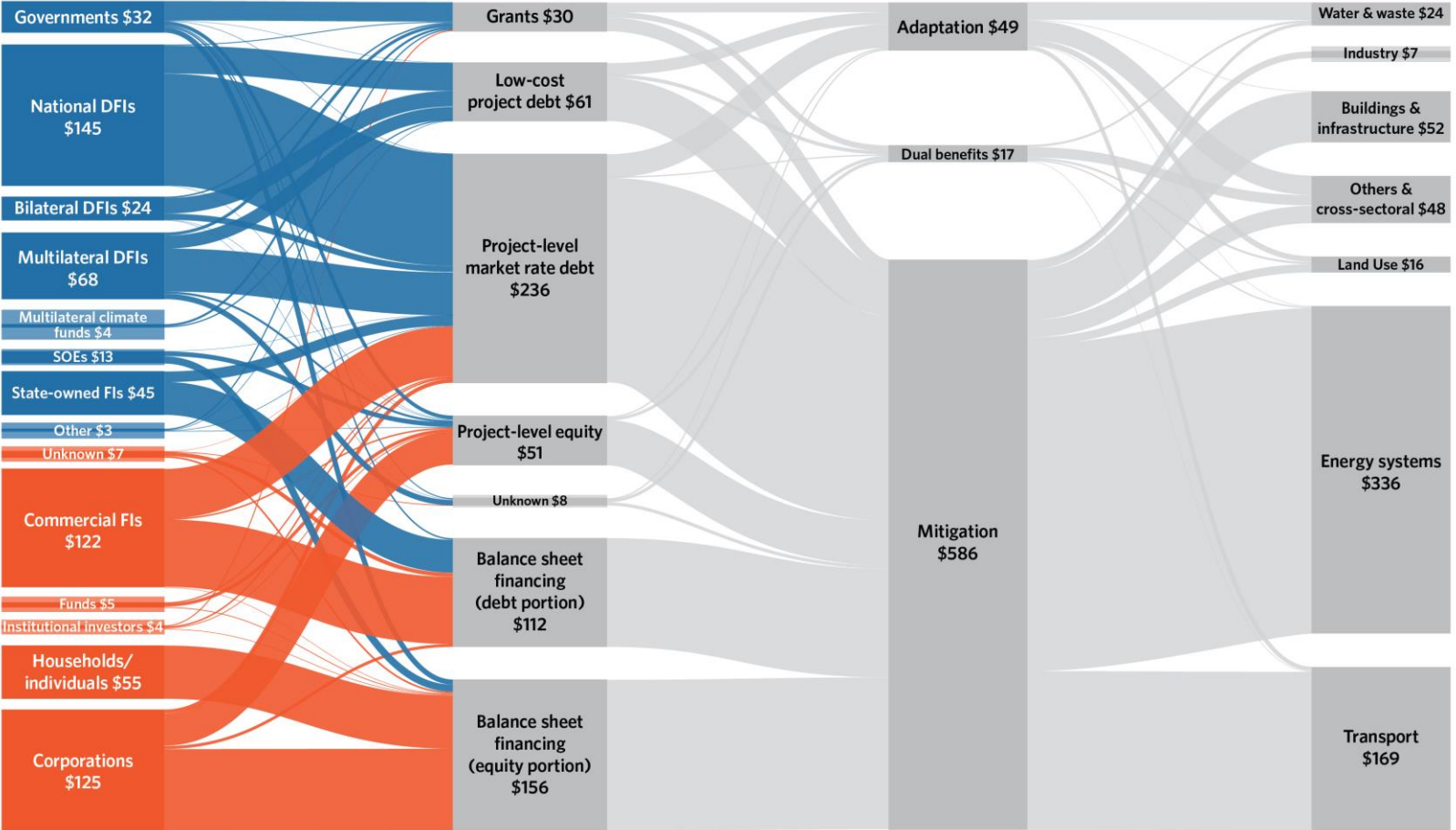
What types of activities are financed?



