



HARNESSING ARTIFICIAL INTELLIGENCE FOR THE FUTURE OF CONSTRUCTION

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Introduction

Presentation Overview

- **Understand AI in Construction**

Discover how AI is shaping processes from design to execution

- **Explore Real-World Case Studies**

Learn about successful AI Applications in construction projects

- **Identify Challenges and Future Trends**

Discuss key barriers and the opportunities ahead for AI in Construction



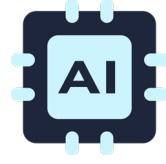
AI in Construction

What is Artificial Intelligence?

AI refers to machines simulating human intelligence to perform tasks. In construction, artificial intelligence can be used to analyse massive datasets to predict equipment failures before they happen. AI tools use data to make decisions and predictions based on patterns.

Common example of AI Tools:

- Instagram showing ads based on reels watched¹
- Netflix making suggestions on your likes or dislikes²
- Google Maps analysing traffic data to suggest better routes³



¹<https://transparency.meta.com/features/explaining-ranking/ig-reels-chaining/>

²<https://www.geeksforgeeks.org/how-netflix-uses-artificial-intelligence/>

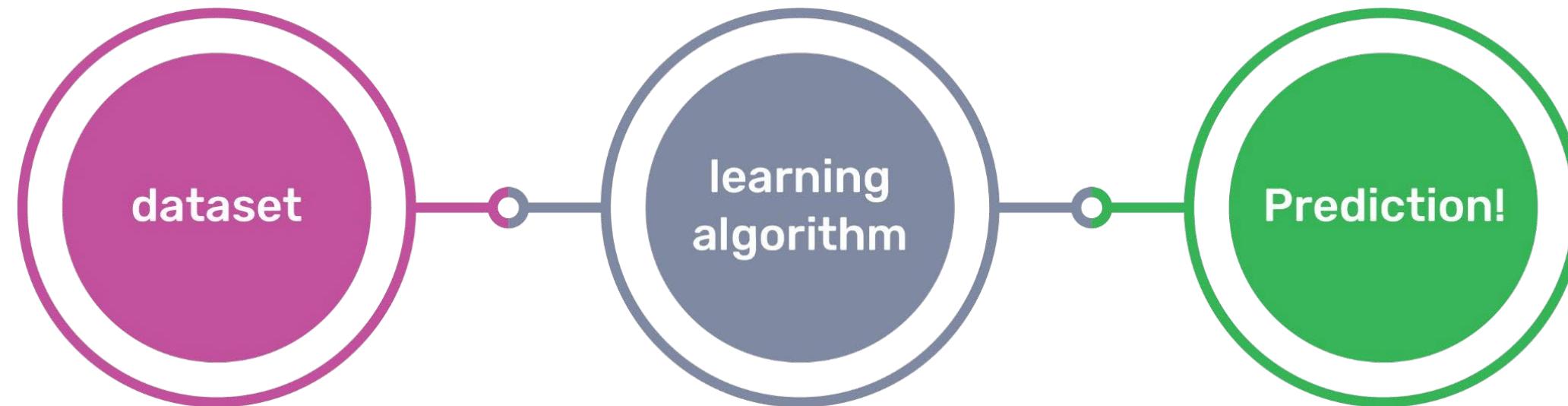
³<https://blog.google/products/maps/google-maps-101-how-ai-helps-predict-traffic-and-determine-routes/>

AI in Construction

MACHINE LEARNING

ML is the subset of AI that enables machines to learn from data and improve over time.

Machine learning systems in construction can predict the impact of weather on project schedules.



AI is **different from automation** because it improves decision-making, while automation follows predefined rules. In construction, AI adjusts plans automatically based on real-time conditions, while automation might only carry out preset tasks.

For example:

- A sprinkler system that waters a lawn according to a pre-programmed schedule.¹
- A basic spell-checker identifying misspelled words based on a dictionary.²

¹<https://www.cnbc.com/2024/06/17/irrigreen-smart-sprinkler-ai.html>

²<https://www.grammarly.com/spell-checker>

Impacts of AI

Why AI in Construction?

- **Efficiency:** AI tools optimise scheduling, design, and workflows to reduce delays and errors.

Autodesk's 2024 report shows 78% of industry leaders believe AI enhances productivity, informed design, and workflow optimization, reducing delays and errors.¹

- **Cost Savings:** Predictive analytics helps reduce material waste and optimise resource allocation.

