

# Section J Energy Efficiency –J 1.5 Wall-glazing construction Case Study.

National Construction Code Comparison models – 2016 vs 2019  
December 2019



# Summary

Inhabit have been engaged by Viridian Glass to undertake a third-party review of the proposed changes outlined in the NCC 2019 Public Comment Draft Version 1.1 – Section J – J1 Building Fabric and Glazing.

The objective of the review is to assess J 1.5 Wall-glazing construction, contextualise it in line with typical or best practise construction and highlight any observations related to the proposed changes in order to support industry advancements in high-performance façade design and construction.

The study results have been presented for all Building Code of Australia (BCA) Climate Zones, allowing a comprehensive insight into the impact of the NCC 2019 changes throughout Australia. Table 1 outlines variables considered in the analysis.

The findings enclosed are to be read as informative only, this document does not replace the need for formal assessment or should be considered as professional advice. The WWR ratios identified in this report do not override actual minimum compliance requirements should they vary.

**Please Note:**

Comparisons have been taken between NCC 2016 and the final draft version of the NCC 2019 released for Public Comment. Final considerations regarding shading multipliers on southern facades in the released NCC version have not been applied to these findings. These areas need to be reviewed separately to this report.

**Table 1:** Summary of Building Class and Materiality Considered

Building Class	Viridian Glazing Types	Frame Types	Wall Types
Class 2 - Common areas of apartment buildings	6mm EnergyTech™ Clear – U-value 3.6 W/m².K, SHGC 0.69	Aluminium (non-thermally broken) – U-value 12 W/m².K	Typical Precast – R 2.8  Typical Spandrel – R 0.46*
	Class 3 – Residential buildings other than a Class 1 or Class 2 building, including a boarding house, guest house, hostel or backpackers	6/12/6mm ThermoTech™ Clear – U-value 2.5 W/m².K, SHGC 0.66	Thermally broken structural glazing – U-value 8 W/m².K
Class 5 - Office buildings that are used for professional or commercial purposes excluding Class 6, 7, 8 or 9 buildings	6/12/6mm PerformaTech™ PH11(60) Clear – U-value 1.3 W/m².K, SHGC 0.26	Thermally broken Low performance – U-value 6 W/m².K	
	6/12/6mm PerformaTech™ PH08(60) Clear – U-value 1.3 W/m².K, SHGC 0.34	Thermally broken High performance – U-value 5 W/m².K	
Class 9c – Aged care buildings			Thermally broken High performance Best Practise – U-value 3.5 W/m².K

\*Please note this spandrel panel is typical of current performance but does not meet the NCC 2019 wall back stop for WWR>20%

# Methodology

This analysis calculated the performance of various façade systems, used to compare to the minimum performance requirements outlined in the NCC 2019 Public Comment Draft Version 1.1 – Section J – J1 Building Fabric and Glazing. The process that has been undertaken is outlined in Figure 1.

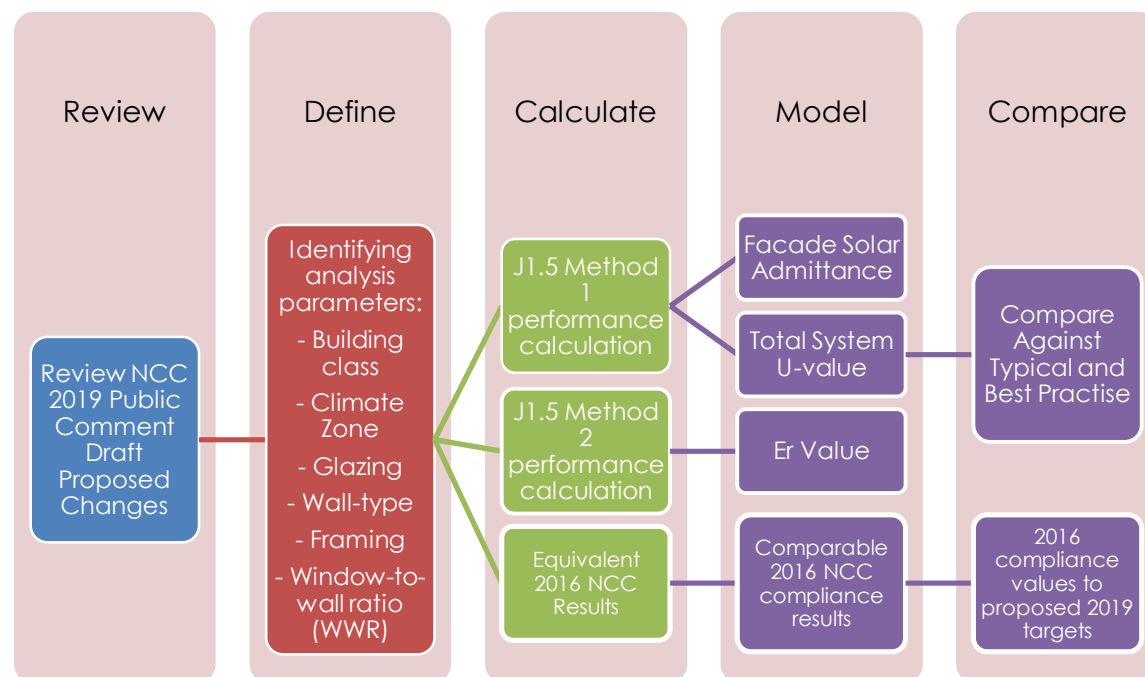


Figure 1: Analysis Methodology

## Building Classes

The NCC building classes considered are:

- Class 2 - Common areas of apartment buildings
- Class 3 – Residential buildings other than a Class 1 or Class 2 building, including a boarding house, guest house, hostel or backpackers
- Class 5 - Office buildings that are used for professional or commercial purposes excluding Class 6, 7, 8 or 9 buildings
- Class 9c – Aged care buildings

These classifications have been used in the analysis for determining the minimum performance requirements of the wall-glazing construction, as outlined in the Section J1.5 of the NCC 2019 proposed changes.

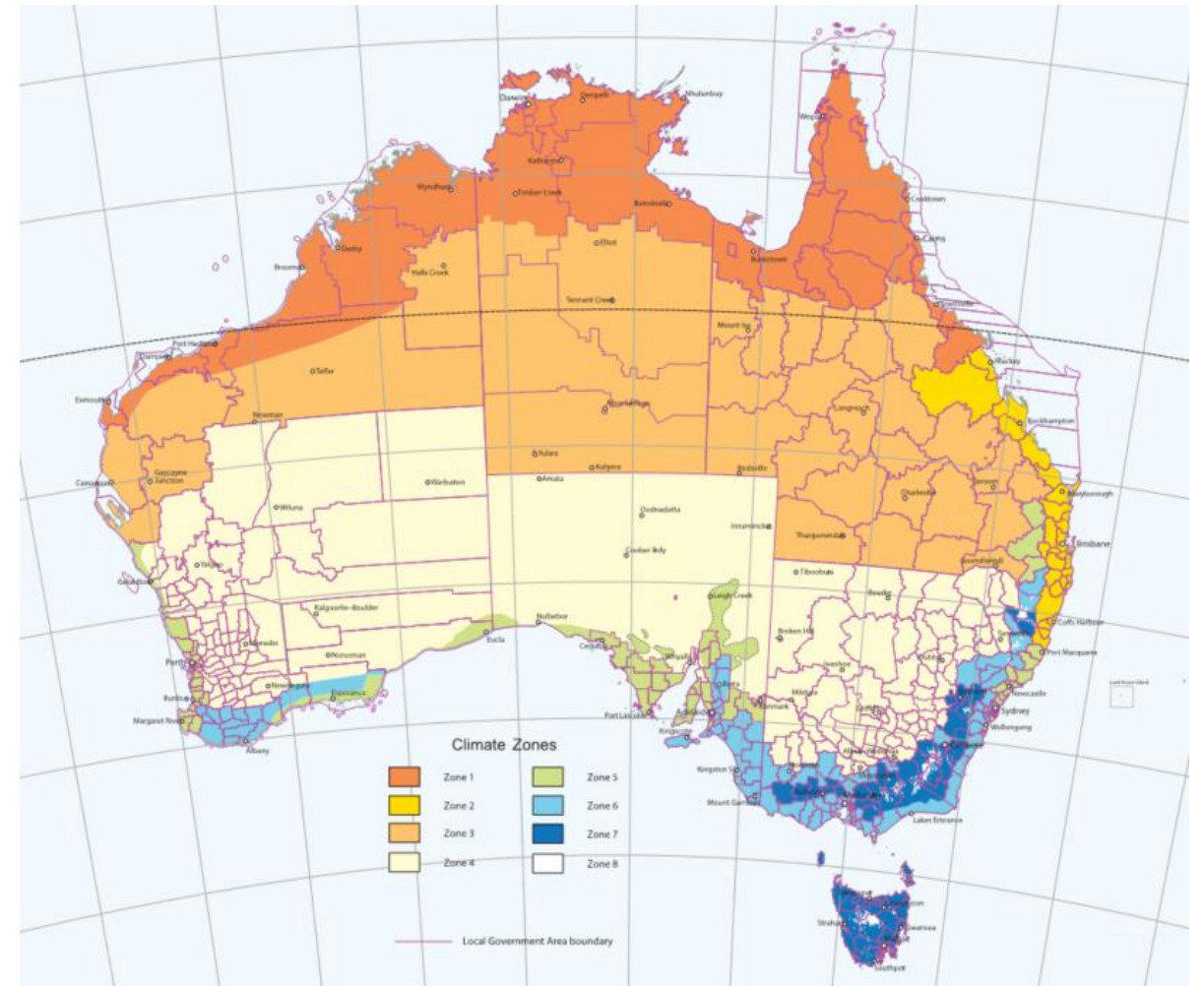
# Methodology

## Australian Climate Zones

Eight climate zones defined by the Australian Building Codes Board (ABCB) are included in this report. These climate zones are identified in Table 2 and Figure 2. Each climate zone has distinctly different design and construction requirements. Within each main zone are many regional sub-zones determined by local geographic features including wind patterns and height above sea level.

Climate Zone	Description	Example Locations
1	Hot, humid summer, warm winter	Darwin
2	Warm humid summer, mild winter	Brisbane
3	Hot, dry summer, warm winter	Alice Springs
4	Hot, dry summer, cool winter	Albury - Wodonga
5	Warm temperate	Adelaide, Perth, Sydney
6	Mild Temperate	Melbourne
7	Cool temperate	Hobart
8	Alpine	Jindabyne

**Table 2:** Australian Climate Zones



**Figure 2:** Climate Zone Map

# Methodology

## Façade and Glazing Types

The façade and glazing types assessed were selected to best represent typical and best practice. Although typical and best practice varies significantly across all Australian States and Territories, the performance has been kept consistent for this study.

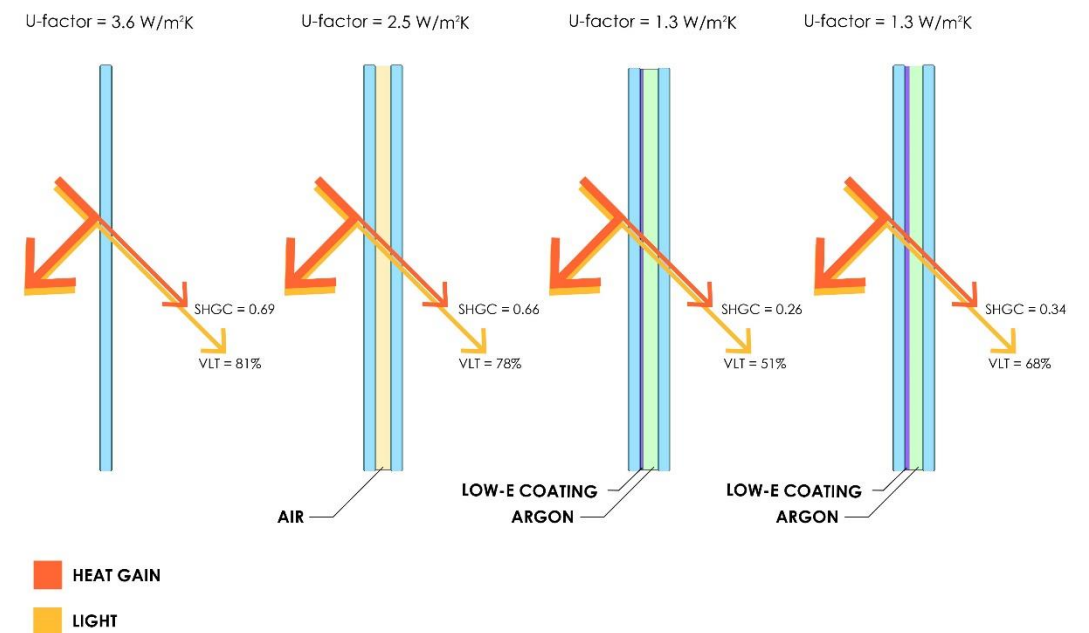
### Glazing Types

Common Viridian glazing products have been used, with schematics showing the glazing units and subsequent performance illustrated in Figure 3. Glazing performance varies regarding U-value, solar heat gain coefficient (SHGC) and visible light transmittance (VLT). To account for the impact of framing on the glazing U-value, an increase factor has been applied to approximate a poorer U-value at the outer edges of the glazing. The assumed multiplier has been derived from previous Total System U-values assessments.

**Table 3:** Glazing Types

Glazing Make-up	Glazing U-value (W/m <sup>2</sup> K)	Edge U-value* (W/m <sup>2</sup> K)	SHGC	VLT (%)
6mm Viridian EnergyTech Clear	3.60	3.96	0.69	81
6/12/6mm Viridian ThermoTech Clear	2.50	3.38	0.71	78
6/12/6mm Viridian PerformaTech PH11 (60) Clear	1.30	1.76	0.26	51
6/12/6mm Viridian PerformaTech PH08(60) Clear	1.30	1.76	0.34	68

\*The edge U-value has been derived by increasing the glazing U-value 35% to account for increased heat transfer near the framing, as per NFRC/AFRC simulation requirements.



**Figure 3:** Glazing assessed (Left to right: 6mm Viridian EnergyTech Clear, 6/12/6mm Viridian ThermoTech Clear, 6/12/6mm Viridian PerformaTech PH11 (60) Clear, 6/12/6mm Viridian PerformaTech PH08(60) Clear)

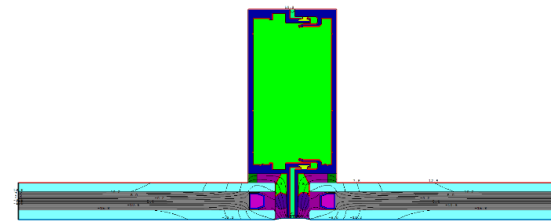
# Methodology

## Frame Types

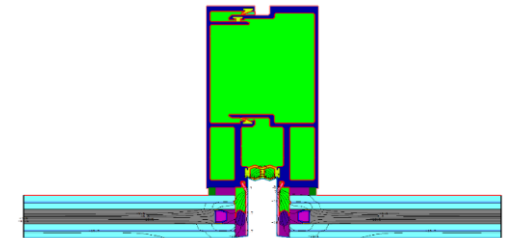
Table 4 defines the façade framing types that have been used in the assessment. Several mullion details representing the different framing types used are provided in Figure 4 to Figure 7. The frame U-values are deemed to be average performance value. These results are based on NFRC/AFRC Total System U-values that have been previously calculated by Inhabit.

**Table 4:** Frame Types

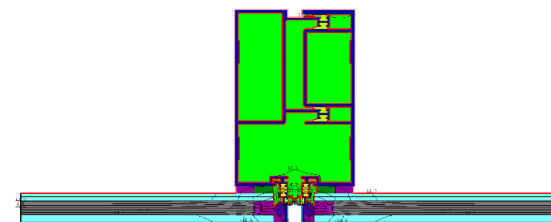
Framing Type	Average Frame U-value
Aluminium (Non-thermally broken) - Typical	12.0 W/m <sup>2</sup> K
Thermally Broken Structurally Glazed - Typical	8.0 W/m <sup>2</sup> K
Thermally Broken (Low Performance)	6.0 W/m <sup>2</sup> K
Thermally Broken (High Performance)	5.0 W/m <sup>2</sup> K
Thermally Broken (High Performance)- Best Practise	3.5W/m <sup>2</sup> K



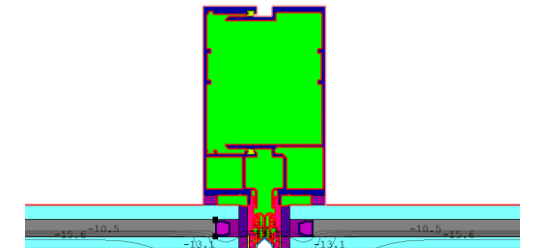
**Figure 4:** Aluminium Frame - Typical



**Figure 5:** Thermally Broken Structurally Glazed - Typical



**Figure 6:** Thermally Broken, Low Performance Frame



**Figure 7:** Thermally Broken, High Performance Frame – Best Practise

# Methodology

## Wall Types

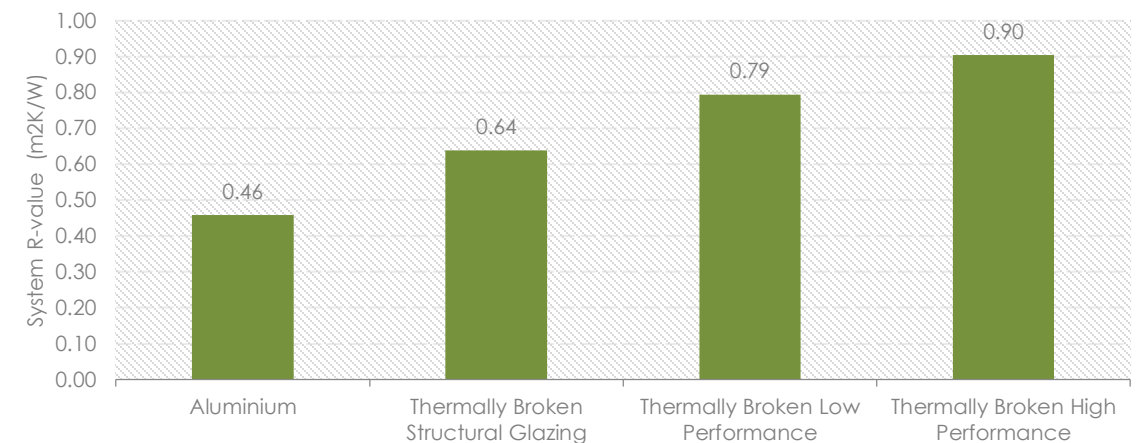
Two unique wall types have been assessed – precast and spandrel. For the spandrel zone, the frame was assumed to be the same as that surrounding the glazing. The spandrel edge U-value was derived by applying a 30% increase to the centre-of-panel U-value to account for worse performance near the framing. A summary of the wall types and respective performance values used can be seen in Table 5 below.

**Table 5:** Wall types and performance

Wall Type	Build-up	Frame U-value	Centre-of-Panel R-value	Centre-of-Panel U-value	Spandrel Edge U-Value	System R-value
Precast	200mm precast/ 200mm air gap/ 60 Rockwool Insulation/ Plasterboard	-	2.8 m <sup>2</sup> K/W	0.36 W/m <sup>2</sup> K	-	-
Spandrel	Aluminium frame with no internal lining. U 1.67 IGU/40 mm air gap/ 2mm aluminium	12.0 W/m <sup>2</sup> K				0.46 m <sup>2</sup> K/W
	backpan/ 69mm Rockwool	8 W/m <sup>2</sup> K	2.8 m <sup>2</sup> K/W	0.36 W/m <sup>2</sup> K	0.46 W/m <sup>2</sup> K	0.64 m <sup>2</sup> K/W
	Insulation/1mm steel sheet	6 W/m <sup>2</sup> K				0.79 m <sup>2</sup> K/W
		5 W/m <sup>2</sup> K				0.90 m <sup>2</sup> K/W
		3.5 W/m <sup>2</sup> K				

\*Please note this spandrel panel is typical of current performance but does not meet the NCC 2019 wall back stop for WWR>20%

The spandrel system R-values used are summarised in Figure 8. The results are based on a 1m by 1m spandrel. Once the WWR increased beyond 70%, these panel sizes were adjusted based on the maximum size the WWR allowed.



**Figure 8:** Spandrel System R-Values used in the Assessment

## Window-to-wall Ratio (WWR)

The window-to-wall ratio is the measure of the percentage area of total glazing against the total exterior wall area of the building. WWR's spanning from 30% to 100% at 5% increments have been used in the analysis.

# Methodology

## Façade Orientation and Dimensions

A simple 4-sided building (with no shading) has been considered with façade orientations facing north, south, east and west – as to align with the NCC 2019 façade aspect definitions. The panel dimensions that have been used are outlined in Table 6. When the window-to-wall ratio exceeds 70%, the wall panel area has been adjusted to incorporate a realistic panel size given the impact on the calculations.

**Table 6:** Panel Dimensions

Panel Type	WWR	Dimensions	
		Height	Width
Glazing	All	2000mm	
Spandrel/Precast	≤ 70%	1000m	1000m
	>70%	Adjusted to be realistic panel size	

## NCC 2019 Section J1.5 Method 1

Section J1.5 – Wall-Glazing construction outlines two procedures for determining if a Wall-Glazing façade meets compliance. In Method 1, the Wall-Glazing U-value is calculated by taking the area weighted performance of the wall and the glazing for each storey of the development and each façade aspect (Equation 1). The FSA is calculated by Method 1 FSA calculation as outline in NCC 2019, Equation 2.

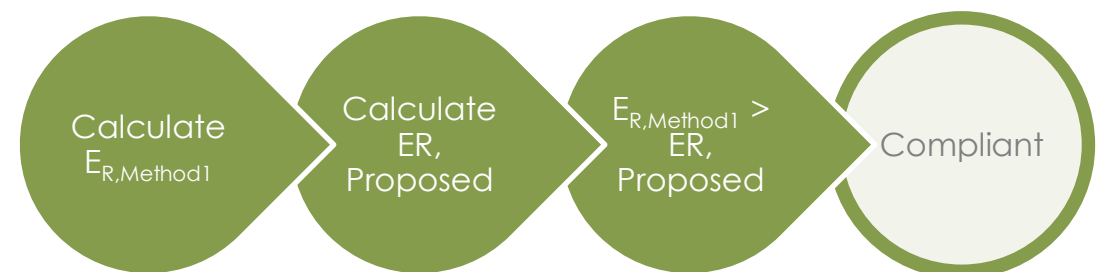
$$U = \frac{\Sigma(U_{Wall}A_{Wall} + U_{System Window}A_{System Window})}{A} \quad \text{Equation 1}$$

$$FSA = \frac{W1 \times SW1 \times SHGCW1}{AWall} + \frac{W2 \times SW2 \times SHGCW2}{AWall} \quad \text{Equation 2}$$

## NCC 2019 Section J1.5 Method 2

In Method 2, the representative air conditioning energy value (Er) is calculated for all storeys and façade aspects according to Equation 3. An Er calculation is undertaken based on a compliant solution for Method 1, and a second Er calculation is undertaken on the proposed building. Where the Er for the proposed building is less than the Er for the Method 1 building, it is deemed compliant with the proposed changes.

$$E_R = A_N \alpha_N FSA_N + A_E \alpha_E FSA_E + A_S \alpha_S FSA_S + A_W \alpha_W FSA_W \quad \text{Equation 3}$$



**Figure 9:** Analysis Methodology



# Methodology

## NCC 2019 Wall-glazing Changes

The NCC 2019 Public Comment Draft Version 1.2, Section J, considers the building envelope differently to that defined in NCC 2016. In NCC 2016, walls and windows are assessed independently, however in NCC 2019 the entire building fabric is evaluated as a 'wall-glazing' construction. Section J2 – Glazing has been removed in the 2019 revision. Figure 9 highlights the relevant NCC changes.

A process has been undertaken to compare NCC 2016 and 2019 performance requirements. The NCC Volume One Glazing Calculator has been used to derive values that could be translated into an equivalent NCC 2019 result. The methodology is as follows:

1. An assumed wall area of 1800m<sup>2</sup> per orientation was taken and the WWR varied between 30% and 100% at 5% increments.
2. The glazing calculator was then solved for the maximum allowable total system U-value, resulting in 100% element share of 100% of allowance used. The total system U-value allowance has been limited to 8 W/m<sup>2</sup>k, and the SHGC has been maintained between 0.05 and 0.82 where possible. It should be noted that a small amount of results could not be solved within these parameters, and the SHGC may reach 0.90 in certain cases.
3. These U-value and SHGC results have been translated into comparable NCC 2019 wall-glazing U-values, façade solar admittance and Er values, following the methodology outlined in the NCC 2019 Draft Version 1.2, Section J.



Figure 10: NCC 2016 and NCC 2019 Section J Changes

# NCC 2016 NCC 2019 Differences

## NCC 2016



J1.5 Wall  
Regardless of area  
meet stated value  
in code

J2 Assessed based  
on Window to Wall  
Ratio, each  
orientation  
independent

## NCC 2019



J1.5 Wall- Glazing  
where the  
window and wall  
assessed  
together. The  
performance of  
both determined  
on the size of  
each.

