



NVF LEAP TO ZERO

Accelerating the Transition to Zero Emission Construction Sites

- **General Overview**
- **Electrification (Vehicle + Charging)**
- **Process improvement (Smart Construction®)**

NVF & Leap to Zero Conference 21th October 2025
Takao Nagano

General Manager of Center of Excellence
Komatsu Europe International N.V.

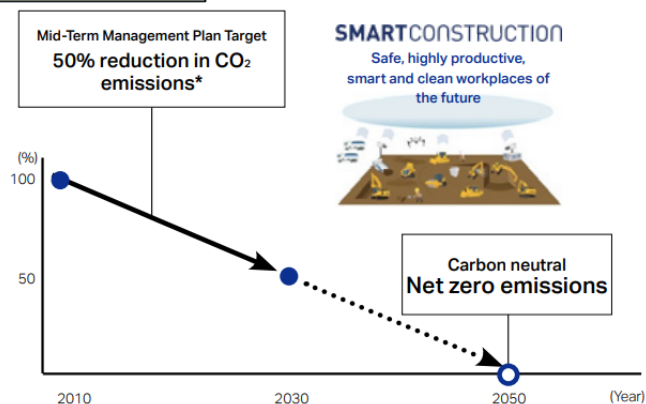
General Overview | Pursuit of 2050 Carbon Neutrality

Komatsu target reducing CO₂ by half in 2030, Achieving Carbon Neutral by 2050.

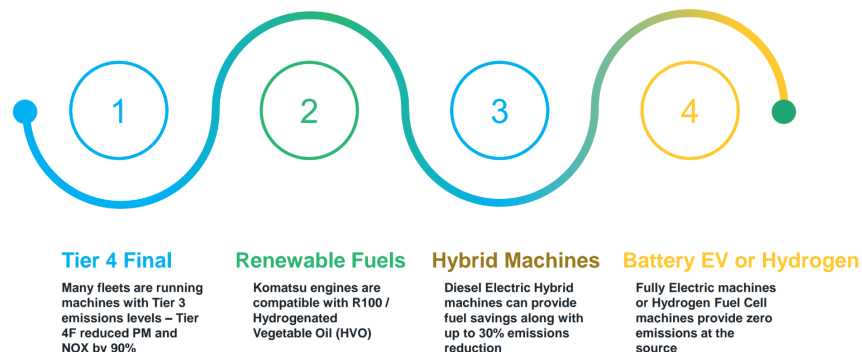
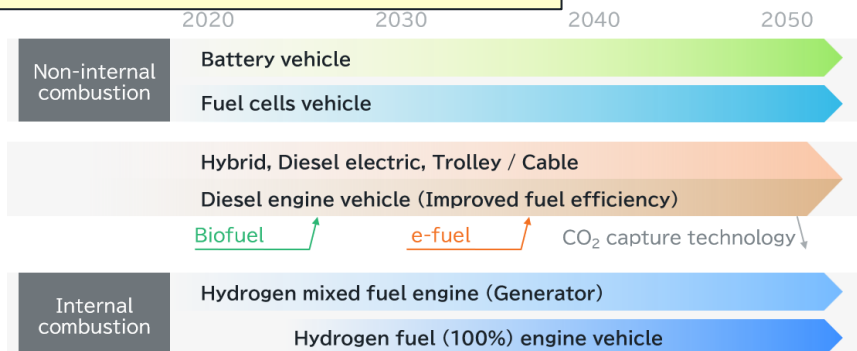
	Mid-Term Management Plan Targets 2030	2050 Carbon neutral
CO ₂ emissions	50% reduction (from 2010)	Virtually Zero
Rate of renewable energy usage	50%	100%

Komatsu's Initiatives

- Pursuit of carbon neutrality at Komatsu production bases
- Development of products that reduce environmental impacts (product improvements)
- Provision of solutions that improve customer workplaces (process improvements)
- Reduction of CO₂ emissions through forestry machinery business
- Reduction of CO₂ emissions through Reman operations

