



# View from the Bridge:

How NG+CCS is super-charging AI  
infrastructure and the energy transition

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Ecosperity 2026, Singapore

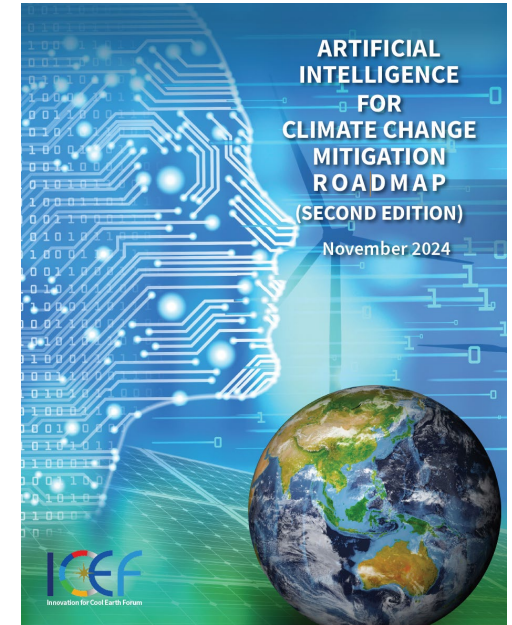


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products using science,  
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# AI FOR CLIMATE CHANGE MITIGATION ROADMAP (Second Edition) (November 2024)

**Topic: How can AI help reduce emissions of greenhouse gases?**

- *17 chapters; 5-10 recommendations in each chapter*
- *Available online at:*
  - [icef.go.jp](https://icef.go.jp)
  - [transitiondigital.org](https://transitiondigital.org)
  - [academiccommons.columbia.edu](https://academiccommons.columbia.edu)