Figure 11: NCC 2016 and NCC 2019 Section J Changes

# Performance Requirements

Façade system performance requirements have been extracted from the NCC Proposed Changes 2019, Public Draft Comment, Section J – Energy Efficiency. Table 7 to Table 8 summarise these requirements.

## Method 1

The Method 1 Total System U-value and FSA values are summarised in Table 7 below.

**Table 7:** Method 1 Total System U-value and FSA

Building Class	Climate Zone	Total System U-value	Façade Solar Admittance (FSA)				
			Eastern Façade	Northern Façade	Southern Façade	Western Façade	
Class 2 Common Area, Class 5, 6, 7, 8 or 9b building or Class 9a (other than ward area)	1	≤ 2.0 W/m²K	0.12	0.12	0.12	0.12	
	2						
	4						
	5		0.13	0.13	0.13	0.13	
	6						
	7						
	3		0.16	0.16	0.16	0.16	
	8		0.2*	0.2	0.42	0.36	
Class 3 or 9c building or Class 9a ward area	1	≤ 1.1 W/m²K	0.07*	0.07	0.10	0.07	
	3						
	4		0.07	0.07	0.07	0.07	
	6						
	7		0.07	0.07	0.08	0.07	
	2		≤ 2.0 W/m²K	0.10	0.10	0.10	0.10
	5						
	8		≤ 0.9 W/m²K	0.08	0.08	0.08	0.08

\*Results presented for Eastern Orientation Only.

## Method 2

The representative air conditioning energy value, Er has been calculated on a façade area per orientation of 1800m² which is notionally representative of a 40mX40m square building, 10 storeys in height, FFL 4.5m. The representative air conditioning energy value, Er for each building class and climate zone is summarised in Table 8.

**Table 8:** Representative air conditioning energy value, Er

Building Class	Climate Zone	Er Method 1
Class 2 Common Area, Class 5, 6, 7, 8 or 9b building or Class 9a (other than ward area)	1	1138
	2	1453
	3	1794
	4	1526
	5	1580
	6	1500
	7	1675
	8	3298
Class 3 or 9c building or Class 9a ward area	1	641
	2	1044
	3	718
	4	665
	5	1058
	6	646
	7	674
	8	655

# Results

The results outline the performance of the current typical and best practise building constructions outlined in Section 2. The performance of these systems can be evaluated with respect to the Deemed To Satisfy (DTS) provisions in the proposed changes. Results are presented for each climate zone and building class, for both a precast wall with punch windows and a glazed curtain wall. An example of the Method 1 – Wall-glazing U-value results is shown in Figure 9.

- The WWR is varied across the X-axis of the graph and the Y-axis is presented as either Wall-Glazing U-value, FSA or the representative air conditioning energy value (Er) of the proposed building
- On the Wall-Glazing U-value charts, the NCC 2019 proposed requirement for the Climate Zone and Building Class are indicated by the red dotted line. To demonstrate compliance, the calculated Wall-glazing U-value must be less than the target

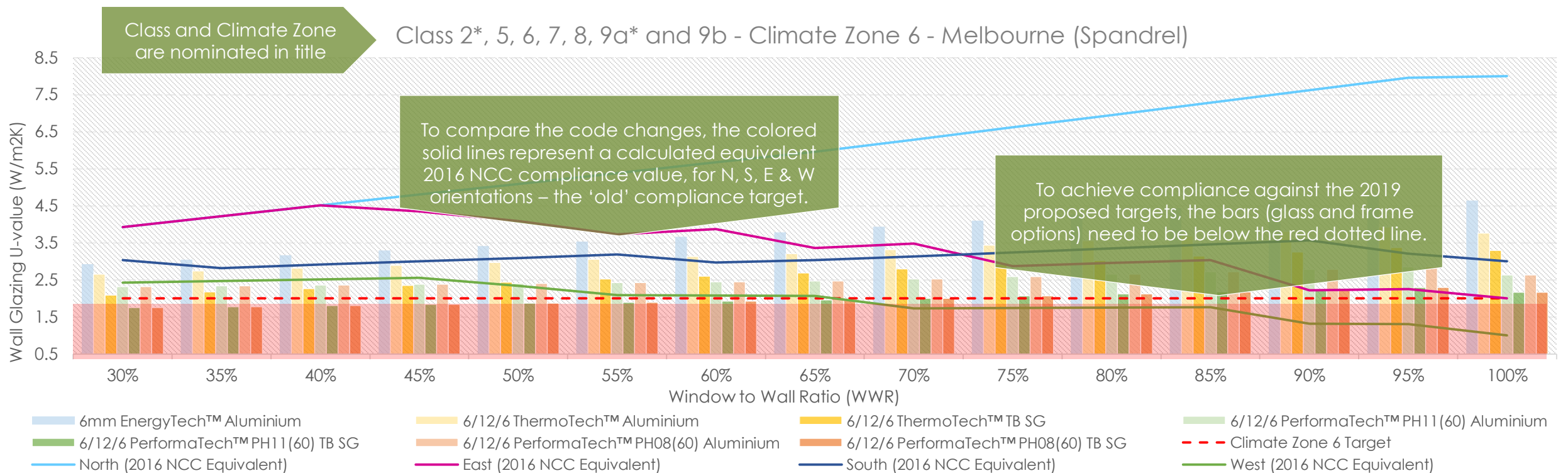
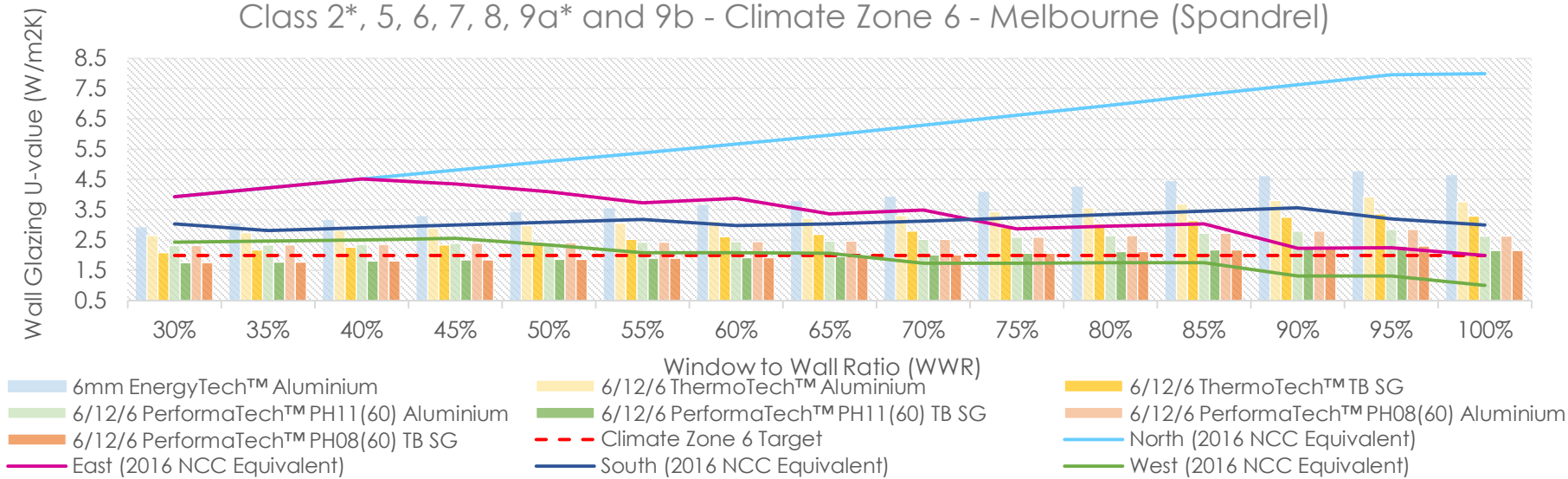


Figure 12: Example image

# Results- Method 1

When complying with the Method 1 DTS option, both the U-value and FSA chart need to be met simultaneously.

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 6 - Melbourne (Spandrel)



While the U-value is compliance at 65% WWR, for the PerformaTech PH08(60), the SHGC is only compliant at 40% WWR. So to comply with the DTS provisional Method 1 the maximum WWR is 40%

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 6 - Melbourne

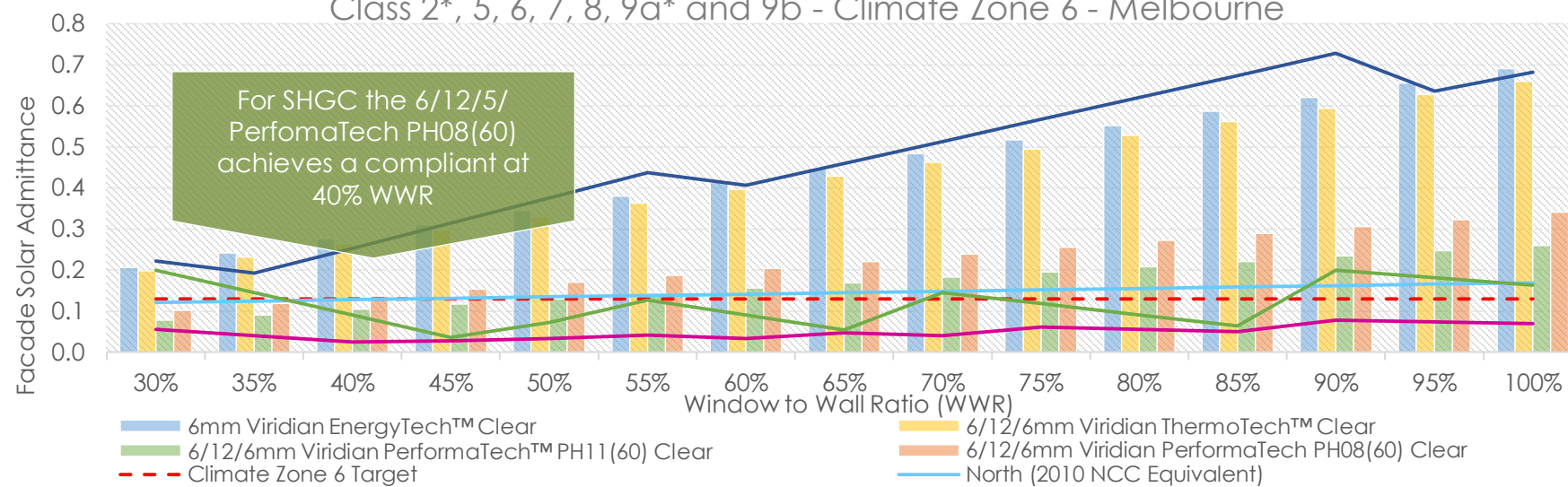


Figure 13: Example Image

# Results- Method 2

The DTS Method 2 considers the U-value, SHGC, shading and all façade orientation simultaneously, so compliance is achieved when the “façade system” is below the red line. This is different to the current code where façade types are considered on an individual basis, under the DTS provisions.

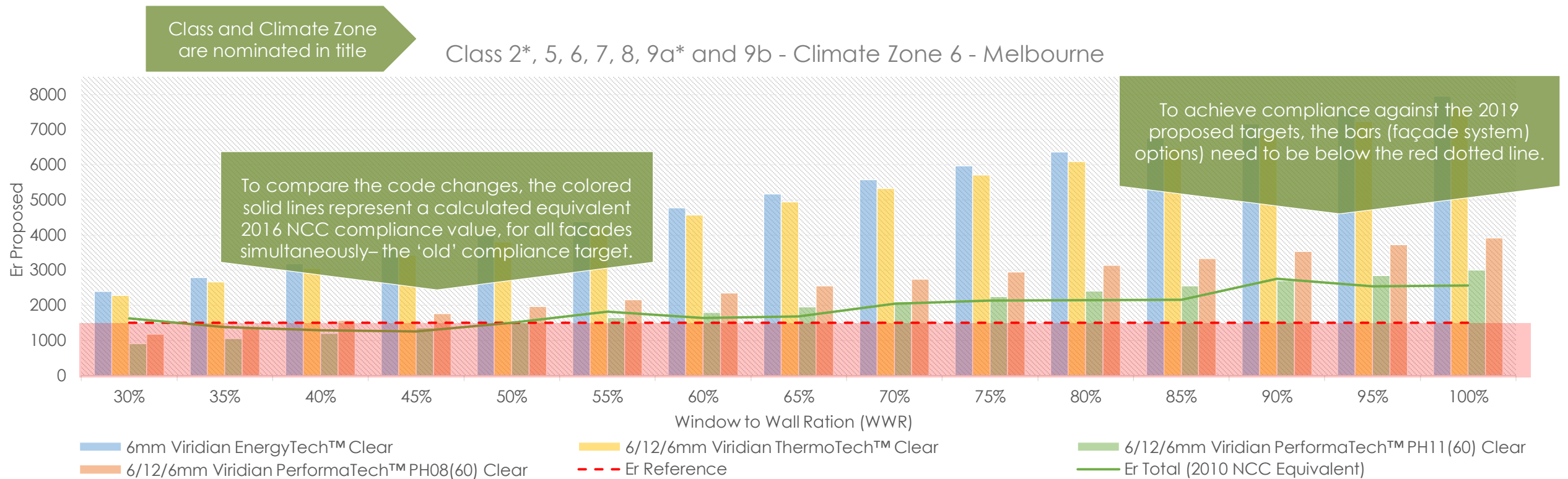


Figure 14: Example image

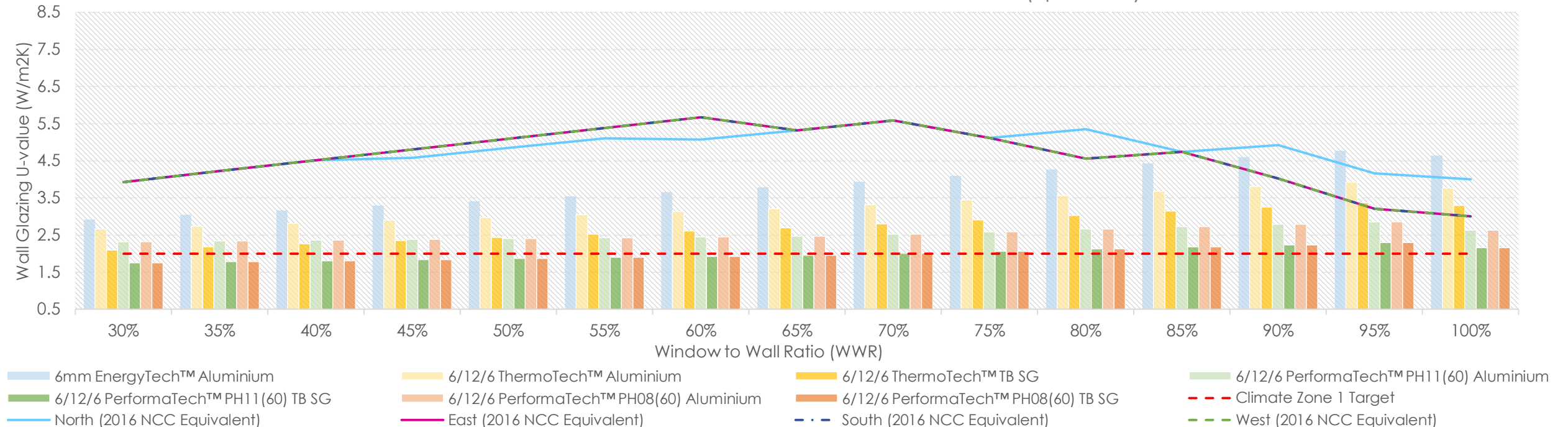
Climate Zone 1

Darwin

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 1 - Darwin (Spandrel)



### NCC 2016

In Climate Zone 1, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code was similar for all orientations. Compliance could be achieved for all orientations with a completely glazed façade, when high performance glazing systems were used.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. This stringency increase varies between approximately 30% and 65% dependent on the WWR.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <70% WWR range, with high performance glazing systems.

Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

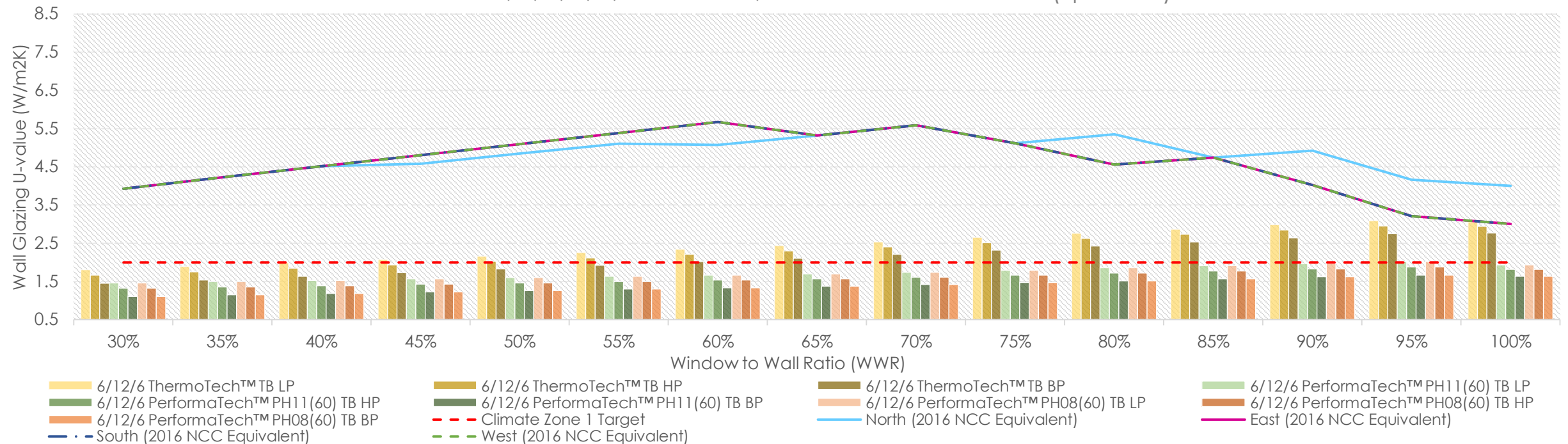
For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.



# Climate Zone 1

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 1 - Darwin (Spandrel)



### NCC 2016

In Climate Zone 1, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code was similar for all orientations. Compliance could be achieved for all orientations with a completely glazed façade, when high performance glazing systems were used.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. This stringency increase varies between approximately 30% and 65% dependent on the WWR.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <70% WWR range, with high performance glazing systems.

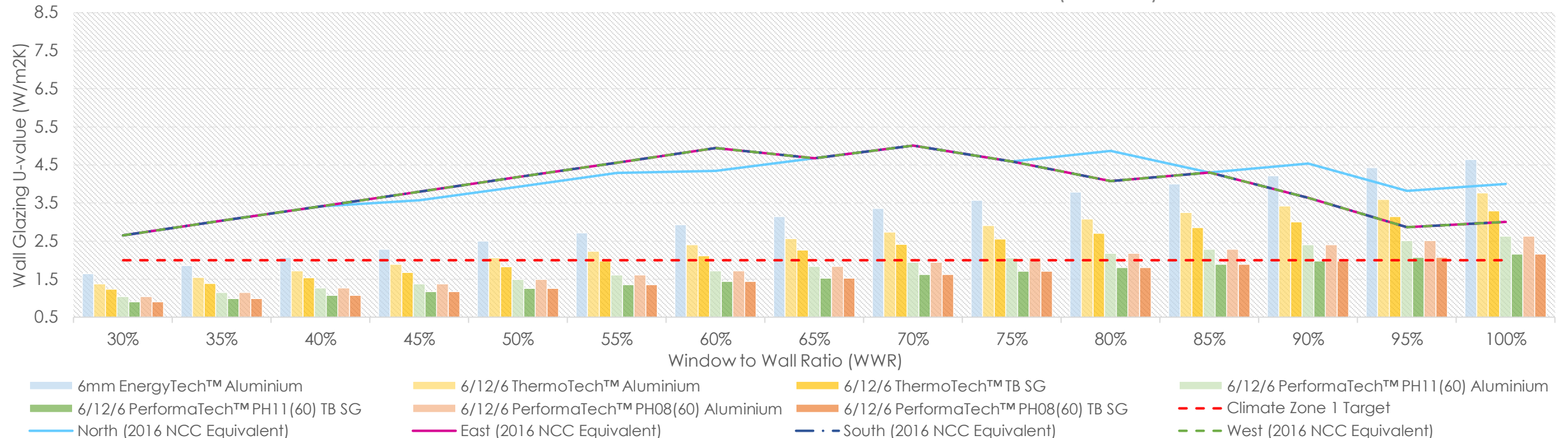
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 1 - Darwin (Precast)



### NCC 2016

In Climate Zone 1, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code was similar for all orientations. Compliance could be achieved for all orientations with a completely glazed façade, when high performance glazing systems were used.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. This stringency increase varies between approximately 30% and 65% dependent on the WWR.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <70% WWR range, with high performance glazing systems.

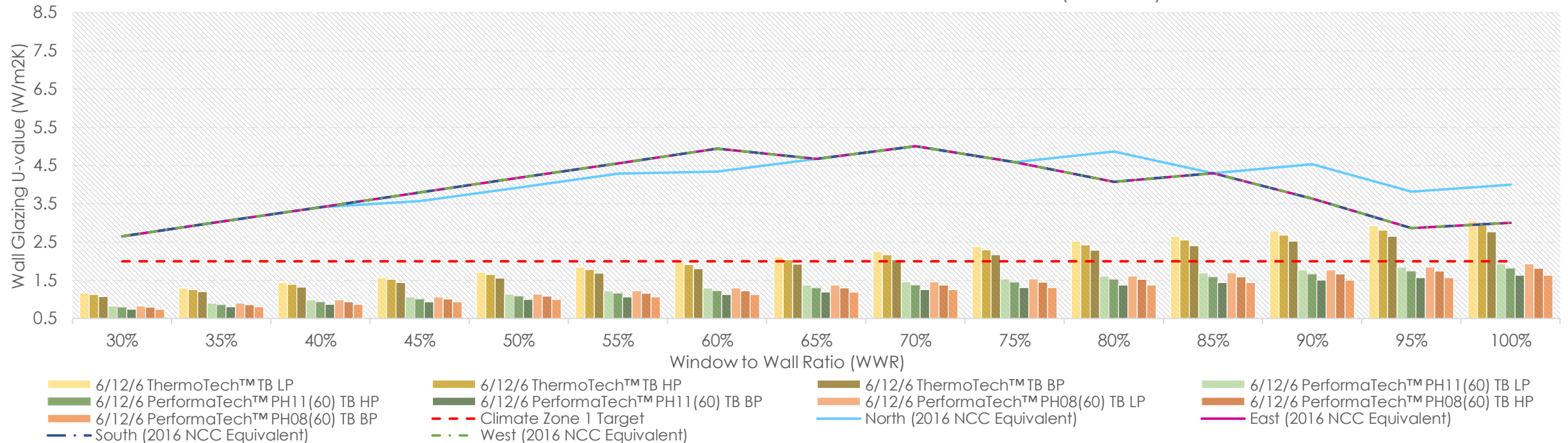
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 1 - Darwin (Precast)



### NCC 2016

In Climate Zone 1, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code was similar for all orientations. Compliance could be achieved for all orientations with a completely glazed façade, when high performance glazing systems were used.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. This stringency increase varies between approximately 30% and 65% dependent on the WWR.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <70% WWR range, with high performance glazing systems.