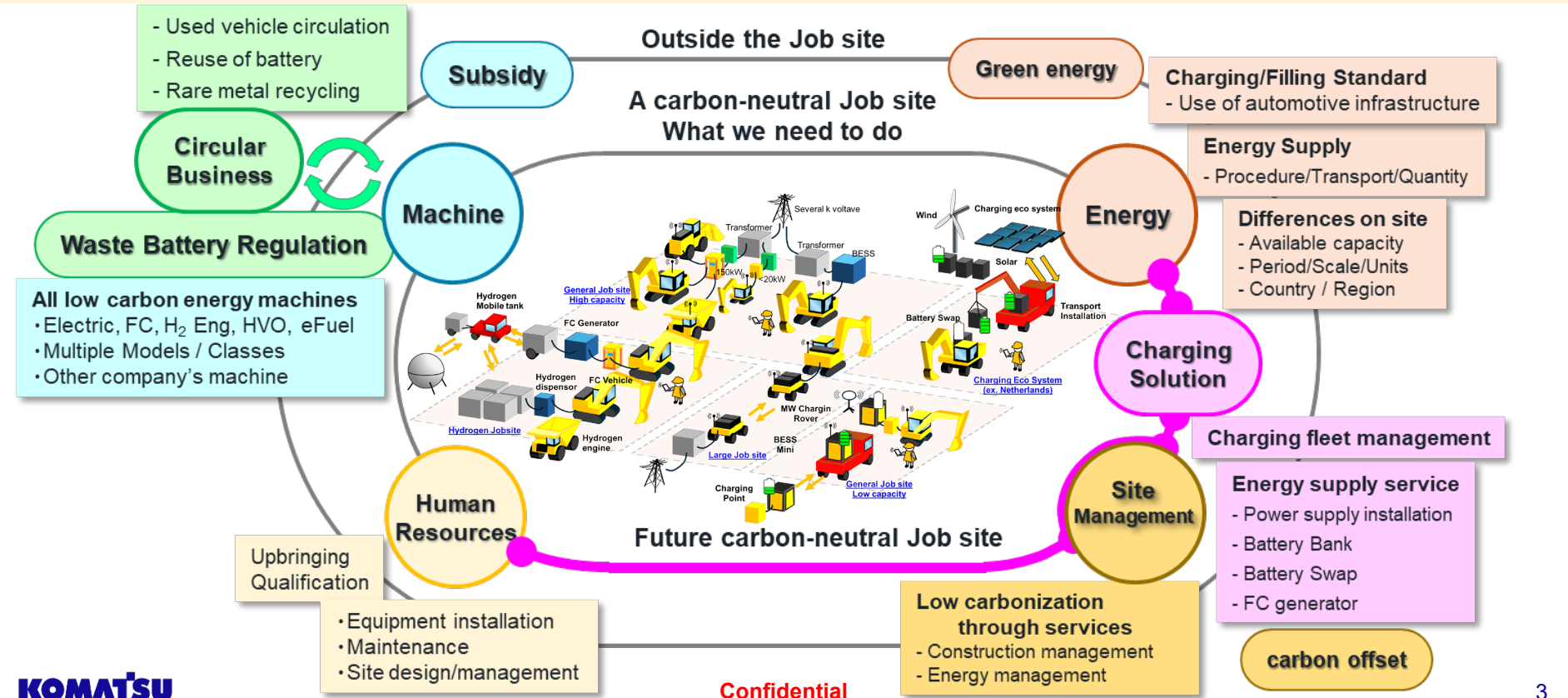


Komatsu proceed multiple power sources

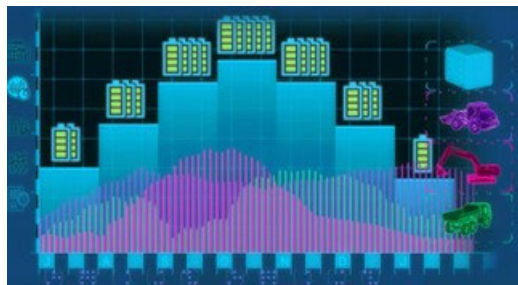


General Overview | Aiming for a Carbon-Neutral Job site

There are various necessary items to realize a carbon-neutral site. KOMATSU keep in mind not only vehicle, but also energy supply, and on-site management.



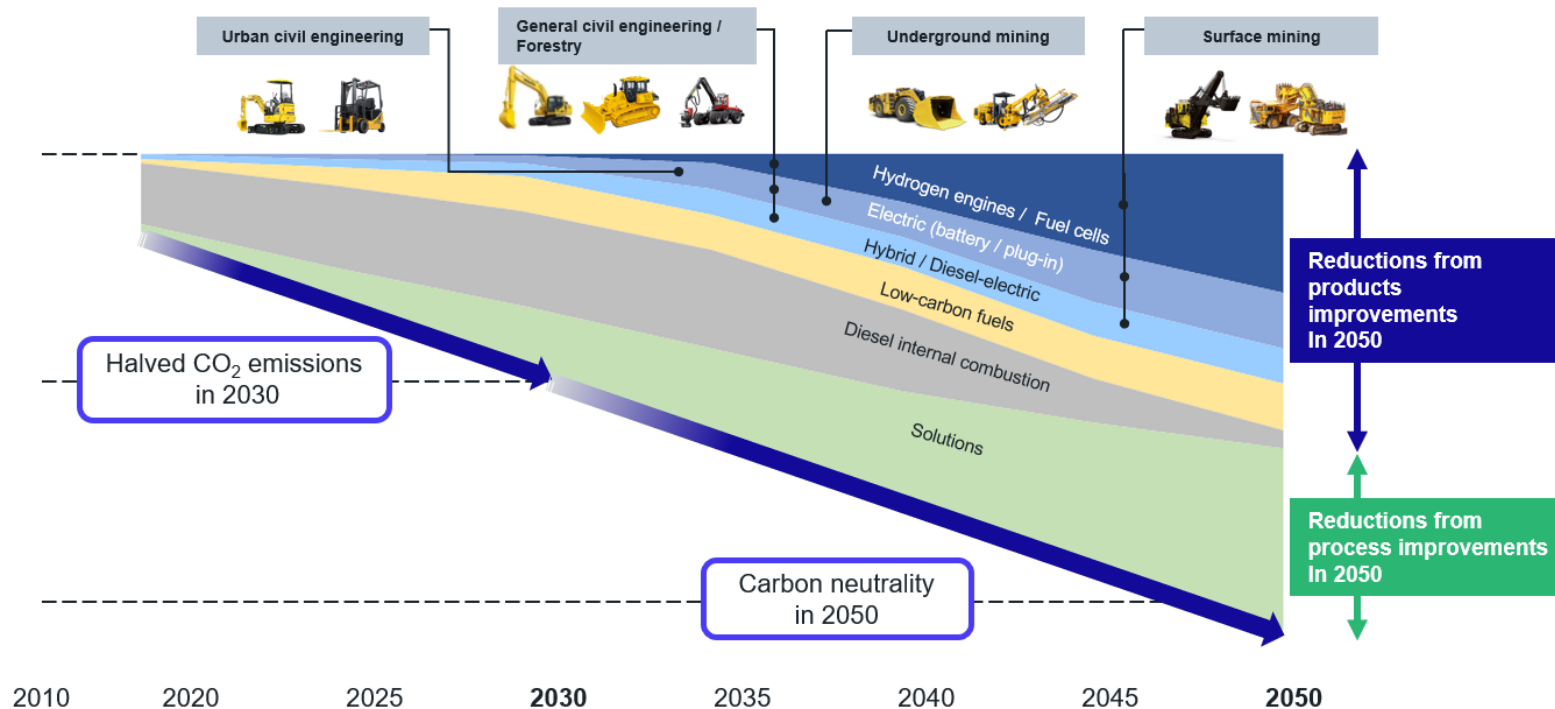
General Overview | Komatsu Future Vision



