Discovery Challenge: Only 16% on Track for Net Zero, Half Going Backwards

The Puzzle

- Accenture 2024: Only 16% of largest companies on track for net zero
- Nearly half seeing increased emissions (not decreased!)
- 10 of 11 sectors likely won't meet short-term targets
- Global decarbonization rate: 1.02% (need 6.9% for 2C)
- Must decarbonize 20x faster for 1.5C target
- Net zero target-setting stalled at 37%

Questions This Raises

- Why are commitments not translating to action?
- How do you enforce net zero pledges?
- What's missing from transition plans?
- Can portfolio decarbonization work?
- Should investors divest or engage?
- What about Scope 3 emissions?

[Discovery 1] This puzzle will be resolved by Goal 1—portfolio decarbonization strategies

Learning Goal 1

Construct Climate-Aligned Portfolios

quantitative — Foundation - Integrates analytical skills

The Net-Zero Investment Landscape

Net Zero Asset Managers Initiative

- 330 signatories globally (Oct 2024)
- $57.5 trillion AUM committed
- 264 have disclosed formal targets
- Geographic spread: 35+ countries

Regional Distribution

- Europe: 200+ signatories (leading)
- North America: 70+ signatories
- Asia: 20+ signatories
- Oceania, South America, Africa: 25+

Net Zero Asset Owner Alliance

- 88 institutional members
- $9.5 trillion AUM
- 81 members with formal targets
- 6%+ annual emissions reduction

Key Achievement

- 80%+ engaging on climate issues
- 73% increased investee ambition
- 46% achieved real-economy cuts

[Goal 1] The net-zero investment movement represents unprecedented institutional commitment to climate-aligned investing

Net-Zero Alignment Methodologies

PAII Net Zero Investment Framework 2.0

- 51% of NZAM signatories use
- Updated June 2024
- Maturity scale for assessment
- Multi-asset class guidance
- Five-year horizon targets
- Uses stricter IPCC pathways (1 or 2)

SBTi for Financial Institutions

- 22% of NZAM signatories
- Science-based approach
- Sectoral decarbonization pathways

NZAOA Target Setting Protocol

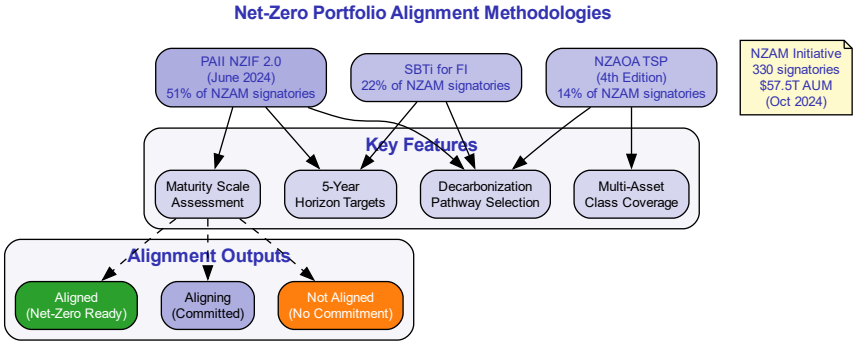
- 14% of NZAM signatories
- 4th edition released 2024
- Covers public and private assets
- Allows IPCC pathway 3

Methodology Comparison

- All allow intensity-based targets
- PAII more stringent on scenarios
- 12% use combination approach
- 10% develop own methodology

[Goal 1] Methodology selection impacts decarbonization trajectory and portfolio construction approach

Net-Zero Alignment Framework Comparison



[Goal 1] Understanding methodology differences is essential for selecting appropriate alignment approaches

EU Climate Benchmarks: PAB and CTB

Paris-Aligned Benchmark (PAB)

- 50% baseline GHG reduction
- 7%+ annual decarbonization
- Strict fossil fuel exclusions
- More ambitious climate alignment
- Tends to outperform broad market

Climate Transition Benchmark (CTB)

- 30% baseline GHG reduction
- 7%+ annual decarbonization
- Fewer exclusions than PAB
- Suitable for broader mandates
- Mixed performance vs market

