

Alex Medich

# Programme wide emissions reduction – A sustainable way towards sustainability!



**water**  
NEW ZEALAND  
CONFERENCE & EXPO  
17-19 OCTOBER 2023  
Tākina, Te Whanganui-a-Tara Wellington

# Agenda

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# Purpose – Legislation and Commitments



## A net-zero emissions water sector by 2035

The Victorian water sector has set world-leading targets to cut emissions.

*"Our water sector is setting the pace on emissions reductions – showing consumers and industry that we can tackle climate change and boost renewable energy use as our population grows."*

# Purpose - Legislation and Commitments

## Statement of Obligations (Emissions reduction)

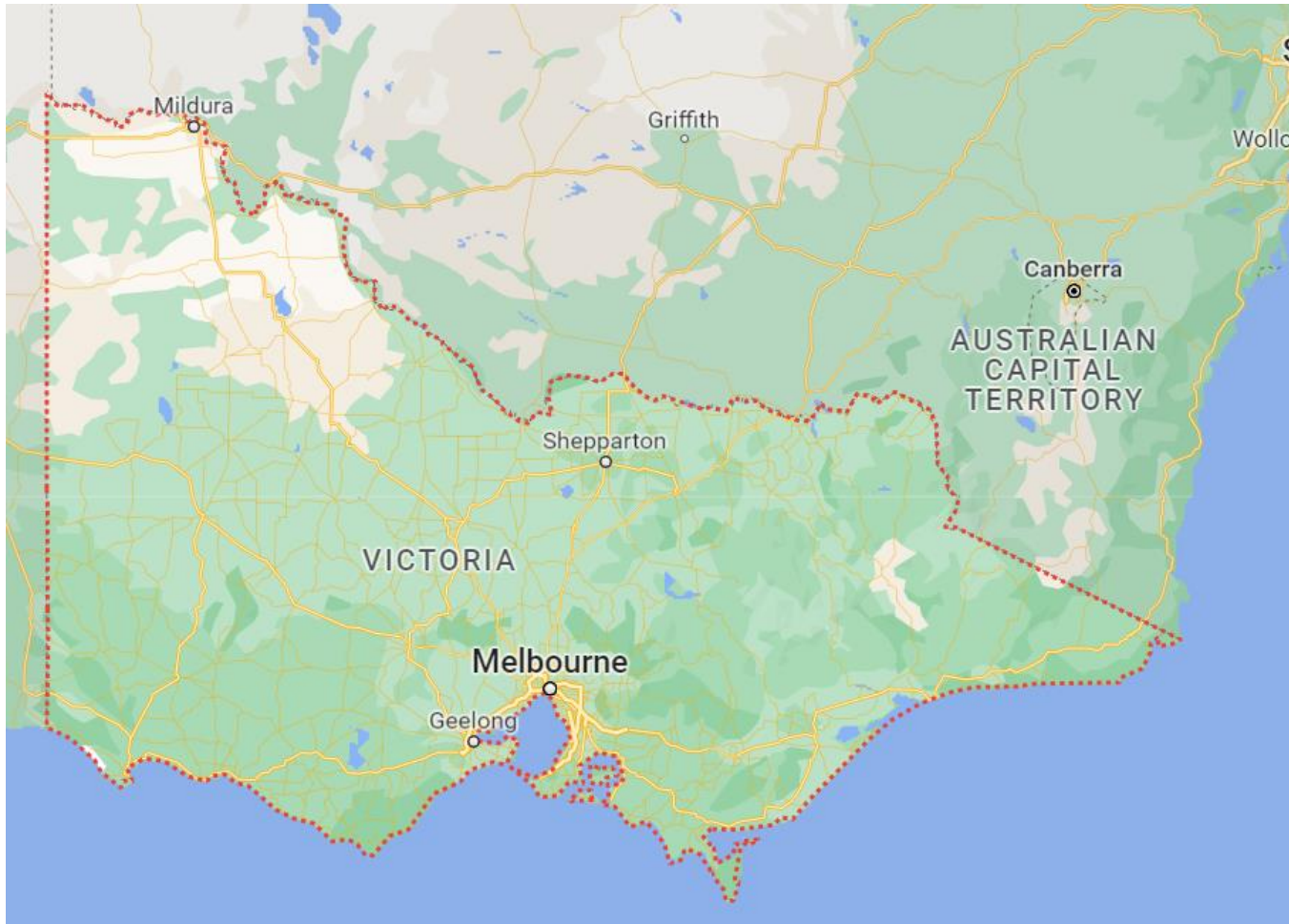
Prioritise the implementation of actions that avoid or reduce emissions resulting from the Corporations' operations

Achieve emission reductions efficiently, making full use of the time available to do so

Pursue actions and targets at the lowest possible cost, seeking to minimise any impact on water customer bills

Have particular regard to any price impacts on their vulnerable customers

# Background



Assessment of the **WoLC** of nine **WWTPs** in the Victorian state area.

Development of **five solution packages** for the management of recycled water

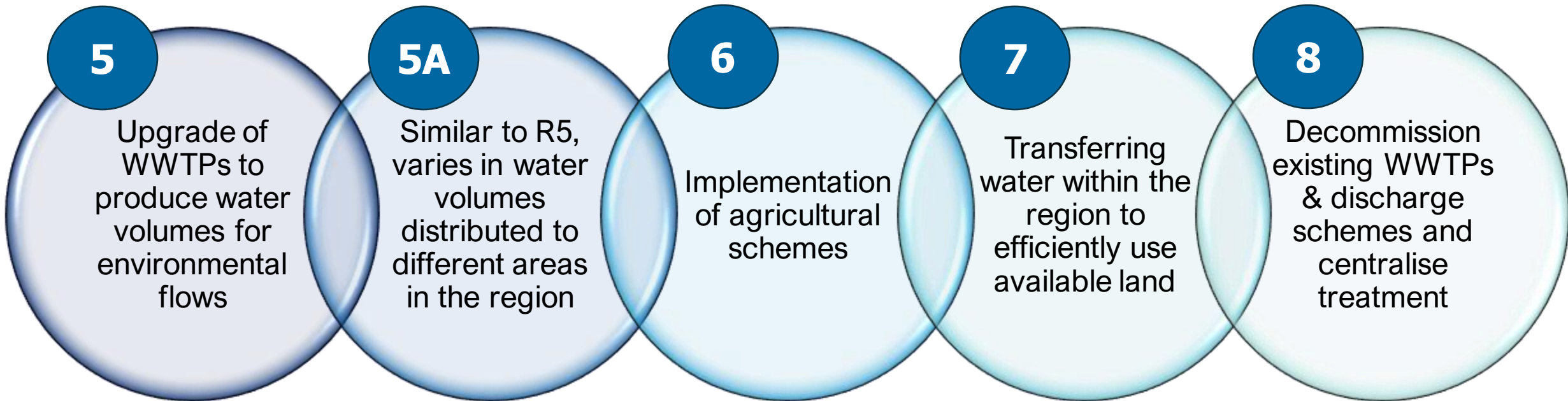
**Transfer of recycled water** to irrigation schemes, environmental flows, and existing disposal schemes