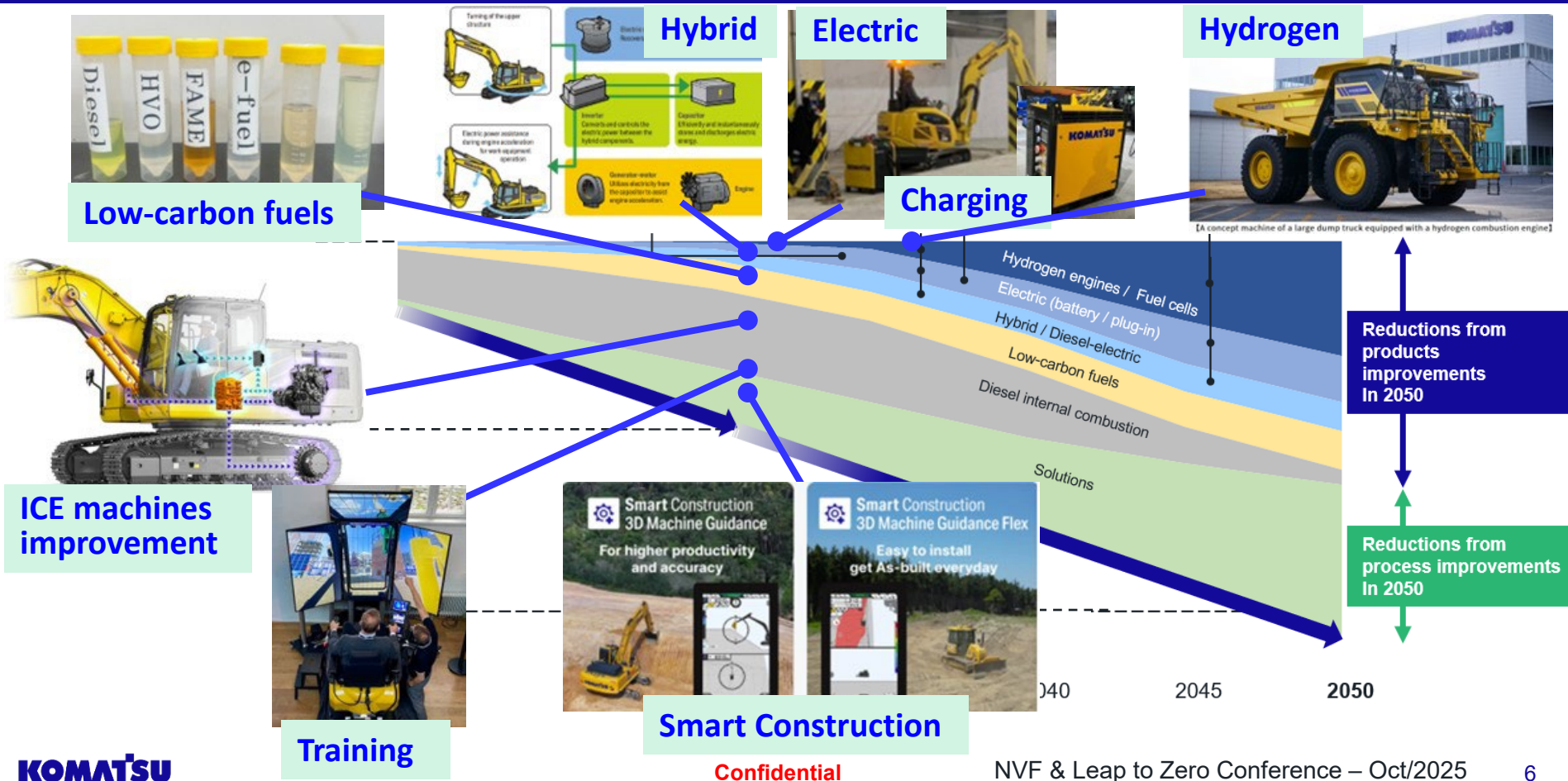
https://www.youtube.com/watch?v=W_12_2-RMaU

General Overview | Roadmap for achieving CN

Each product has each suitable option for Carbon Neutral.



General Overview | How to Carbon-Neutral Job site <Summary>



Electrification Vehicle + Charging

Electrification | Electric model line-up by Komatsu



9010C



9020XPC



PC4000~8000



(Diesel Electric/Tethered)



LF19EB



320XPC



WE1350-3



WE1850-3



WE2350-2



WX18H



WX22H



730E ~980E Diesel Electric (205~400t)



- Include not EU models.
- Include Diesel Electric models

Electrification | Electric Utility sales model for European Market

PC20E



Sales model

 11.8 kW
 23 kW/h
 2,100 kgs



PC26E



Sales model

 15.8 kW
 23 kW/h
 2,655 kgs



PC33E



Sales model

 17.4 kW
 35 kW/h
 3,620 kgs



Onboard Charger Standard (Type2)
Charge Anywhere, Anytime
External Fast Charger Option

External Fast Charger Standard
Back to Action in no-time

Electrification | Small & Mid size excavator and Wheel Loader

PC210E

Pilot model



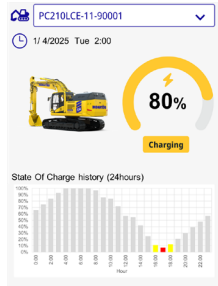
PC138E

Pilot model



WA Electric

Concept model



123kW
451 kW/h
24,000 kgs

CCS2 charging Standard

72.5kW
225.5 kW/h
15,100 kgs

6,000 kgs

Bucket Capacity 1m³
CCS2 charging Standard
+ 22kW onboard charger (Type2)