Performance Characteristics

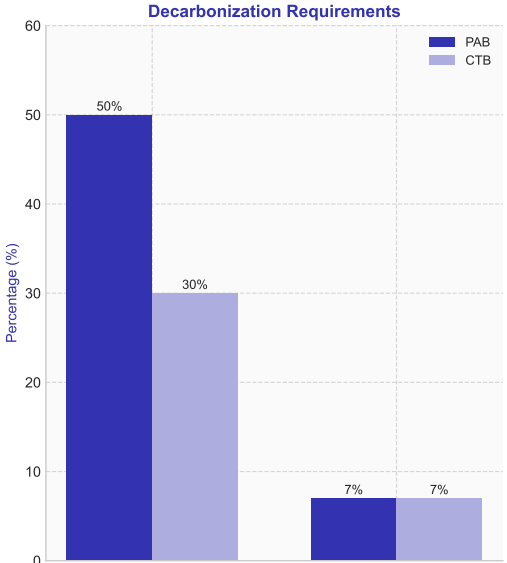
- Growth and quality tilts
- Small-cap bias in some regions
- Higher tracking error to parent

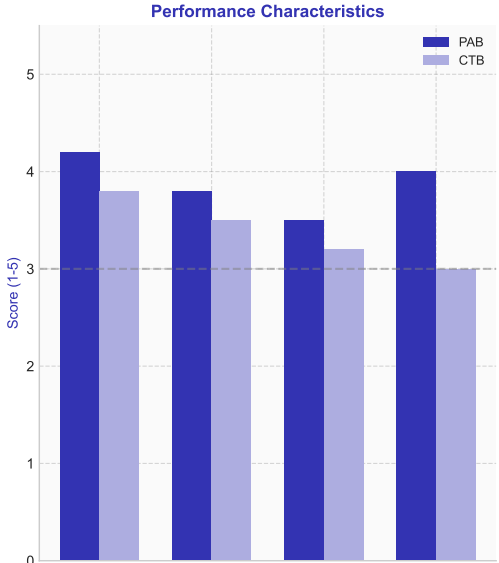
Investor Applications

- PAB: Frontrunner investors
- CTB: Broader transition focus
- Both: EU Regulation 2020/1818

[Goal 1] EU climate benchmarks provide standardized frameworks for climate-aligned passive investing

Climate Benchmark Characteristics





Portfolio Decarbonization Pathways

1.5C Aligned Pathway

- 7% annual intensity reduction
- 50% reduction by 2030
- Near-zero by 2050
- Most stringent requirement
- Aligns with IPCC SR15

2C Pathway

- 4% annual intensity reduction
- 35% reduction by 2030
- Allows more gradual transition

Implementation Levers

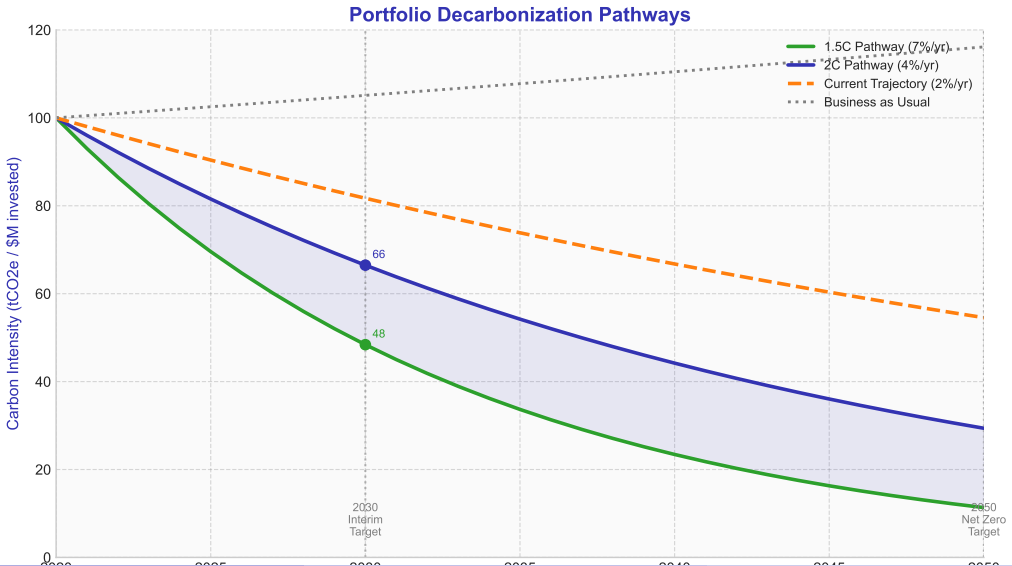
- Portfolio tilting (sector weights)
- Best-in-class selection
- Engagement for improvement
- Divestment from laggards
- Green asset allocation