**Decommissioning of schemes** and transfer of sewage to other treatment plants

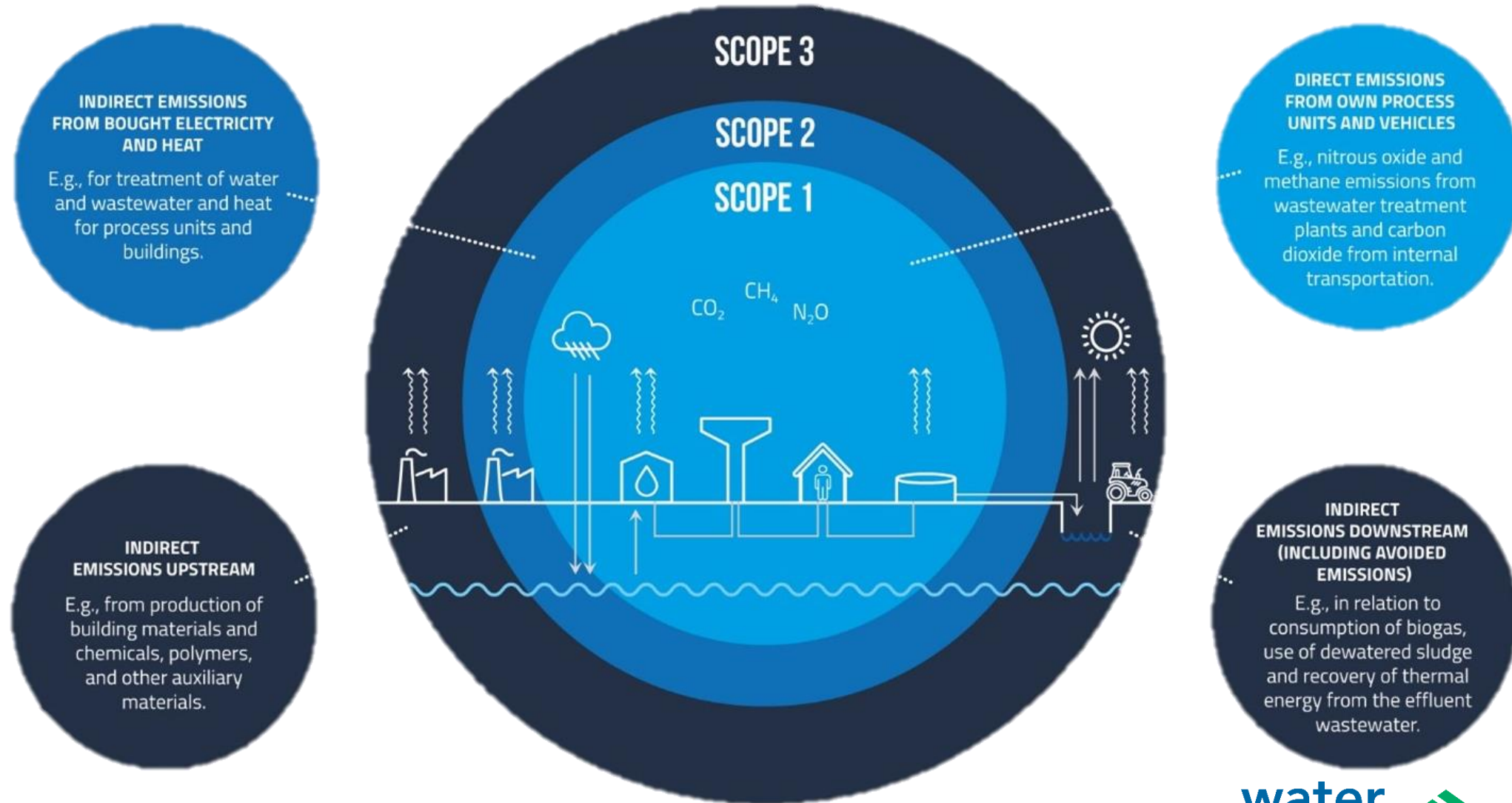
**Construction** of pipelines, pump stations, treatment plant equipment, and bulk water storage

# Background – Solution Packages

## Focus of each package:



# Scope of Assessment



# Scope – Emissions Sources



## Embodied Carbon

The emissions from manufacturing, transportation, and installation of building materials.

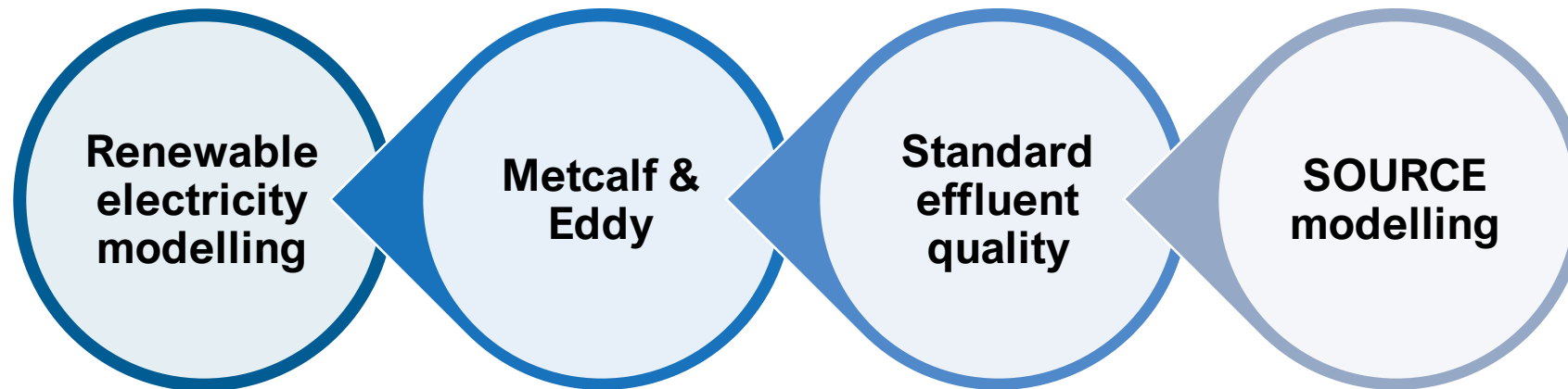
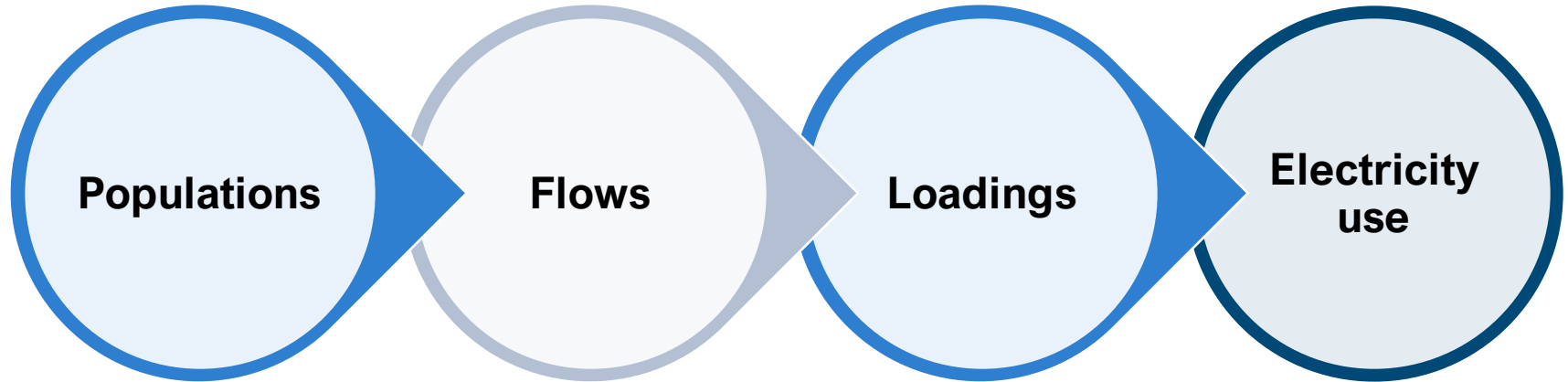
## Operational Carbon