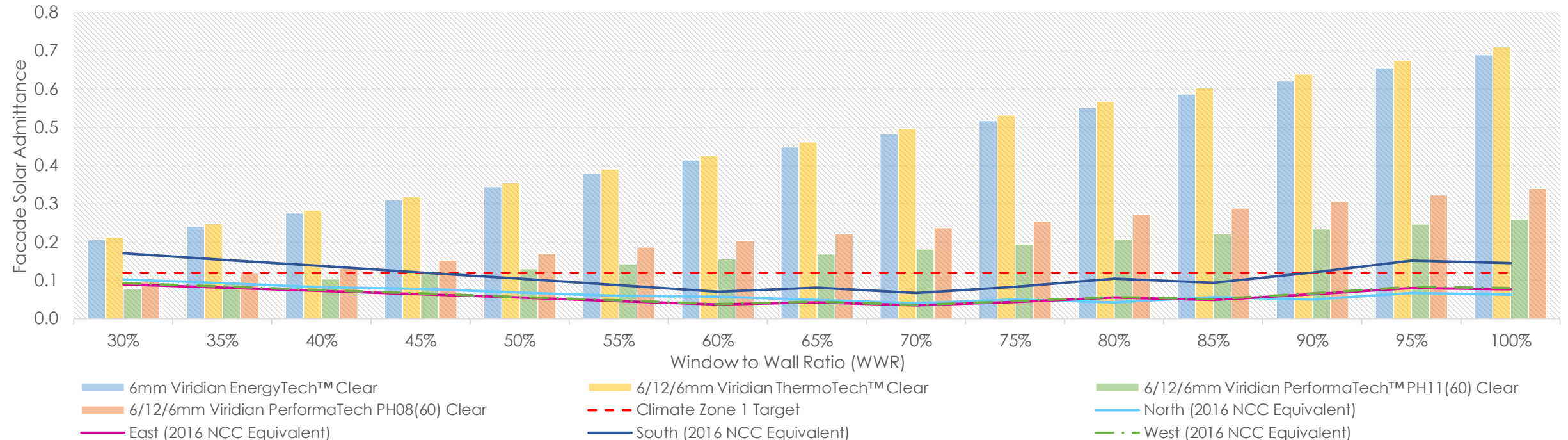
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 1

## Method 1 - FSA Target Glazing

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 1- Darwin



### NCC 2016

In Climate Zone 1, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 FSA equivalent shows similarly stringent requirements for SHGC on the north, east and west façade, and a slightly higher allowance on the south.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the SHGC requirement for all façade orientations is more lenient between 50% and 90% WWR. The southern façade is slightly more sensitive at low and high WWR's. The new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

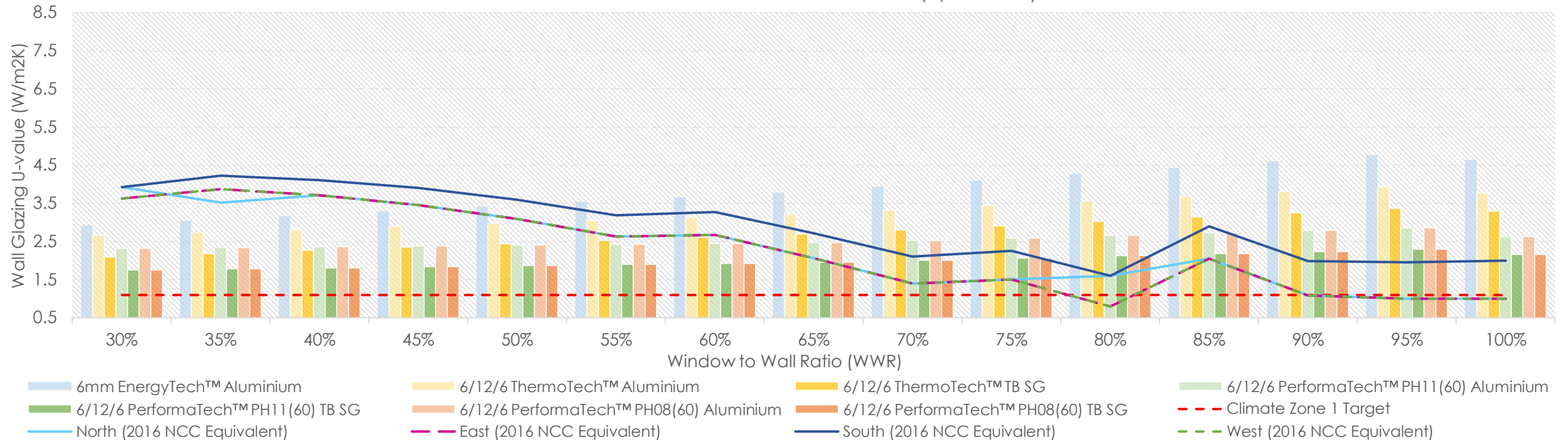
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 1.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 1 - Darwin (Spandrel)



### NCC 2016

In Climate Zone 1, for building class 3, the NCC 2016 code wall-glazing U-value requirement was similar for the north, east and west façade, and slightly more lenient on the south. Compliance could be achieved for all orientations with a WWR <65% when high performance glazing systems were used. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations with WWR <70% are now significantly more sensitive to U-value. This stringency increase varies between approximately 20% and 70% dependent on the WWR. At higher WWRs the 2019 requirement is similar to 2016, with the exception of the south façade which is approximately 50% more stringent.

### When to Use Method 1 DTS provisions?

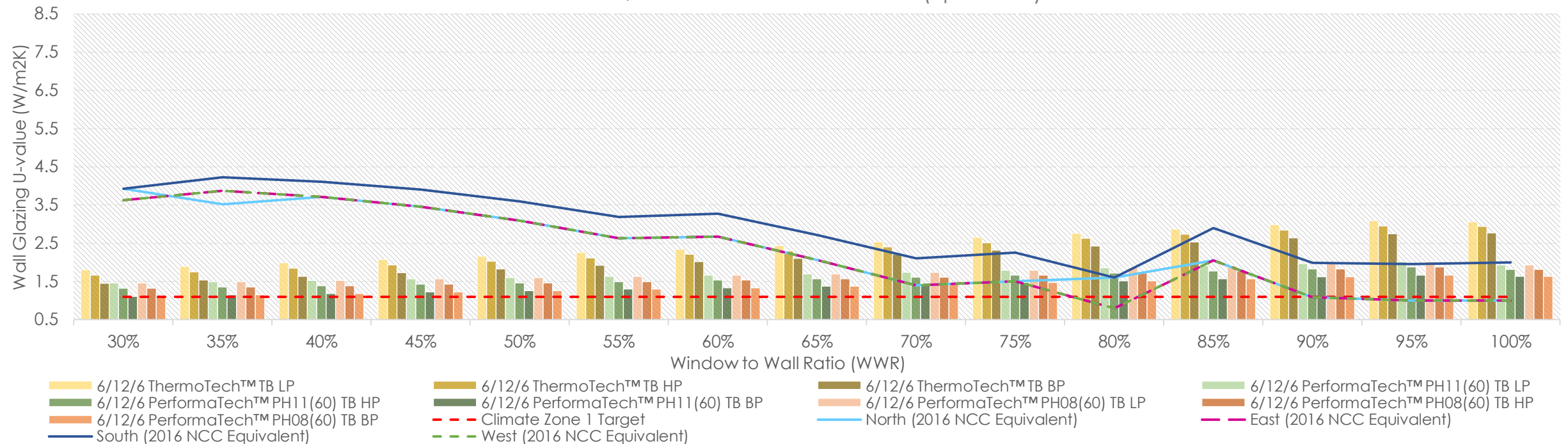
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 1.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 1 - Darwin (Spandrel)



### NCC 2016

In Climate Zone 1, for building class 3, the NCC 2016 code wall-glazing U-value requirement was similar for the north, east and west façade, and slightly more lenient on the south. Compliance could be achieved for all orientations with a WWR < 65% when high performance glazing systems were used. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations with WWR < 70% are now significantly more sensitive to U-value. This stringency increase varies between approximately 20% and 70% dependent on the WWR. At higher WWRs the 2019 requirement is similar to 2016, with the exception of the south façade which is approximately 50% more stringent.

### When to Use Method 1 DTS provisions?

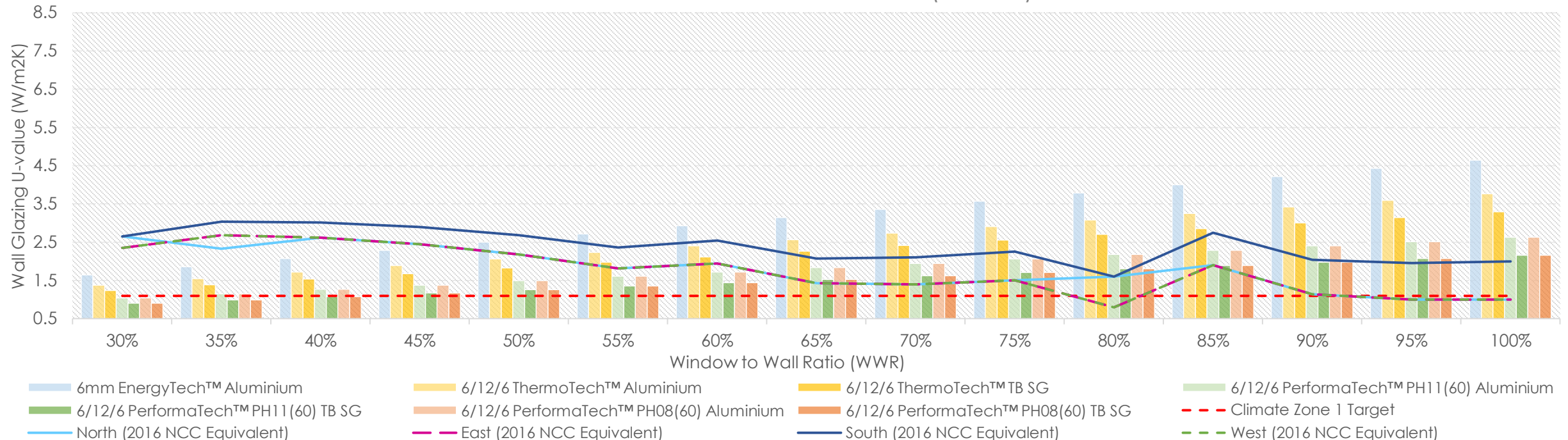
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs < 45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 1.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 1 - Darwin (Precast)



### NCC 2016

In Climate Zone 1, for building class 3, the NCC 2016 code wall-glazing U-value requirement was similar for the north, east and west façade, and slightly more lenient on the south. Compliance could be achieved for all orientations with a WWR < 65% when high performance glazing systems were used. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations with WWR < 70% are now significantly more sensitive to U-value. This stringency increase varies between approximately 20% and 70% dependent on the WWR. At higher WWRs the 2019 requirement is similar to 2016, with the exception of the south façade which is approximately 50% more stringent.

### When to Use Method 1 DTS provisions?

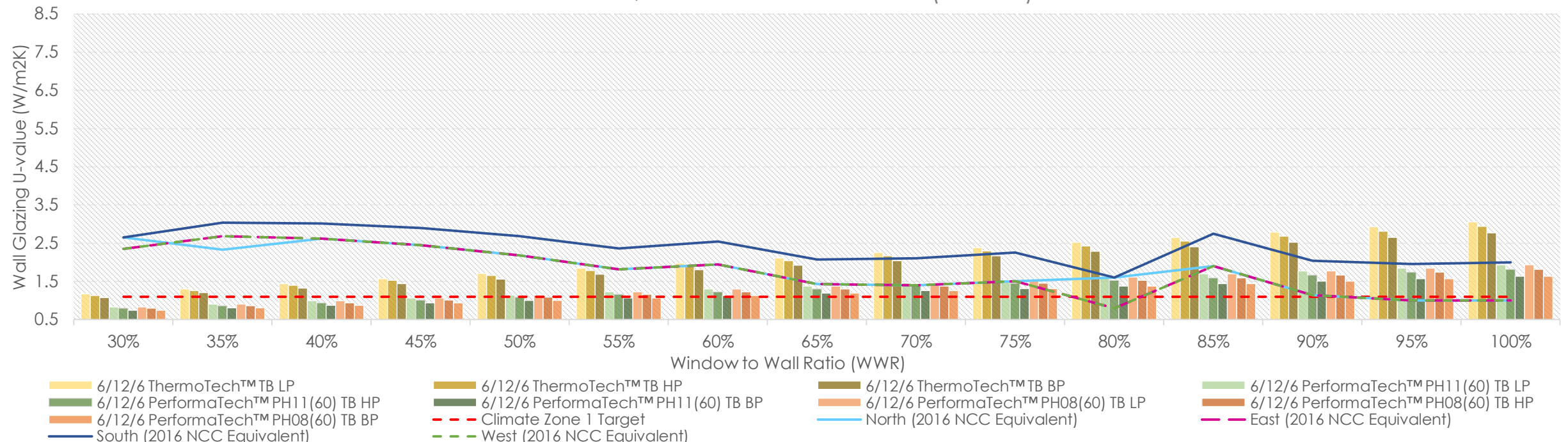
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs < 45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 1.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 1 - Darwin (Precast)



### NCC 2016

In Climate Zone 1, for building class 3, the NCC 2016 code wall-glazing U-value requirement was similar for the north, east and west façade, and slightly more lenient on the south. Compliance could be achieved for all orientations with a WWR < 65% when high performance glazing systems were used. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations with WWR < 70% are now significantly more sensitive to U-value. This stringency increase varies between approximately 20% and 70% dependent on the WWR. At higher WWRs the 2019 requirement is similar to 2016, with the exception of the south façade which is approximately 50% more stringent.

### When to Use Method 1 DTS provisions?

Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs < 45% able to meet the wall-glazing U-value performance requirement.

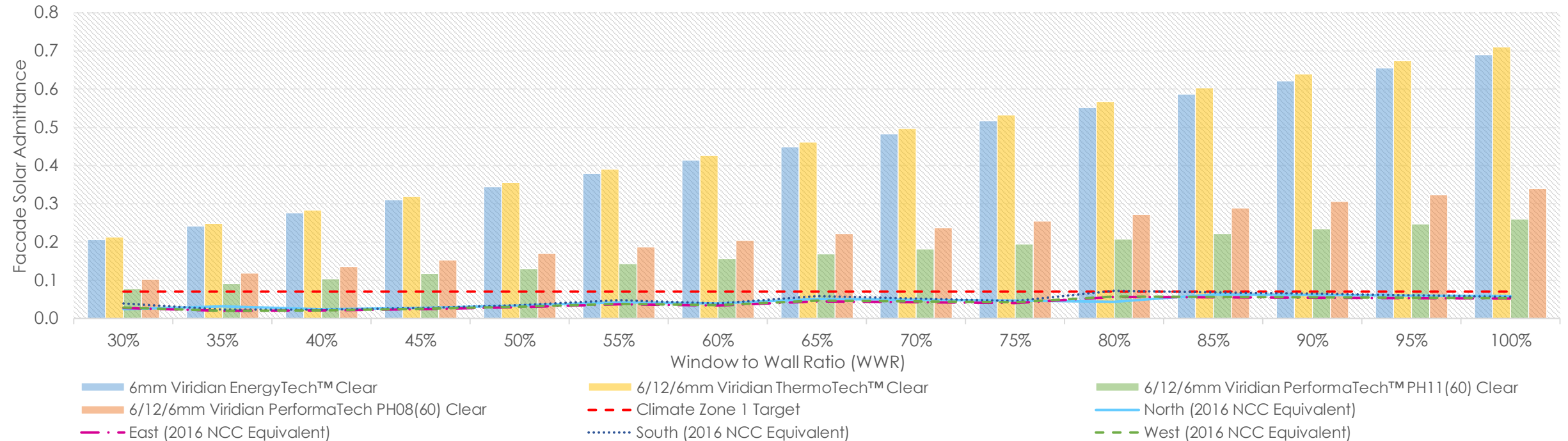
The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 1.



# Climate Zone 1

## Method 1 - FSA Target Glazing

Class 3, Climate Zone 1- Darwin



### NCC 2016

In Climate Zone 1, for building class 3, previously there were similarly stringent requirements for SHGC on all façade orientations.

### NCC 2019- What is the key change?

When compared to the new NCC 2019 code, all façade orientations are more lenient on SHGC for WWRs <80%, where >80% WWR the 2016 and 2019 FSA requirement is reasonably equivalent. The new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

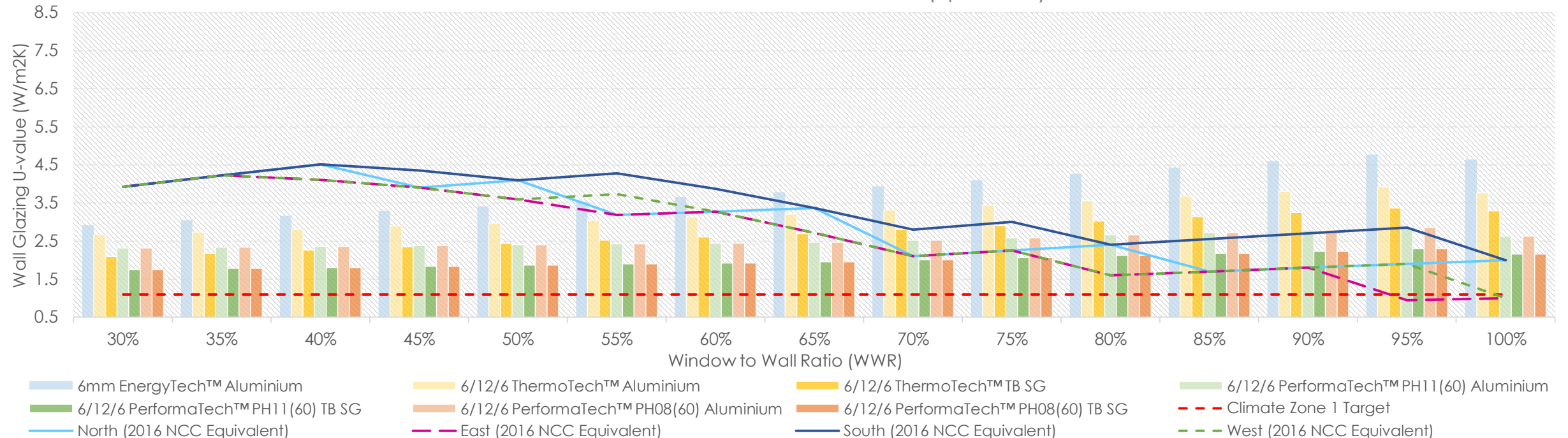
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 1.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 1 - Darwin (Spandrel)



### NCC 2016

In Climate Zone 1, for building class 9c, the NCC 2016 code wall-glazing U-value requirement was similar for the north, east and west façade, and slightly more lenient on the south. Compliance could be achieved for all orientations with a WWR <70% with high performance glazing systems.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value, with greater variation at lower WWRs. This stringency increase varies between approximately 50% and 75% dependent on the WWR. For WWRs >95% there is a small exception, with the 2019 wall-glazing U-value requirement more lenient on the eastern façade.

### When to Use Method 1 DTS provisions?

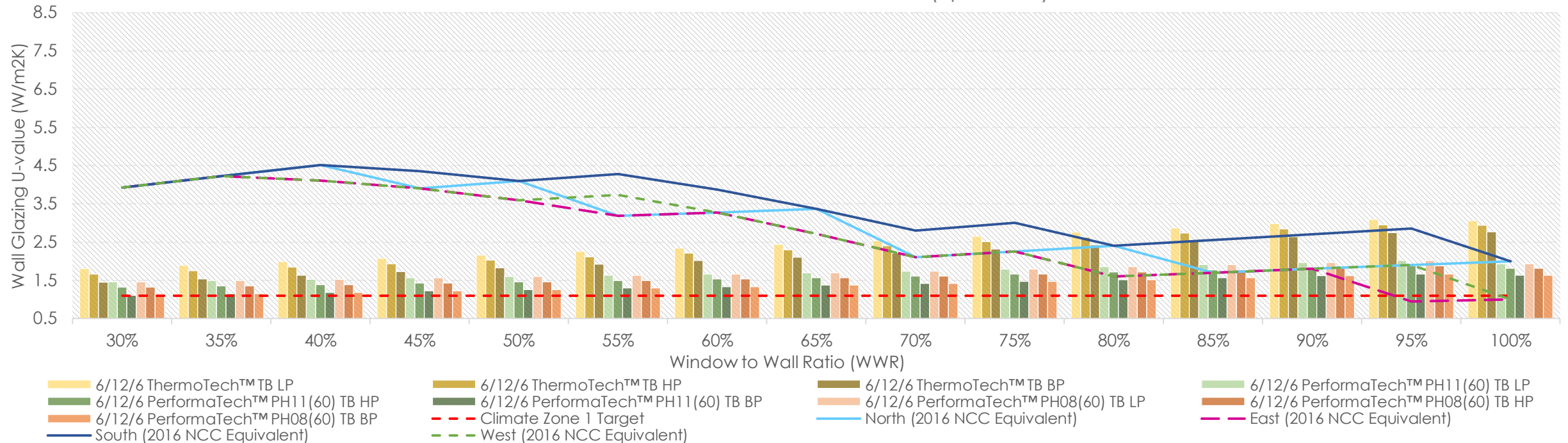
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 1.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 1 - Darwin (Spandrel)



### NCC 2016

In Climate Zone 1, for building class 9c, the NCC 2016 code wall-glazing U-value requirement was similar for the north, east and west façade, and slightly more lenient on the south. Compliance could be achieved for all orientations with a WWR <70% with high performance glazing systems.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value, with greater variation at lower WWRs. This stringency increase varies between approximately 50% and 75% dependent on the WWR. For WWRs >95% there is a small exception, with the 2019 wall-glazing U-value requirement more lenient on the eastern façade.

### When to Use Method 1 DTS provisions?

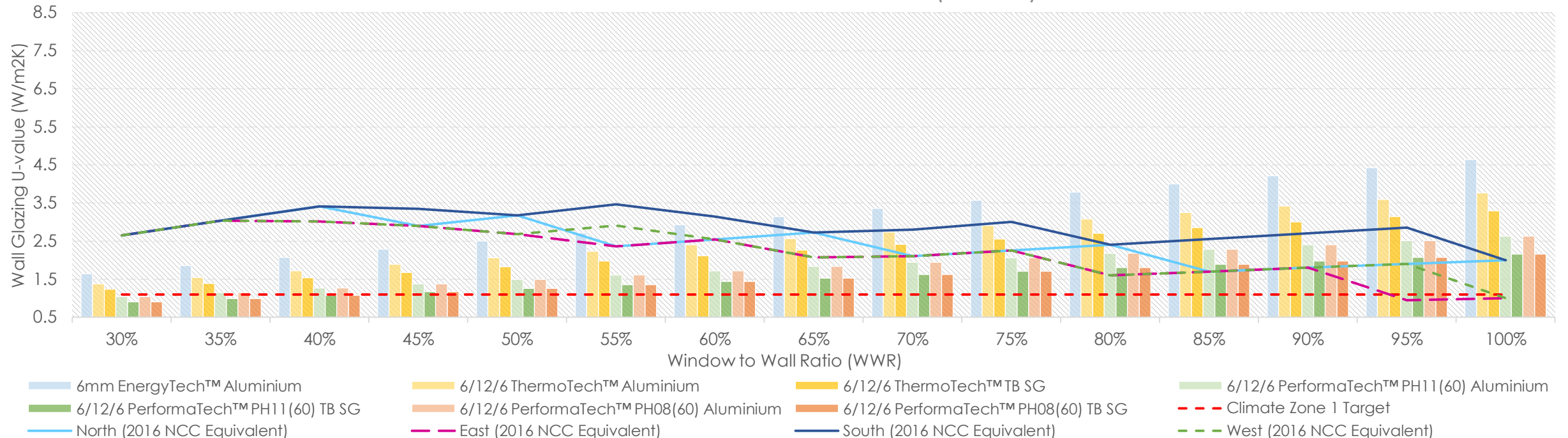
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 1.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 1 - Darwin (Precast)



### NCC 2016

In Climate Zone 1, for building class 9c, the NCC 2016 code wall-glazing U-value requirement was similar for the north, east and west façade, and slightly more lenient on the south. Compliance could be achieved for all orientations with a WWR <70% with high performance glazing systems.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value, with greater variation at lower WWRs. This stringency increase varies between approximately 50% and 75% dependent on the WWR. For WWRs >95% there is a small exception, with the 2019 wall-glazing U-value requirement more lenient on the eastern façade.

### When to Use Method 1 DTS provisions?

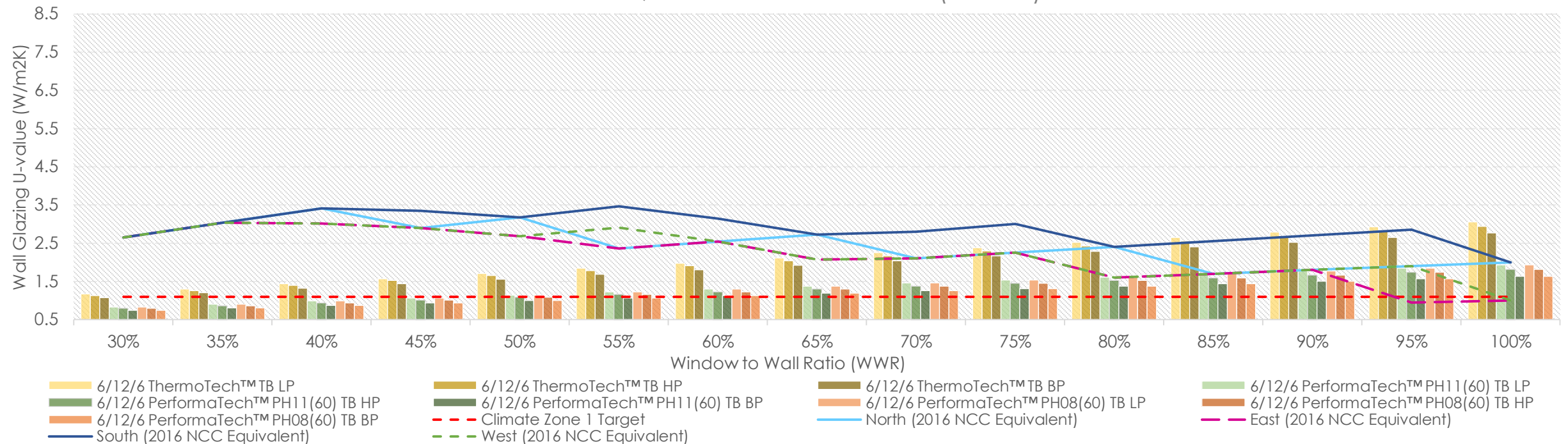
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 1.

# Climate Zone 1

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 1 - Darwin (Precast)



### NCC 2016

In Climate Zone 1, for building class 9c, the NCC 2016 code wall-glazing U-value requirement was similar for the north, east and west façade, and slightly more lenient on the south. Compliance could be achieved for all orientations with a WWR <70% with high performance glazing systems.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value, with greater variation at lower WWRs. This stringency increase varies between approximately 50% and 75% dependent on the WWR. For WWRs >95% there is a small exception, with the 2019 wall-glazing U-value requirement more lenient on the eastern façade.