Measurement

- Carbon intensity (tCO2e/$M)
- Absolute emissions tracking
- Forward-looking metrics
- Implied temperature rise (ITR)

[Goal 1] Pathway selection determines pace of portfolio transformation and interim targets

Portfolio Decarbonization Trajectory



Sovereign Green Bonds and Central Banks

Sovereign Green Bond Growth

- France: €68B+ issued
- Germany: €45B+ Green Bunds
- UK: GBP 16B+ Green Gilts
- Italy: €8.5B BTP Green
- Growing share of sovereign debt

Portfolio Applications

- AAA-rated climate assets
- Liability matching for insurers
- Central bank eligible collateral

Central Bank Green Programs

- ECB: Tilting corporate bond purchases
- BoE: Greening operations
- PBOC: Green lending facilities
- Reserve requirements adjustments

Implications for Portfolios

- Enhanced liquidity for green assets
- Benchmark inclusion effects
- Potential greenium compression
- Policy-driven demand floor

[Goal 1] Central bank actions create structural demand for green assets, affecting portfolio construction

Learning Goal 1: Summary

What We Achieved

- ✓ Mapped net-zero investor landscape
- ✓ Compared alignment methodologies
- ✓ Understood PAB vs CTB benchmarks
- ✓ Defined decarbonization pathways
- ✓ Analyzed sovereign green market

Can You Now...

- Select appropriate alignment methodology?
- Construct climate-aligned benchmarks?
- Set interim decarbonization targets?
- Integrate sovereign green bonds?
- Evaluate central bank policy impacts?

Key Takeaway: Climate-aligned portfolio construction requires choosing appropriate frameworks (PAII, SBTi, NZAOA) and benchmarks (PAB/CTB) that match institutional objectives while following credible decarbonization pathways.

[Goal 1] Achieved - Foundation for applying climate alignment to corporate transition analysis

Discovery Challenge: Corporate Transition Plan Greenwashing

The Puzzle

- Most net zero pledges not backed by near-term policies
- Even if fulfilled: 22B tonnes CO2 in 2050 (not net zero!)
- PwC: Businesses in 10/11 sectors won't meet targets
- SBTi controversy: Allowing carbon offsets?
- Senior management overconfident in integrity programs
- "Say-do" gap widening (rhetoric vs reality)

Questions This Raises

- What makes a credible transition plan?
- How do you validate corporate commitments?
- Should SBTi allow offsets?
- What about hard-to-abate sectors?
- Can investors identify greenwashing?
- What governance is needed?

[Discovery 2] This puzzle will be resolved by Goal 2—transition plan frameworks

Learning Goal 2

Analyze Corporate Transition Strategies

applied — Build - Develops corporate analysis skills

Science Based Targets Initiative Framework

SBTi Scale (2024)

- 7,710+ organizations validated
- 41% of global market cap covered
- 97% growth in near-term targets
- 227% growth in net-zero commitments
- 38% now have both target types

Regional Growth

- Asia: 134% increase
- China: 228% growth rate
- Japan: 1,000+ companies

Business Impact Reported

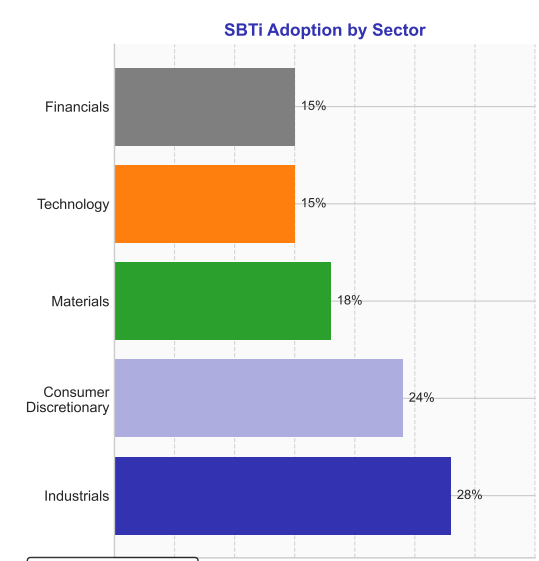
- 95% enhanced reputation
- 92% neutral/positive financials
- 86% accelerated decarbonization
- 80% stronger investor relations