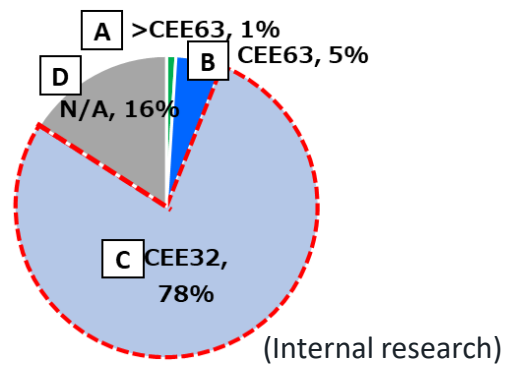
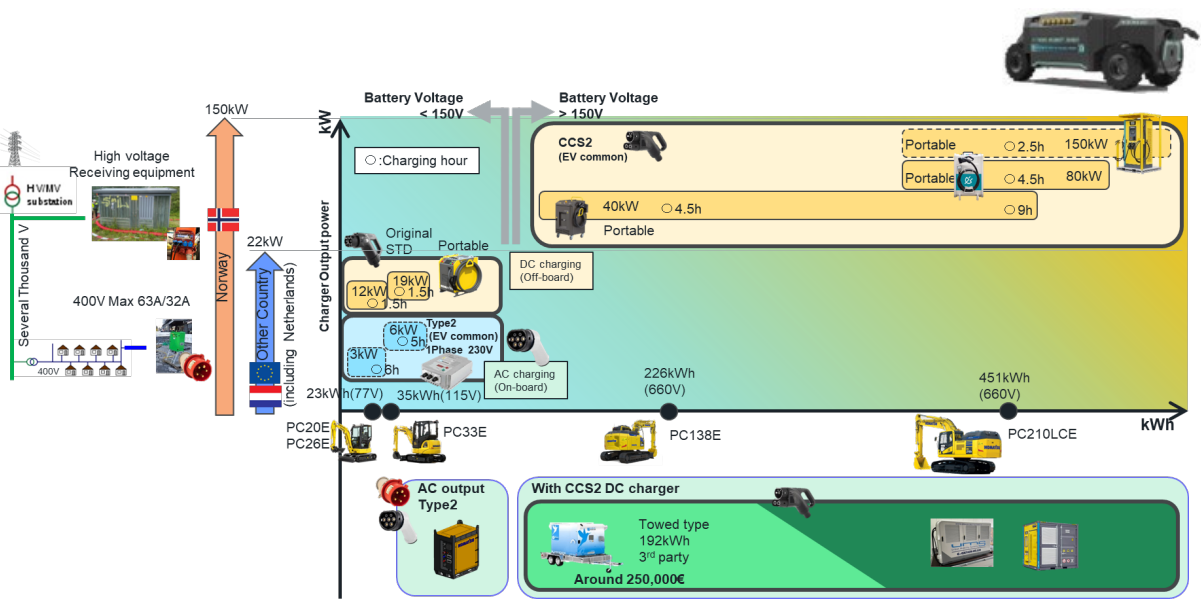
Battery Support App
KOMATSU

Confidential

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Electrification | Electric charging infrastructure and Solutions

Power source situations are difference based on country, area, application, site etc.
Komatsu will work with Partners to prepare solutions.



	Kw	Coverage	Overnight charging			Connection image
			3t	13t	20t	
A	>CEE63	1%	OK	OK	OK	
B	CEE63	5%	OK	OK	Maybe OK	
C	CEE32	78%	OK	Maybe OK	NO	
D	N/A	16%	-	-	-	

Electrification | Charging solution potential

Necessary to seek good solution of charging to solve customer's pain point on electrification.



Concept

On site generation by Hydrogen



HICE generators

Concept model
(Japan)



Concept model



Mobile Megawatt Charging

1MW output
295kWh
Remote control
Autonomous operation

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Collaboration

CCS2 charger interoperability



Trial model



BESS for mini

35kWh
Easy to transport
(ADR compliant)
Re-use battery concept
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Collaboration