The emissions associated with a plant's operations.




# Methodologies – Operational Emissions

**Design  
Basis**



**Emissions  
Projections**

# Methodologies – Operational Emissions Guidelines



**National Greenhouse and Energy Reporting Act 2007**  
No. 175, 2007

**Compilation No. 23**

**Compilation date:** 12 April 2023  
**Includes amendments up to:** Act No. 14, 2023  
**Registered:** 24 April 2023

**About this compilation**

**This compilation**  
This is a compilation of the *National Greenhouse and Energy Reporting Act 2007* that shows the text of the law as amended and in force on 12 April 2023 (the *compilation date*).

The notes at the end of this compilation (the *endnotes*) include information about amending laws and the amendment history of provisions of the compiled law.

**Uncommenced amendments**  
The effect of uncommenced amendments is not shown in the text of the compiled law. Any uncommenced amendments affecting the law are accessible on the Legislation Register ([www.legislation.gov.au](http://www.legislation.gov.au)). The details of amendments made up to, but not commenced at, the compilation date are underlined in the endnotes. For more information on any uncommenced amendments, see the series page on the Legislation Register for the compiled law.


**Application, saving and transitional provisions for provisions and amendments**  
If the operation of a provision or amendment of the compiled law is affected by an application, saving or transitional provision that is not included in this compilation, details are included in the endnotes.

**Editorial changes**  
For more information about any editorial changes made in this compilation, see the endnotes.

**Modifications**  
If the compiled law is modified by another law, the compiled law operates as modified but the modification does not amend the text of the law. Accordingly, this compilation does not show the text of the compiled law as modified. For more information on any modifications, see the series page on the Legislation Register for the compiled law.

**Self-repealing provisions**  
If a provision of the compiled law has been repealed in accordance with a provision of the law, details are included in the endnotes.

NGER




INTERGOVERNMENTAL PANEL ON climate change


**2019 Refinement to the  
2006 IPCC Guidelines for National  
Greenhouse Gas Inventories**

**Volume 5  
Waste**

Edited by Calvo Buendia, E., Tanabe, K., Kranjc, A.,  
Baasansuren, J., Fukuda, M., Ngiruze S.,  
Osako, A., Pyrozhenko, Y., Sherman, P. and Fedoret, S.



**Task Force on National Greenhouse Gas Inventories**



IPCC



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# Methodologies – Embodied Emissions

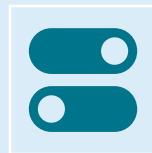
Level of  
certainty



Quantities of materials, emissions factors, EPDs



Rate based information



Proxy data – based on similar projects or processes

# Methodologies – Embodied emissions



PIPELINES



STORAGE



PUMP  
STATIONS



TREATMENT  
PLANTS



IRRIGATION


# Methodologies – Embodied Emissions


## PIPE OPTIONEERING - CARBON CALCULATOR

AIM: TO AID HIGH-LEVEL DESIGN DECISIONS FOR PIPELINES THROUGH CALCULATION OF CAPITAL CARBON

INPUTS: PIPE MATERIAL, PIPE CLASS, PIPE DIAMETER, INSTALL METHOD, PIPE COVER, INSTALL LOCATION, PIPE LENGTH

OUTPUTS: TONNES CARBON DIOXIDE EQUIVALENT PER METRE\*, DESIGN LIFE, COST, BENEFITS & LIMITATIONS

ORANGE CELL = WARNING   
Expired EPD data- notify E. Molloy

RED CELL = WARNING 

Check pipe class, then diameter selections!

INPUT CELLS BELOW

OUTPUT CELLS BELOW

OPTION	INPUTS - MUST be selected left to right, using one row for each pipe option				
	PIPE MATERIAL	PIPE CLASS	PIPE NOMINAL DIAMETER	INSTALL METHOD	INSTALL LOCATION
1	RCRRJ	Class_4	600	Open trench	Greenfield
2	PE_100	PN_16	400	Open trench	Greenfield
3	GRP	PN_16_SN_5000	600	Open trench	Greenfield
4	GRP	PN_16_SN_5000	675	Open trench	Greenfield
5	MSCL_sintakote	PR_3.8	914	Open trench	Greenfield
6	MSCL_sintakote	PR_2.9	1829	Open trench	Greenfield

PIPE COVER	UNIT CARBON (tCO <sub>2</sub> -e/m)	PIPE LENGTH	TOTAL CARBON	OPTIONAL INPUTS (applied to all options)
AVERAGE PIPE COVER (m)	PIPE SUPPLY	INSTALL	LENGTH (m)	tCO <sub>2</sub> -e
0.9	0.087	0.044	2.34	0
0.9	0.084	0.022	100	11
0.9	0.075	0.042	100	12
0.9	0.094	0.047	100	14
0.9	0.042	0.061	100	10
0.9	0.182	0.149	100	33

*UT OR LEAVE AT DEFAULT VALUES (50km, 50km, 25%, 100%)*

Trench fill material transport distance (One-way to quarry) 50 km

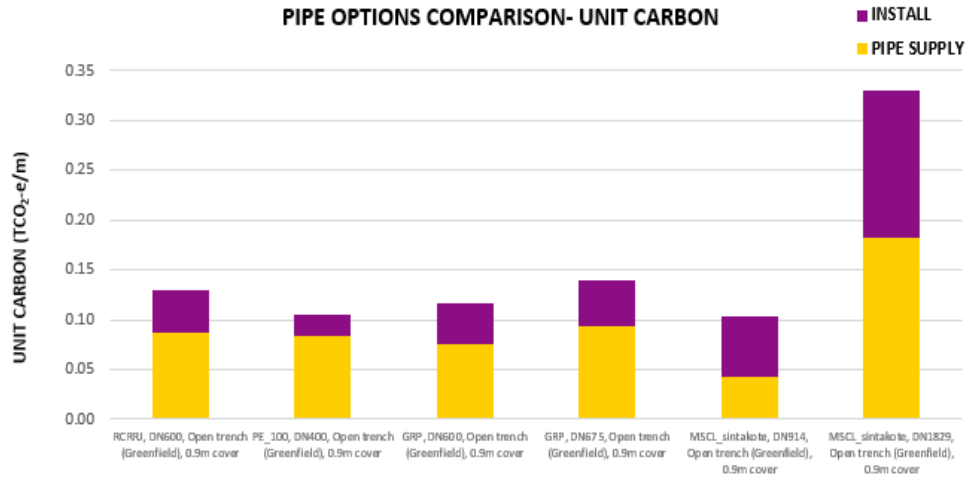
Trench cut material transport distance (One-way to disposal site) 50 km