### When to Use Method 1 DTS provisions?

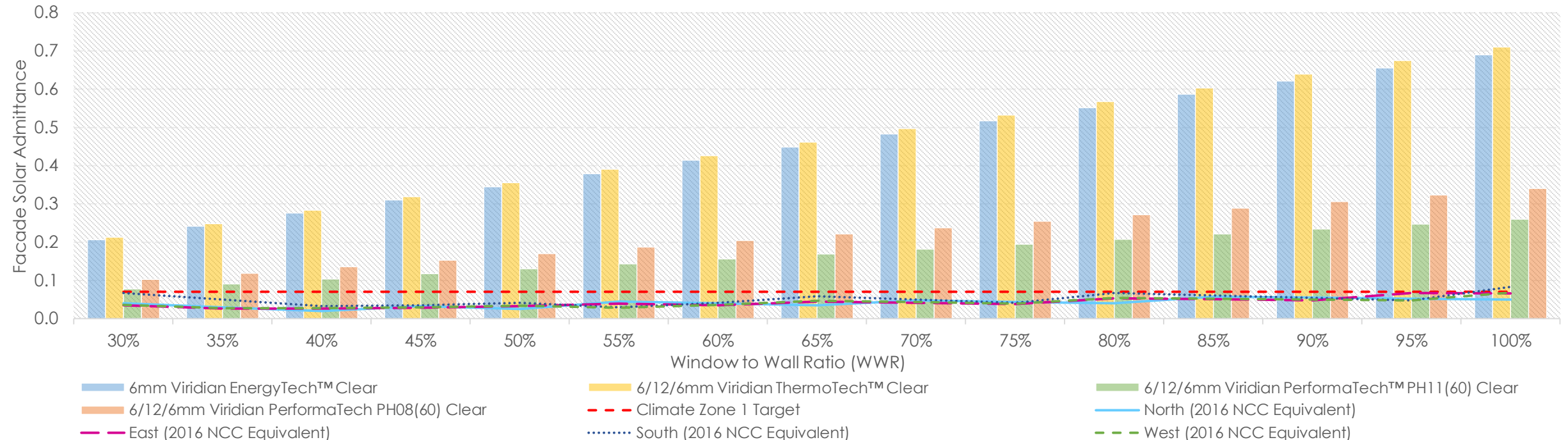
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 1.

# Climate Zone 1

## Method 1 - FSA Target Glazing

Class 9c, Climate Zone 1- Darwin



### NCC 2016

In Climate Zone 1, for building class 9c, previously there were similarly stringent requirements for SHGC on all façade orientations.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are more lenient on SHGC for WWRs <80%, where >80% the 2016 and 2019 FSA requirements are reasonably equivalent.

The new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

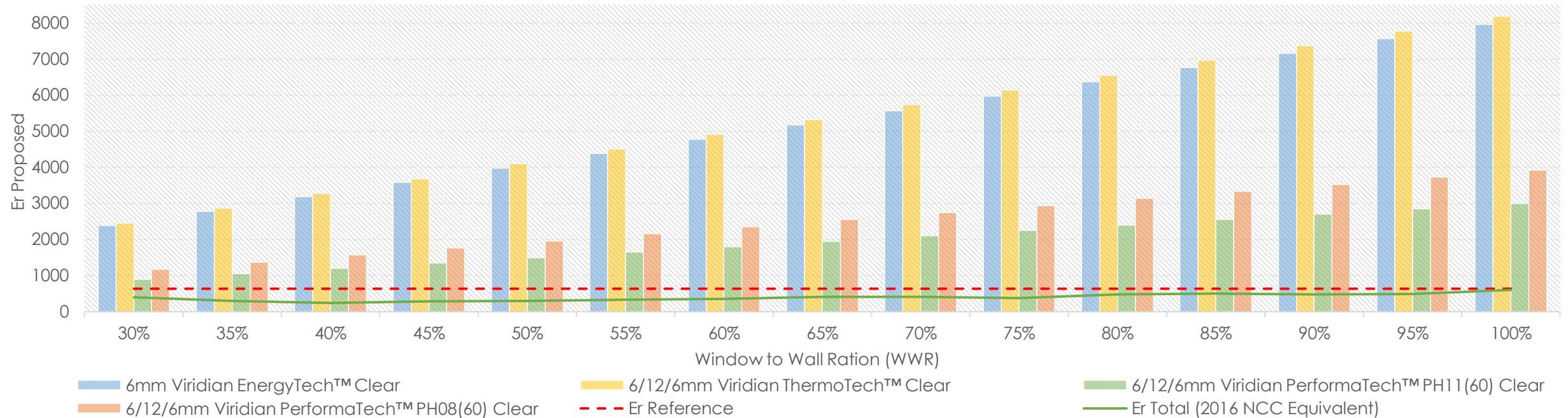
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 1.

# Climate Zone 1

## Method 2 - Class 2

Class 9c, Climate Zone 1 - Darwin



### NCC 2016

In Climate Zone 1, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the 2016 NCC Er equivalent is more stringent than the 2019 reference for all WWRs.

### NCC 2019- What is the key change?

The 2016 NCC Er equivalent was approximately 30-50% more stringent for WWRs between 45% and 85%. The 2019 code applies the Er requirement in a more balanced way across varied WWRs.

### When to Use Method 2 DTS provisions?

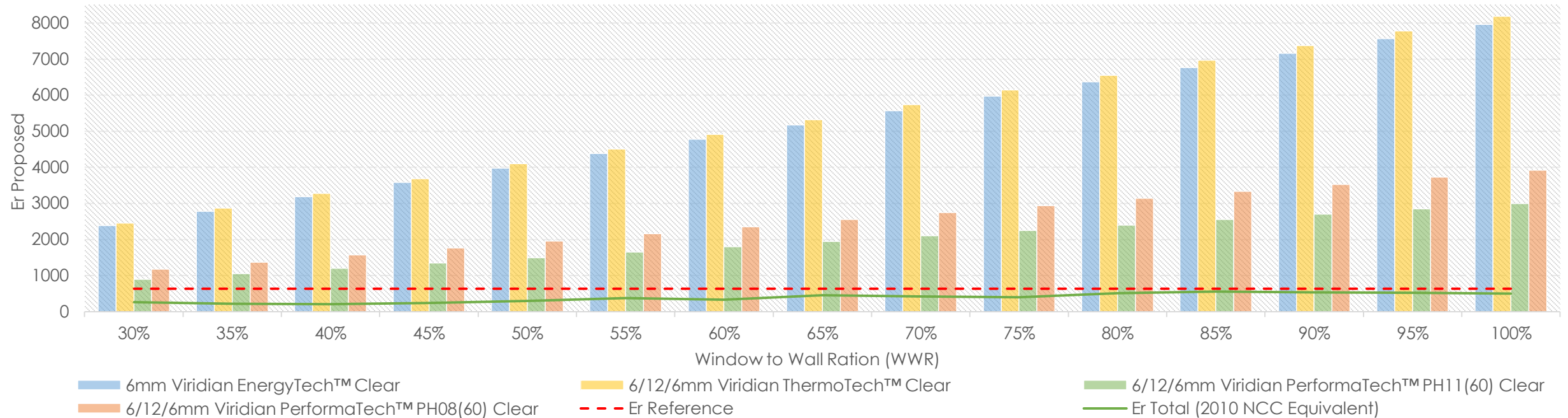
The new method 2 DTS provisions do not work well for this class and climate zone. It may be appropriate for a building with WWR<45% without vertical shading.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 1

## Method 2 - Class 3

Class 3, Climate Zone 1 - Darwin



### NCC 2016

In Climate Zone 1, for building class 3, the 2016 NCC Er equivalent is more stringent than the 2019 requirement for all WWRs.

### NCC 2019- What is the key change?

At high WWRs, the Er requirement is similar in both the 2016 and 2019 NCC code. For WWRs <80%, the 2016 code was approximately 10-70% more stringent, with larger variation at lower WWRs. The 2019 code applies the Er requirement in a more balanced way across varying WWRs.

### When to Use Method 2 DTS provisions?

The new method 2 DTS provisions do not work well for this class and climate zone.

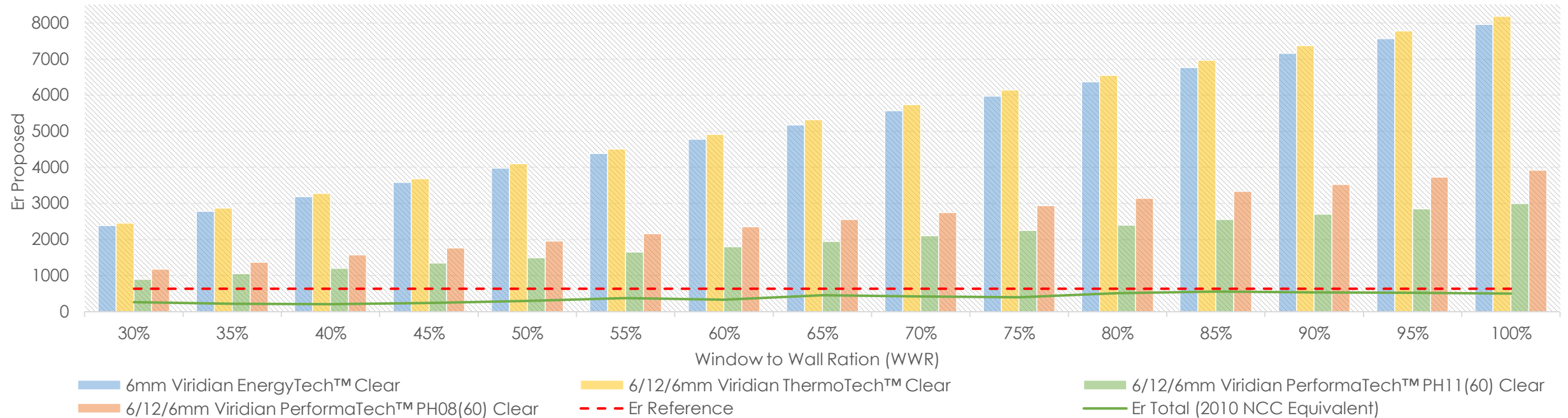
The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.



# Climate Zone 1

## Method 2 - Class 9c

Class 3, Climate Zone 1 - Darwin



### NCC 2016

In Climate Zone 1, for building class 9c, the 2016 NCC Er equivalent is more stringent than the 2019 requirement for all WWRs.

### NCC 2019- What is the key change?

At high WWRs, the Er requirement is similar in both the 2016 and 2019 NCC code. For WWRs <80%, the 2016 code was approximately 10-70% more stringent, with larger variation at lower WWRs. The 2019 code applies the Er requirement in a more balanced way across varying WWRs.

### When to Use Method 2 DTS provisions?

The new method 2 DTS provisions do not work well for this class and climate zone.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

It is recommended that for Class 9c buildings, a JV3 model is always considered.

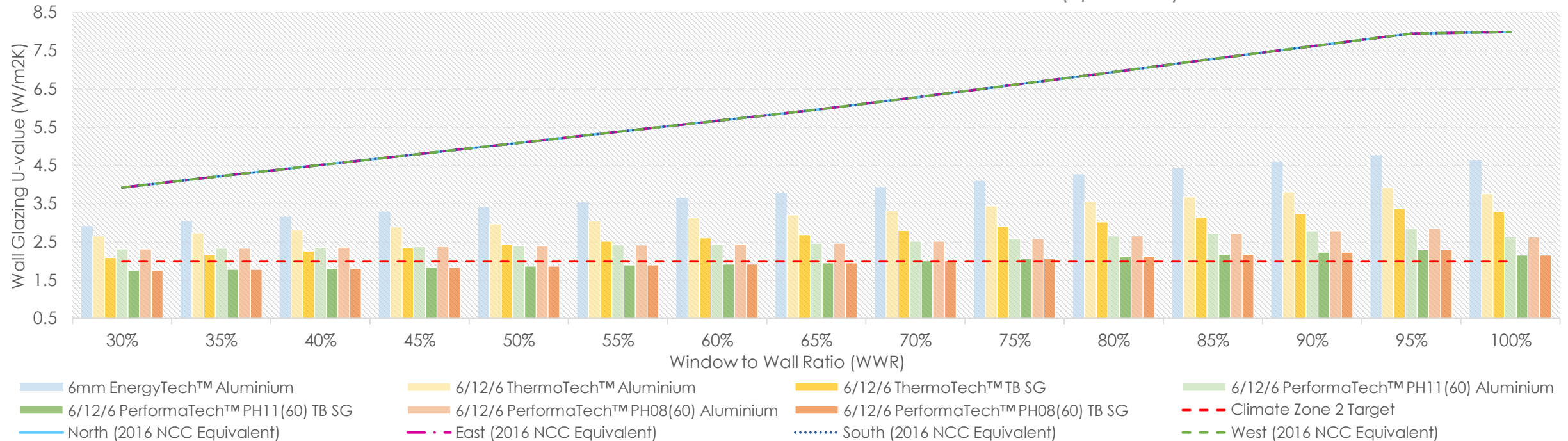
Climate Zone 2

Brisbane

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 2 - Brisbane (Spandrel)



### NCC 2016

In Climate Zone 2, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

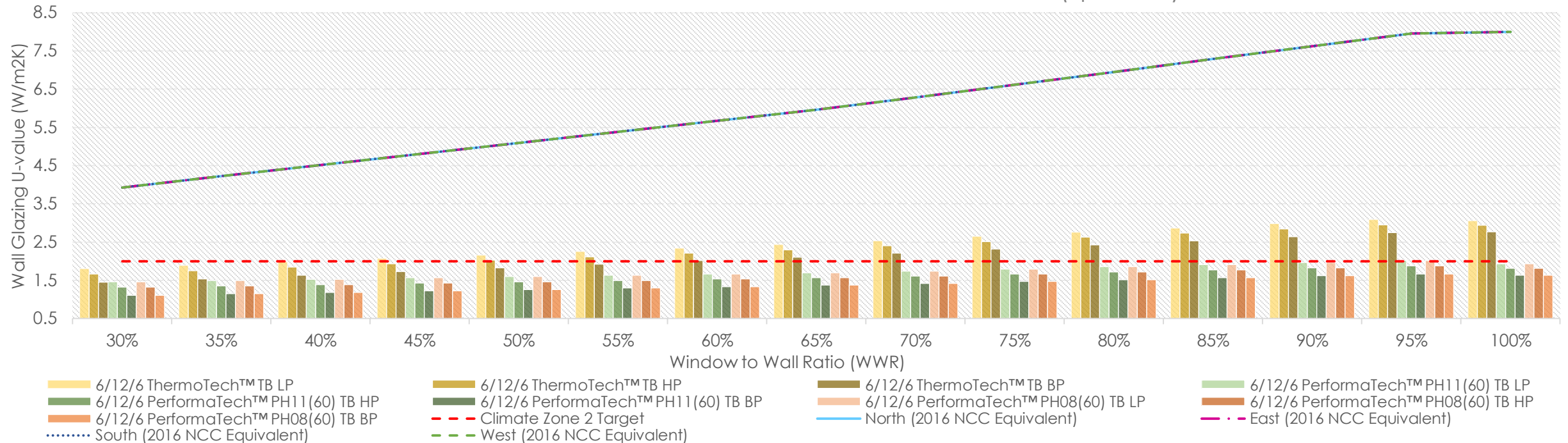
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 2 - Brisbane (Spandrel)



### NCC 2016

In Climate Zone 2, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

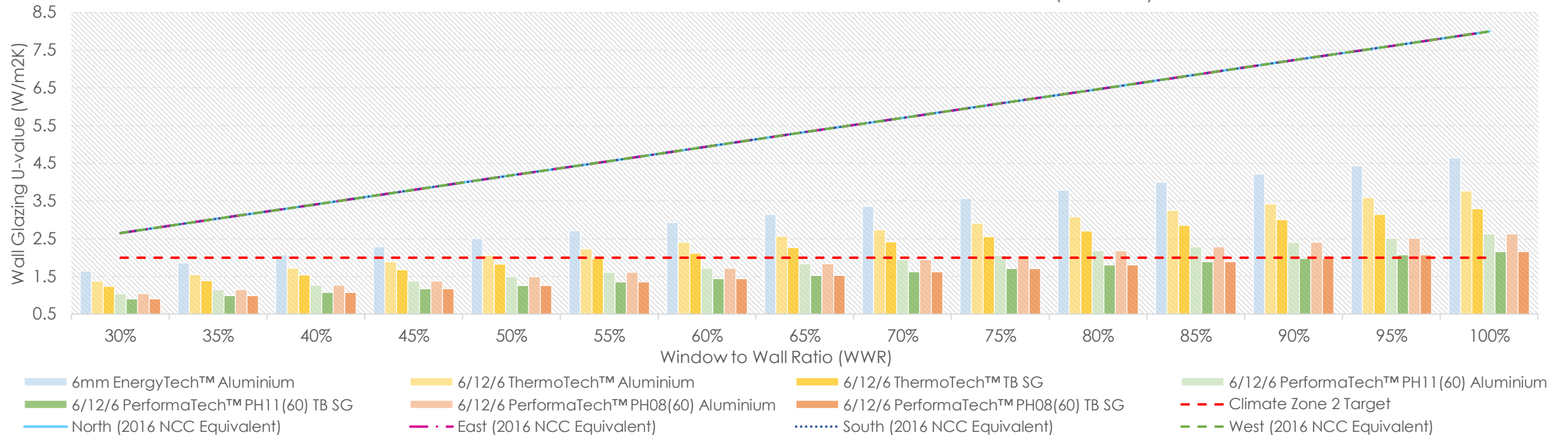
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 2 - Brisbane (Precast)



### NCC 2016

In Climate Zone 2, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

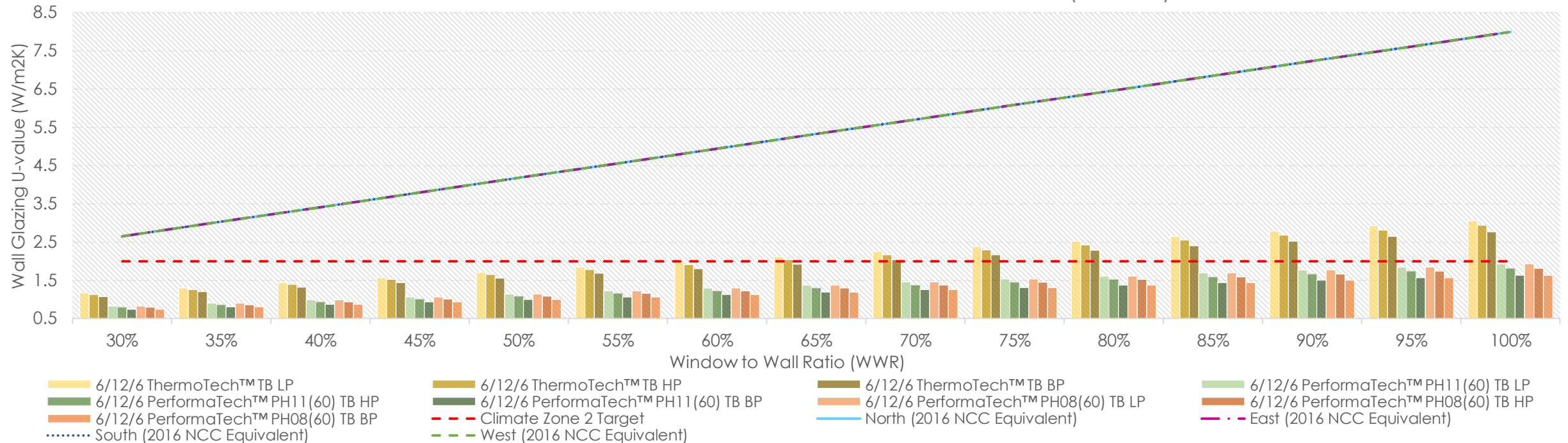
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 2 - Brisbane (Precast)



### NCC 2016

In Climate Zone 2, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

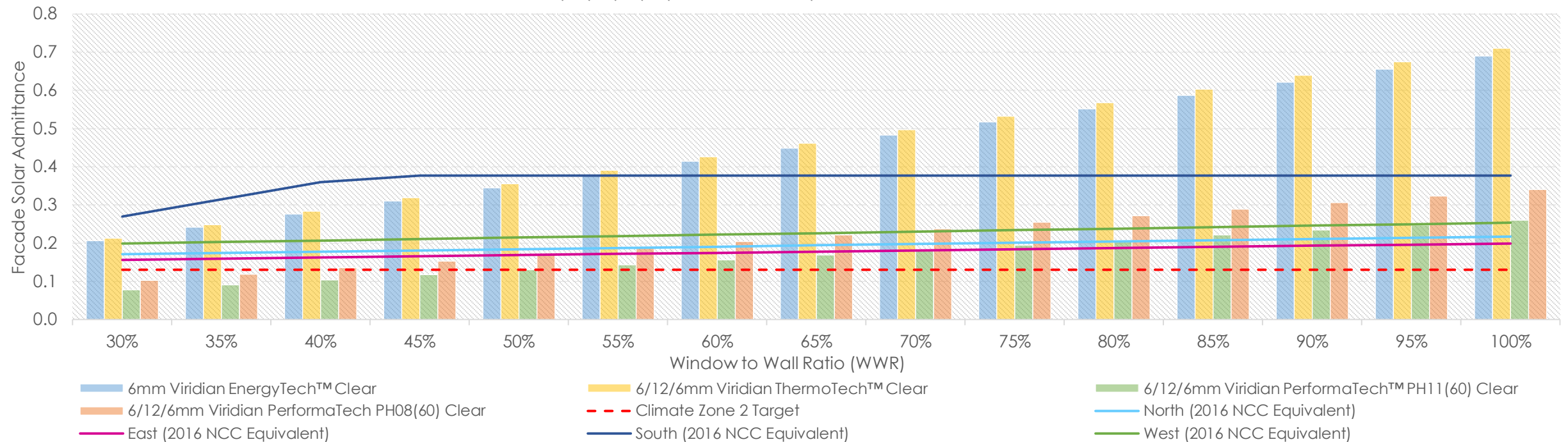
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - FSA Target Glazing

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 2 - Brisbane



### NCC 2016

In Climate Zone 2, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, previously there was a relaxed requirement for SHGC on the southern façade, as this orientation receives no direct solar. The east, west and north facing façades have a lower SHGC requirement.

### NCC 2019- What is the key change?

The southern façade is now significantly more sensitive to SHGC. All other façade orientations have too been made more stringent, with the FSA requirement increased by approximately 30-50%.

### When to Use Method 1 DTS provisions?

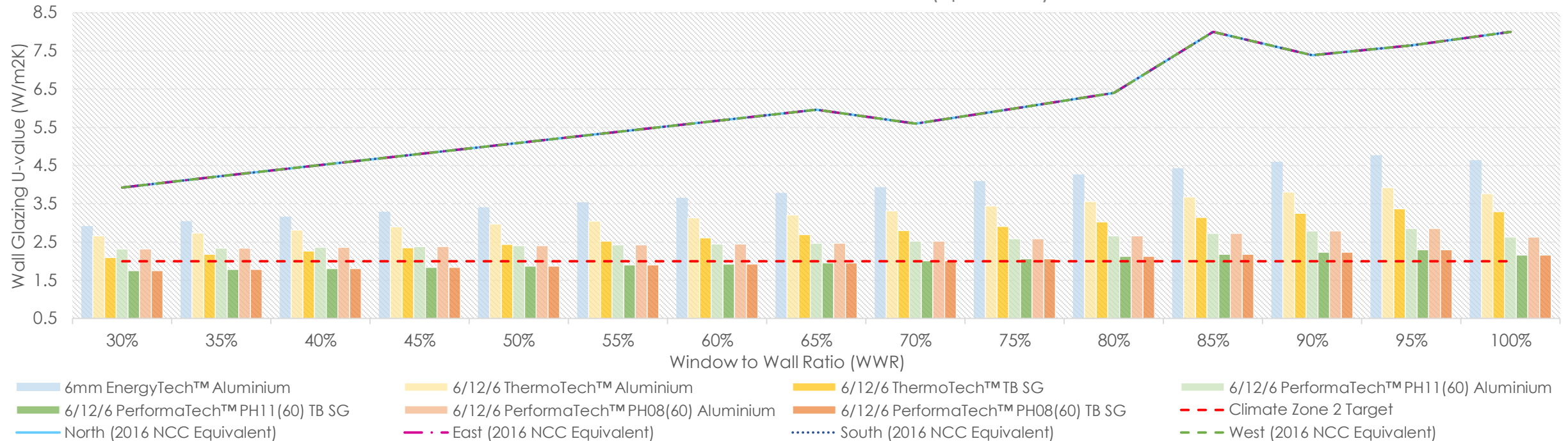
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 2.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 2 - Brisbane (Spandrel)



### NCC 2016

In Climate Zone 2, for building class 3, the NCC 2016 wall-glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

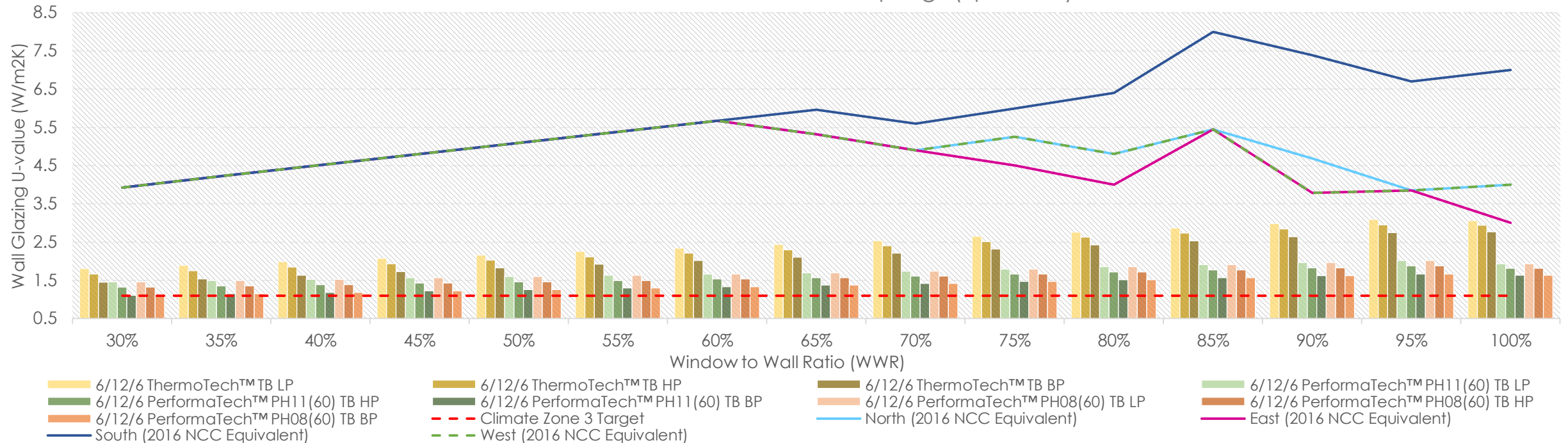
For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.