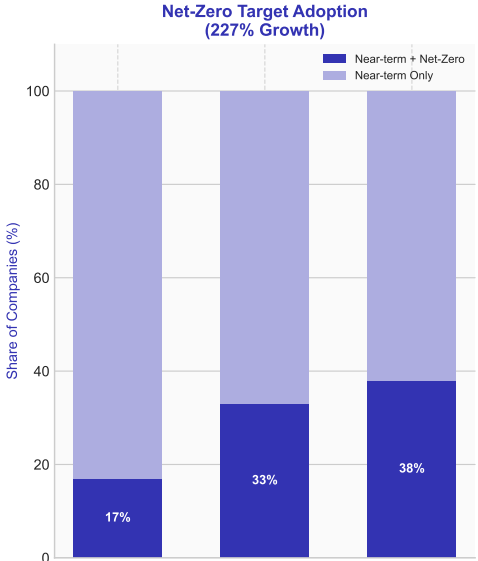
Target Types

- Near-term: 5-10 year horizon
- Long-term: Net-zero by 2050
- Scope 1, 2, and 3 coverage
- Sector-specific pathways

[Goal 2] SBTi provides the most widely adopted framework for credible corporate climate targets

SBTi Adoption and Target Growth





Sector Decarbonization Pathways

Steel Sector

- 10Mt near-zero capacity by 2030
- Requires 100Mt+ for net-zero path
- Three key pathways:
  - Increased scrap (EAF)
  - Green hydrogen (DRI)
  - Carbon capture (BF-BOF)
- 10% gap to net-zero by 2050

Transport and Energy

- Transport: 84% reduction by 2050
- Clean power: 22% of transport energy
- Industry: 33% clean power by 2050
- Aviation/Shipping: Hardest to abate

Key Barriers

- Technology scaling costs
- Green hydrogen availability
- Skilled workforce gaps
- Policy uncertainty

[Goal 2] Sector-specific pathways reveal varying decarbonization challenges and technology dependencies

Corporate Transition Plan Assessment

Assessment Dimensions

- **Ambition:** Target alignment (1.5C/2C)
- **Credibility:** Pathway definition
- **Action:** CapEx alignment
- **Governance:** Board oversight

Key Indicators

- Scope 1-3 emissions trajectory
- Green CapEx allocation (%)
- Green revenue share
- Stranded asset exposure

Maturity Levels

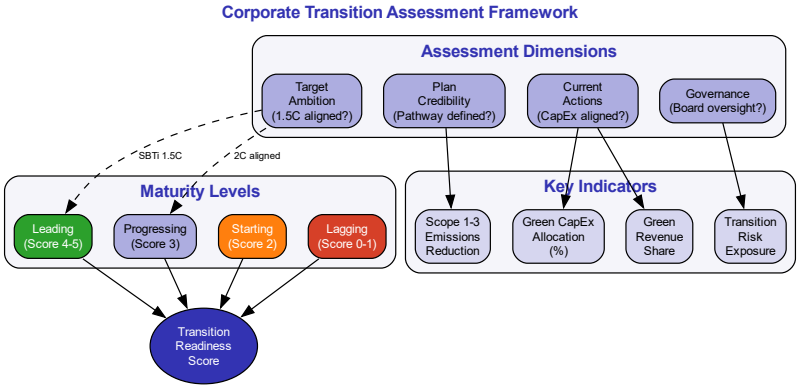
- **Leading (4-5):** Net-zero ready
- **Progressing (3):** Committed
- **Starting (2):** Emerging
- **Lagging (0-1):** No commitment

Case Study: Oil Majors

- Shell: Scope 3 target revision
- BP: Strategy adjustment 2023
- TotalEnergies: Renewables pivot
- Different transition approaches

[Goal 2] Systematic assessment enables comparison of corporate transition credibility across sectors

Corporate Transition Assessment Framework



[Goal 2] A structured assessment framework enables consistent evaluation of corporate transition plans