BAM Nuttall uses AI-driven predictive analytics to forecast concrete strength development, optimizing construction schedules and resource allocation while reducing material waste.²

- **Safety:** AI enhances safety by detecting hazards in real-time.

viAct's AI-powered construction solutions, monitor sites, sends automated alerts, analyses risky behaviors, predicts accidents, and provides detailed safety reports to improve performance.³

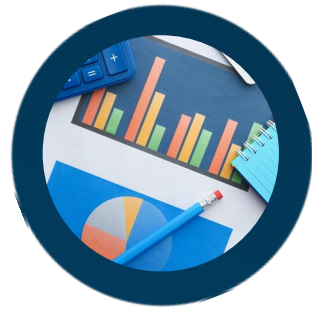
¹ <https://www.autodesk.com/design-make/articles/generative-ai-in-construction>

² <https://constructionmanagement.co.uk/bam-uses-artificial-intelligence-predict-concrete/>

³ <https://www.viact.ai/post/beyond-helmets-and-harnesses-the-future-of-ai-in-construction-safety>

Key Applications of AI

AI in Project Management and Scheduling



Predictive Analytics

- AI analyses historical data
- Forecast project timelines
- Mitigate risks, and
- Improves cost overruns.

OpenSpace utilizes AI-driven 360-degree image mapping to create an interactive visual record of construction progress, helping project teams monitor timelines and detect deviations.



Automated Scheduling

AI can dynamically adjust project schedules based on real-time factors like weather or supply chain disruptions.

ALICE Technologies offers an AI-driven platform that optimizes construction scheduling by simulating various project scenarios and thereby reducing projected completion time by 15%.

Key AI Applications Cont.

AI for Safety and Risk Mitigation



Computer Vision

AI-powered cameras detect safety hazards (e.g., workers without helmets) in real-time.

Smartvid.io utilizes AI to analyze images and videos from job sites, identifying potential safety hazards and reducing accident risks. The tool can automatically tag safety best practices and areas for improvement. ¹



Drones

Used for site monitoring to gather data for risk assessments and progress tracking.

DroneDeploy, uses proprietary AI with multimodal models to automatically identify construction site safety risk as well as monitor project progress and spot defects early on. ²

¹ <https://aps.autodesk.com/customer-stories/smartvidio>

² <https://www.dronedeploy.com/blog/dronedeploy-revolutionizes-safety-risk-detection-in-construction-with-launch-of-safety-ai>

Key AI Applications Cont.

Mid-Workshop Interaction

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Time to share our personal experiences with various AI Applications and some challenges we might have encountered.

5 MINUTES



Key AI Applications Cont.

AI in Design and Planning



Generative Design

AI tools like generative design create multiple design solutions based on project constraints.

Fusion 360 equips users with an extensive array of modeling tools and generative design capabilities that leverage machine learning and AI to define requirements, constraints, and materials for creating production-ready designs