CUT TO SPILL (% cut material taken offsite)

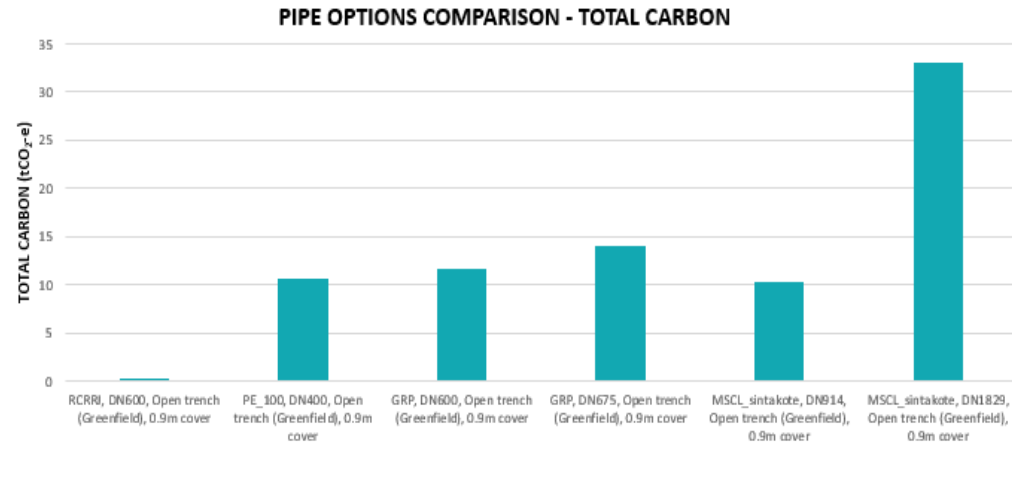
Applied to 'greenfield' install locations 25%