# AI FOR CLIMATE CHANGE MITIGATION ROADMAP 2.0 (November 2024)

## PART I: BACKGROUND

Chapter 1. **INTRODUCTION TO AI**

Chapter 2. INTRODUCTION TO CLIMATE CHANGE

## PART II: SECTORS

Chapter 3. POWER GRID

Chapter 4. FOOD SYSTEM

Chapter 5. MANUFACTURING

Chapter 6. ROAD TRANSPORT

Chapter 7. AVIATION

Chapter 8. BUILDINGS

Chapter 9: **CARBON CAPTURE & CDR**

Chapter 10: NUCLEAR POWER

## PART III: CROSS-CUTTING TOPICS

Chapter 11. LARGE LANGUAGE MODELS

Chapter 12. GHG EMISSIONS MONITORING

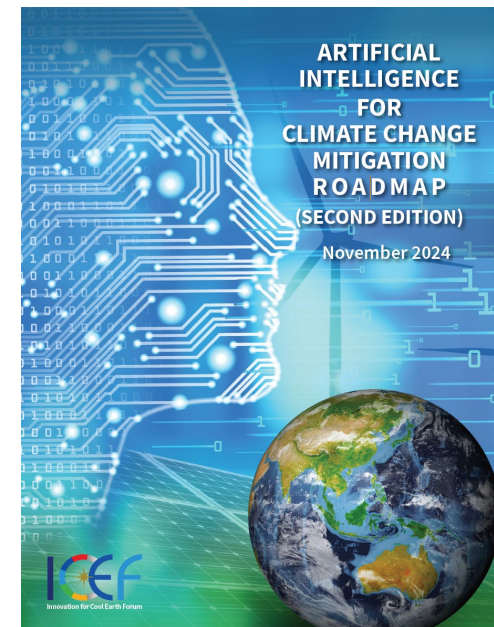
**Chapter 13. MATERIALS INNOVATION**

Chapter 14. EXTREME WEATHER RESPONSE

Chapter 15: GHG EMISSIONS FROM AI

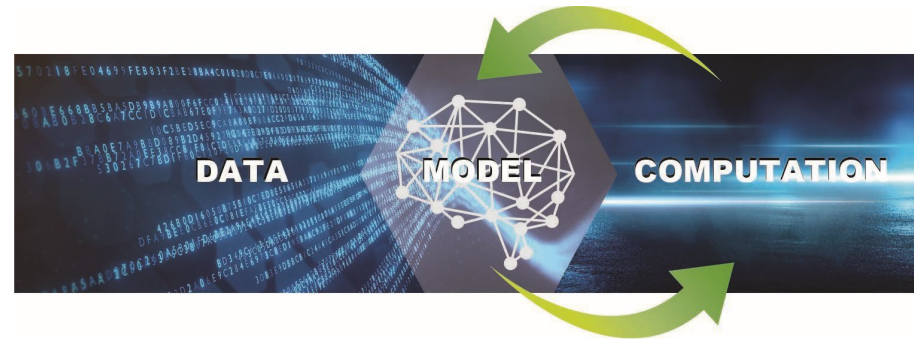
Chapter 16: GOVERNMENT POLICY

Chapter 17: FINDINGS AND RECOMMENDATIONS



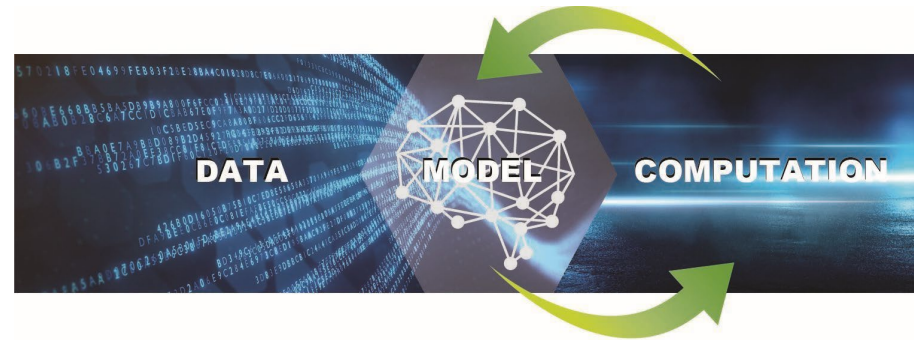
# Chapter 1: INTRODUCTION TO AI

- Artificial intelligence (AI) is the science of making computers perform complex tasks
- AI differs from traditional software
  - Instead of relying on explicit programming, AI relies on historical data and simulation to train models and learn patterns
- Modern AI has far-reaching capabilities:
  - Detect -- such as facial recognition
  - Predict – such as ChatGPT
  - Optimize – such as Google Maps routing
  - Simulate -- such as video games



# Chapter 1: INTRODUCTION TO AI

- Artificial intelligence (AI) is the science of making computers perform complex tasks
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- Modern AI has far-reaching capabilities:
  - Detect – *such as methane emissions from satellite data*
  - Predict – *such as weather patterns at solar/wind farms*
  - Optimize – *such as power flows on transmission lines*
  - Simulate – *such as battery chemistry reactions*



## MMRV is fundamental to credit quality

### ***No MMRV = no product***

### **MMRV shows delivery of environmental service purchased**

- Without it, buyers won't buy
- Compliance markets require it

### **Remote sensing + AI allows MMRV to scale with accuracy**

- Much lower cost
- More comprehensive, higher fidelity

### **Data quality is essential for AI –based MMRV**

- Requires ground truthing
- Requires expert insight
- Requires access and transparency
- Should be validated