CLIMATE POLICY INITIATIVE

SECTORS

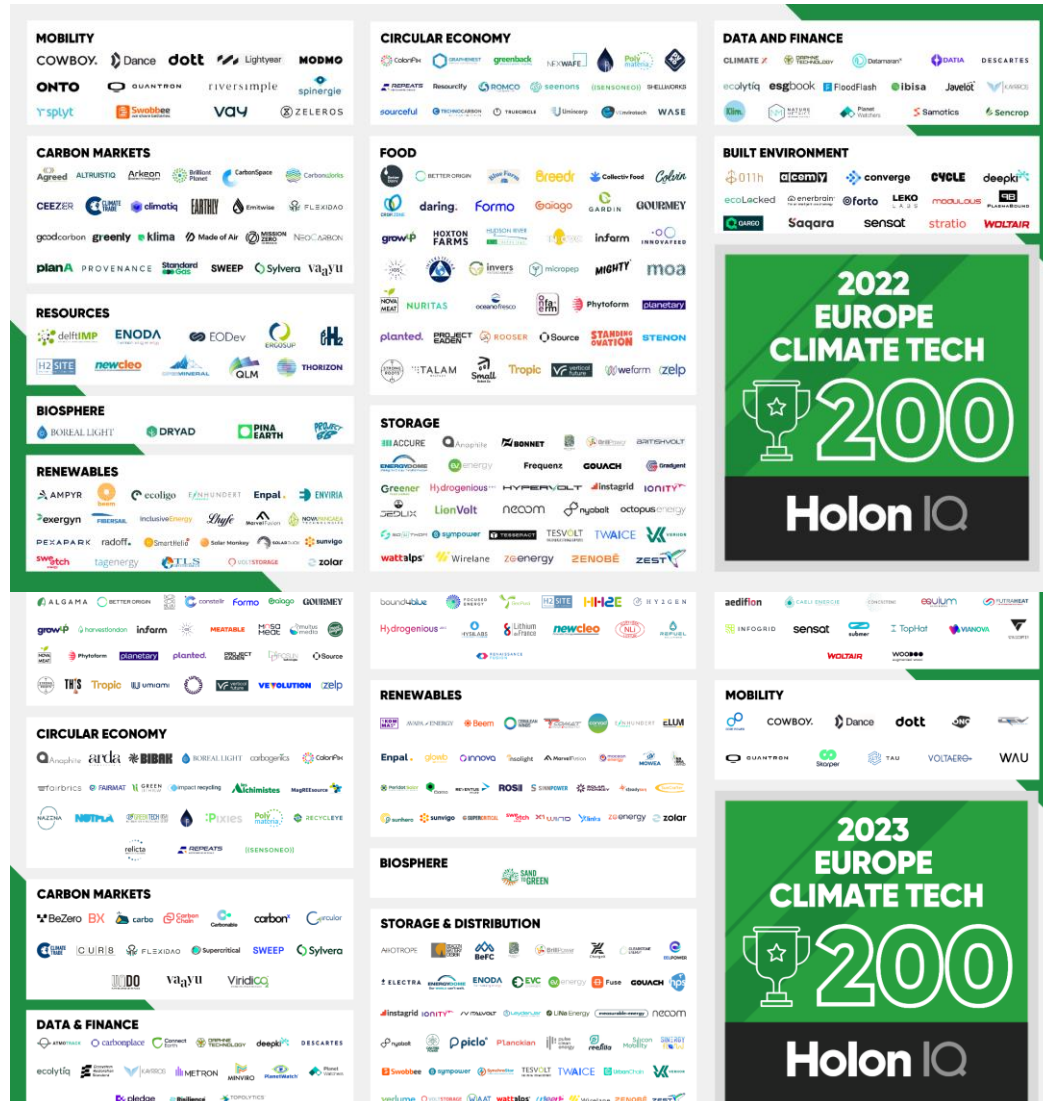
What is the finance used for?



01. Background



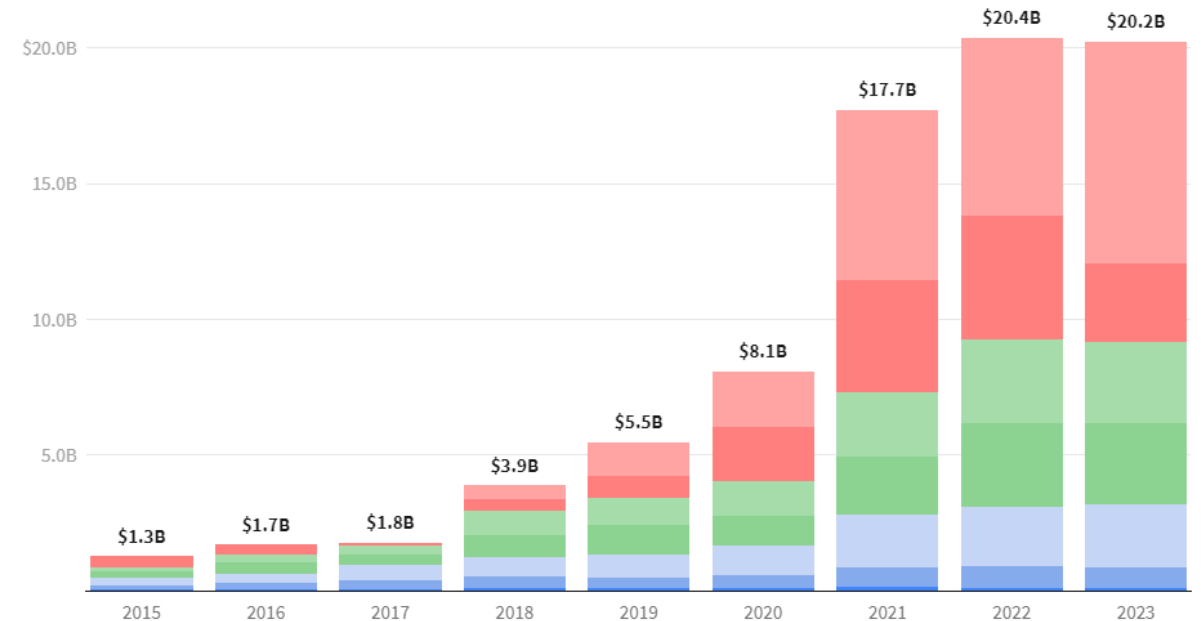
Climate Technologies



Over \$20B raised by European climate tech startups in 2023, nearly matching its record year set the year before.