Applied to 'road' install locations 100%

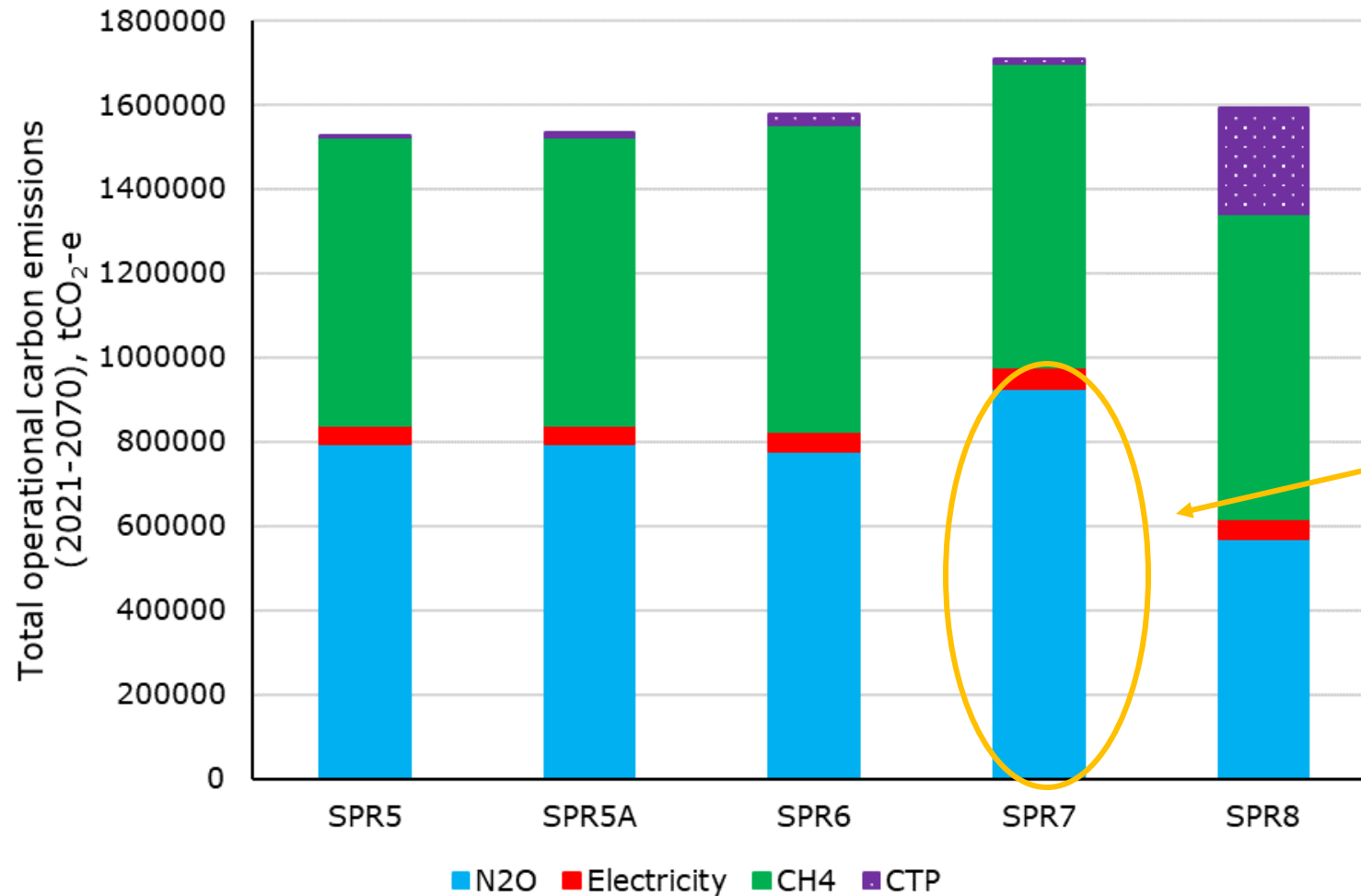
PIPE OPTIONS COMPARISON- UNIT CARBON



PIPE OPTIONS COMPARISON - TOTAL CARBON

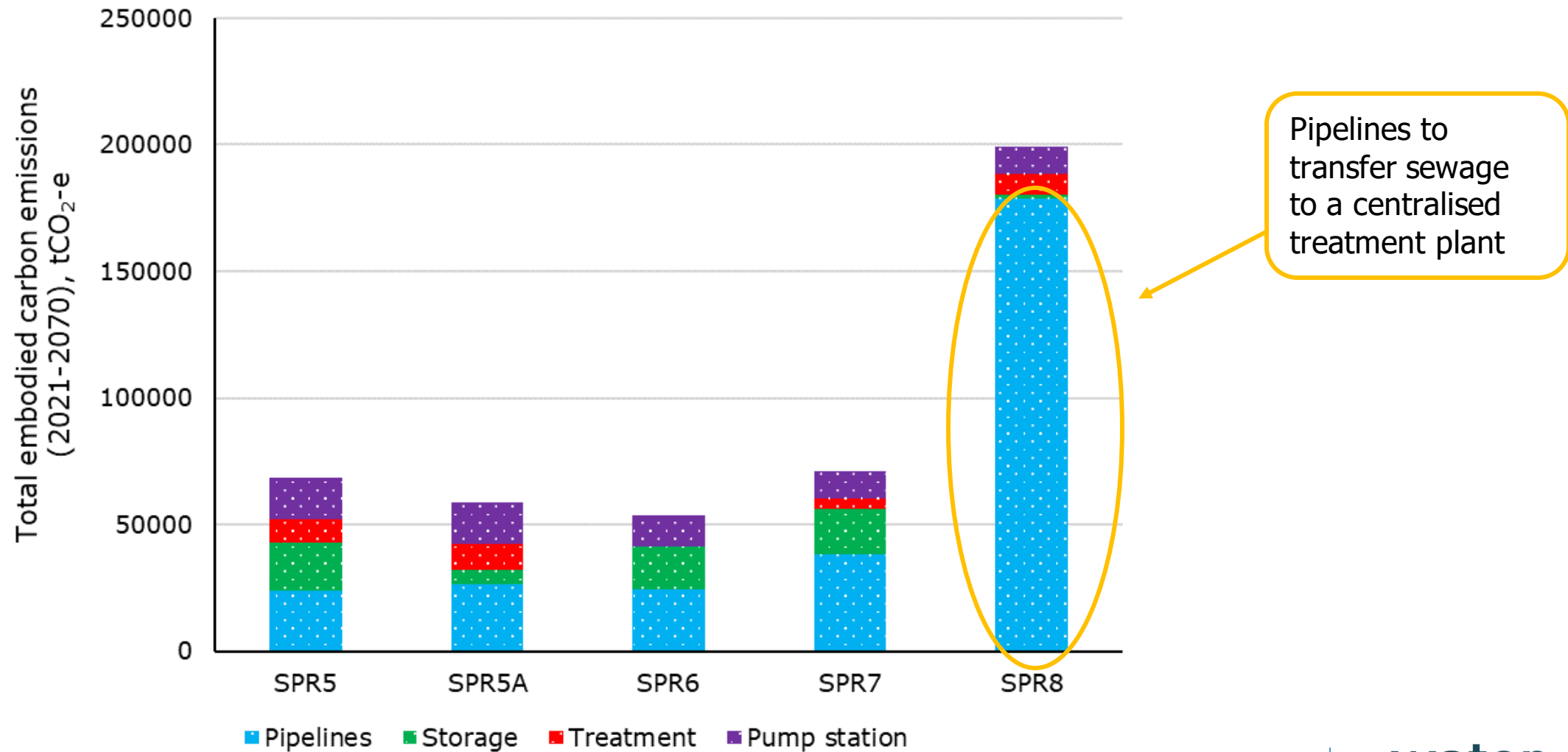


# Results – Operational Carbon Emissions

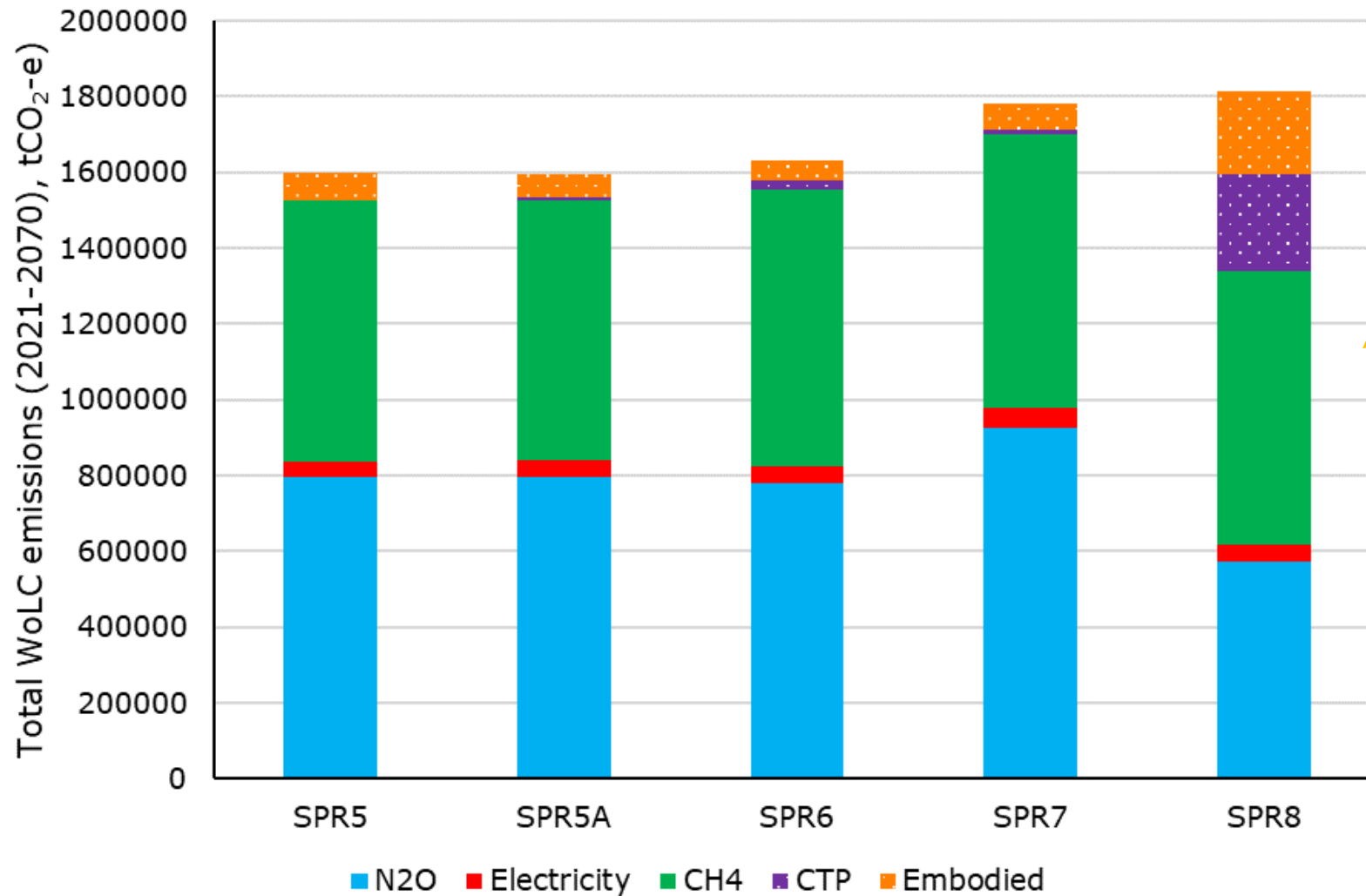


Combination of higher process emissions from centralised aerobic treatment and higher discharge emissions with poorer effluent quality