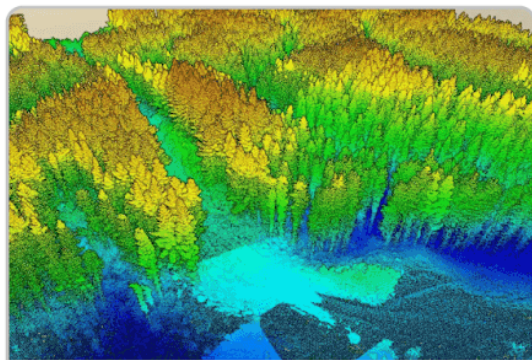


<https://www.carbon-direct.com/criteria/2025-edition>

# AI is essential to modern MMRV for nature-based solutions (NBS)

## Model training stage

*Done by Meta*



Lidar-based canopy height measurements



Meta's AI model

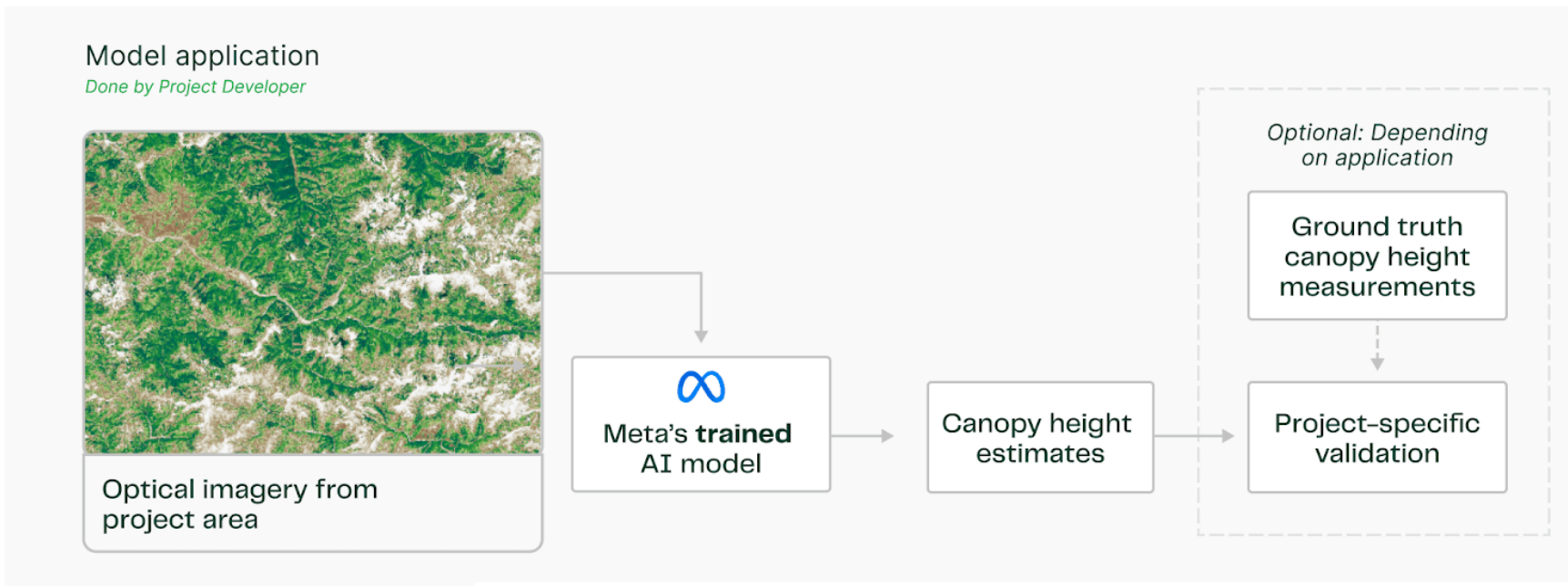


Optical imagery

<https://www.carbon-direct.com/insights/scaling-forest-carbon-with-artificial-intelligence-remote-sensing>

<https://www.carbon-direct.com/research-and-reports/meta-landscape-analysis>

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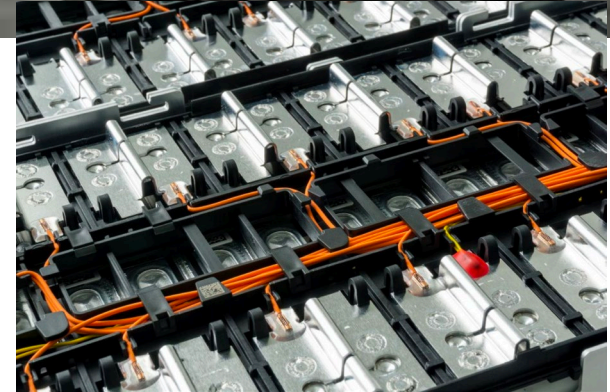
# AI is already helping with durable CDR (BECCS, DAC)

- Discover new carbon capture materials
- Help design new capture reactors
- Help integrate into more industrial facilities
  - Reduces cost, risk
  - improves performance
- Optimize CO2 transportation and storage
  - Improve siting, monitoring of pipelines and dedicated CO2 storage sites
  - Reduce costs and risk, including community and EJ
- Accelerate permitting and community acceptance
  - Reduce permit submission and review time