BIM (Building Information Modeling) Optimization



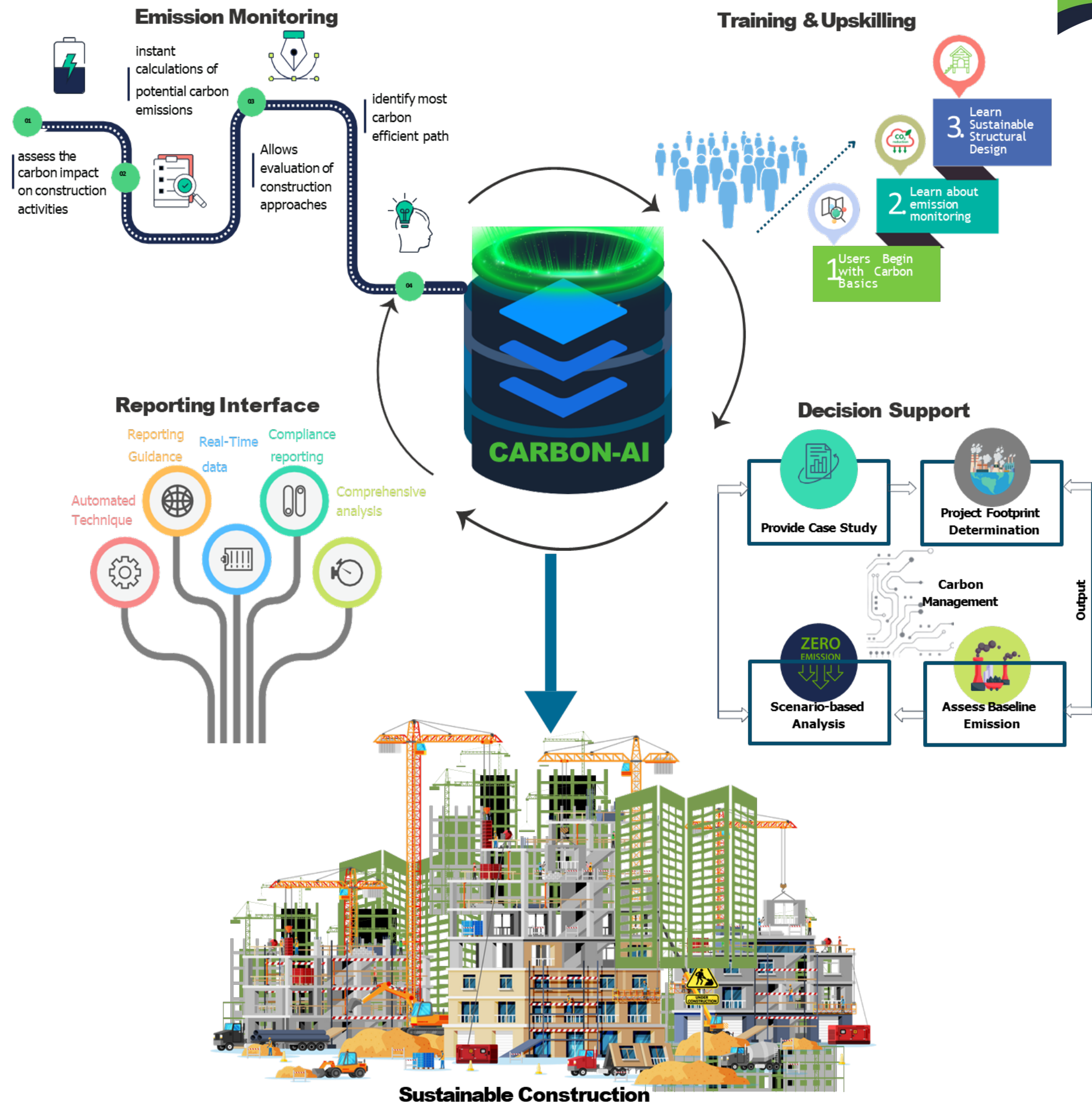
AI enhances BIM models by predicting future challenges and suggesting improvements.

Artificial Intelligence in **BricsCAD BIM** is used to optimize geometry and make existing 3D geometry smarter.¹