BESS for mini

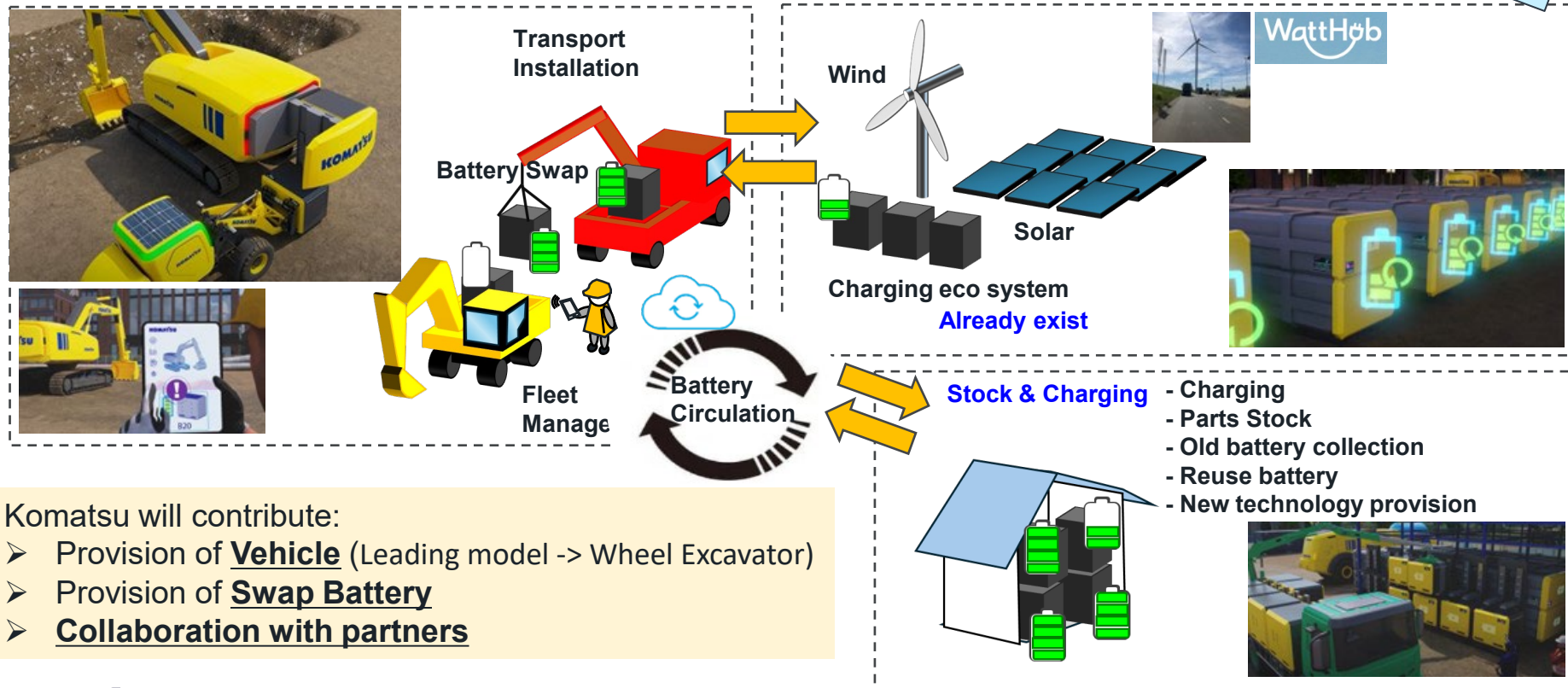
200kWh
CCS2 charging



Electrification | Battery Swapping Solution Concept

Battery Swap Solutions have great potential for sites with limited or no power capacity.

Concept

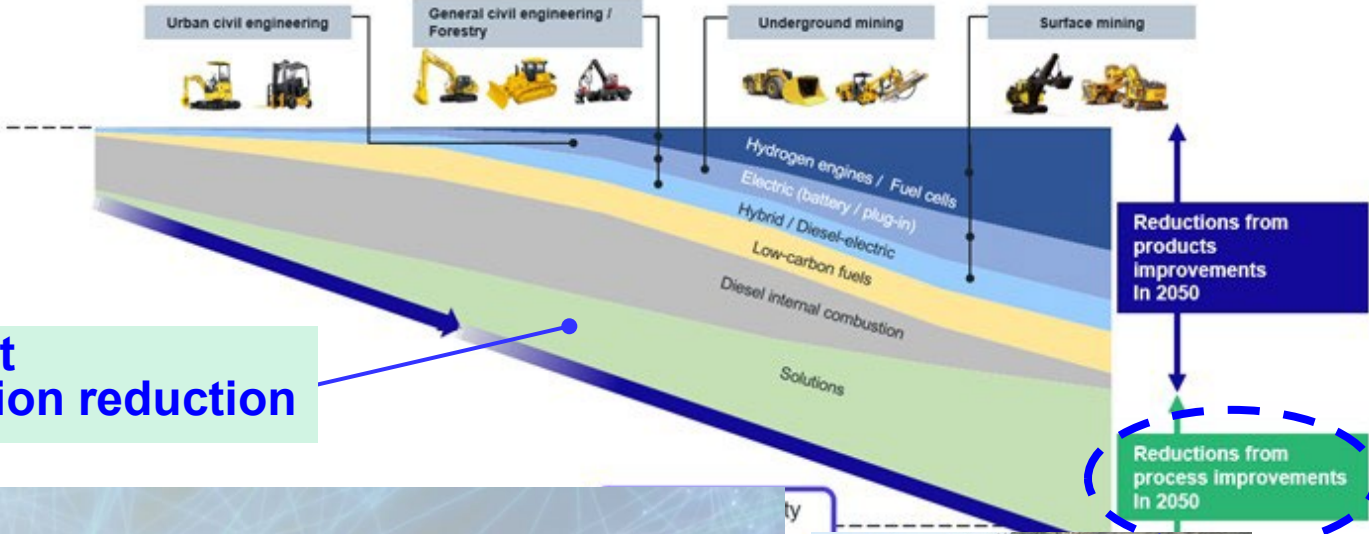


Komatsu will contribute:

- Provision of **Vehicle** (Leading model -> Wheel Excavator)
- Provision of **Swap Battery**
- Collaboration with partners

**Process improvement
Smart Construction®**

Process improvement | Smart Construction



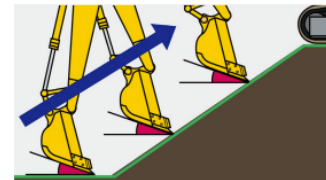
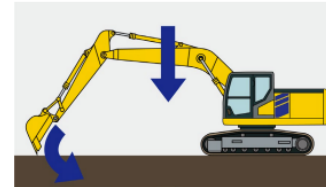
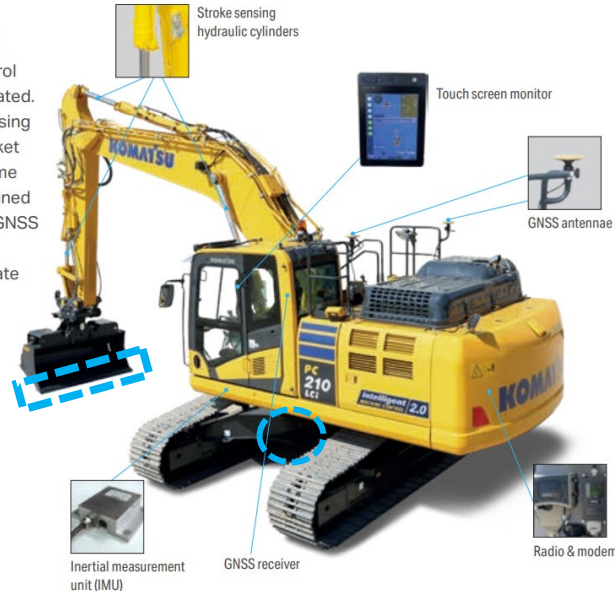
Process improvement | Intelligent Machine Control (IMC)