Climate Tech VC investment by stage

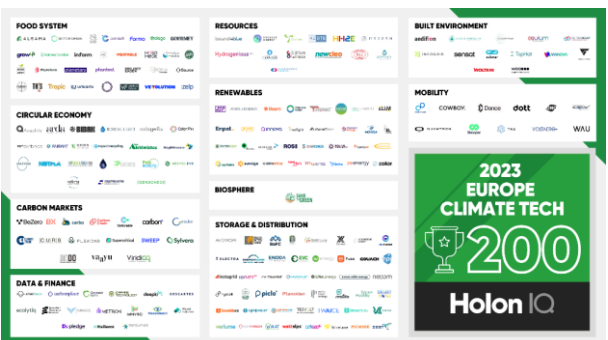
■ \$0-1m (pre seed) ■ \$1-4m (seed) ■ \$4-15m (series A) ■ \$15-40m (Series B) ■ \$40-100m (Series C) ■ \$100-250m (Mega rounds) ■ \$250m+ (Mega+)



02. Purposes

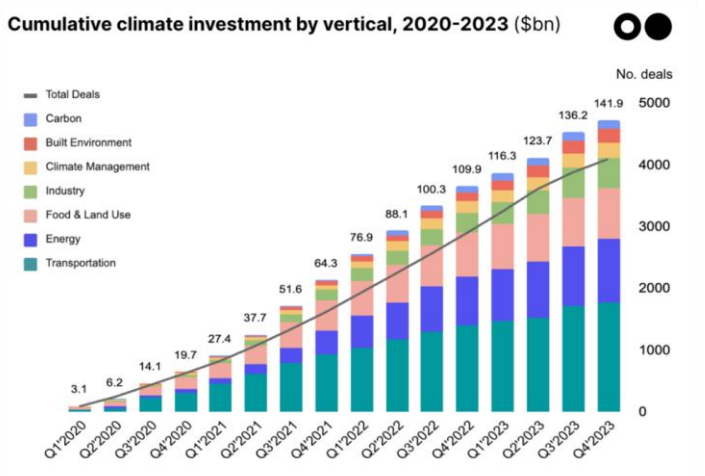
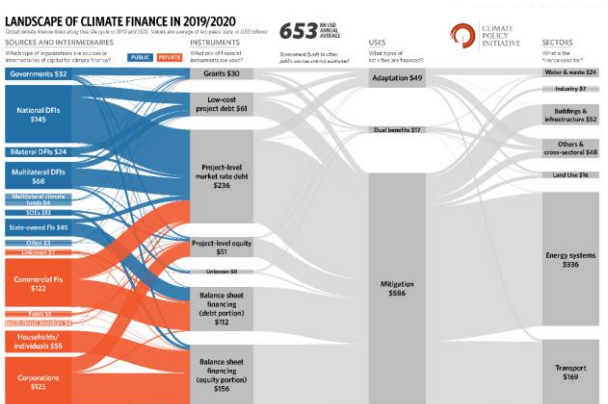
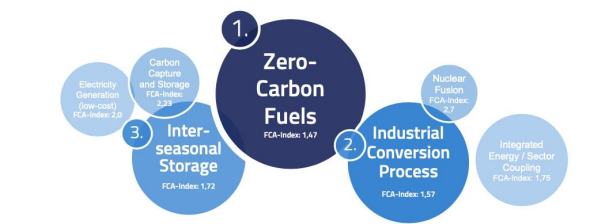


Climate Technologies / Investment funding / R&D funding



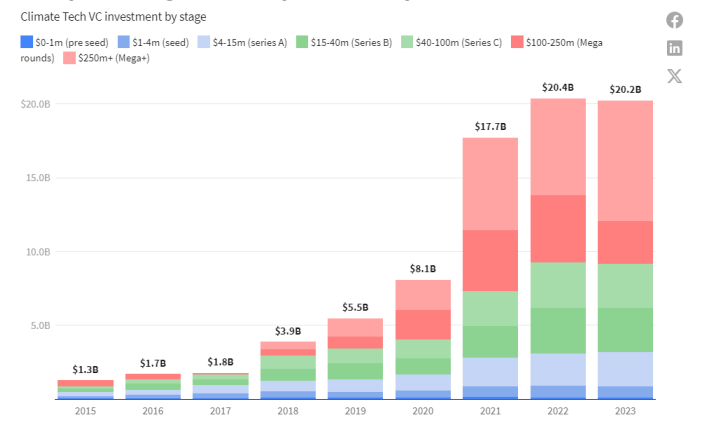
3 | R&D Priorities: 2026 - 2030

FCA Future Climate Architects



Source: Sightline Climate

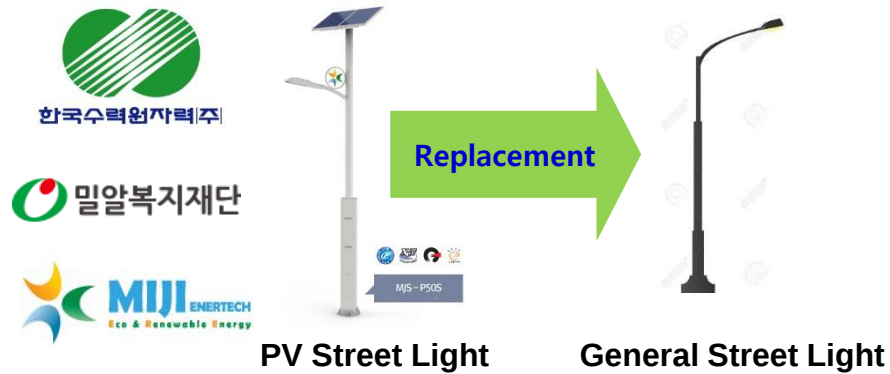
Over \$20B raised by European climate tech startups in 2023, nearly matching its record year set the year before.