# Results – Embodied Carbon Emissions



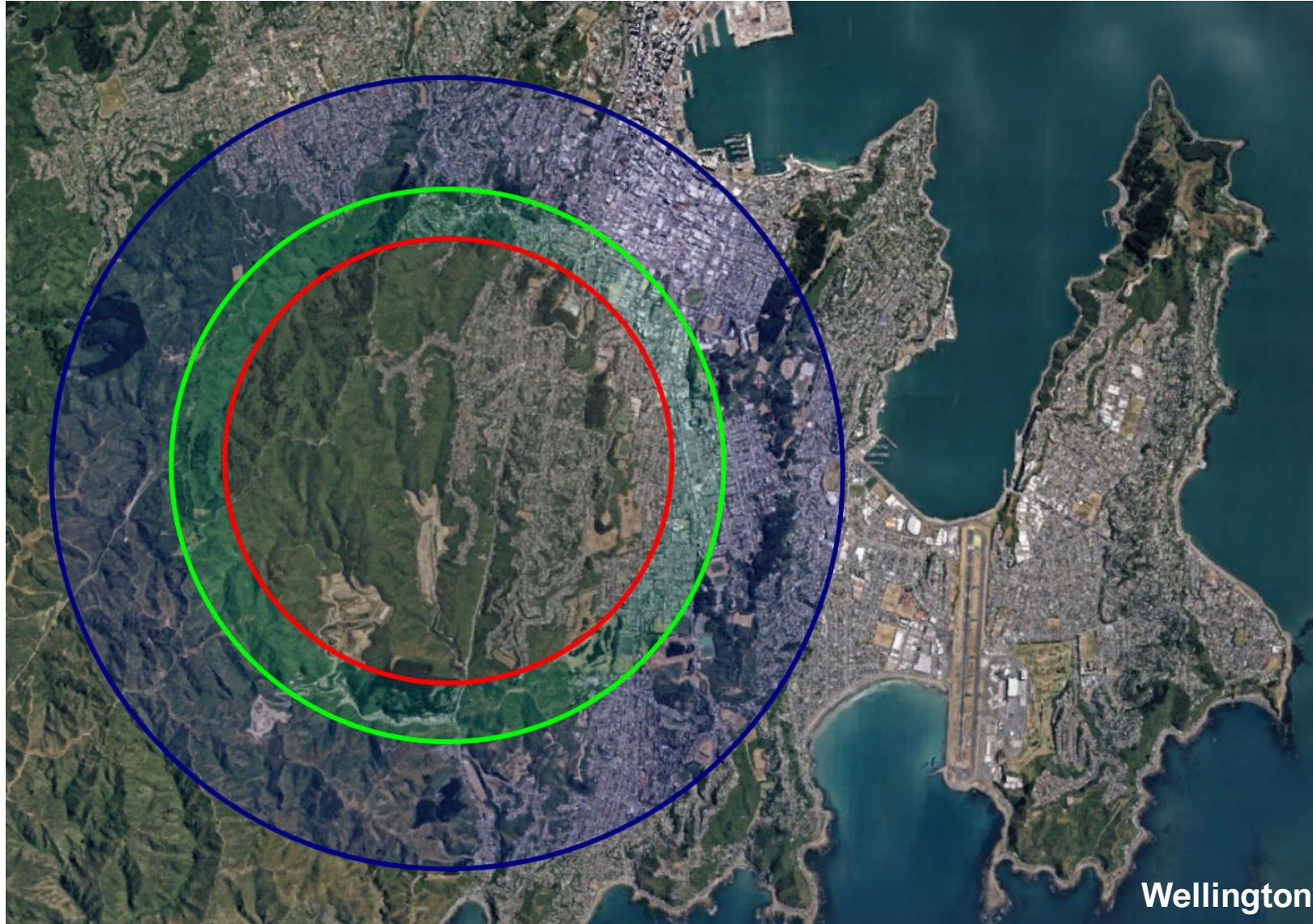
# Results – WoLC Emissions



SPR8 has the lowest Scope 1 and Scope 2 emissions, however, the highest Scope 3 and hence WoLC emissions



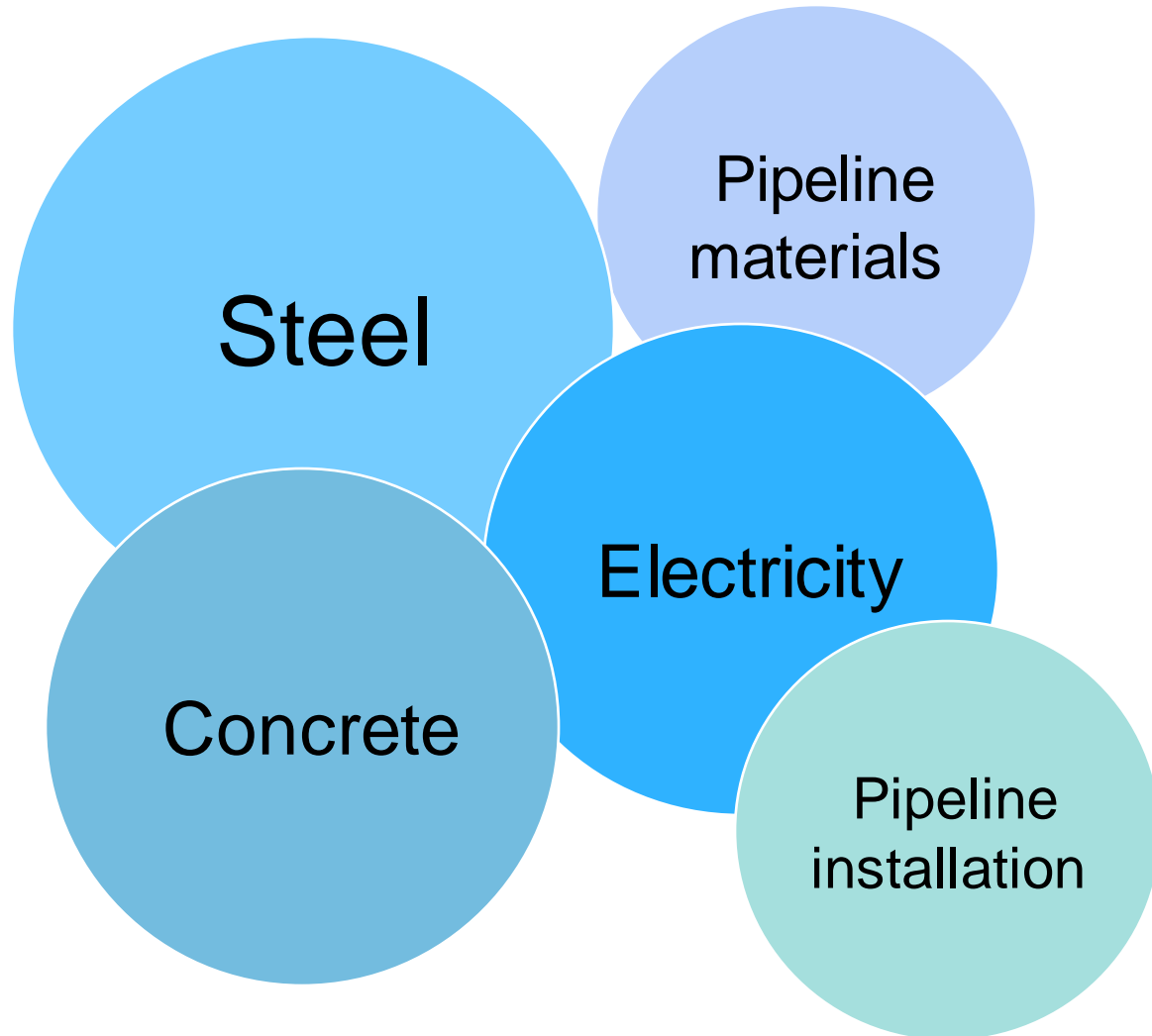
# Putting these emissions in perspective