# Climate Zone 2

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 3 - Alice Springs (Spandrel)



### NCC 2016

In Climate Zone 2, for building class 3, the NCC 2016 wall-glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

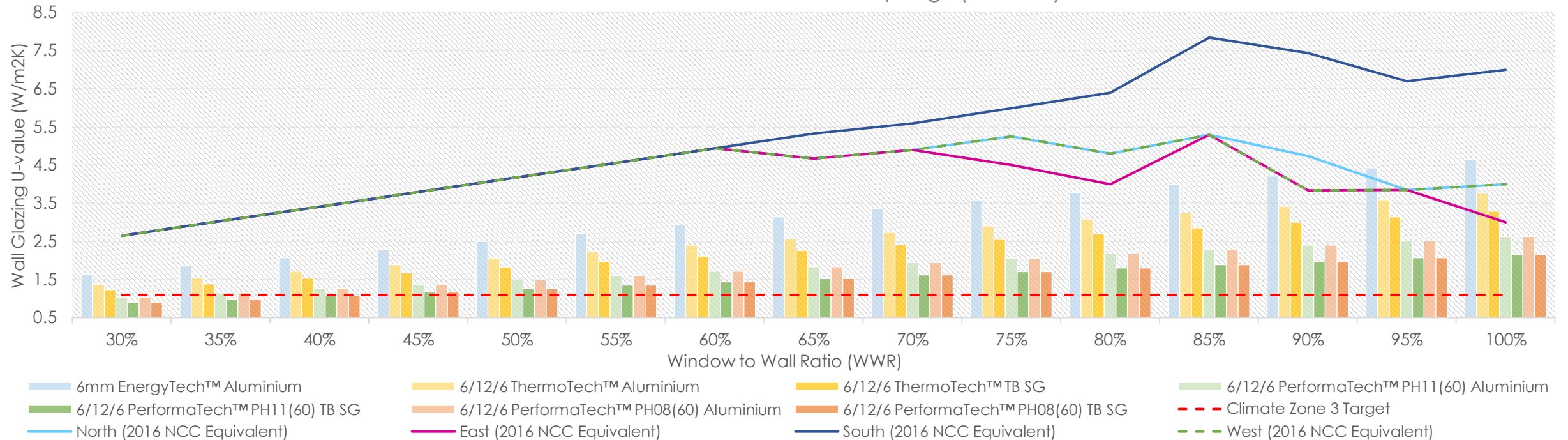
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 2, for building class 3, the NCC 2016 wall-glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

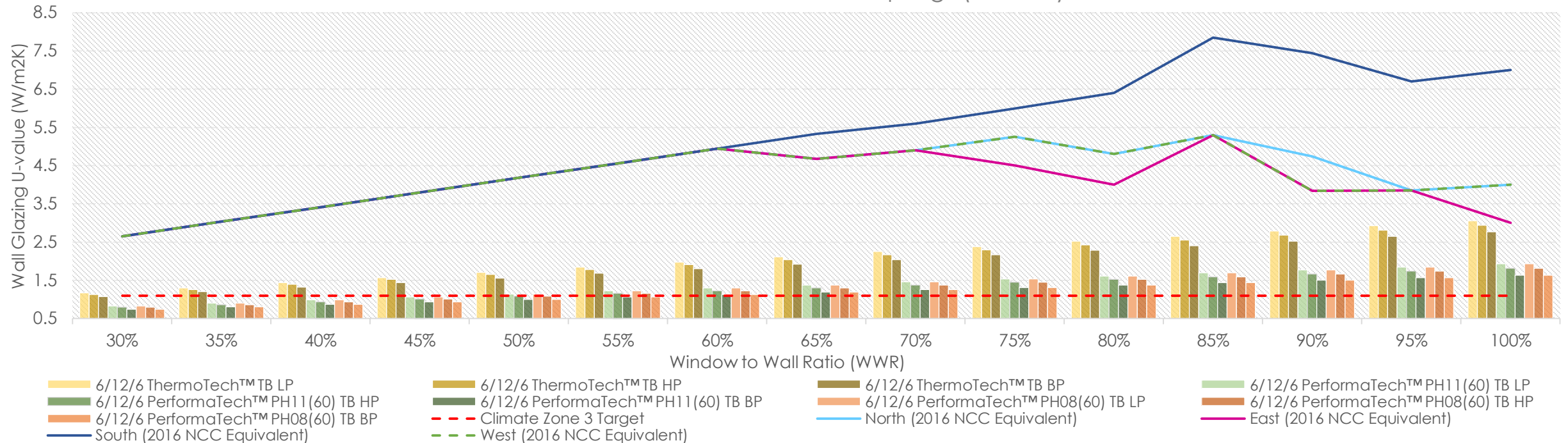
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 2, for building class 3, the NCC 2016 wall-glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

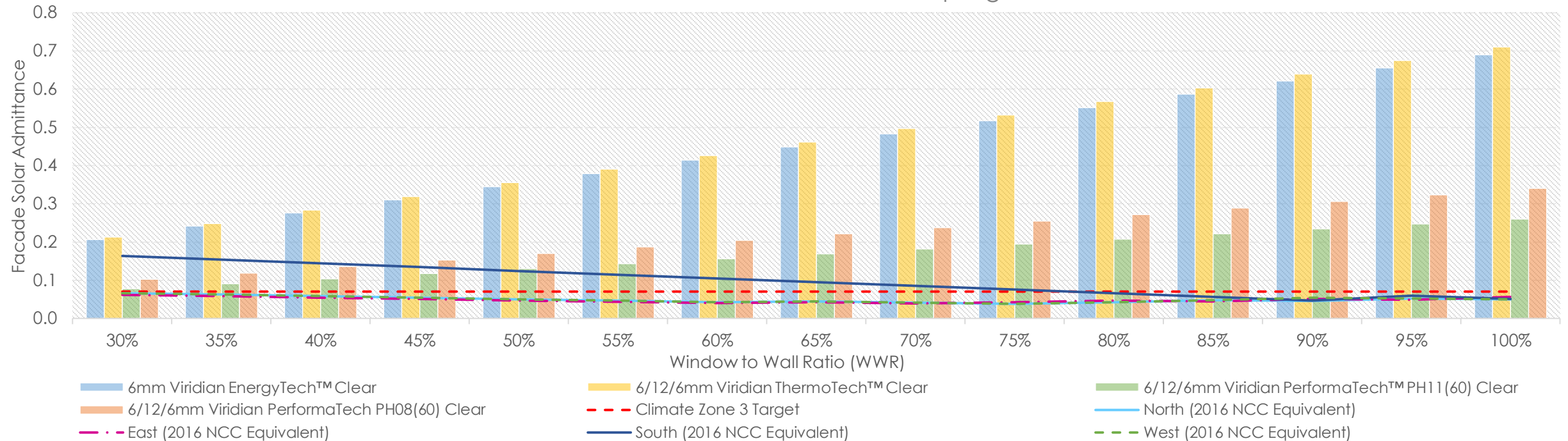
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - FSA Target Glazing

Class 3, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 2, for building class 3, previously there was a more relaxed requirement for SHGC on the southern façade, as this orientation receives no direct solar. The east, west and north facing façades have a lower SHGC requirement.

### NCC 2019- What is the key change?

The southern façade is now significantly more sensitive to SHGC. All other façade orientations have too been made more stringent, with the FSA requirement increased by approximately 30-50%.

### When to Use Method 1 DTS provisions?

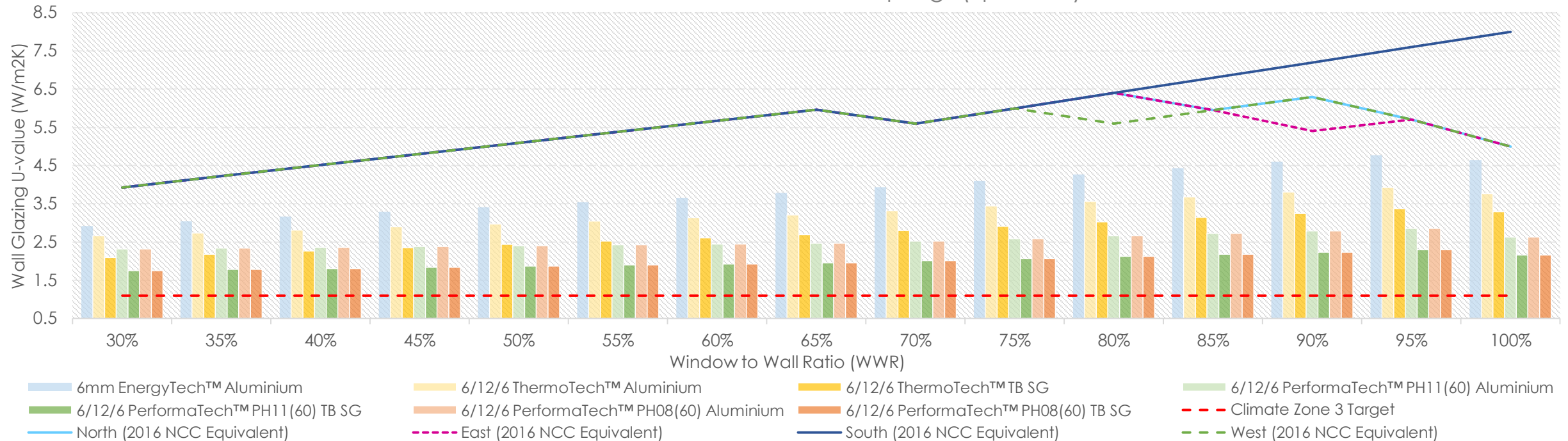
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 2.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 3 - Alice Springs (Spandrel)



### NCC 2016

In Climate Zone 2, for building class 9c, the NCC 2016 wall-glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

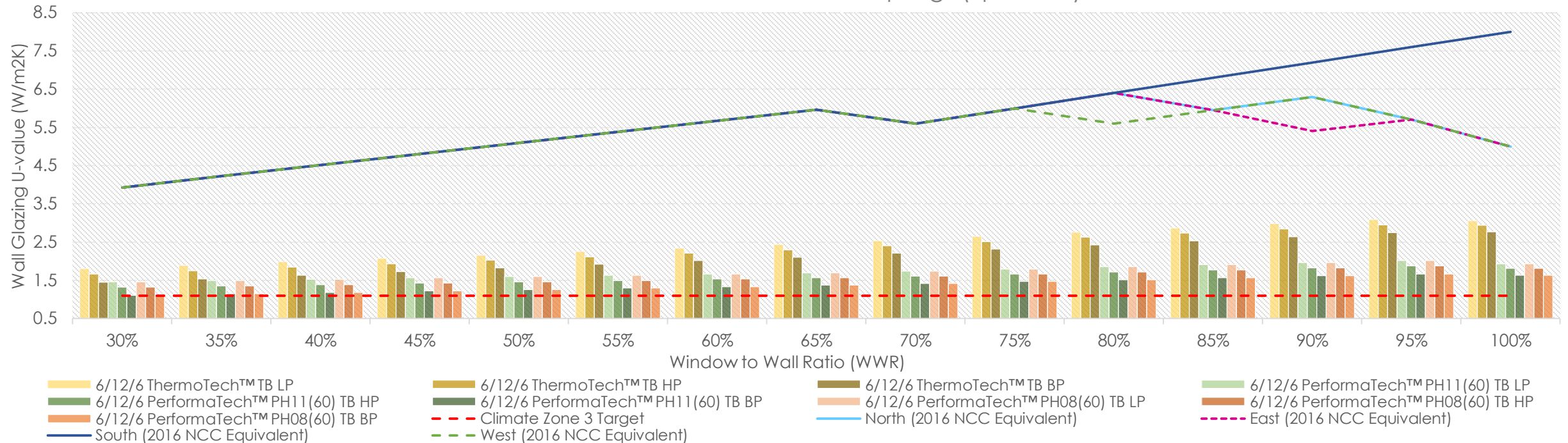
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 3 - Alice Springs (Spandrel)



### NCC 2016

In Climate Zone 2, for building class 9c, the NCC 2016 wall-glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

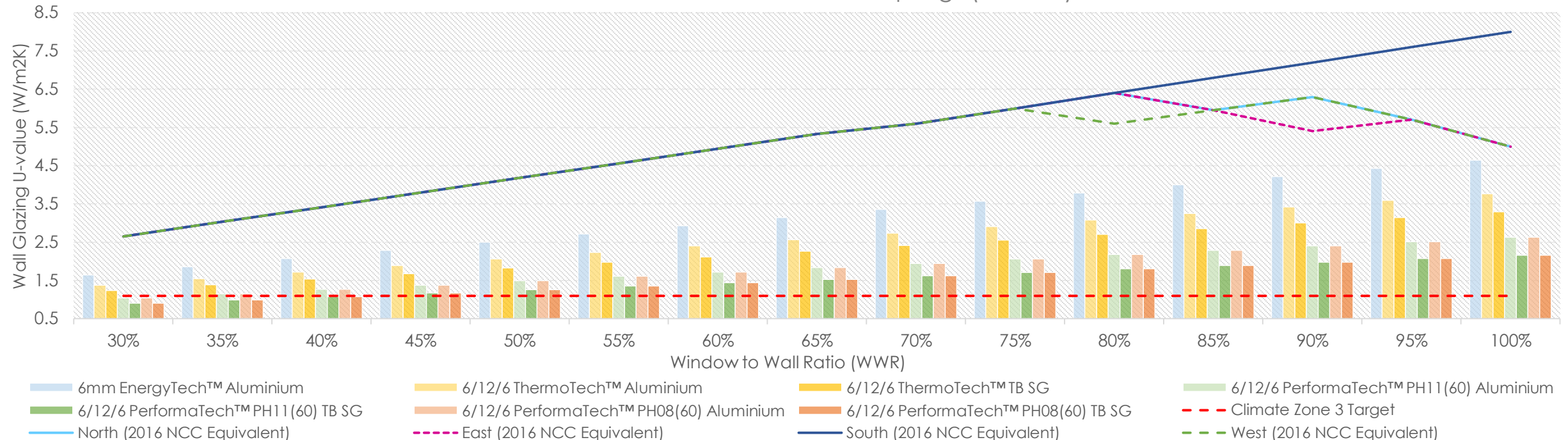
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 2, for building class 9c, the NCC 2016 wall-glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

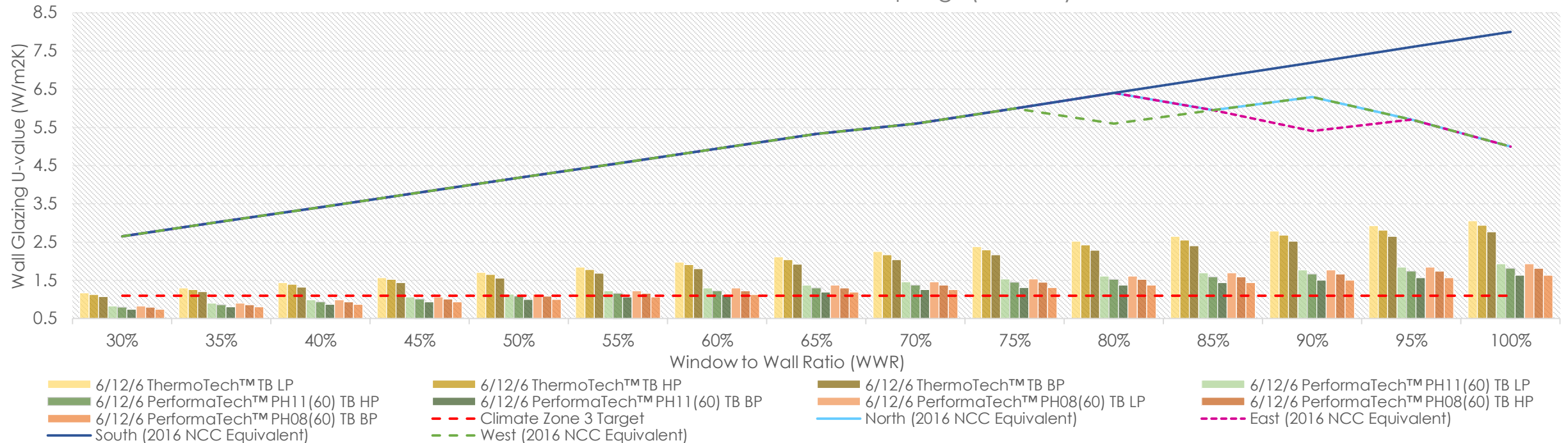
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 2, for building class 9c, the NCC 2016 wall-glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are now significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent at lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes at low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

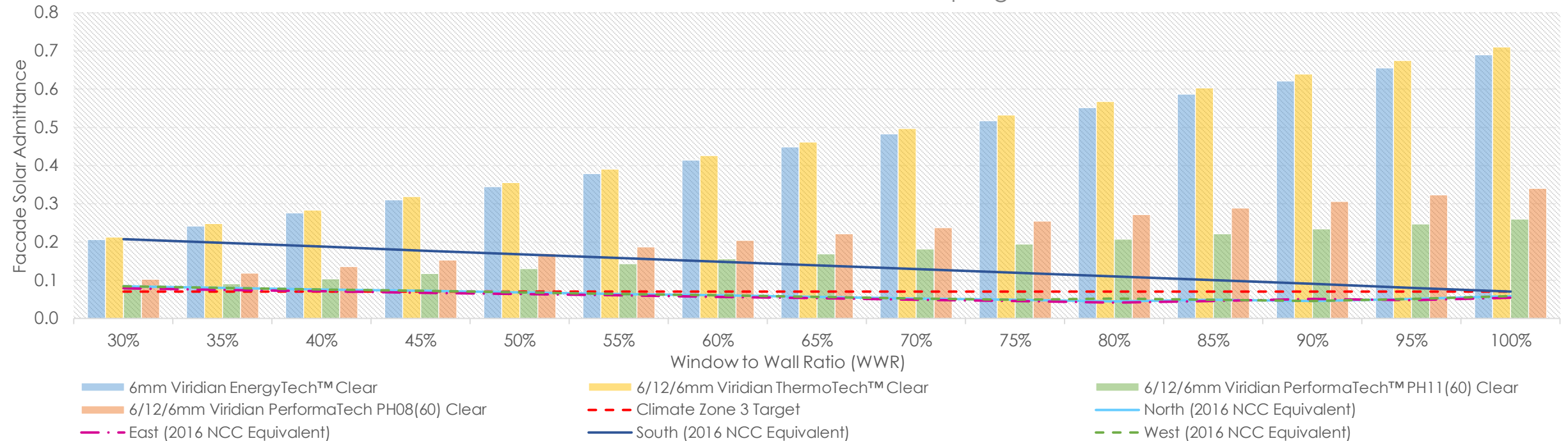
For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.



# Climate Zone 2

## Method 1 - FSA Target Glazing

Class 9c, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 2, for building class 9c, previously there was a more relaxed requirement for SHGC on the southern façade, as this orientation receives no direct solar. The east, west and north facing façades have a lower SHGC requirement.

### NCC 2019- What is the key change?

The southern façade is now significantly more sensitive to SHGC. All other façade orientations have too been made more stringent, with the FSA requirement increased by approximately 30-50%.

### When to Use Method 1 DTS provisions?

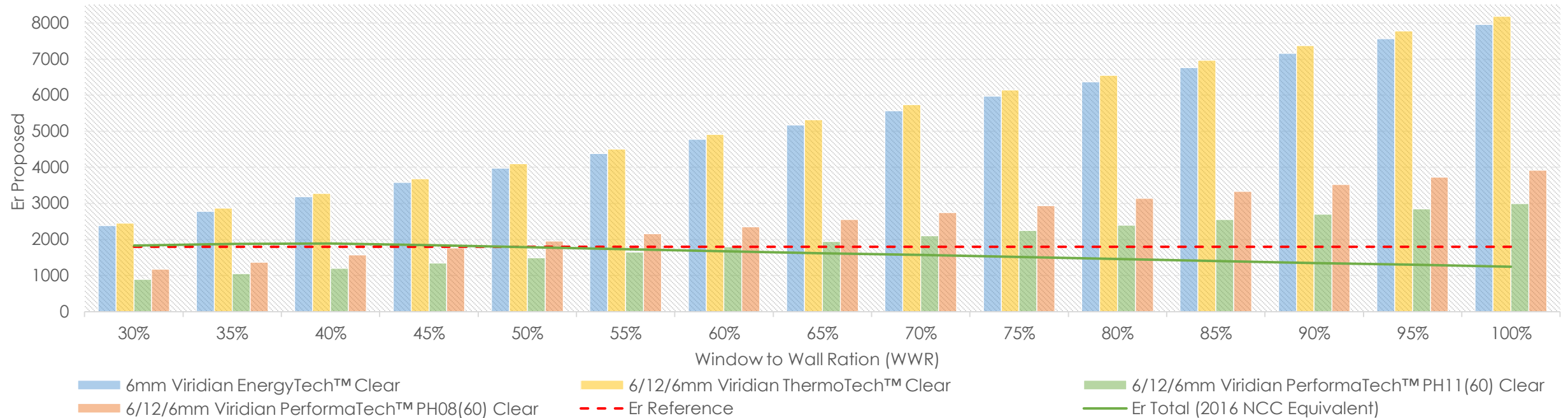
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 2.

# Climate Zone 2

## Method 2 - Class 2

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 2, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the 2019 method 2 DTS provisions are more stringent than the previous NCC 2016 code.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 30-50% more stringent than the 2016 equivalent.

### When to Use Method 2 DTS provisions?

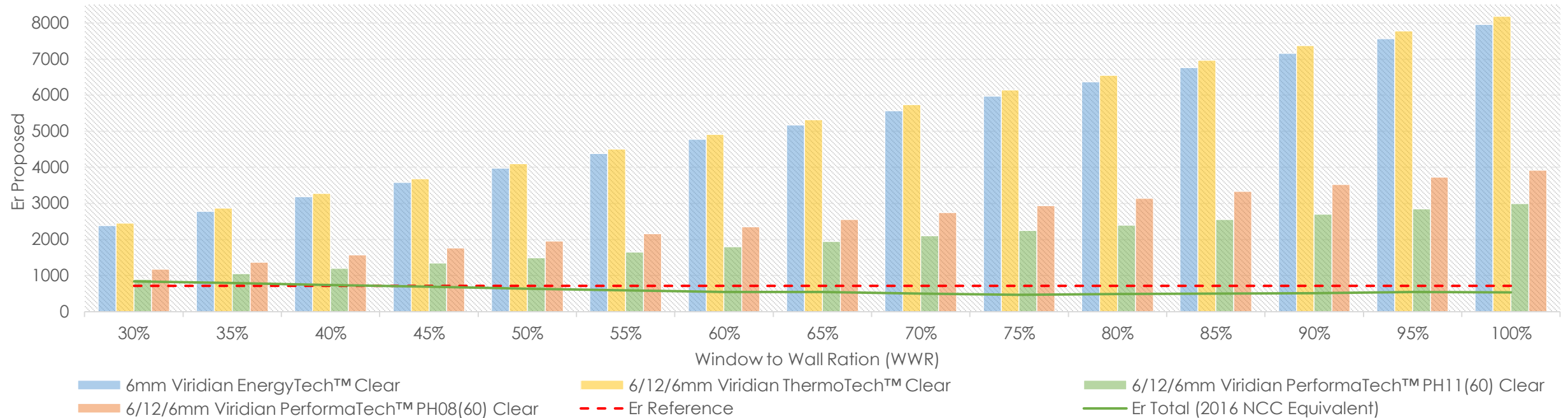
The new method 2 DTS provisions do not work well for this class and climate zone, unless the building has a WWR <50%, no vertical shading and a high performance glazing system is used.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 2 - Class 3

Class 3, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 2, for building class 3, the 2019 method 2 DTS provisions are more stringent than the previous NCC 2016 code.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 30-50% more stringent than the 2016 equivalent.