Engagement vs Divestment Strategies

Engagement Approach

- Maintain ownership for influence
- Vote on climate resolutions
- Direct board-level dialogue
- Collaborative initiatives (CA100+)
- Time-bound escalation

NZAM Evidence (2024)

- 80%+ engage on climate
- 73% report increased ambition
- 46% see real-economy impact

Divestment Approach

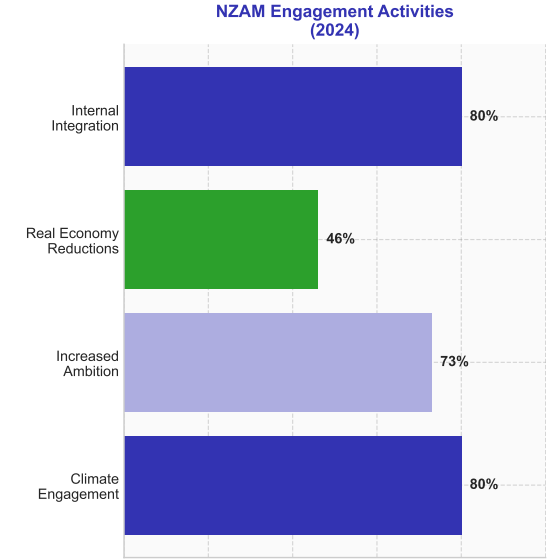
- Immediate portfolio alignment
- Signal market preference
- Reduce transition risk exposure
- Clear reporting metrics
- Limited influence post-sale

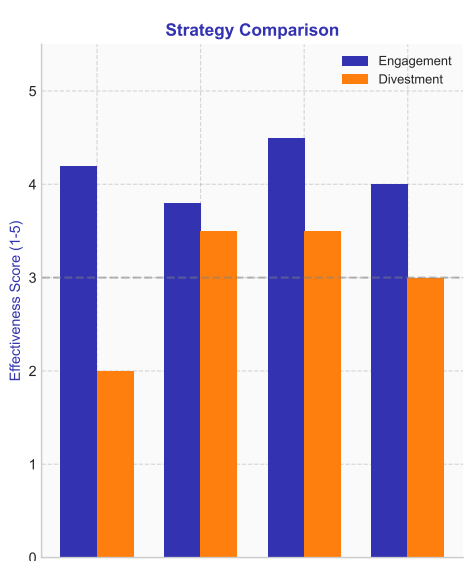
Hybrid Approach

- Engage with time limits
- Escalate to divestment
- Phased exclusion criteria
- Combine voice and exit

[Goal 2] Engagement shows measurable effectiveness but requires clear escalation protocols

Engagement Effectiveness Analysis





Just Transition Principles

Core Concept

- Climate action that leaves no one behind
- Social dimension of decarbonization
- Worker and community protection
- Equitable distribution of benefits

Three Pillars

- **Workers:** Reskilling, social protection
- **Communities:** Economic diversification
- **Society:** Affordable clean energy

Investor Considerations

- Workforce transition plans
- Community engagement quality
- Supply chain social impact
- Human capital management

Assessment Criteria

- Reskilling program scope
- Union/worker consultation
- Regional economic impact
- Job creation vs displacement

[Goal 2] Just transition analysis adds social dimension to corporate transition assessment

Learning Goal 2: Summary

What We Achieved

- ✓ Analyzed SBTi framework and adoption
- ✓ Mapped sector decarbonization paths
- ✓ Developed transition assessment tools
- ✓ Compared engagement strategies
- ✓ Integrated just transition principles

Can You Now...

- Evaluate SBTi target credibility?
- Assess sector-specific challenges?
- Score corporate transition plans?
- Design engagement escalation?
- Incorporate just transition factors?

Key Takeaway: Corporate transition analysis requires evaluating target ambition, plan credibility, current actions, and governance while considering engagement effectiveness and social dimensions of the transition.

[Goal 2] Achieved - Skills for assessing corporate transitions inform fintech and future trends analysis

Discovery Challenge: Green Fintech or Just Tech-Washing?

The Puzzle

- Blockchain carbon credits: Multiple fraud cases
- AI ESG ratings: Black box algorithms
- Digital greenwashing easier than traditional
- Tokenized carbon offsets lack verification
- Some "green fintech" apps just repackage ESG funds
- Crypto carbon footprint vs claimed green benefits

Questions This Raises

- Can blockchain truly solve transparency?
- How do you audit AI ESG models?
- What about crypto energy consumption?
- Are digital carbon markets credible?
- Can fintech scale climate solutions?
- What regulation is needed?