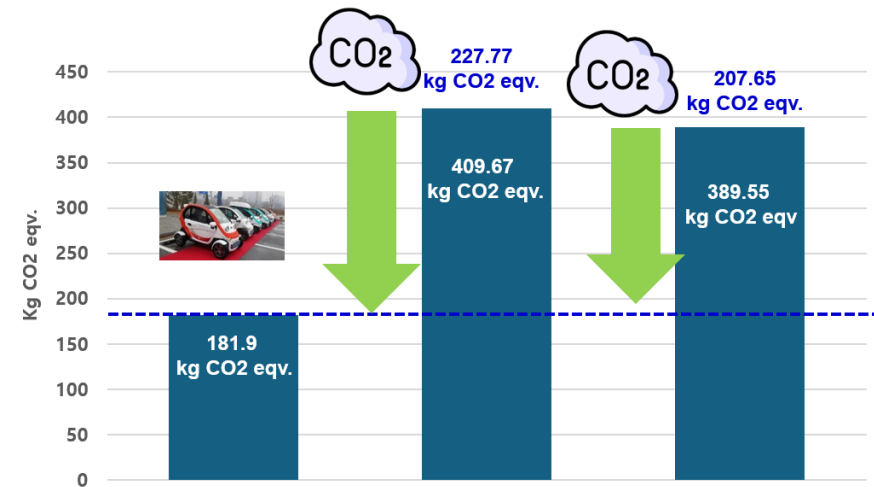
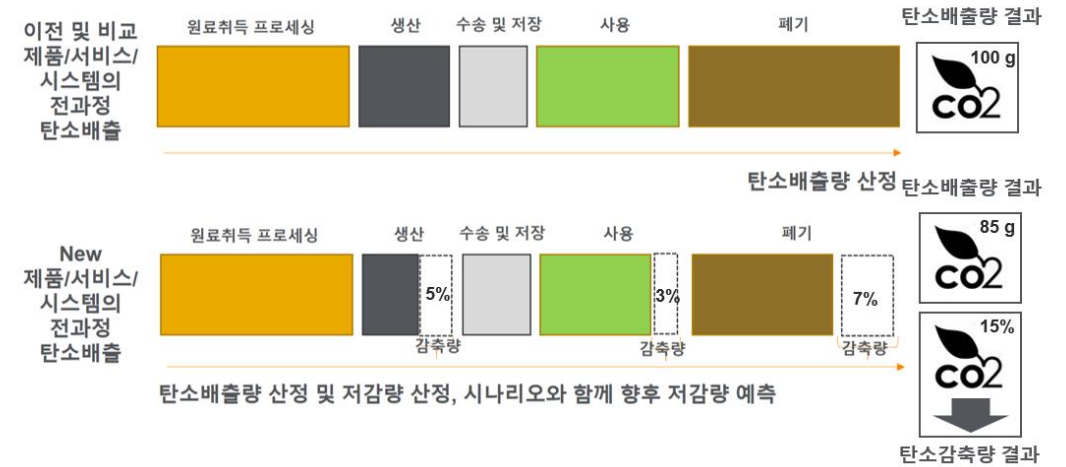
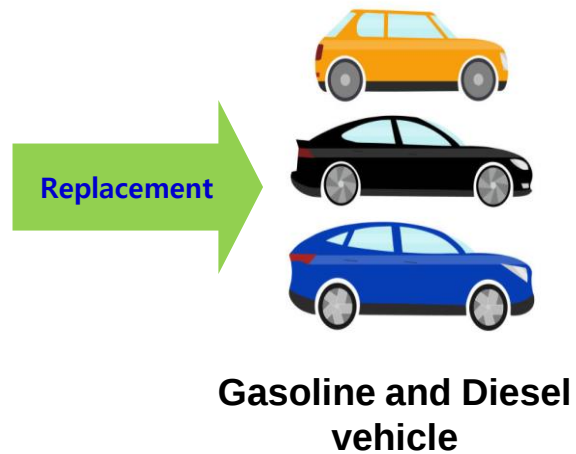
How much Carbon Emissions were reduced ? Or Contribution of Carbon reduction?