### When to Use Method 2 DTS provisions?

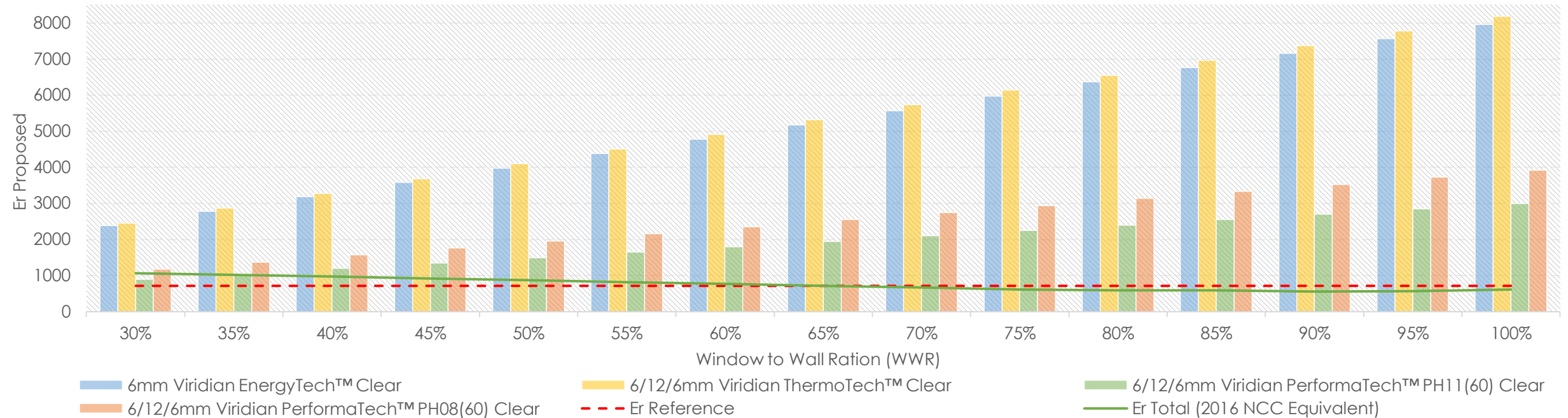
The new method 2 DTS provisions do not work well for this class and climate zone, unless the building has a WWR <35%, no vertical shading and a high performance glazing system is used.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 2

## Method 2 - Class 9c

Class 9c, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 2, for building class 9c, the 2019 method 2 DTS provisions are more stringent than the previous NCC 2016 code.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 30-50% more stringent than the 2016 equivalent.

### When to Use Method 2 DTS provisions?

The new method 2 DTS provisions do not work well for this class and climate zone, unless the building has a WWR <35%, no vertical shading and a high performance glazing system is used.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

It is recommended that for Class 9c buildings, a JV3 model is always considered.

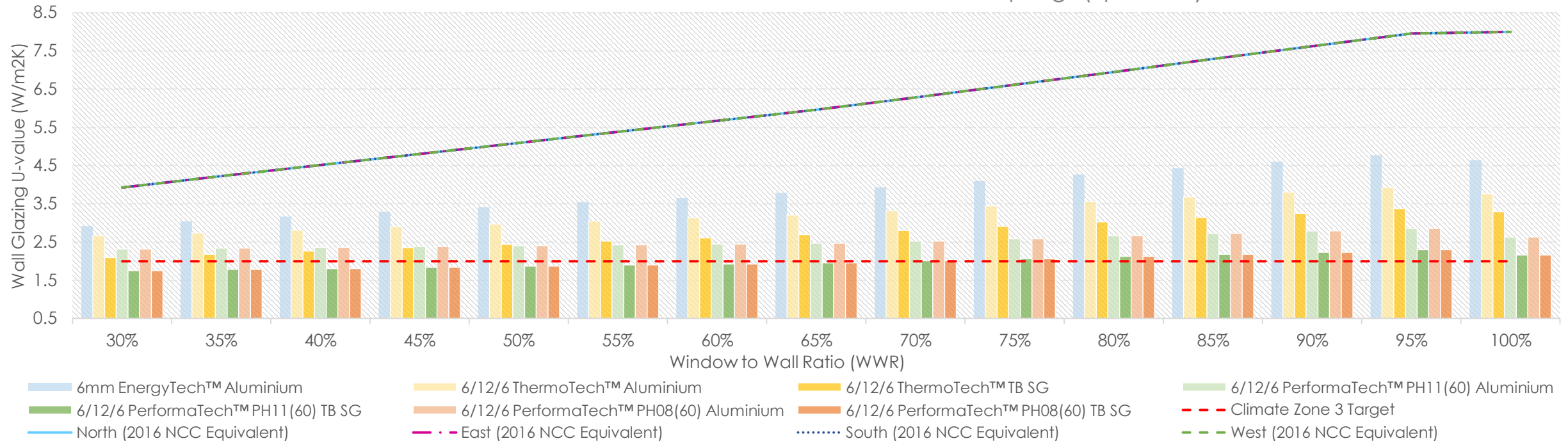
Climate Zone 3

Alice Springs

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 3 - Alice Springs (Spandrel)



### NCC 2016

In Climate Zone 3, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent for lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes for low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

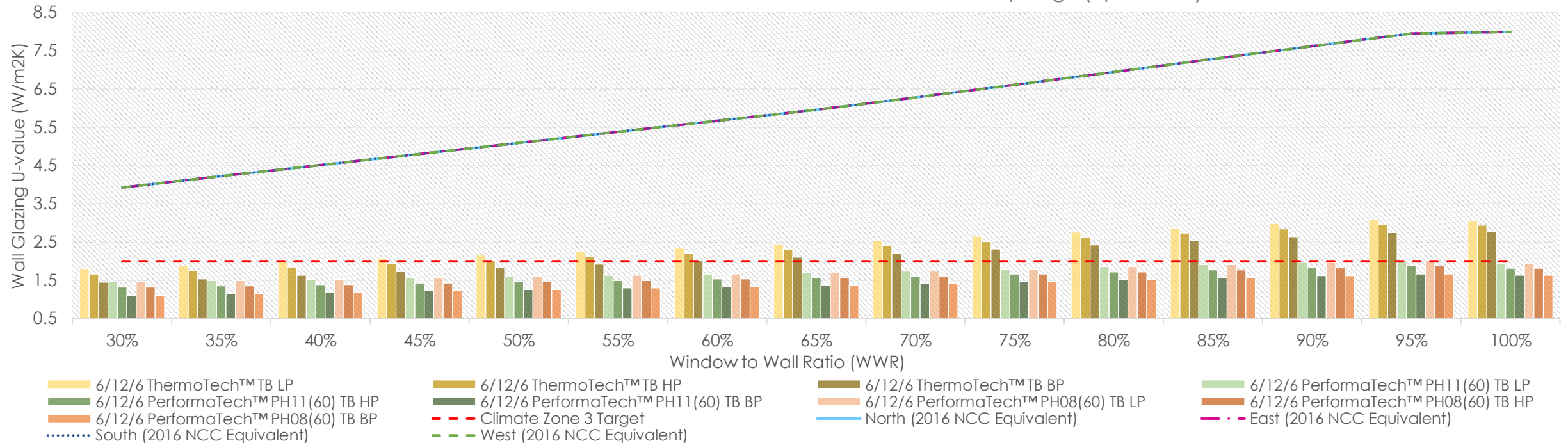
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 3 - Alice Springs (Spandrel)



### NCC 2016

In Climate Zone 3, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent for lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes for low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

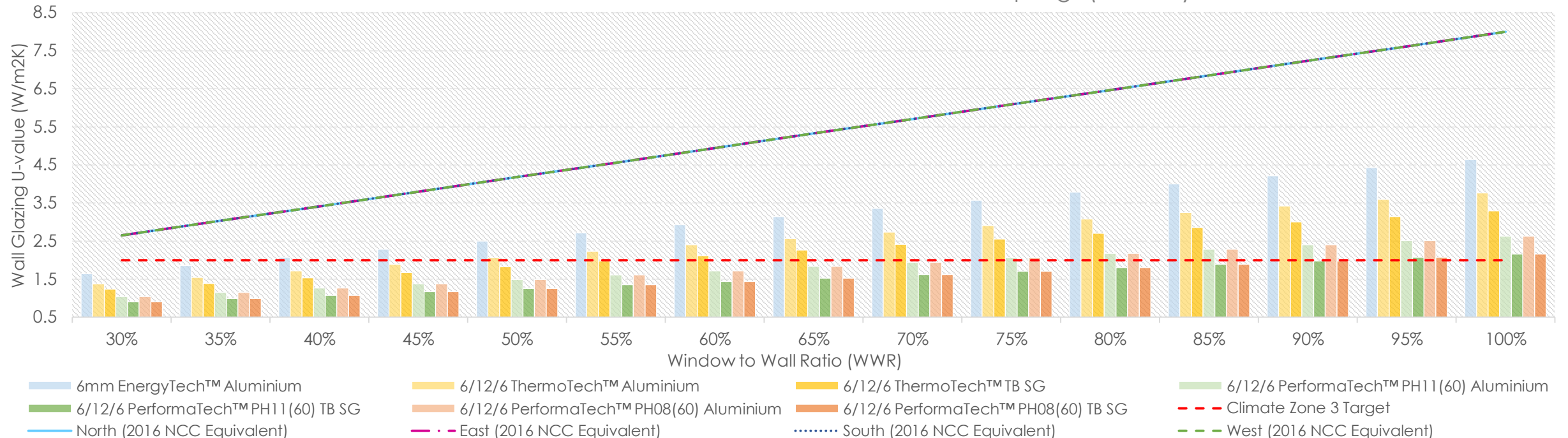
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 3, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent for lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes for low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

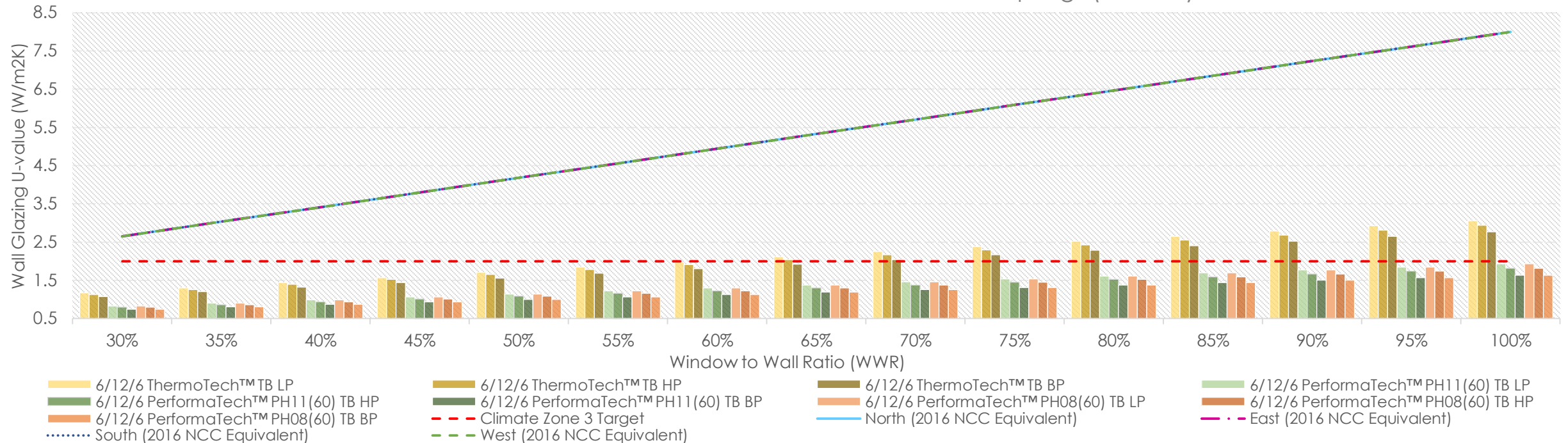
For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.



# Climate Zone 3

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 3, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations. The requirement becomes more lenient with increased WWRs.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are significantly more sensitive to U-value. The 2019 code is approximately 75% more stringent at high WWRs, >70%, and approximately 60% more stringent for lower WWRs of 50%. A precast wall shows a more comparable result than spandrel between the codes for low WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

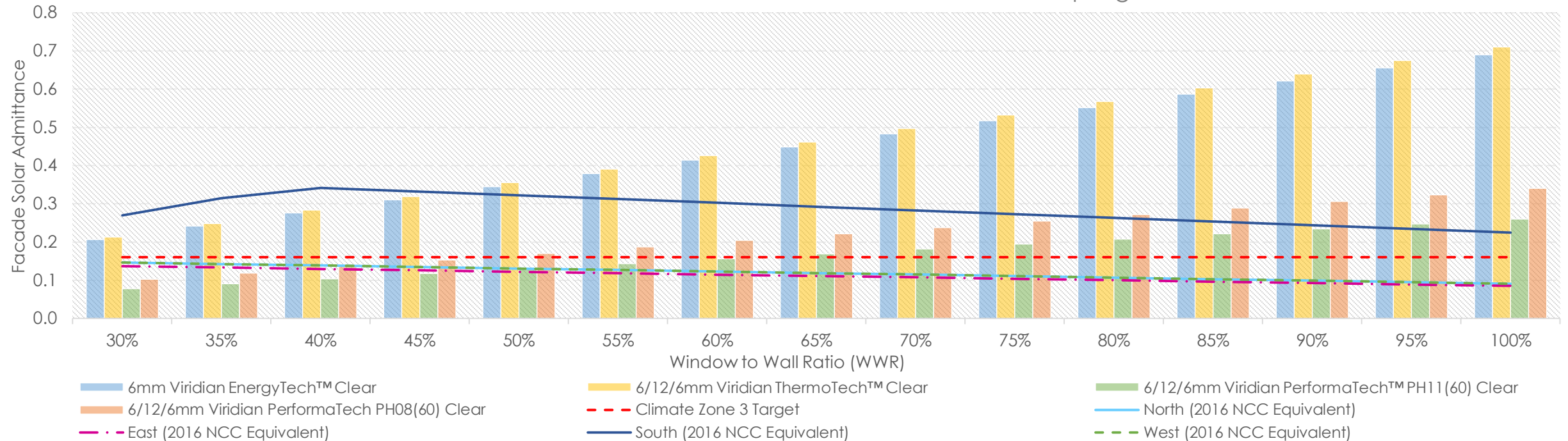
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 3

## Method 1 - FSA Target Glazing

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 3, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, previously there was a relaxed requirement for SHGC on the southern façade at low WWRs, becoming more stringent as the WWR increases. The east, west and north facing facades share a lower and more stringent SHGC requirement.

### NCC 2019- What is the key change?

When compared to the 2016 equivalent FSA requirement, the southern façade is significantly more sensitive to SHGC. All other façade orientations share similar requirements at low WWRs, and the 2019 requirement become more lenient compared to the 2016 equivalent as the WWR increases.

### When to Use Method 1 DTS provisions?

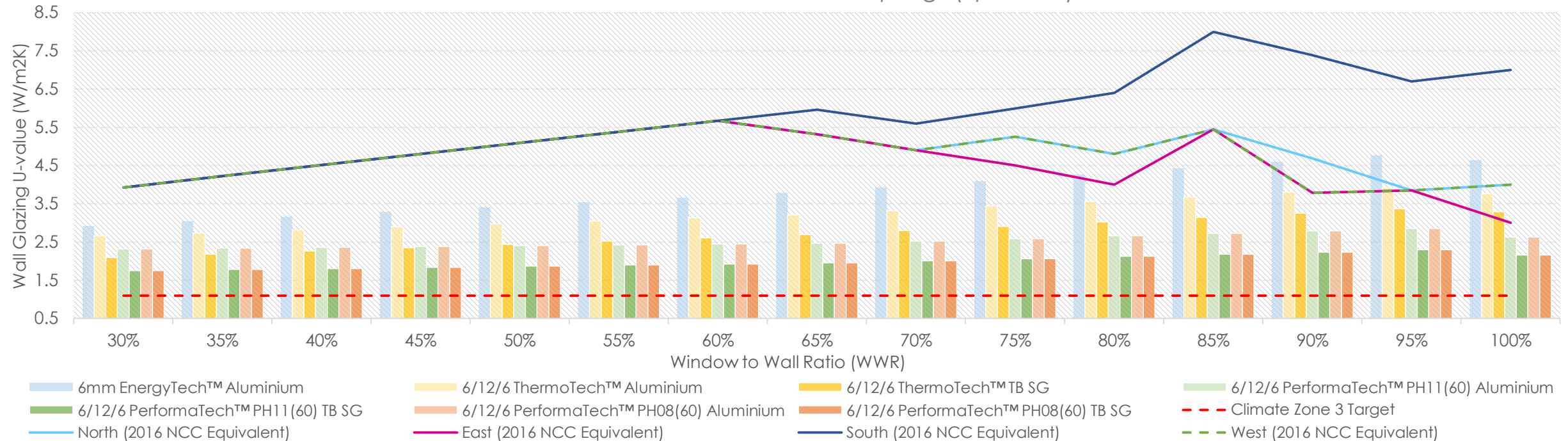
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 3.

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 3 - Alice Springs (Spandrel)



### NCC 2016

In Climate Zone 3, for building Class 3, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations for WWR <60%. For WWR >60%, the north façade was particularly lenient on U-value performance, and not a governing factor to determining compliance. The remaining orientations were more onerous however still achievable.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are more sensitive to U-value, with particular emphasis on the north which is approximately 90% more stringent for WWRs > 80%.

### When to Use Method 1 DTS provisions?

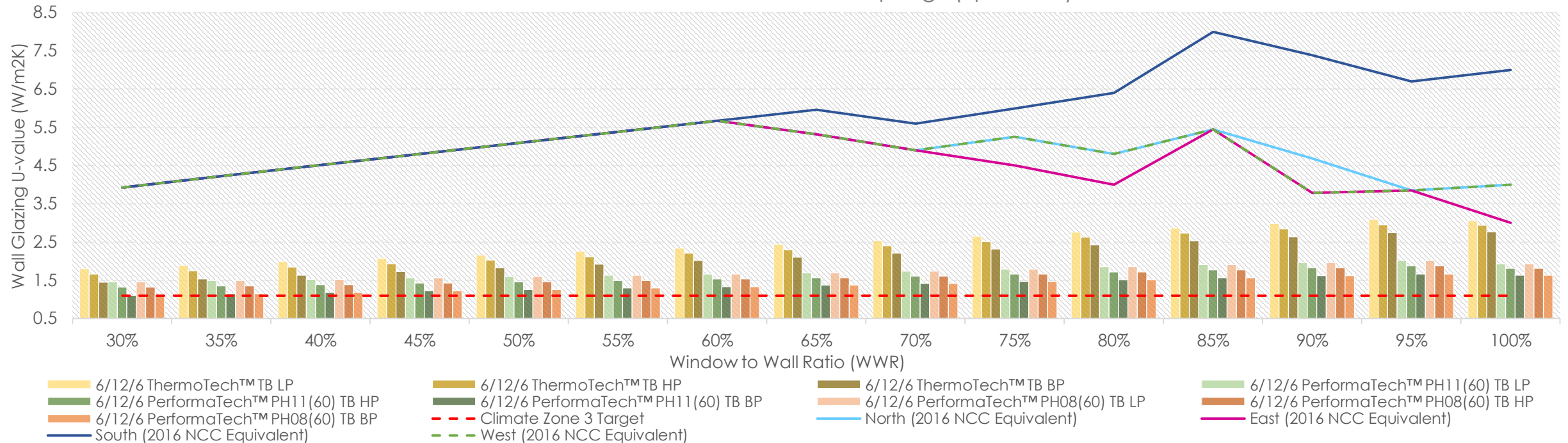
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 3.

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 3 - Alice Springs (Spandrel)



### NCC 2016

In Climate Zone 3, for building Class 3, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations for WWR <60%. For WWR >60%, the north façade was particularly lenient on U-value performance, and not a governing factor to determining compliance. The remaining orientations were more onerous however still achievable.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are more sensitive to U-value, with particular emphasis on the north which is approximately 90% more stringent for WWRs > 80%.

### When to Use Method 1 DTS provisions?

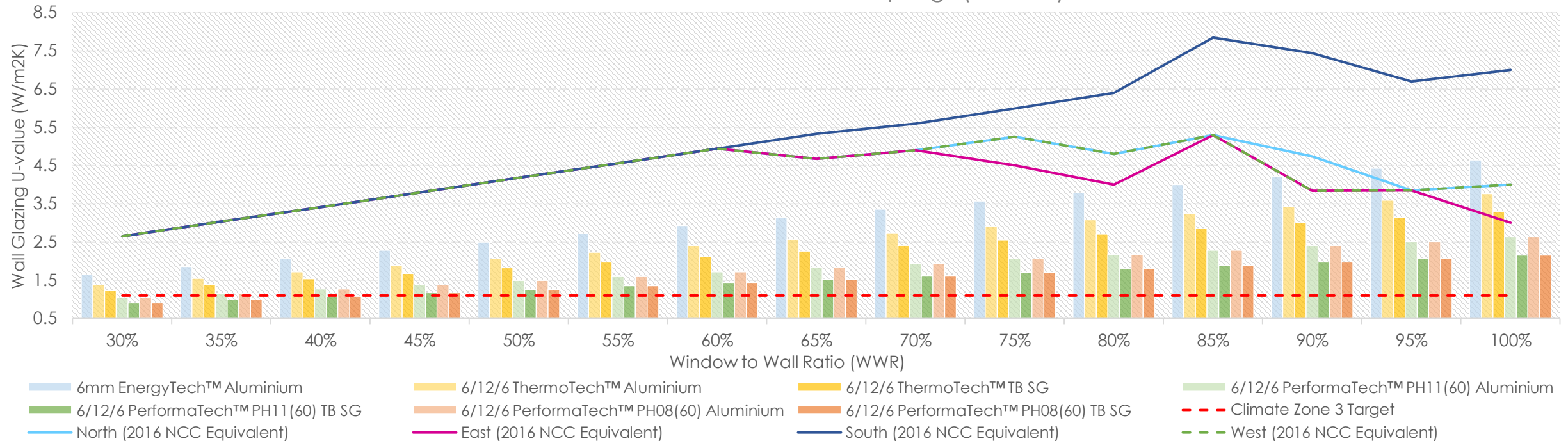
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 3.

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 3, for building Class 3, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations for WWR <60%. For WWR >60%, the north façade was particularly lenient on U-value performance, and not a governing factor to determining compliance. The remaining orientations were more onerous however still achievable.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are more sensitive to U-value, with particular emphasis on the north which is approximately 90% more stringent for WWRs > 80%.

### When to Use Method 1 DTS provisions?

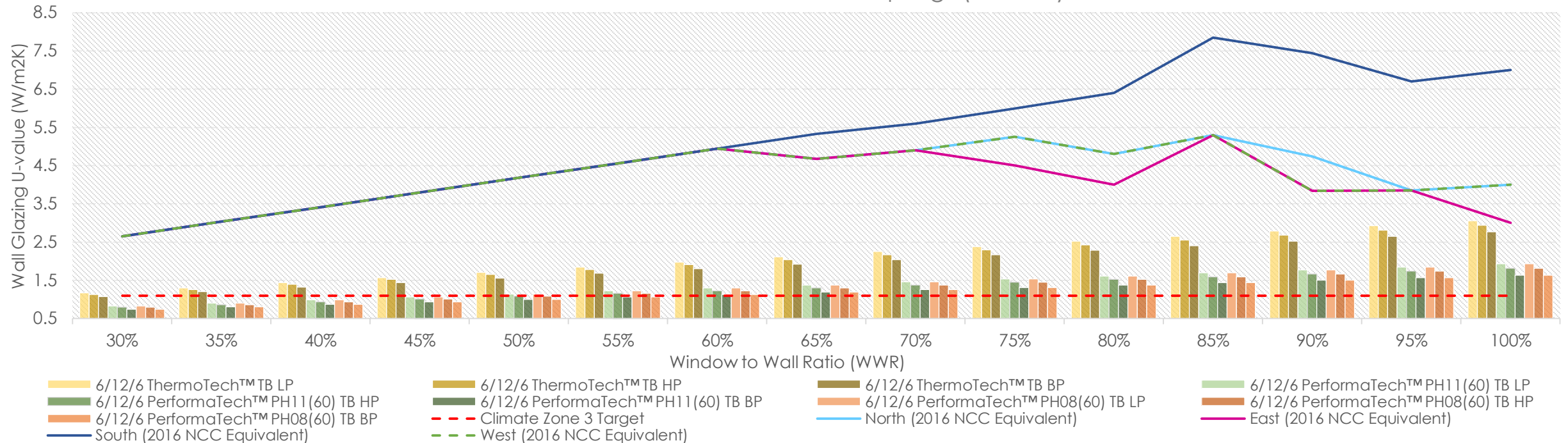
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 3.

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 3, for building Class 3, the NCC 2016 code wall glazing U-value requirement was equal for all façade orientations for WWR <60%. For WWR >60%, the north façade was particularly lenient on U-value performance, and not a governing factor to determining compliance. The remaining orientations were more onerous however still achievable.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are more sensitive to U-value, with particular emphasis on the north which is approximately 90% more stringent for WWRs > 80%.