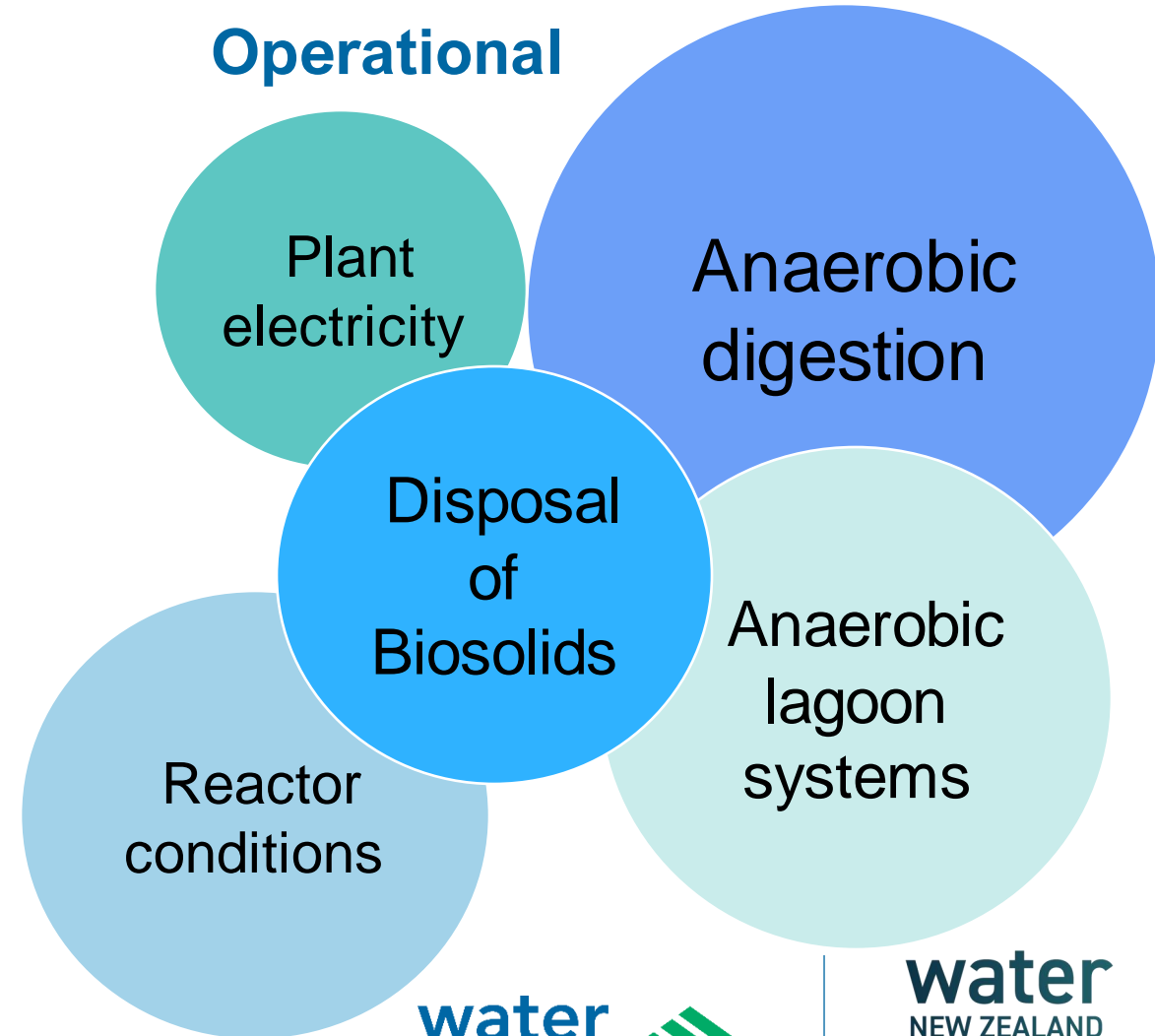
**Roughly 2000ha  
required over 50  
years!**