¹<https://www.buildingsmart.org/artificial-intelligence-in-bim-and-renovation/>

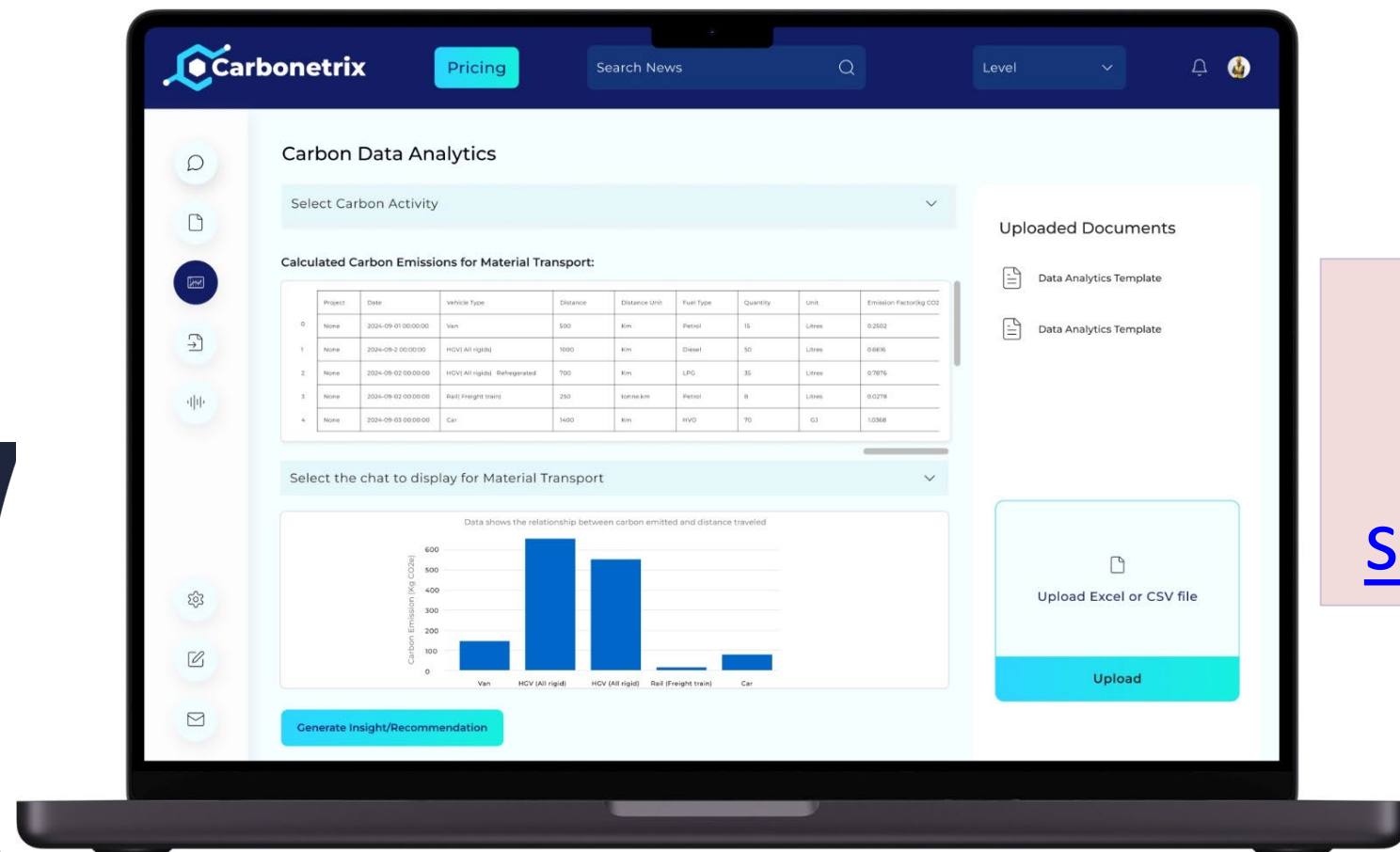
Case Study: AI in Action

Successful AI Implementation by Carbonetrix

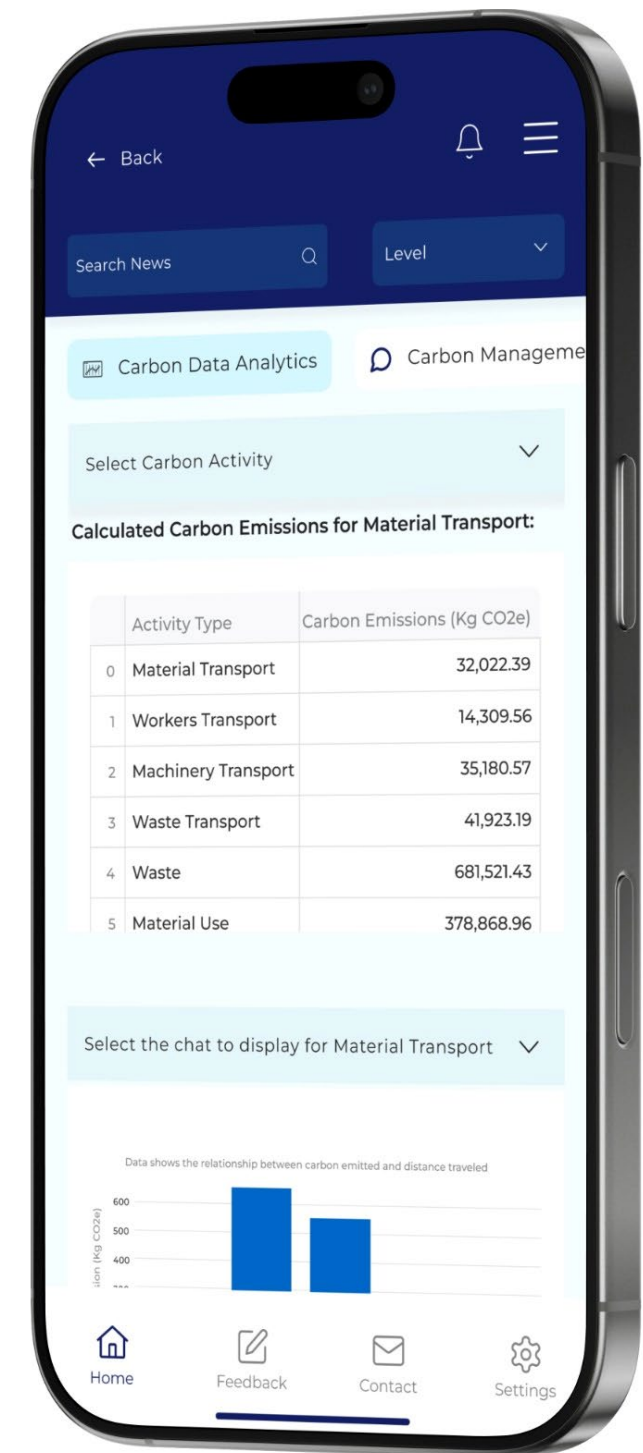


Case Study: AI in Acton

Successful AI Implementation by Carbonetrix



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- ✔ Unlimited file upload (Pdf, Doc, Audio, Image & Video).
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- ✔ Share carbon insights.
- ✔ Get unlimited support.

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Recommended

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- ✔ Unlimited file upload (Pdf, Doc, Audio, Image & Video).
- ✔ Get access to **CaDI** (Carbon Data Intelligence). Generate insight & download data report.
- ✔ Register up to 5 users within an organisation.
- ✔ Share carbon insights.
- ✔ Get unlimited support.
- ✔ Free onboarding process.

Choose Plan

Enterprise

Contact Us

The enterprise plan includes:

- ✔ Get access to **BECM-AI** (Built Environment Carbon Management AI) Assistant.
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- ✔ Unlimited file upload (Pdf, Doc, Audio, Image & Video).
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- ✔ Unlimited users.
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- ✔ Get unlimited support.
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AI Challenges

Challenges in AI Adoption

- **Workforce Skills Gap**

- ❑ AI adoption may be slowed by the need to upskill construction workers in AI tools.

There is a shortage of professionals trained to operate AI tools and integrate them with traditional construction processes, which hinders the full adoption of AI technologies (Regona et al., 2022).

- **Data Management**

- ❑ AI requires high-quality, structured data. Many construction firms struggle with fragmented or incomplete data.