03. Method and Approach

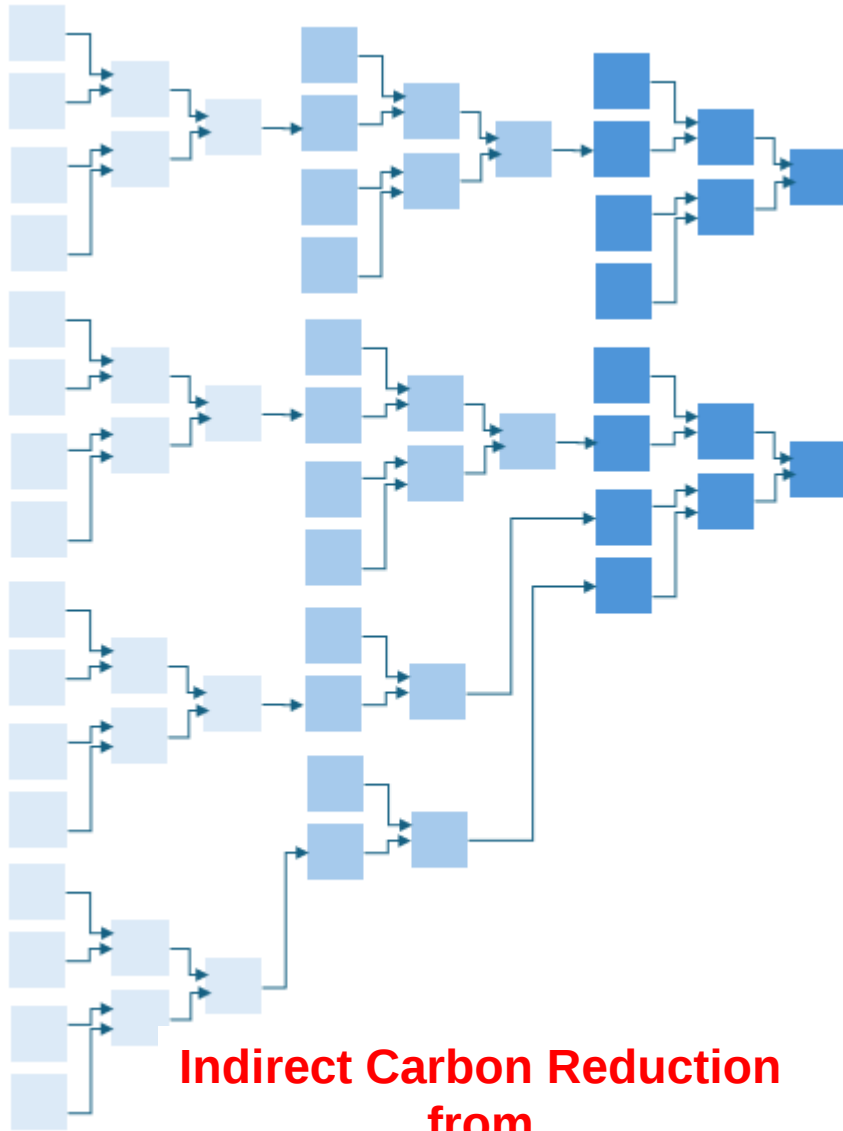
✓ Current carbon reduction assessment for climate tech.



