



Sustainability &
Construction Team



EPDs & Embodied Carbon from a Manufacturer's perspective

Presented By: Chris Newman – Zero Carbon Design Manager



Making Positive Contributions to the Earth and Its People through Technology and Action

- Reduce CO₂ emissions from product usage by 30% (Base year: fiscal 2001)

- Reduce total CO₂ emissions from production by 30%*² (Base year: fiscal 1991)

- Aim to reduce CO₂ emissions from power generation

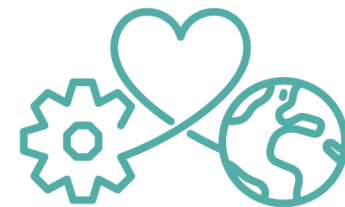
Creating a Low-Carbon Society

Creating a Recycling-Based Society

Respecting Biodiversity
Ensuring harmony with nature and fostering environmental awareness

- Promote product “3Rs”; reduce, reuse and recycle
Reduce resource inputs

- Aim for zero emissions from manufacturing



Environmental Sustainability Vision 2050

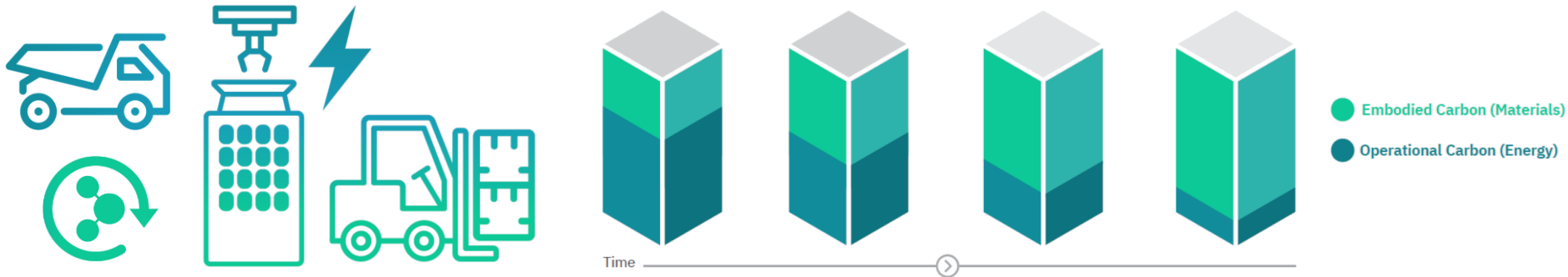
Resource circulation

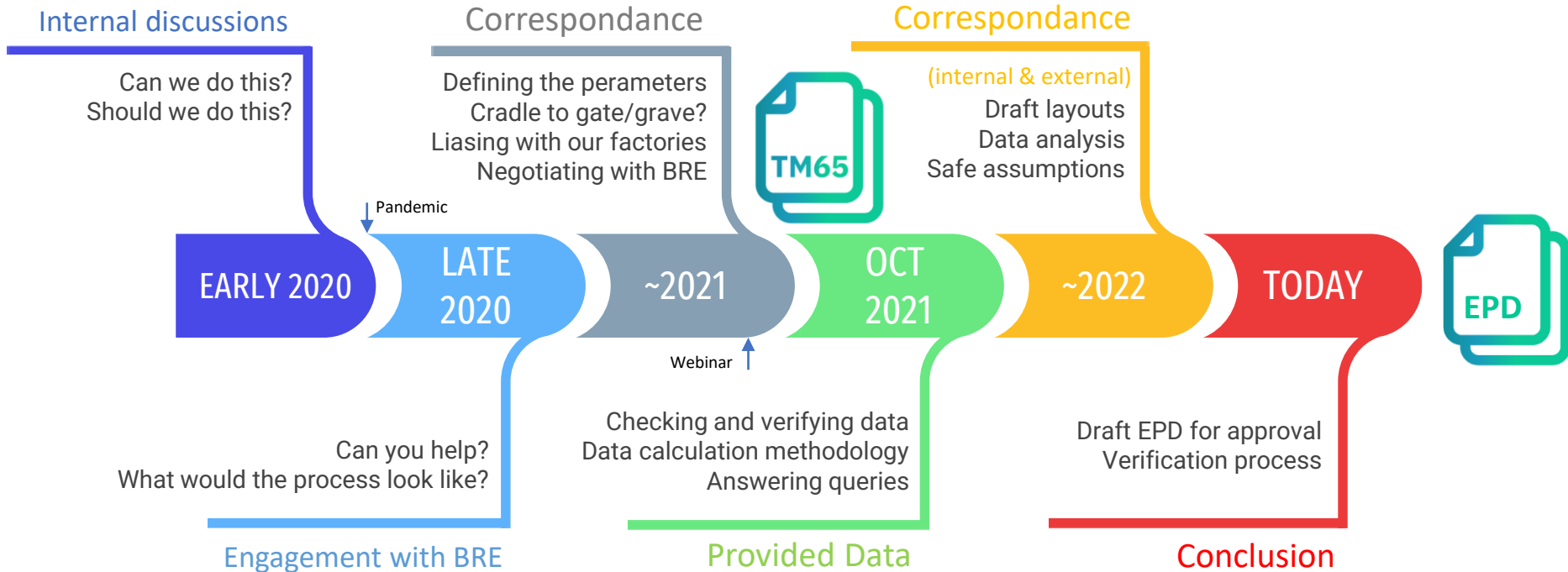
Reducing the size and weight of products, we will consider the use of recycled materials and the recyclability rate of the products and systems we produce