[Discovery 3] This puzzle will be resolved by Goal 3—fintech applications and risks

Learning Goal 3

Explore Green Fintech and Future Trends

applied — Apply - Forward-looking synthesis

Green Fintech Market Overview

Market Size and Growth

- Green finance: $28.7T by 2033
- Green fintech: 22.4% CAGR
- Fintech blockchain: $21.6T by 2034
- AI in fintech: $51B by 2029
- ESG data market: $2.1B (2024)

Key Segments

- Data and analytics platforms
- Carbon markets infrastructure
- Green lending platforms
- Impact measurement tools

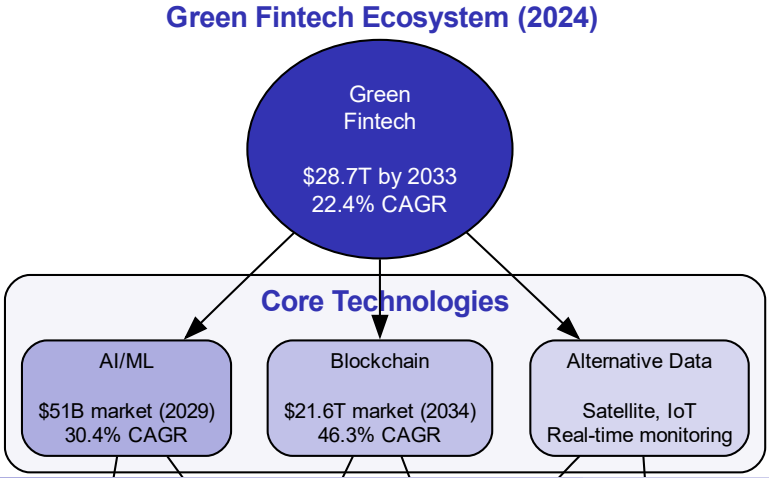
Technology Enablers

- AI/ML: 30.4% CAGR to 2029
- Blockchain: 46.3% CAGR to 2034
- RegTech: 22.8% CAGR to 2032
- Alternative data analytics

Notable Developments

- Hong Kong: $756M digital green bond
- EU Green Bond Standard registry
- Tokenized carbon credits
- Real-time emissions monitoring

[Goal 3] Green fintech is transforming how sustainable finance data is collected, verified, and traded


Green Fintech Ecosystem (2024)
Green Fintech
$28.7T by 2033
22.4% CAGR
Core Technologies
AI/ML
$51B market (2029)
30.4% CAGR
Blockchain
$21.6T market (2034)
46.3% CAGR
Alternative Data
Satellite, IoT
Real-time monitoring

Blockchain for Green Finance

Green Bond Applications

- Digital bond issuance
- Automated use-of-proceeds tracking
- Smart contract coupon payments
- Real-time impact reporting
- Immutable audit trail

Case: Hong Kong Digital Bond

- $756 million issuance (2024)
- World's largest digital green bond
- Blockchain-based settlement
- Institutional adoption milestone

Carbon Market Applications

- Carbon credit tokenization
- Transparent registry systems
- Fractional ownership enabling
- Cross-border trading
- Double-counting prevention

Supply Chain Tracking

- Emissions verification
- Scope 3 data collection
- Certification validation
- Product carbon footprint

[Goal 3] Blockchain provides transparency and traceability essential for credible green finance instruments

AI and Machine Learning in ESG

Data Analysis Applications

- NLP for sustainability reports
- Sentiment analysis of news
- Greenwashing detection
- Regulatory document scanning
- Controversy monitoring

Predictive Models

- Climate risk scoring
- Transition probability estimates
- Default prediction with ESG
- Physical risk assessment