IMC machine has lots of function to support operator with electrical control.
Machine location and **teeth position** can be recognized by each sensor and GNSS antenna.
Machine recognize the Construction plan and Final Terrain.

Intelligent Machine Control 2.0

Integrated – Factory installed components

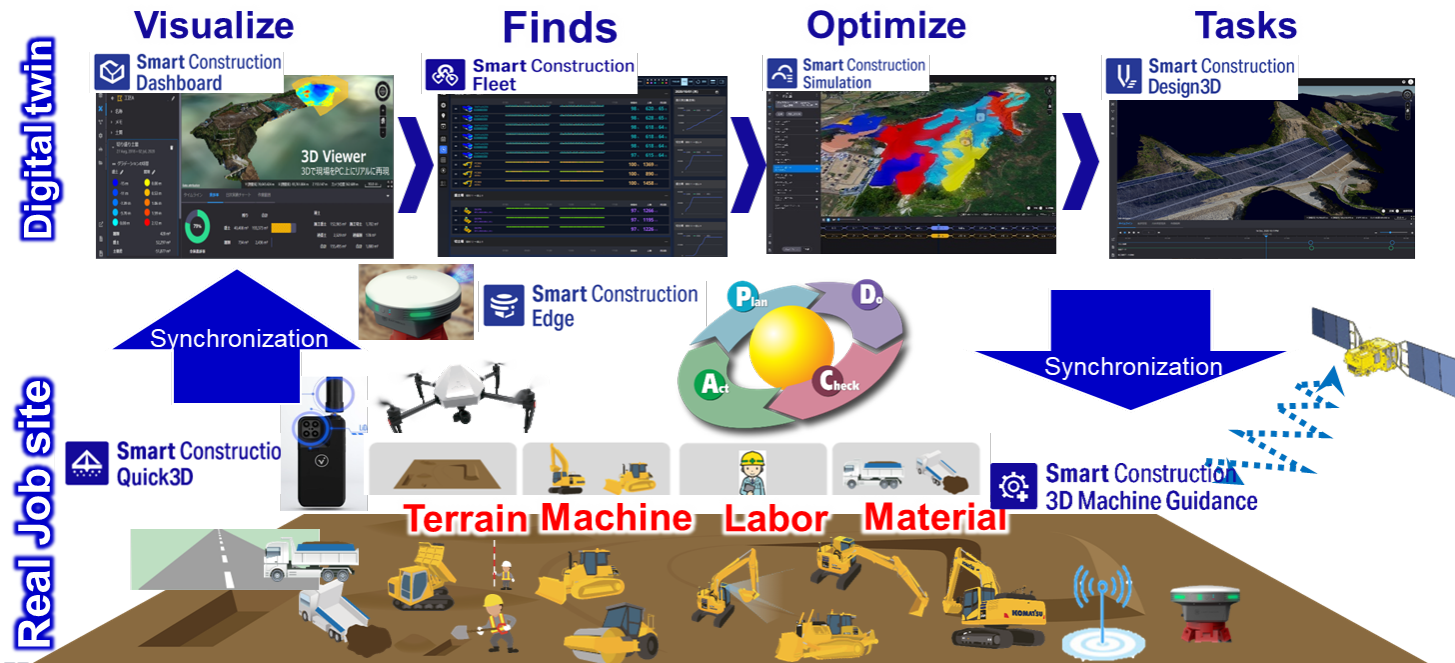
The intelligent Machine Control system is fully factory-integrated. Komatsu's unique stroke sensing cylinders for boom, arm, bucket and tilt bucket provide real time bucket tip positioning. Combined with built-in IMU sensor and GNSS antennae, the PC210LCI-11 can achieve incredibly accurate performance, consistently.



Process improvement | Smart Construction Solution Architecture

Optimize construction plan in digital twin

We **digitize information from the real-world construction jobsite**, including terrain, machinery, workers, and materials. By **creating optimal construction plans (digital tasks)** in cyber world and **feeding them back into the actual construction process**, we are creating an innovative construction jobsite.

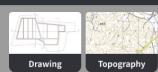


Process improvement | Smart Construction Application

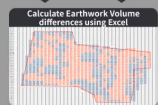


Planning time comparison : Large-Scale Land Development Work
(Assuming approximately 500,000 m²)

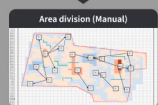
Conventional



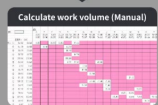
Calculate Earthwork Volume
differences using Excel



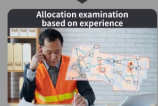
Area division (Manual)



Calculate work volume (Manual)



Allocation examination
based on experience



1~4 weekends

Smart Construction Simulation



Calculate Earthwork volume (Auto)



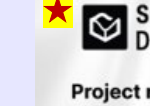
AI area division (Auto)



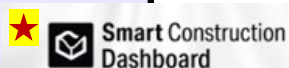
AI soil distribution plan (Auto)