*² Mitsubishi Electric Corporation: Base year fiscal 1991;
Affiliated companies in Japan: Base year fiscal 2001;
Affiliated companies outside Japan: Base year fiscal 2006

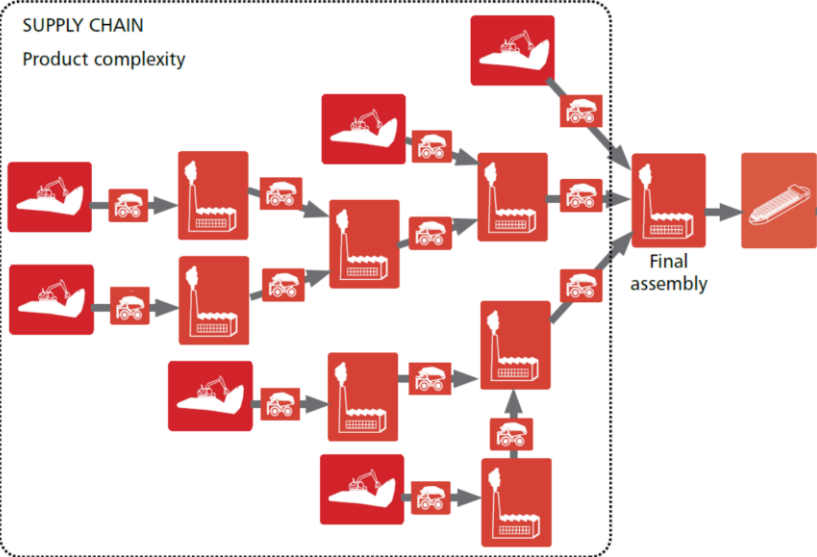


- European market typically leads with legislative/compliance requirements (e.g. ERP)
- Product Environmental Passport (PEP) in France is good example of this (requirement from Jan 2022)
- Requirement to document and understand raw material makeup, manufacturing energy and packaging
- PEP allows interpolation by weight of similar products within a range – important for large manufacturers
- PEP provided a template and an element of standardisation on important assumptions (e.g. lifecycle)





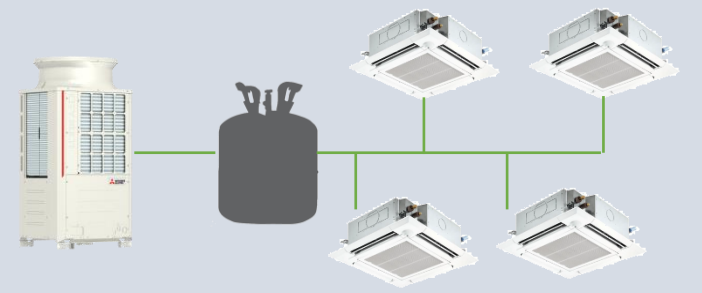
SUPPLY CHAIN
Product complexity



Equipment manufacture, refrigerant base charge and transport etc. covered by TM65 calculation



Site added refrigerant not covered by TM65 calculation





PURY-EP300YNW-A1



CMB-M108V-JA1

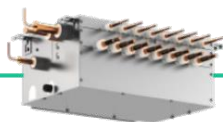


8 x PEFY-M40VMA-A

R410A VRF System
21.4kg*
49,655 (kg CO₂e)

R32

PURY-EP300YNW-A1



CMB-M108V-JA1



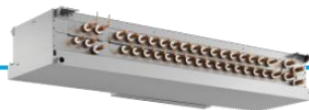
8 x PEFY-M40VMA-A

R32 VRF System
18.6kg*
19,776 (kg CO₂e)

60%

R32

PURY-EM300YNW-A1



CMB-WM108V-AA



8 x PEFY-WP40VMA-E

R32 HVRF System
12.5kg*
13,802 (kg CO₂e)