New mobility car sharing service



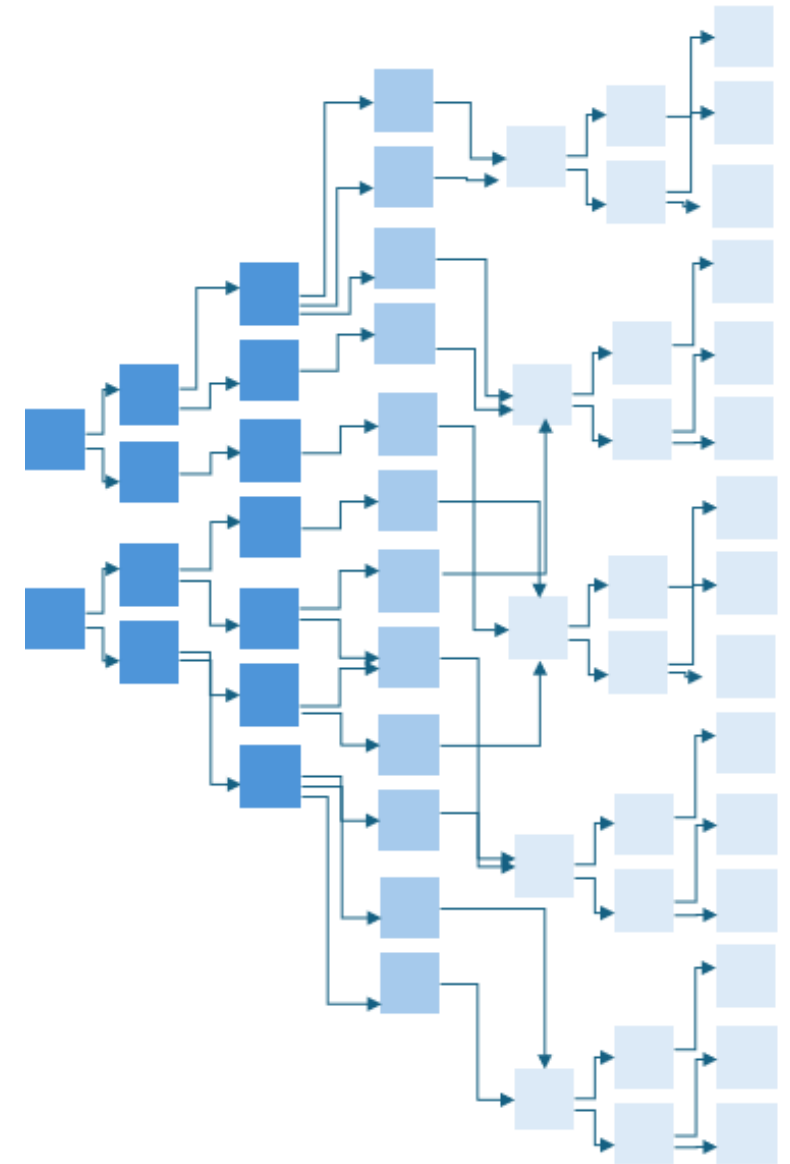
03. Method and Approach



**Indirect Carbon Reduction
from
Related Industry Sectors**



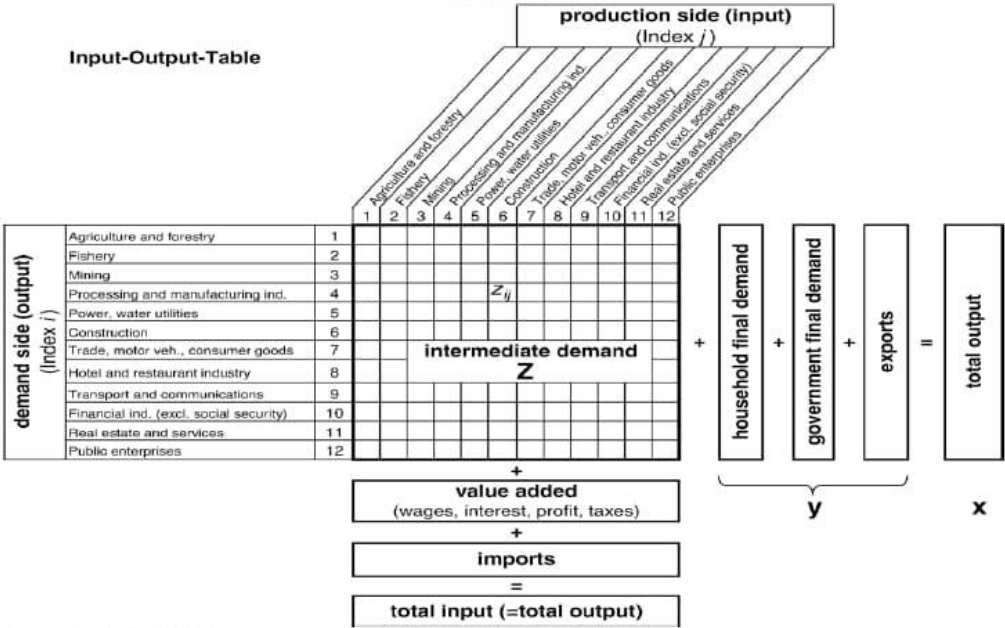
Direct Carbon Reduction



**Indirect Carbon Reduction
from
Related Industry Sectors**

03. Method and Approach

Figure 1
An illustrative I-O table



Source: Sporri et al. (2007)

Input-Output table				
Industry (Endogenous sector) (Unit: million KRW)	Industry (Endogenous sector) (Unit: million KRW)	Exogenous sector		Total output (Unit: million KRW)
		Research and development (Unit: million KRW)	Final demand (Unit: million KRW)	
Industry (Endogenous sector)	Z_{nn-1}	Z_{nh}	f	x
Research and development	Z_{hn}	Z_{hh}		
Value added	v			
Total input	x			

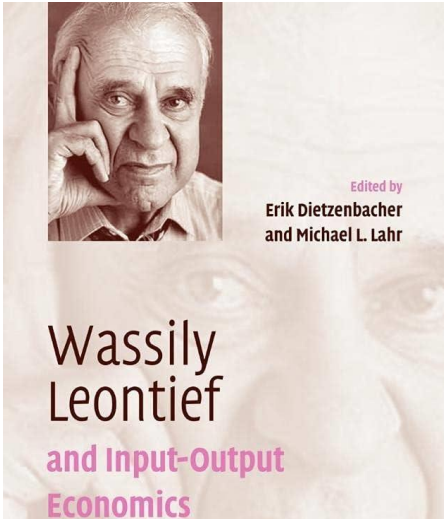
Input-Output table (IOT)

Environmental Satellite table			
Energy consumption (Energy balance) (Unit: TOE)	Industry	Research and development	Carbon emission factor (Unit: ton CO ₂ /TOE)
	E	D	P

Carbon emission factor by energy sources

GHG emissions base on energy balance and national GHGs Inventory
(Unit: ton CO₂eq.)