Automatically calculate
soil distribution volume
and drainage



A few



Project management in 3D

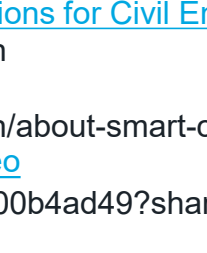


Inspection



We can create the value
that customers expect

- Smart Construction Edge
- Smart Construction Quick3D
- Smart Construction Rover
- Smart Construction Fleet
- Smart Construction 3D Machine Guidance
- Smart Construction Whiteboard



For more information

[【Official】Smart Construction | DX Solutions for Civil Engineering](https://jp.smartconstruction.com/en)

<https://jp.smartconstruction.com/en>

[About Smart Construction](https://jp.smartconstruction.com/en/about-smart-construction)

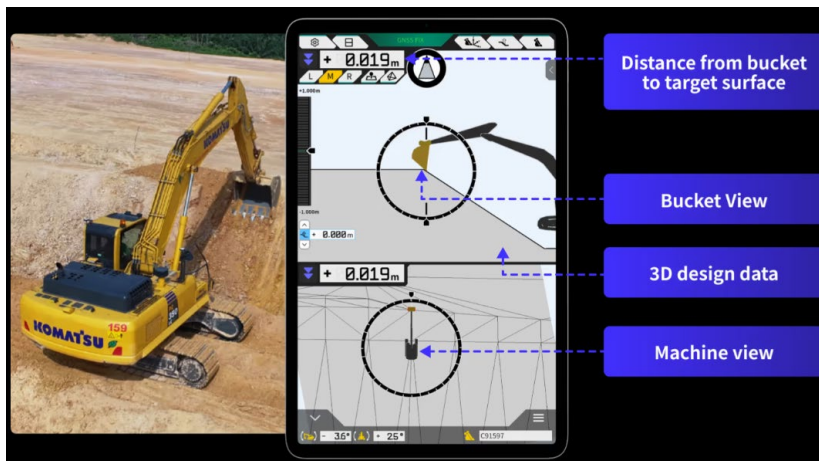
<https://jp.smartconstruction.com/en/about-smart-construction>

[Smart Construction Dashboard on Vimeo](https://vimeo.com/1078148396/2900b4ad49?share=copy)

<https://vimeo.com/1078148396/2900b4ad49?share=copy>

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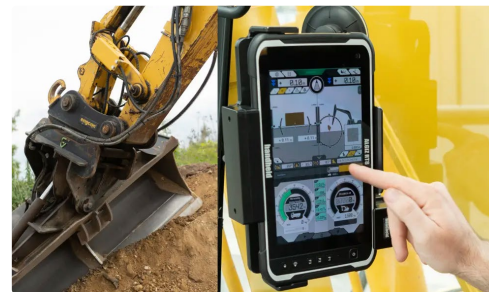
Process improvement | 3D Machine Guidance