The construction industry often suffers from fragmented data sources, making it difficult to effectively apply AI solutions that require large, consistent datasets (Regona et al., 2022).

AI Challenges Cont.

Challenges in AI Adoption

- **Financial Investment**

- ❑ Initial investment for AI implementation can be significant.

Small and mid-sized firms often hesitate to **invest in AI** due to the upfront costs, even though the long-term ROI is proven.



Future Trends in AI

Opportunities and Future Trends



Sustainability

AI helps optimise resource usage, promoting greener, more efficient construction practices.

Qflow enables you to make informed decisions on cost, carbon and quality. Collecting real-time materials and waste data at source for construction teams.¹

Autonomous Construction Vehicles



AI will drive innovation with autonomous machinery performing repetitive tasks.

SafeAI's AI powered software allows construction and mining sites to transform their existing vehicles and operations into autonomously operating assets.²

¹ <https://www.qualisflow.com/>

² <https://www.safeai.ai/>

Key AI Applications Cont.

End of Workshop Interaction

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How do you see AI impacting your projects? Would you be implementing AI anytime soon?

5 MINUTES



Conclusion

Key Insights 1

AI is revolutionising construction with better efficiency, safety, site monitoring, and risk assessment that enable **proactive measures**.

Resources 1

For further learning, explore platforms like **Autodesk's** AI tools for construction, AI-powered design, and operations solutions.

Key Insights 2

AI drives **predictive analytics**, that is, data-driven decision-making, forecasting, and scenario planning.

Resources 2

Stay updated on latest AI innovations within the industry via –“AI in AIEC”
<https://www.aiinaec.com/the-aec-ai-hub>



THANK YOU!

For Your Attention

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