### When to Use Method 1 DTS provisions?

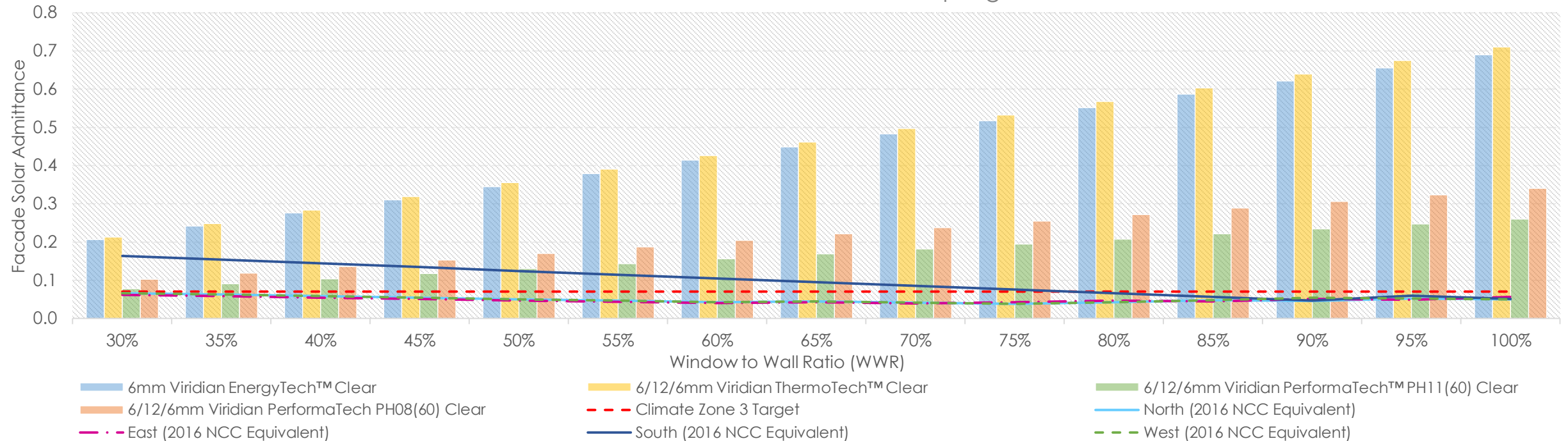
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 3.

# Climate Zone 3

## Method 1 - FSA Target Glazing

Class 3, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 3, for building class 3, previously there was a relaxed requirement for SHGC on the southern façade at low WWRs, becoming more stringent as the WWR increases. The east, west and north facing facades share a lower and more stringent SHGC requirement.

### NCC 2019- What is the key change?

When compared to the 2016 equivalent FSA requirement, the southern façade is now more sensitive to SHGC for WWRs <75%. For WWRs >75%, the requirement for all orientations is similar in both the 2016 and 2019 code. The NCC 2019 revision shows a slight leniency in the FSA for north, east and west façade orientations across all WWRs.

### When to Use Method 1 DTS provisions?

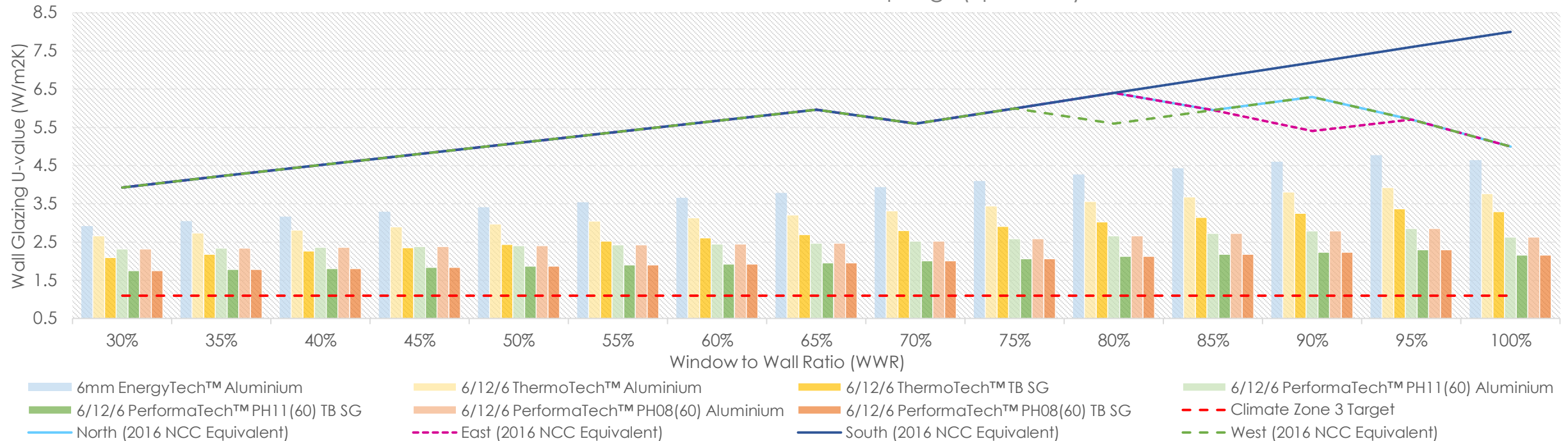
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 3.

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 3 - Alice Springs (Spandrel)



### NCC 2016

In Climate Zone 3, for building class 9c, the NCC 2016 code wall glazing U-value requirement is equal for all façade orientations when the WWR is <75%. For WWR >75%, the north façade is particularly lenient on U-value performance. None of the façade performance requirements are a governing factor to determining compliance.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are far more sensitive to U-value, with particular emphasis on the north which is approximately 90% more stringent for WWRs > 70%.

### When to Use Method 1 DTS provisions?

Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

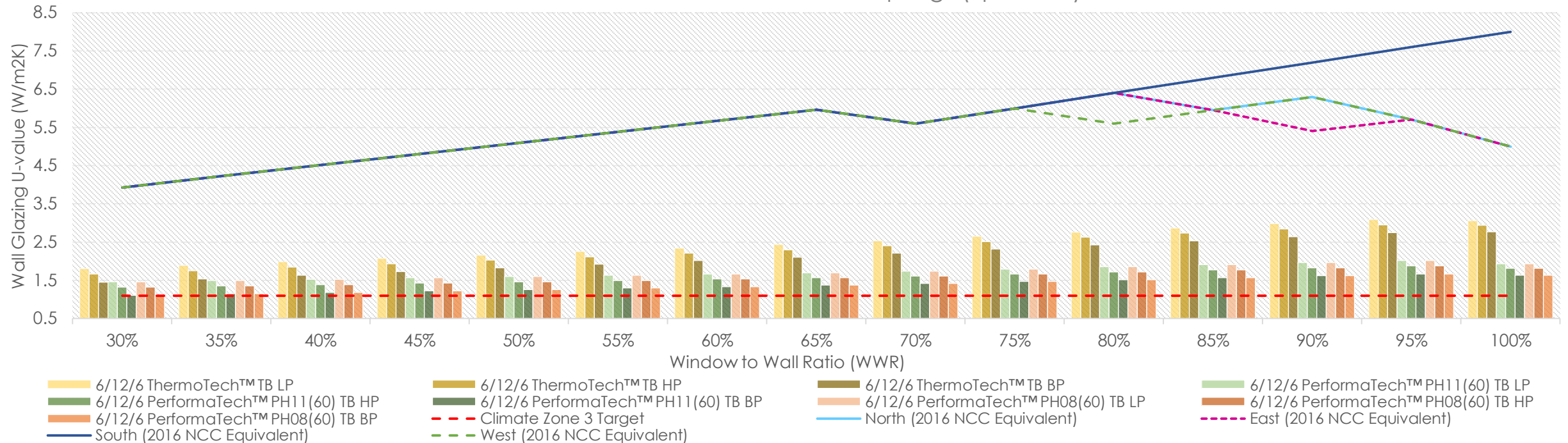
The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 3.



# Climate Zone 3

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 3 - Alice Springs (Spandrel)



### NCC 2016

In Climate Zone 3, for building class 9c, the NCC 2016 code wall glazing U-value requirement is equal for all façade orientations when the WWR is <75%. For WWR >75%, the north façade is particularly lenient on U-value performance. None of the façade performance requirements are a governing factor to determining compliance.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are far more sensitive to U-value, with particular emphasis on the north which is approximately 90% more stringent for WWRs > 70%.

### When to Use Method 1 DTS provisions?

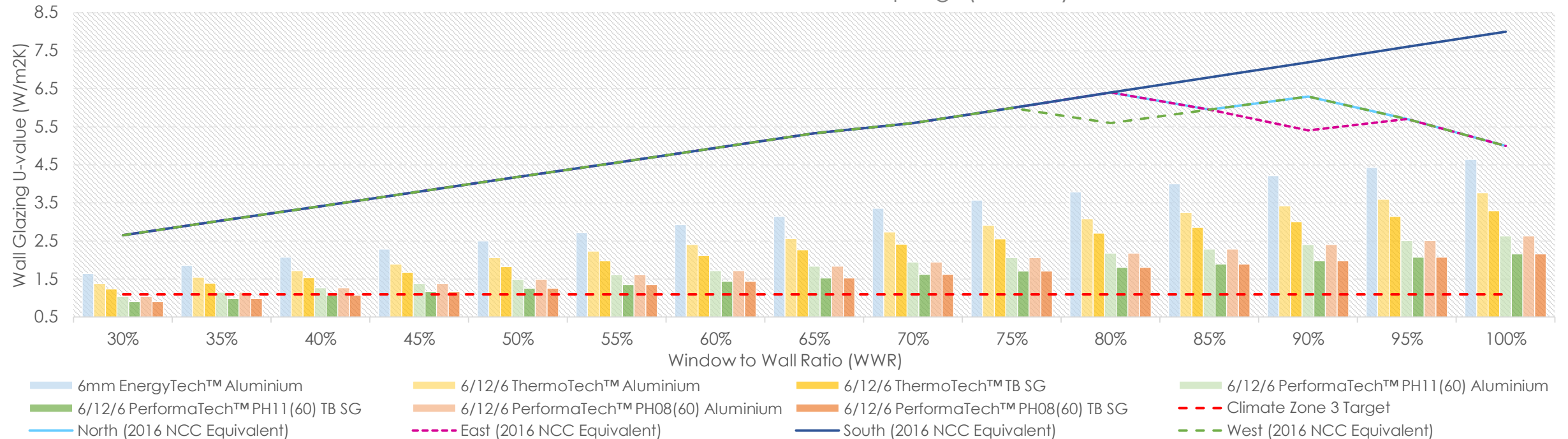
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 3.

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 3, for building class 9c, the NCC 2016 code wall glazing U-value requirement is equal for all façade orientations when the WWR is <75%. For WWR >75%, the north façade is particularly lenient on U-value performance. None of the façade performance requirements are a governing factor to determining compliance.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are far more sensitive to U-value, with particular emphasis on the north which is approximately 90% more stringent for WWRs > 70%.

### When to Use Method 1 DTS provisions?

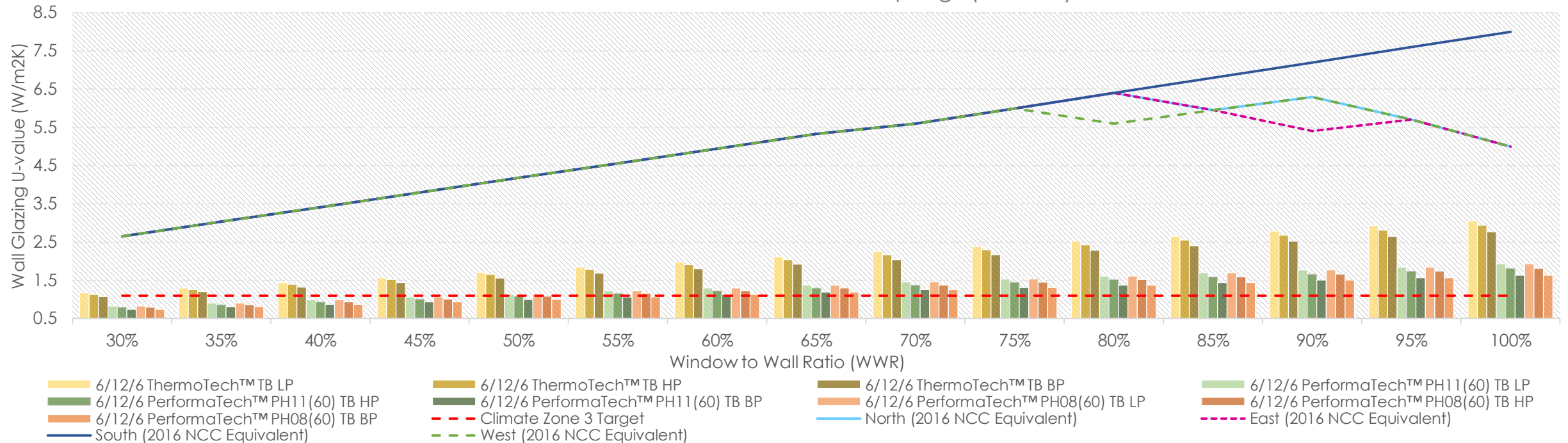
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 3.

# Climate Zone 3

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 3 - Alice Springs (Precast)



### NCC 2016

In Climate Zone 3, for building class 9c, the NCC 2016 code wall glazing U-value requirement is equal for all façade orientations when the WWR is <75%. For WWR >75%, the north façade is particularly lenient on U-value performance. None of the façade performance requirements are a governing factor to determining compliance.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are far more sensitive to U-value, with particular emphasis on the north which is approximately 90% more stringent for WWRs > 70%.

### When to Use Method 1 DTS provisions?

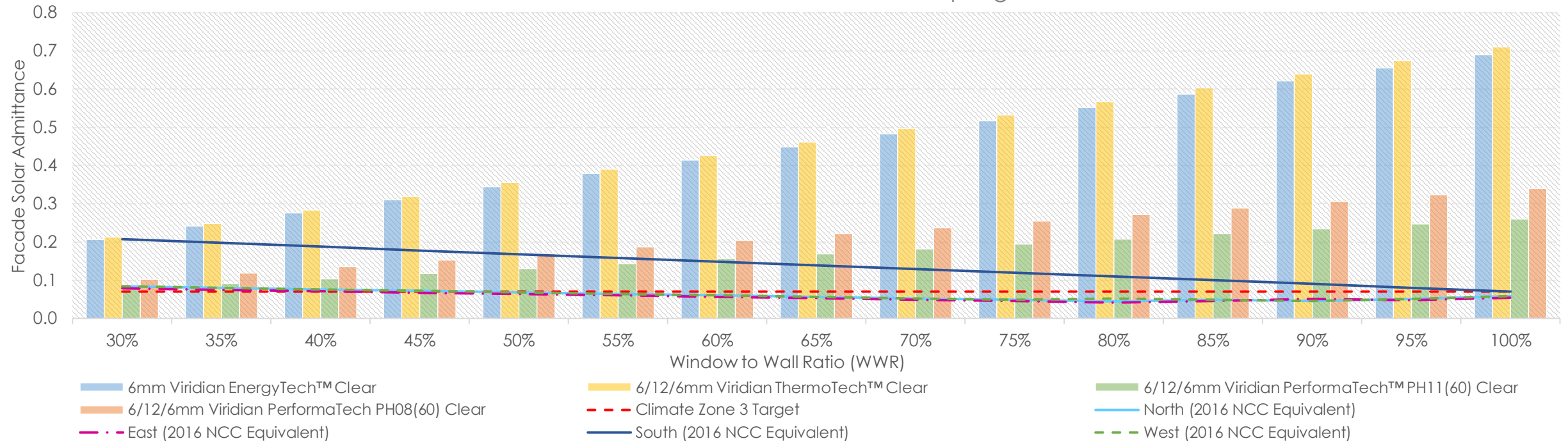
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 3.

# Climate Zone 3

## Method 1 - FSA Target Glazing

Class 9c, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 3, for building class 9c, there was previously a relaxed requirement for SHGC on the southern façade at low WWRs, becoming more stringent as the WWR increases. The east, west and north facing façades share a lower and more stringent SHGC requirement.

### NCC 2019- What is the key change?

When compared to the 2016 equivalent FSA requirement, the southern façade is more sensitive to SHGC for all WWRs. For WWRs >75%, the requirement for all orientations is similar in both the 2016 and 2019 code. The NCC 2019 revision shows a slight leniency in the FSA for north, east and west façade orientations for WWRs >60%.

### When to Use Method 1 DTS provisions?

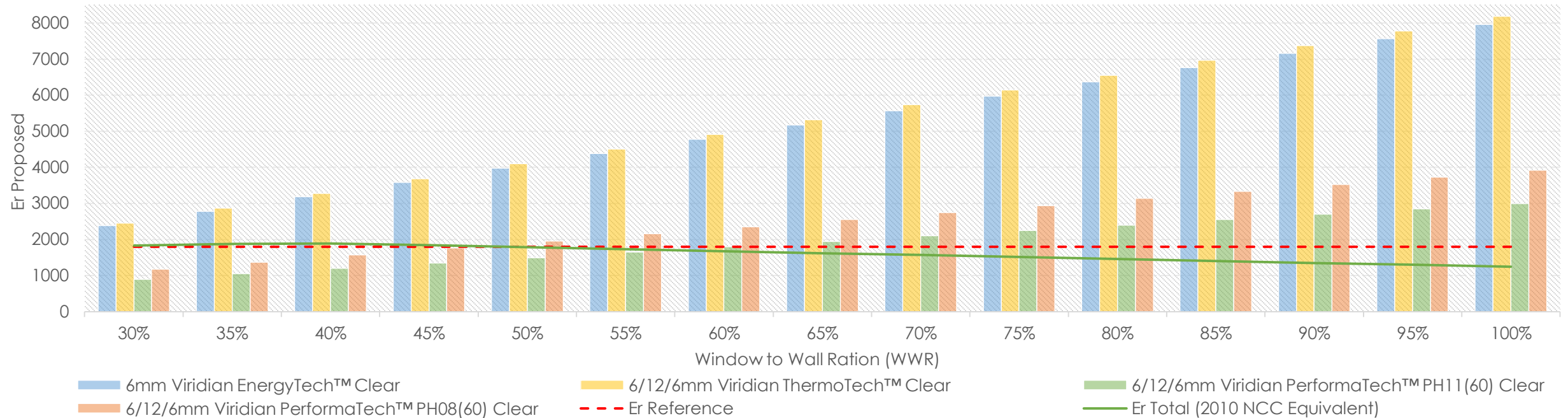
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 3.

# Climate Zone 3

## Method 2 - Class 2

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 3, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the 2016 method 2 DTS provision tracks well with the previous code until WWR >65%, where thereafter there is increased stringency.

### NCC 2019- What is the key change?

As the WWR increases from 65-100%, the Er requirement becomes slightly more lenient compared to the NCC 2016 code.

### When to Use Method 2 DTS provisions?

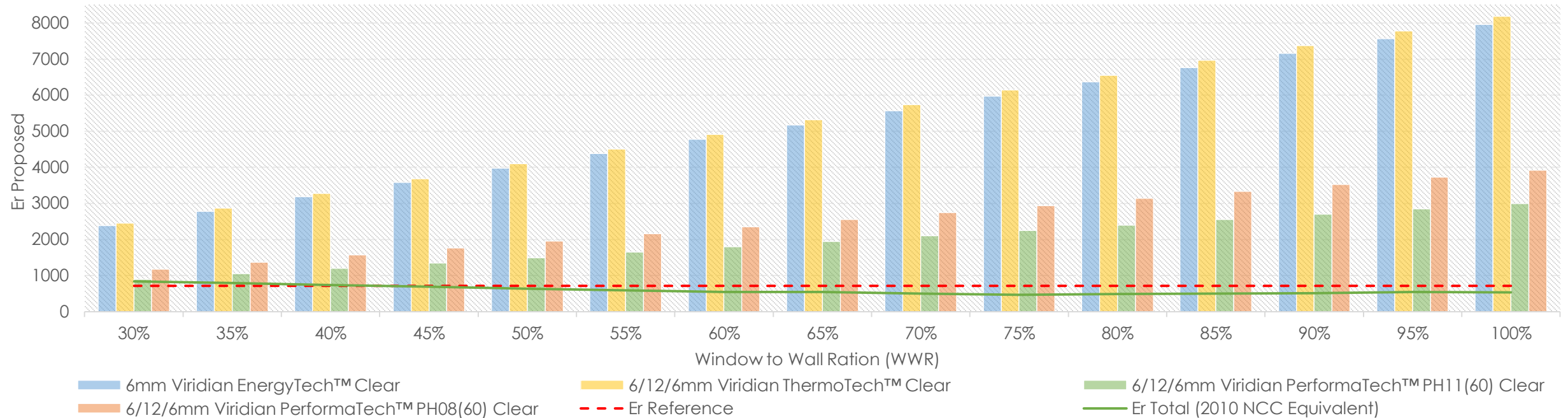
The new method 2 DTS provisions will work well for WWR <60% and high performance glazing systems without vertical shading.

The JV3 modelling pathway will give the best results for a building where a WWR >60% is desired. This pathway is also recommended for more complex buildings, and those with vertical shading.

# Climate Zone 3

## Method 2 - Class 3

Class 3, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 3, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the 2016 method 2 DTS provision tracks well with the previous code until WWR >50%, where thereafter there is increased stringency.

### NCC 2019- What is the key change?

As the WWR increases from 50-100%, the Er requirement becomes more lenient compared to the NCC 2016 code.

### When to Use Method 2 DTS provisions?

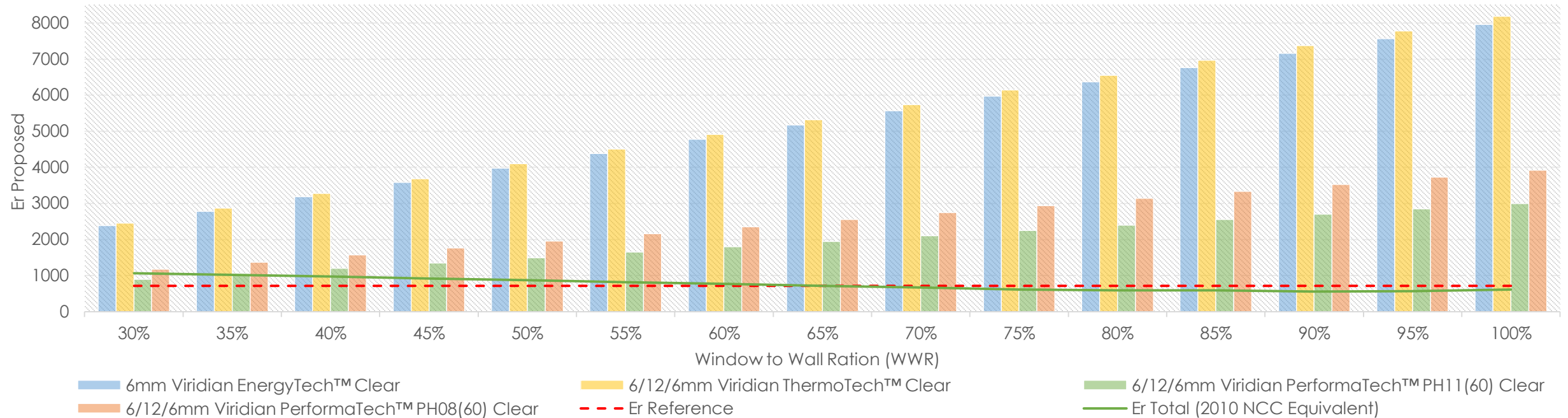
The new method 2 DTS provisions do not work well for this class and climate zone. The JV3 modelling pathway will give the best results for the building.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 3

## Method 2 - Class 9c

Class 9c, Climate Zone 3 - Alice Springs



### NCC 2016

In Climate Zone 3, for building class 9c, the 2016 method 2 DTS provision is more lenient than NCC 2019 for WWR <55%, similar for WWR between 60-70% and slightly more onerous for WWR > 70%.

### NCC 2019- What is the key change?

Both the 2016 and 2019 Er requirements are similar in this case, with the 2019 Er reference approximately 30% more stringent at low WWRs and 15% more lenient at high WWRs.

### When to Use Method 2 DTS provisions?

The new method 2 DTS provisions do not work well for this class and climate zone. The JV3 modelling pathway will give the best results for the building.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

It is recommended that for Class 9c buildings, a JV3 model is always considered.