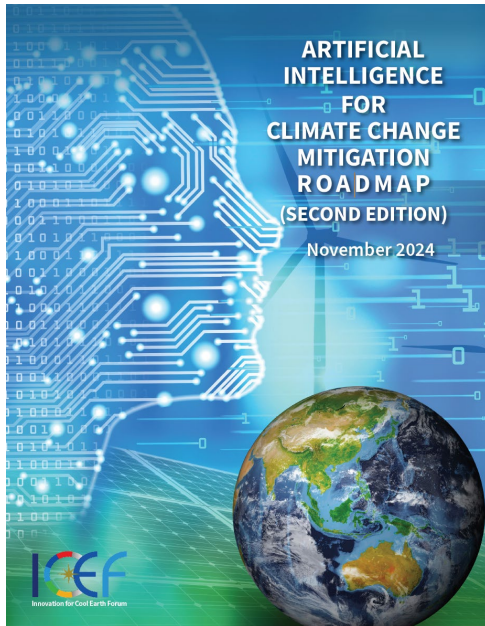


# AI can create “curve jumping” materials – and already has

- **New materials are vital for low-carbon technologies**
- **AI vastly reduces computing time for computational materials research**
  - Summarize and integrate thousands of research articles
  - Search millions of possible materials
  - Identify tiny fraction worth physically testing
  - Pinpoint exact formula for production

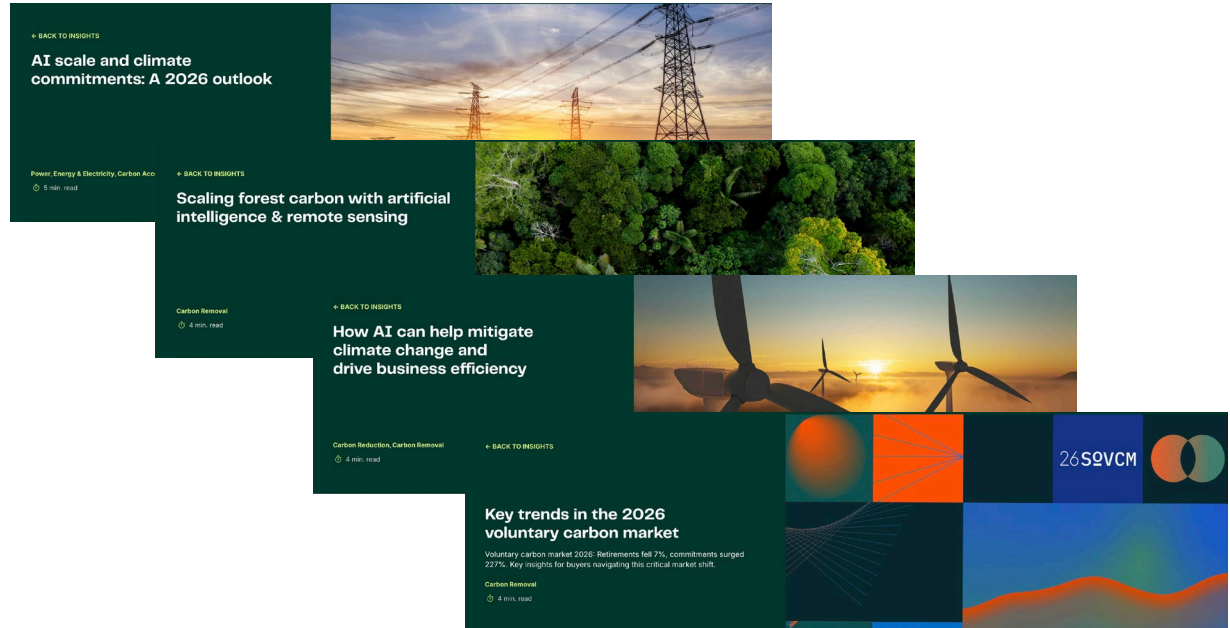


# Some resources: ICEF Roadmaps and at Carbon Direct's website



## ICEF Roadmaps, 2025

<https://icef.go.jp/roadmap/>



## All and more at Carbon Direct Insights

<https://www.carbon-direct.com/insights>

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Thank you.