GHG Emissions



Nobel Memorial Prize
in Economic Sciences
in 1973

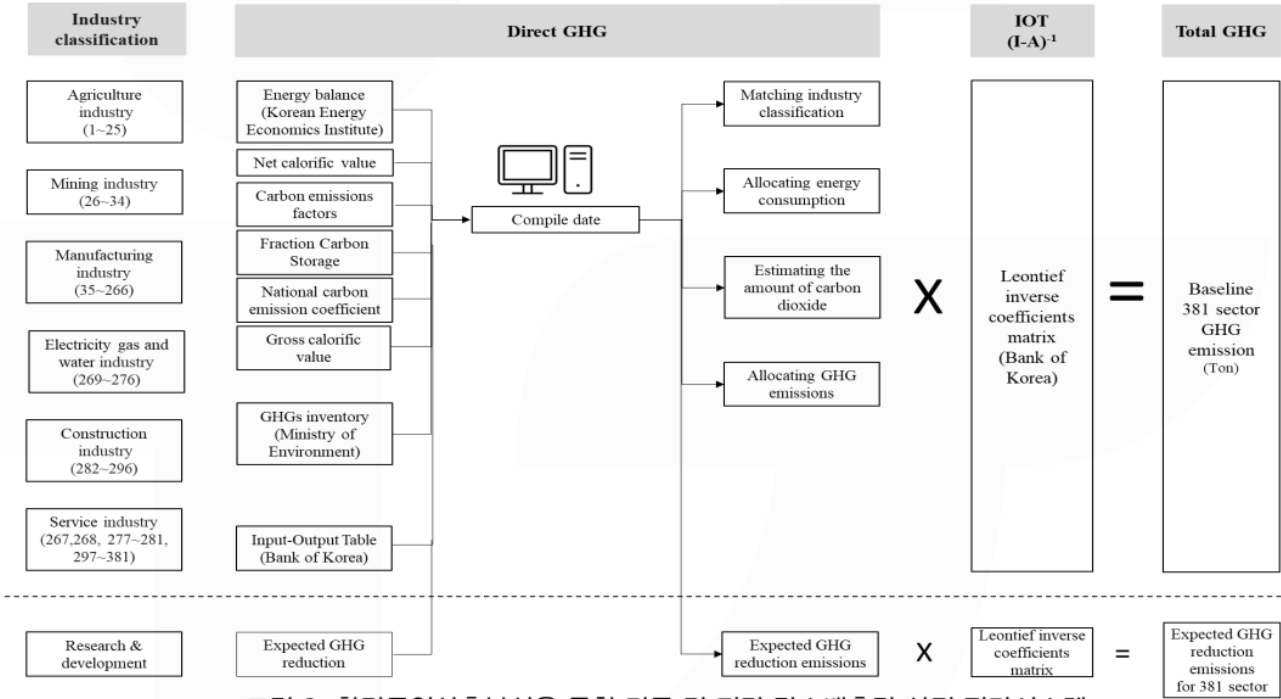
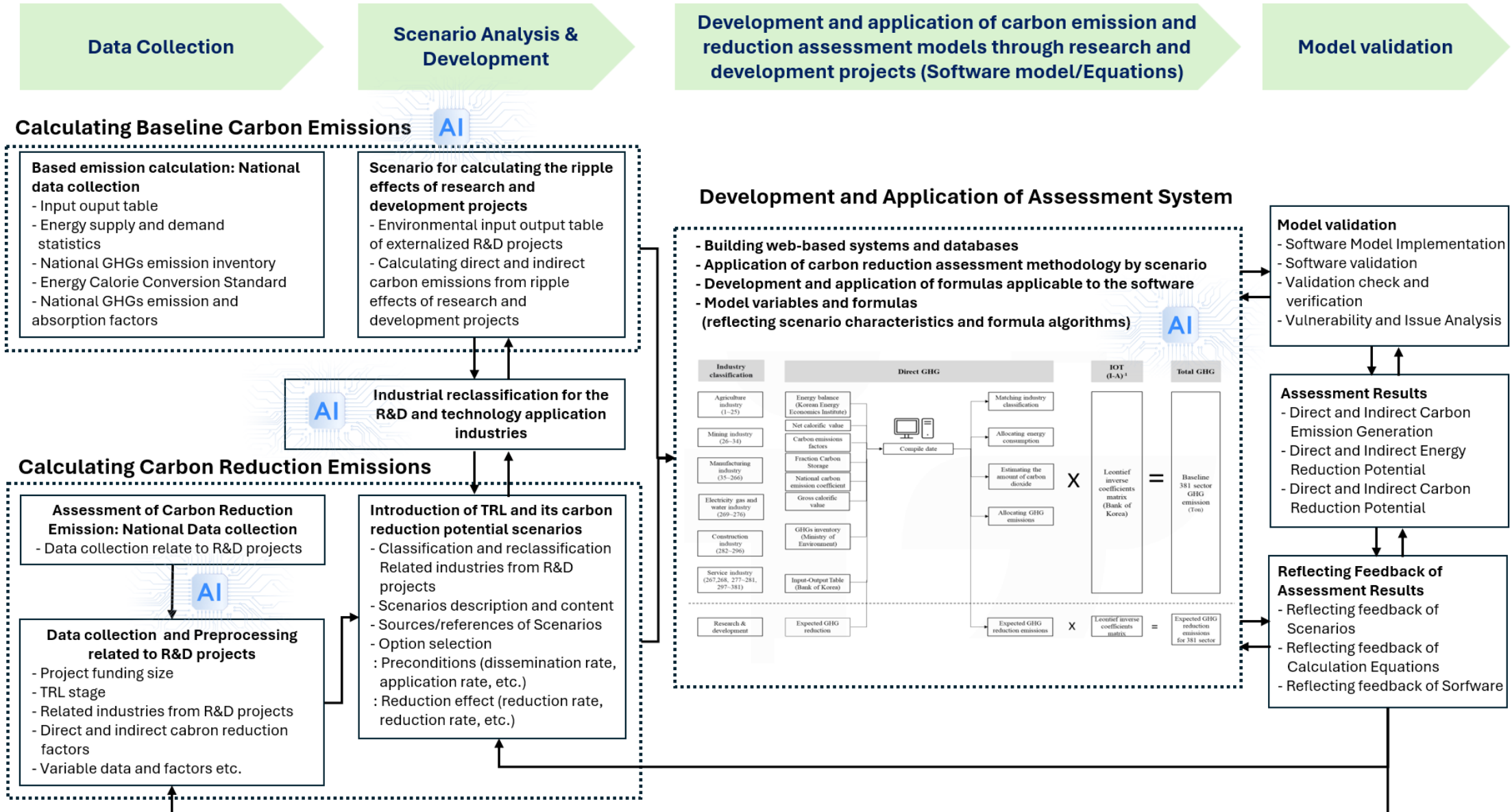