2D and 3D Guidance



Safety Zone Alert in 3D



Dynamic Payload Metering



Two-piece boom



Tilt Rotator / Bucket / Coupler

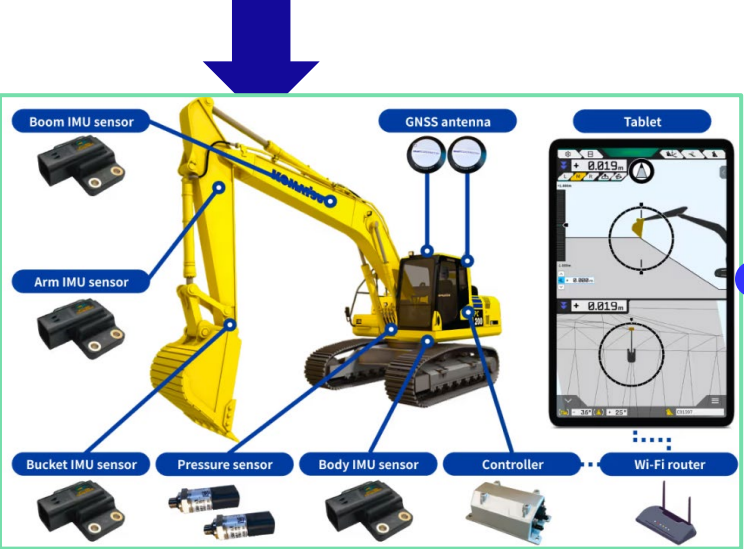


Super Long Front

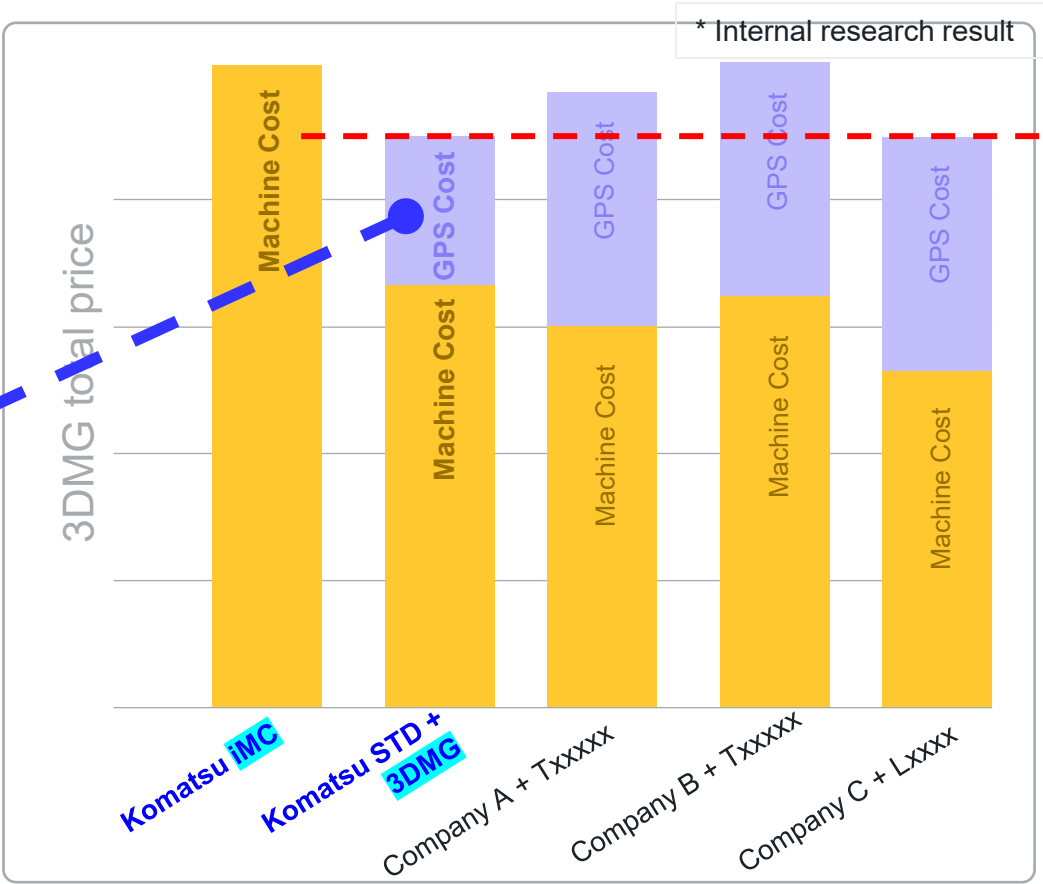
Smart Construction 3D Machine Guidance can be installed on conventional excavator, and by using IMU sensors and GNSS antennas, it identifies the current position, **allowing machine to reference the 3D design data while operating the machine.**

Process improvement | 3D Machine Guidance (3DMG), price comparison

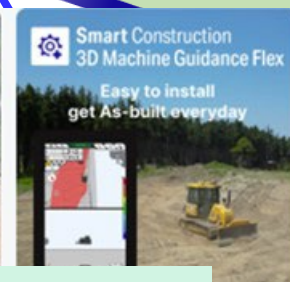
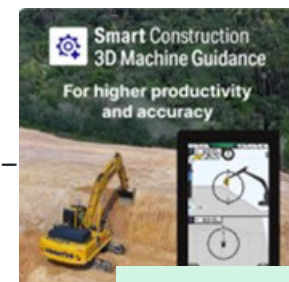
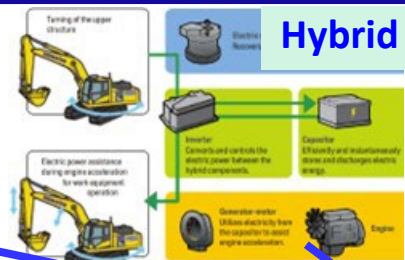
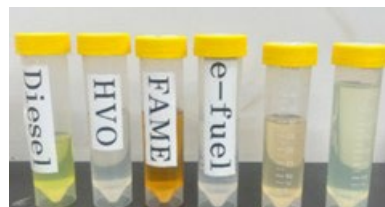
Even though iMC2.0 is still state of the art on the market, the customer might not need all features or different sizes



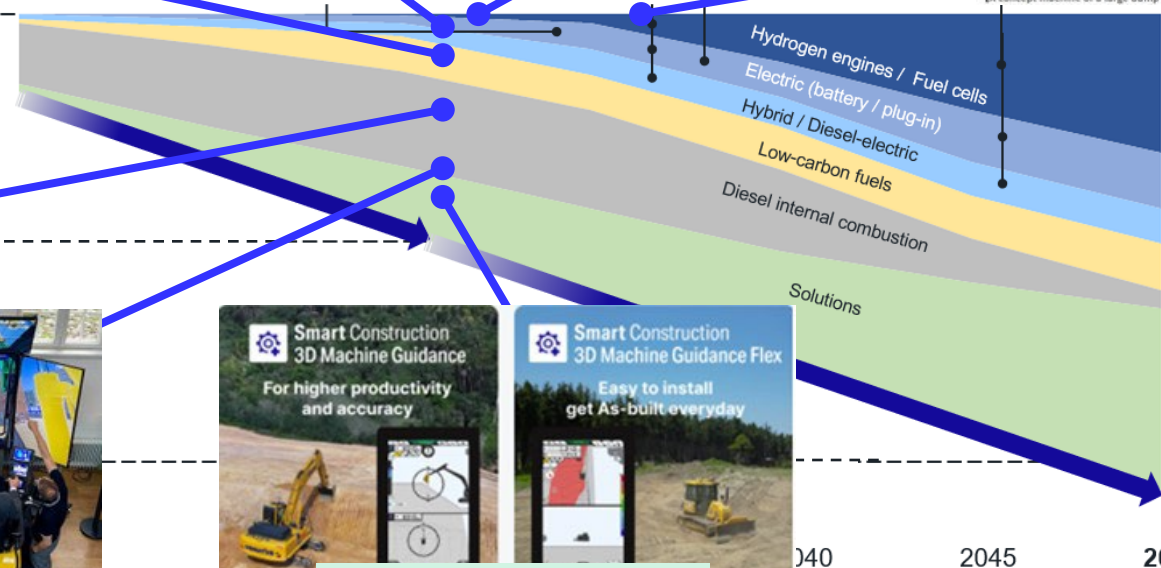
Combining Komatsu -11 machines with our **in-house 3DMG technology** brings us up to speed at a cost-effective price.



Summary



Smart Construction



Reductions from products improvements In 2050

Reductions from process improvements In 2050

KOMATSU

Creating value **together**