Real-Time Monitoring

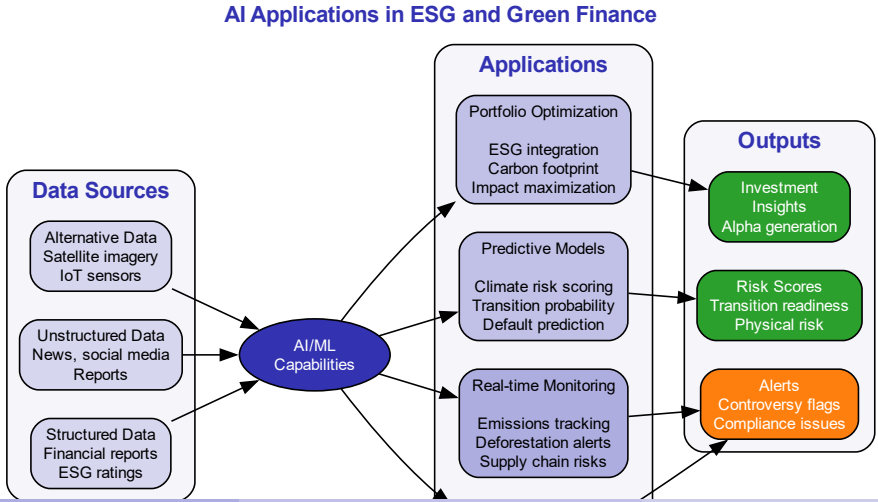
- Satellite-based emissions tracking
- Deforestation alerts
- Supply chain disruption signals
- Weather pattern analysis

Portfolio Applications

- ESG factor integration
- Carbon footprint optimization
- Impact measurement
- Scenario modeling

[Goal 3] AI enables processing of massive unstructured data for enhanced ESG analysis and decision-making

AI Applications Framework



Digital MRV: Monitoring, Reporting, Verification

Traditional Challenges

- Manual data collection
- Annual reporting cycles
- Limited verification scope
- High audit costs
- Data quality concerns

Digital MRV Solutions

- IoT sensor networks
- Satellite monitoring
- Automated data pipelines
- Real-time dashboards
- Continuous verification

Applications

- Renewable energy output
- Emissions tracking
- Water usage monitoring
- Biodiversity assessment
- Carbon sequestration

Benefits

- Reduced verification costs
- Increased data frequency
- Enhanced credibility
- Fraud prevention
- Scalable coverage

[Goal 3] Digital MRV addresses credibility challenges in impact measurement and green bond verification

Course Integration: 8-Week Journey

Foundation (Weeks 1-2)

- Week 1: Market context, theory
- Week 2: Bond mechanics, pricing
- Core: Understanding instruments

Analysis (Weeks 3-4)

- Week 3: ESG data integration
- Week 4: Climate risk, disclosure
- Core: Data and measurement

Implementation (Weeks 5-6)

- Week 5: Project finance models
- Week 6: Regulatory compliance
- Core: Practical application

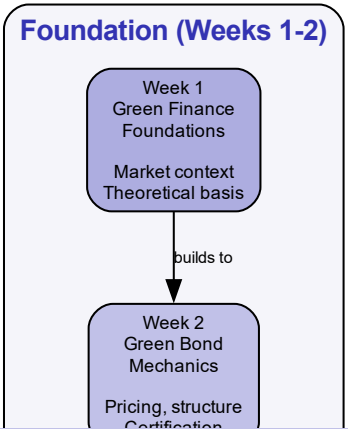
Advanced (Weeks 7-8)

- Week 7: Impact, natural capital
- Week 8: Integration, fintech
- Core: Synthesis and future

Progression: Theoretical foundations → Analytical tools → Implementation skills → Strategic synthesis

[Goal 3] The 8-week structure builds comprehensive green finance competency from theory to practice

Green Finance Professional Certificate - Course Integration



Learning Goal 3 and Course Summary

What We Achieved (Goal 3)

- ✓ Mapped green fintech ecosystem
- ✓ Explored blockchain applications
- ✓ Analyzed AI in ESG
- ✓ Understood digital MRV
- ✓ Integrated full course content

Course Competencies Gained

- Green bond analysis and pricing
- ESG data interpretation
- Climate risk assessment
- Project finance modeling

Can You Now...

- Evaluate fintech solutions?
- Apply blockchain to green finance?
- Leverage AI for ESG analysis?
- Integrate course concepts?
- Develop green finance strategy?

Final Takeaways

- Green finance is rapidly evolving
- Technology enables scale and trust
- Integration across skills is key
- Continuous learning essential

[Goal 3] Achieved - Green Finance Professional Certificate: Ready for implementation