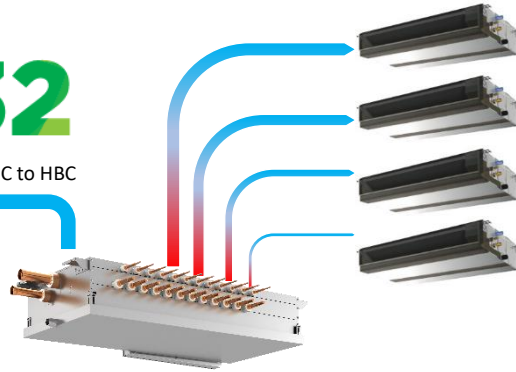
72%



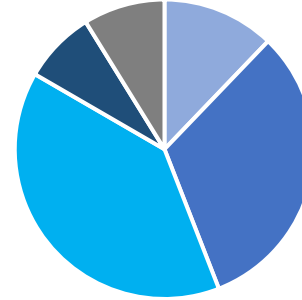


R32

*Assumed 50m from OC to HBC



Total Embodied Carbon



R32 HVRF System
12.5kg*
13,802 (kg CO₂e)
72%

- Outdoor Unit (Excluding Base Charge)
- Outdoor Unit Base Refrigerant Charge
- Additional Refrigerant Charge
- Hybrid Branch Controller Box
- Hybrid Indoor Units

5,907 Kg



- Example 30KW HVRF Outdoor Unit
- R32 Base Charge

4,583 Kg



- Additional 7.3Kg Site Added Refrigerant Charge

848 Kg



- Branch Controller Box

2,464 Kg



- 8 x 4KW Hybrid Ducted Units



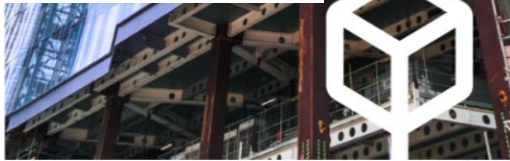
kgCO ₂ e	R410A VRF		R32 VRF		R32 HVRF	
Outdoor unit + Factory Charge Refrigerant	PURY-EP300YNW-A1 + 5.2kg Refrigerant	12,741	PURY-EM300YNW-A1 + 5.2kg Refrigerant	5,907	PURY-EM300YNW-A1 + 5.2kg Refrigerant	5,907
Site Added Refrigerant	+ 16.2kg Refrigerant	31,457	+ 13.4kg Refrigerant	8,412	+ 7.3kg Refrigerant	4,583
BC Box	CMB-M108V-JA1	545	CMB-M108V-JA1	545	CMB-WM108V-AA	848
Indoor Units	8 x PEFY-M40VMA-A	(8 x 614) 4912	8 x PEFY-M40VMA-A	(8 x 614) 4912	8 x PEFY-WP40VMA-E	(8 x 308) 2464
Total Embodied Carbon	49,655		19,776		13,754	
Embodied Carbon per kW	1,655		659		460	
Approximate Embodied Carbon Reduction	Baseline		60%		72%	



Embodied Carbon in the Built Environment



An Overview



les.mitsubishielectric.co.uk

City Multi VRF / Hybrid VRF Outdoor Units

Model	Description	Cooling Capacity (kW)	TM65 Mid Display (kgCO ₂ e)
PURY-EM200YNW-A1	Heat Recovery High Efficiency R32	22.4	5,907
PURY-EM250YNW-A1	Heat Recovery High Efficiency R32	28.0	5,907
PURY-EM300YNW-A1	Heat Recovery High Efficiency R32	33.5	5,907
PURY-EM350YNW-A1	Heat Recovery High Efficiency R32	40.0	6,979
PURY-EM400YNW-A1	Heat Recovery High Efficiency R32	45.0	7,074
PURY-EM450YNW-A1	Heat Recovery High Efficiency R32	50.0	7,670
PURY-EM500YNW-A1	Heat Recovery High Efficiency R32	56.0	8,694

Commercial Heat Pumps & Chillers

Model	Description	Cooling / Heating Capacity (kW)	TM65 Mid Display (kgCO ₂ e)
EAHV-M1500YCL-N	Modular Air Source Heat Pump R32	150 / 150	23,831
EAHV-M1800YCL-N	Modular Air Source Heat Pump R32	180 / 180	23,831
CAHV-P500YB-HPB	Ecodan Air Source Heat Pump R407c	- / 42.6	11,273
QAHV-N560YA-HPB	Ecodan Air Source Heat Pump R744	- / 40	3,619
EHWT17D-MHEDW	Hydrodan Water to Water Heat Pump R32	- / 8.0	1,399

Note. all other calculations have been interpolated from the reference Model highlighted



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Thank you

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