그림 3. 환경투입산출분석을 통한 기준 및 저감 탄소배출량 산정 평가시스템

03. AI-driven Carbon Reduction Calculation System



04. Current progress and plans



Carbon Reduction Assessment System for Climate Technologies and National R&D Projects

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수신 서울특별시 강남구 강남대로78길 30(역삼동) 3층 (특허법인인)
특허법인인 [장영태] 귀하(귀중)

06243

특 허 청 특허결정서

출원인 성명 한국과학기술연구원 외 1명 (특허고객번호: 319980077518)
소재지 서울특별시 성북구 화랑로14길 5 (하월곡동)
대리인명 특허법인인
주소 서울특별시 강남구 강남대로78길 30(역삼동) 3층(특허법인인)
지정된변리사 장영태 외 2명
발명자 성명 송재령
주소 서울특별시 은평구 통일로87길 21-27, 503호 (갈현동, 안민하늘애)
발명자 성명 김준범
주소 서울특별시 성동구 무학로 33, 108동 2001호 (하월곡동, 텐즈힐)
발명자 성명 박유진
주소 세종특별자치시 마을로 152, 1102동 305호 (고은동, 가락마을11단지)
출원번호 10-2023-0194680
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청구항수 10

이 출원에 대하여 특허법 제66조에 따라 특허결정합니다.
(특허권은 특허료를 납부하여 특허법 제87조에 따라 실정등록을 받음으로써 발생하게 됩니다.) 끝.

[참고문헌]

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2. KR102129133 B1
3. KR1020130090630 A
4. KR1020130043518 A



중소벤처기업부
Ministry of SMEs and Startups



LCA based Carbon Reduction Assessment & Carbon Trading Platform System



Establishment of a Carbon Reduction and Trading System for Electric Mobility in Connection with the Korea-Vietnam Cluster Commercialization



business goals

01 Electric Mobility-Based Carbon Reduction

- AI-based monitoring of carbon savings from electric vehicles
- Integration of Vietnam's carbon credit trading system with real-time electric vehicle usage data
- Promotion of decarbonization in the transportation sector

02 IoT-Based Air Quality Monitoring and Data Mapping

- Installation of smart air quality sensors on electric vehicles and at key urban locations
- Development of real-time GIS-based pollution maps accessible to government agencies and the public
- Development of AI-based air quality prediction systems for predictive analytics

03 Blockchain-Integrated Carbon Credit Trading System

- Building a transparent and verifiable carbon credit trading platform for electric vehicle users
- Collaboration with Vietnamese government agencies to integrate the system into the national carbon market
- Development of an internationally compatible carbon trading model for Southeast Asia

1 step (1~6 months)

Pilot projects and local optimization

- Data collection and environment construction
- Air quality measurement system pilot application
- Policy linkage and technology application direction establishment

2 step (7~12 months)

Advancing AI analytics and carbon trading models

- Advancement of AI-based carbon reduction automatic analysis system
- Review of carbon trading possibility and system linkage
- Study on utilization of carbon reduction data in industrial complexes

3 step (13~18 months)

System stabilization and expansion application

- Carbon reduction trading formal operation
- Policy linkage and global expansion strategy establishment
- Research on real-time operation system establishment and industrial complex expansion model

05. Conclusion

- ✓ Developing an AI-Based Carbon Reduction Assessment System
 - : National R&D
 - : Climate Technologies
- ✓ Our system can be used and applied for
 - : Carbon reduction potential estimation of National R&D on carbon neutrality
 - Categorization of high/low carbon reduction contribution R&D projects
 - : Carbon reduction potential estimation for Climate Technologies
 - One important investment decision assessment tool for climate technologies
- ✓ Our system can be used in the national R&D application stage.
The carbon reduction potential estimation value can be included in the proposal, and it can be part of the evaluation.
With Country-Specific Modification, our system can be applied to Asian pacific countries

Thank you for your attention !

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주태국 대한민국 대사관



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