# Emissions Reduction Opportunities

## Embodied



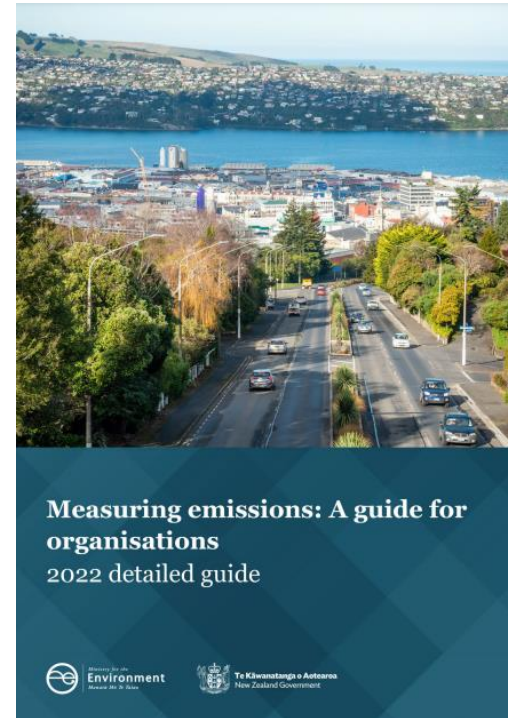
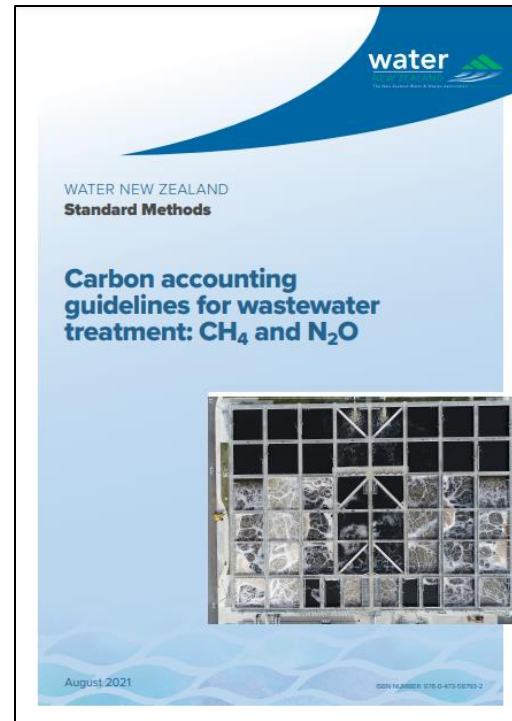
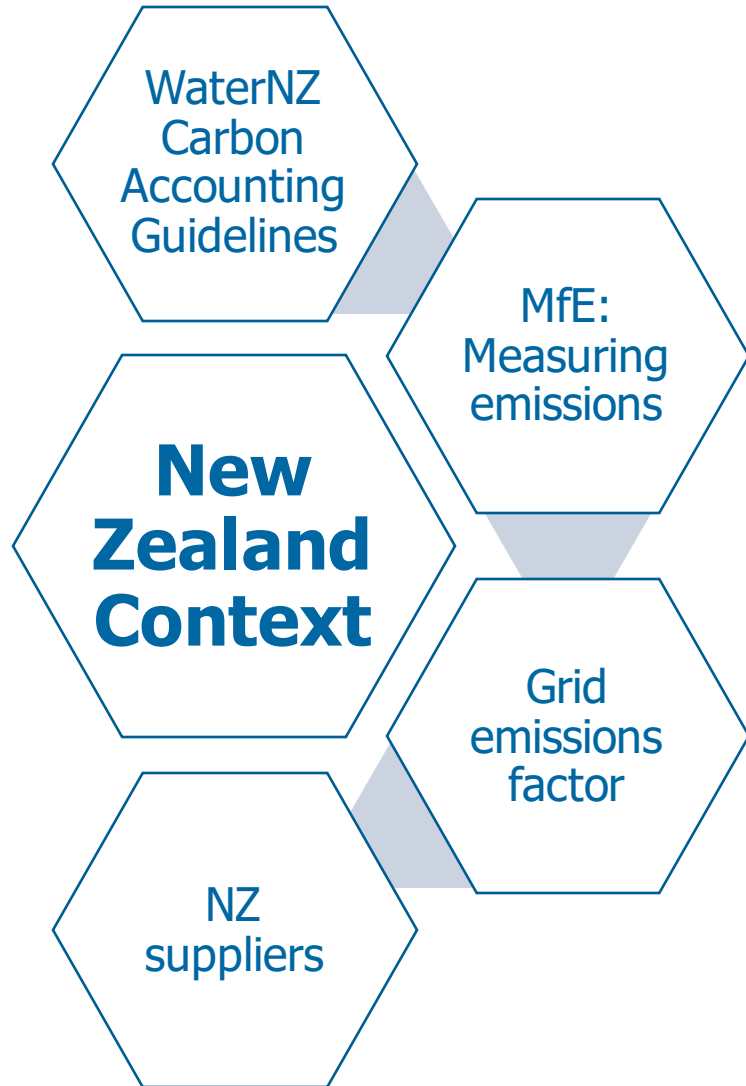
## Operational



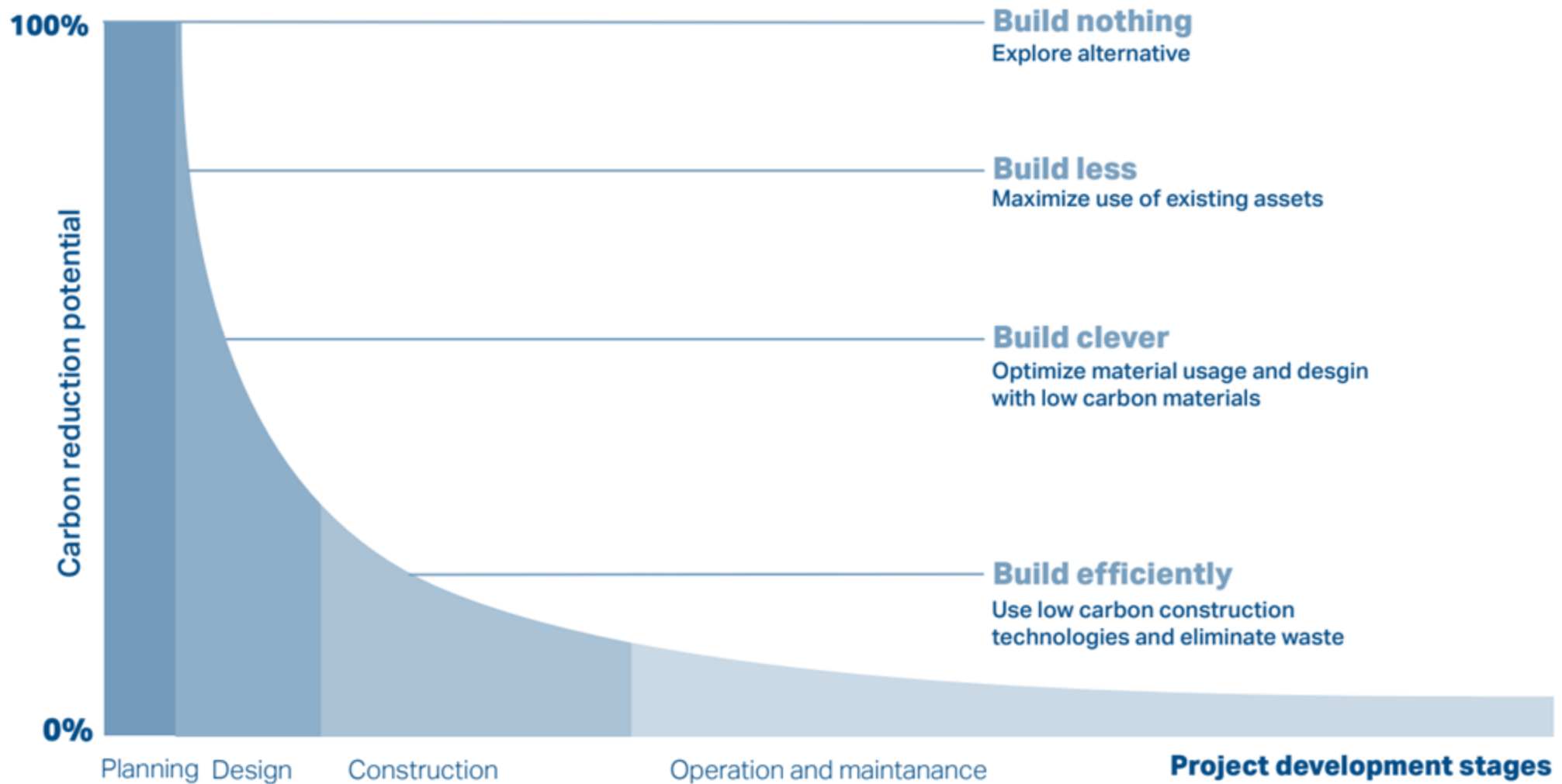
# Application for use on other projects



# Application for use on other projects



# Benefits of implementing a WoLC assessment



**You can't manage what  
you don't measure!**