Climate Zone 4

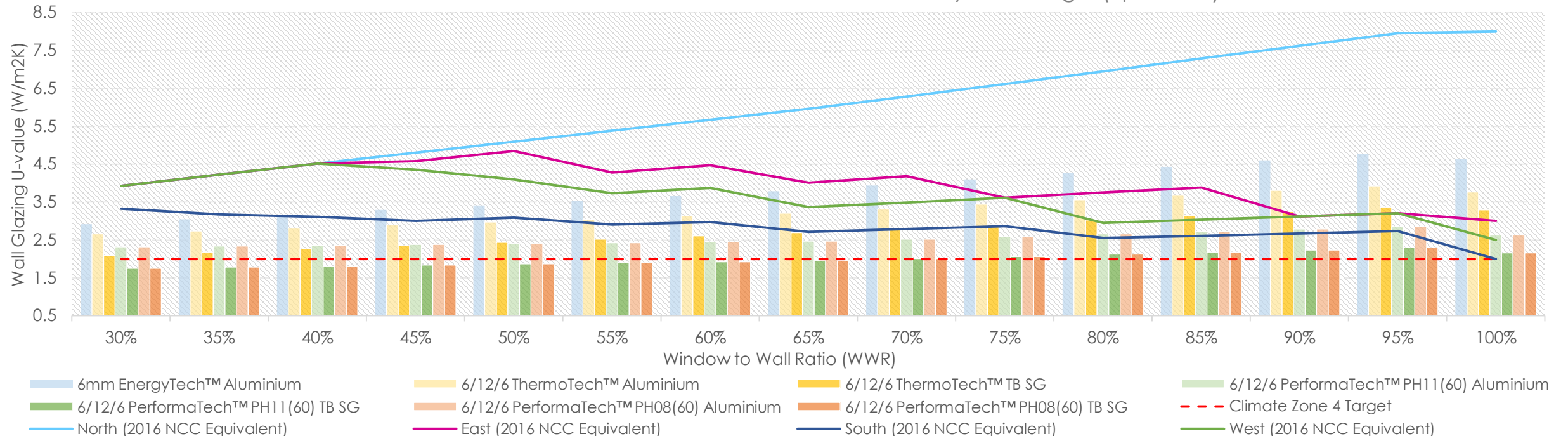
Albury-Wodonga



# Climate Zone 4

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 4 - Albury-Wodonga (Spandrel)



### NCC 2016

In Climate Zone 4, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. Eastern and western façade U-value was moderately important at higher WWRs, and the south façade had the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value, with significant emphasis on the north. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <70% WWR range, with high performance glazing systems.

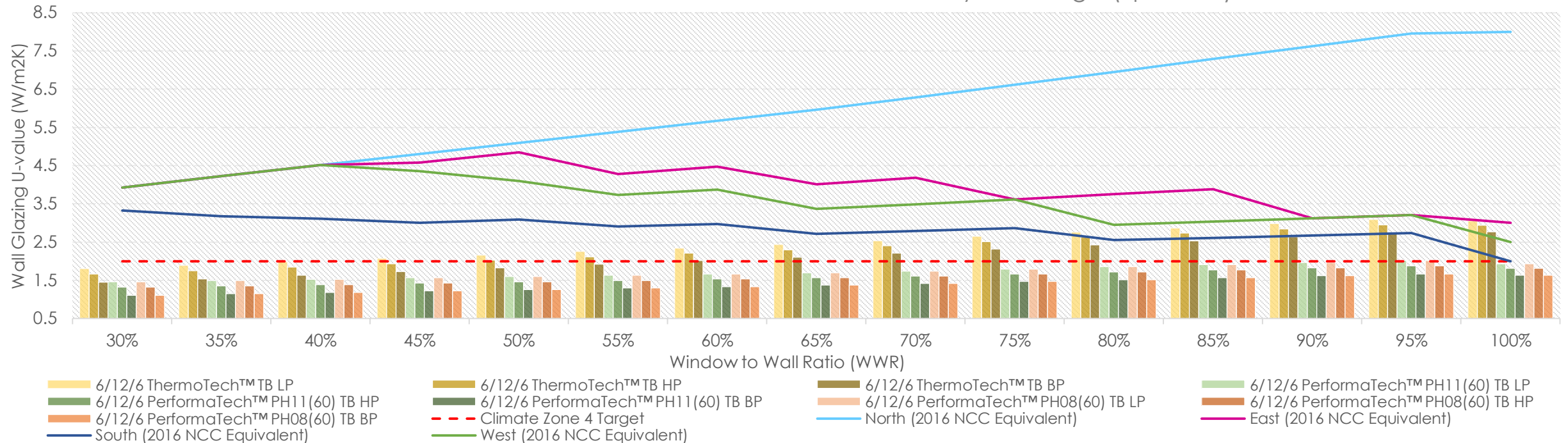
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 4 - Albury-Wodonga (Spandrel)



### NCC 2016

In Climate Zone 4, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. Eastern and western façade U-value was moderately important at higher WWRs, and the south façade had the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value, with significant emphasis on the north. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <70% WWR range, with high performance glazing systems.

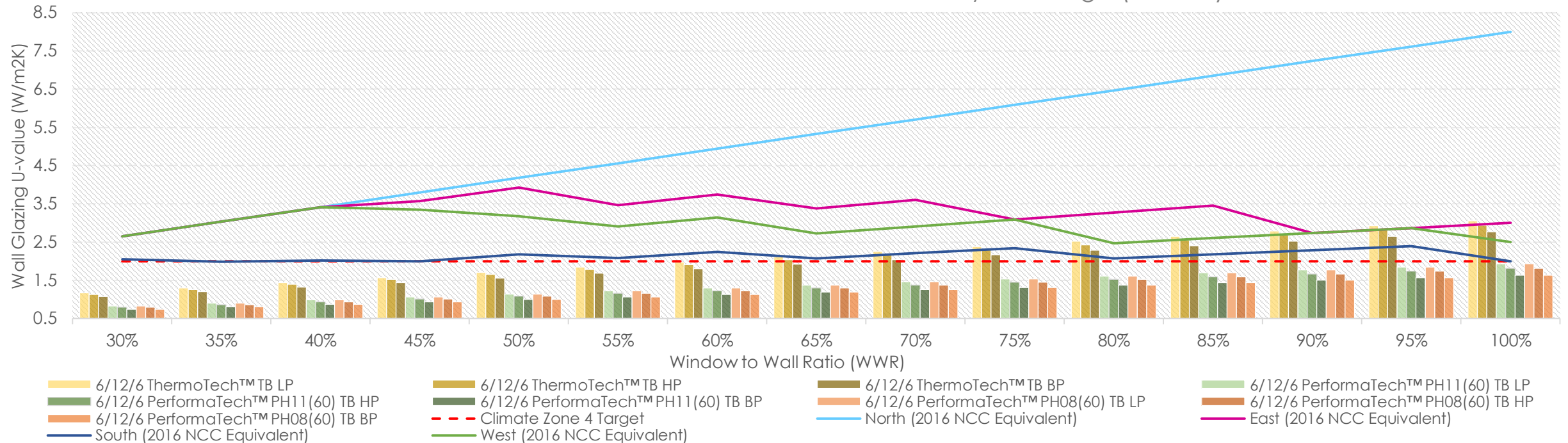
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 4 - Albury-Wodonga (Precast)



### NCC 2016

In Climate Zone 4, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. Eastern and western façade U-value was moderately important at higher WWRs, and the south façade had the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value, with significant emphasis on the north. With a precast wall, the south orientation presents similar performance requirements in both codes. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <70% WWR range, with high performance glazing systems.

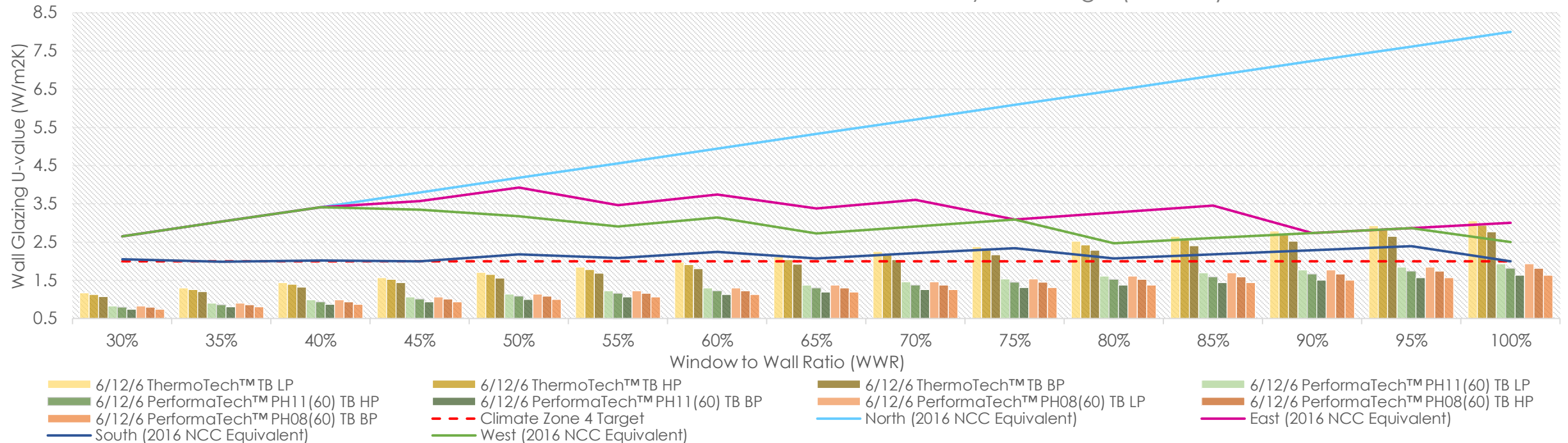
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 4 - Albury-Wodonga (Precast)



### NCC 2016

In Climate Zone 4, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. Eastern and western façade U-value was moderately important at higher WWRs, and the south façade had the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value, with significant emphasis on the north. With a precast wall, the south orientation presents similar performance requirements in both codes. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <70% WWR range, with high performance glazing systems.

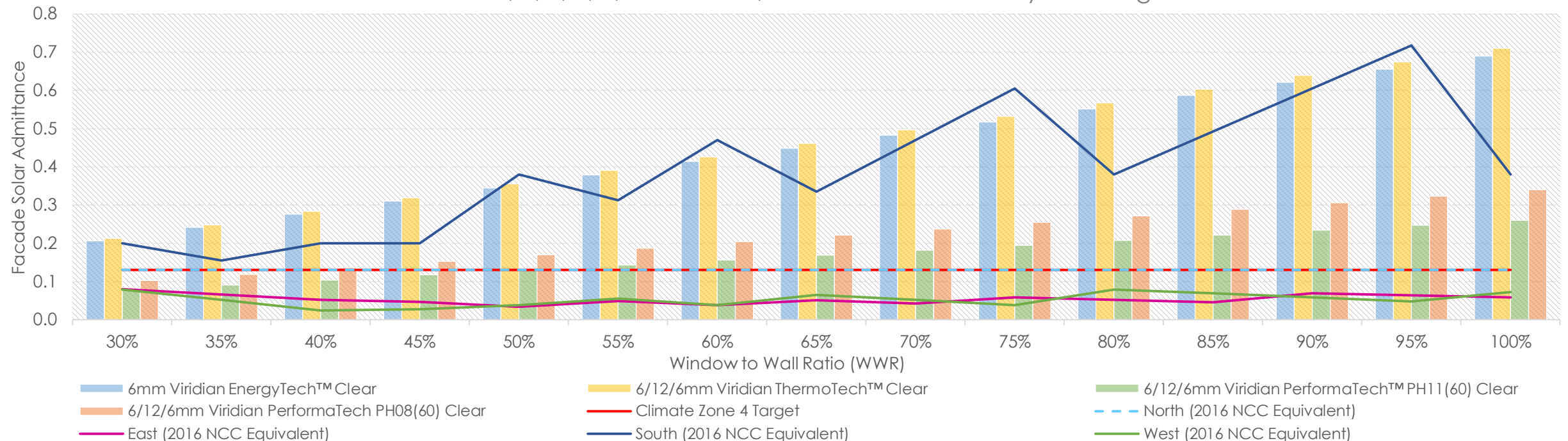
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 4

## Method 1 - FSA Target Glazing

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 4 - Albury-Wodonga



### NCC 2016

In Climate Zone 4, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, previously there was a relaxed requirement for SHGC on the southern façade, as this orientation receives no direct solar. The north facing façade has a lower requirement, and the west and east facing façades have particularly onerous SHGC requirements.

### NCC 2019- What is the key change?

Compared to NCC 2016, the southern façade is significantly more sensitive to SHGC. The north 2016 FSA equivalent is identical to the 2019 requirement, and the west and east performance requirements are more lenient in comparison. Overall, the new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

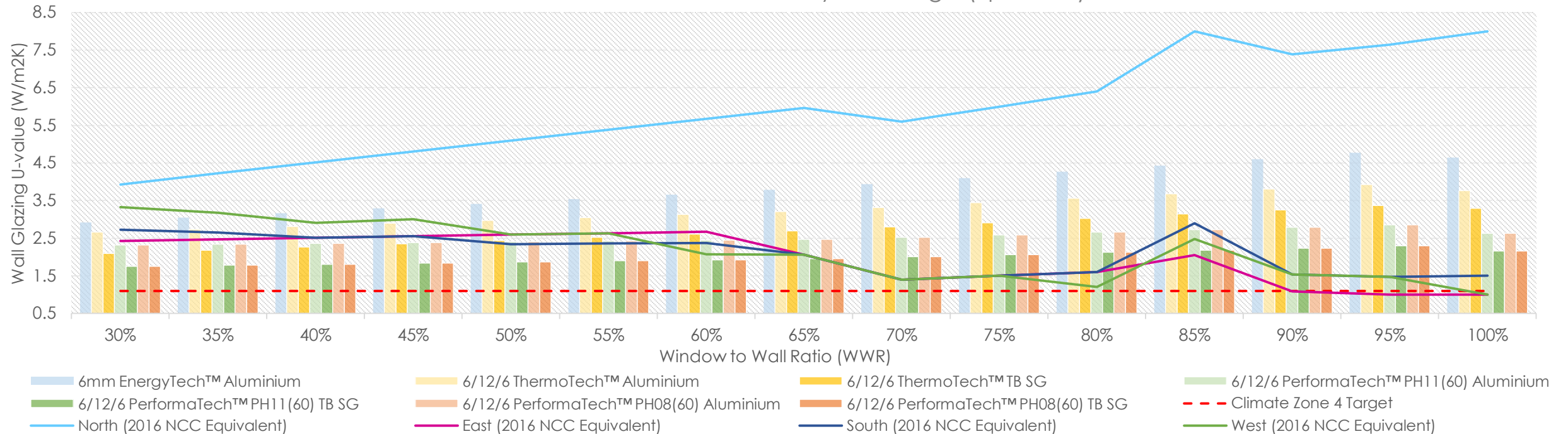
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 4.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 4 - Albury-Wodonga (Spandrel)



### NCC 2016

In Climate Zone 4, for building class 3, the NCC 2016 code was relatively orientation specific. On the north, U-value was not a governing factor to determine compliance. East, west and south façade U-value was far more stringent, and increasingly important for high WWRs. The inconsistent results at 85% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value. The north is approximately 85% more stringent for 80% WWR. The NCC 2016 precast east, west and south equivalents more closely align with the 2019 requirement than the spandrel results. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

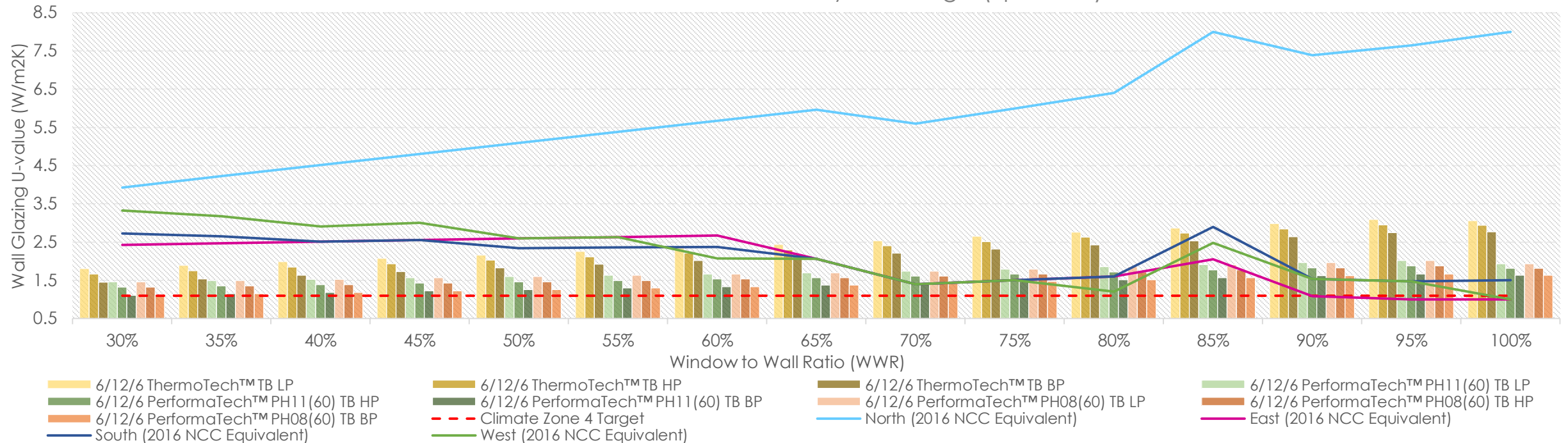
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 4.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 4 - Albury-Wodonga (Spandrel)



### NCC 2016

In Climate Zone 4, for building class 3, the NCC 2016 code was relatively orientation specific. On the north, U-value was not a governing factor to determine compliance. East, west and south façade U-value was far more stringent, and increasingly important for high WWRs. The inconsistent results at 85% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value. The north is approximately 85% more stringent for 80% WWR. The NCC 2016 precast east, west and south equivalents more closely align with the 2019 requirement than the spandrel results. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

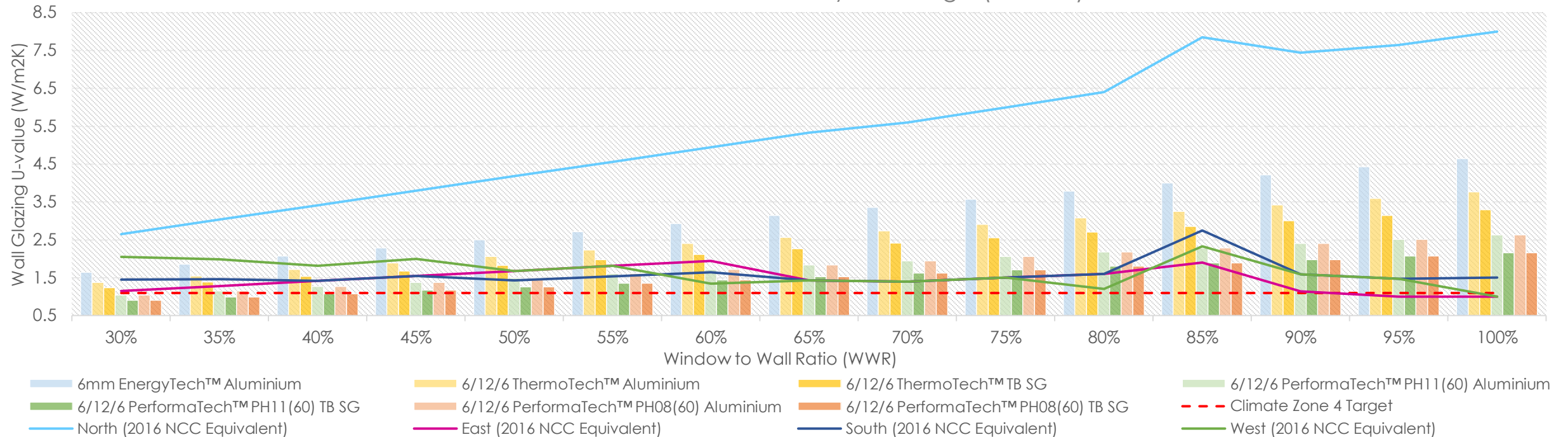
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 4.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 4 - Albury-Wodonga (Precast)



### NCC 2016

In Climate Zone 4, for building class 3, the NCC 2016 code was relatively orientation specific. On the north, U-value was not a governing factor to determine compliance. East, west and south façade U-value was far more stringent, and increasingly important for high WWRs. The inconsistent results at 85% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value. The north is approximately 85% more stringent for 80% WWR. The NCC 2016 precast east, west and south equivalents more closely align with the 2019 requirement than the spandrel results. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

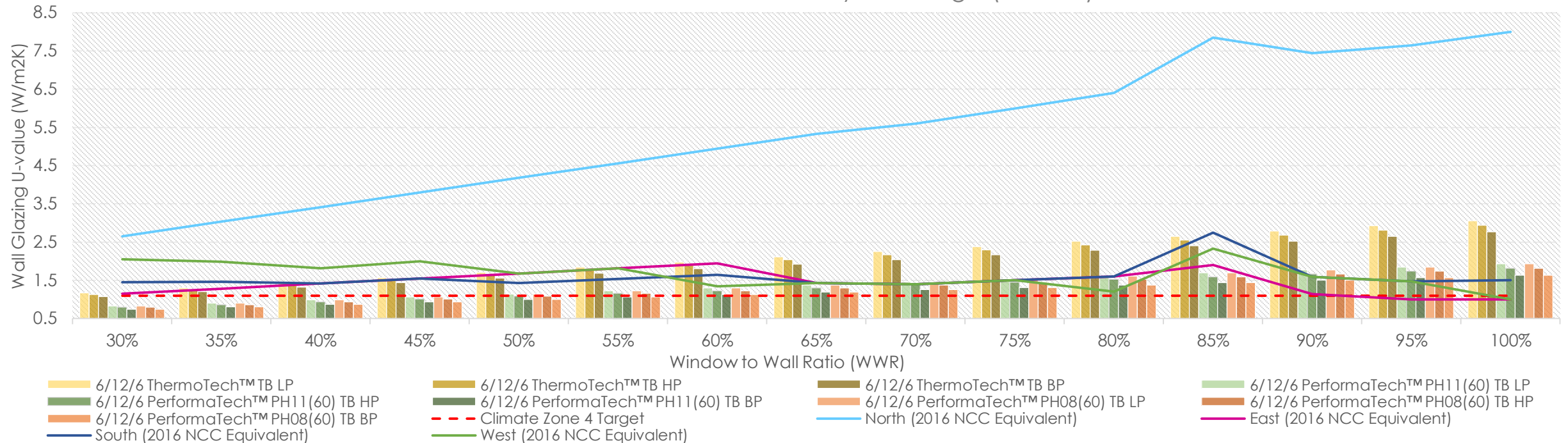
The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 4.



# Climate Zone 4

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 4 - Albury-Wodonga (Precast)



### NCC 2016

In Climate Zone 4, for building class 3, the NCC 2016 code was relatively orientation specific. On the north, U-value was not a governing factor to determine compliance. East, west and south façade U-value was far more stringent, and increasingly important for high WWRs. The inconsistent results at 85% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value. The north is approximately 85% more stringent for 80% WWR. The NCC 2016 precast east, west and south equivalents more closely align with the 2019 requirement than the spandrel results. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

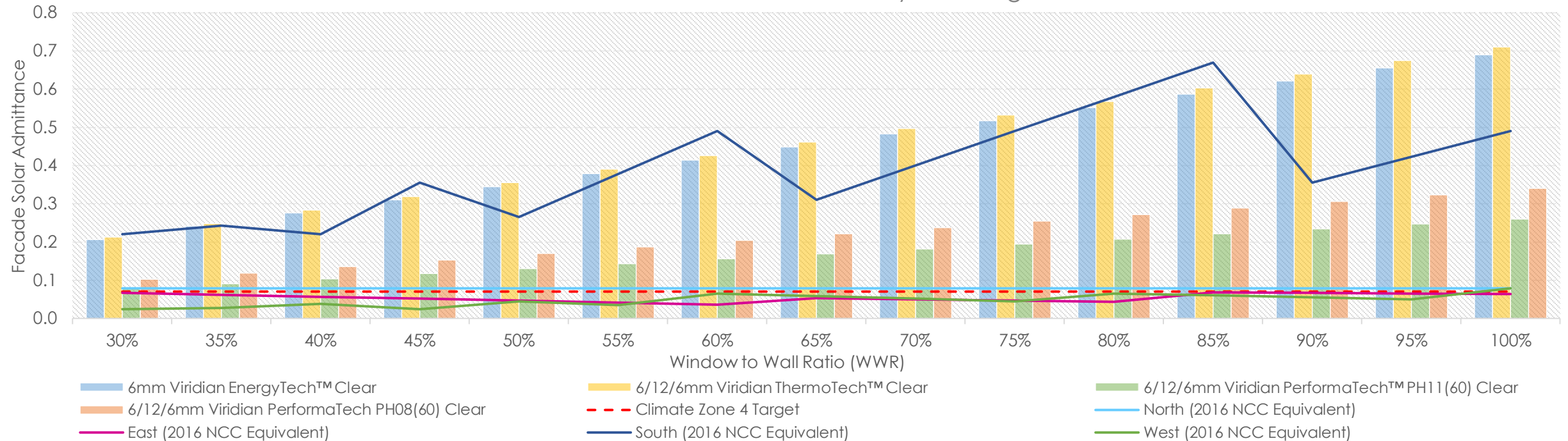
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 4.

# Climate Zone 4

## Method 1 - FSA Target Glazing

Class 3, Climate Zone 4 - Albury-Wodonga



### NCC 2016

In Climate Zone 4, for building class 3, previously there was a relaxed requirement for SHGC on the southern façade, as this orientation receives no direct solar. The north, west and east facing façades have particularly onerous SHGC requirements.

### NCC 2019- What is the key change?

Compared to NCC 2016, the southern façade is more sensitive to SHGC. The north 2016 FSA equivalent is very similar to the 2019 requirement, and the west and east performance requirements are slightly more lenient in comparison. Overall, the new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

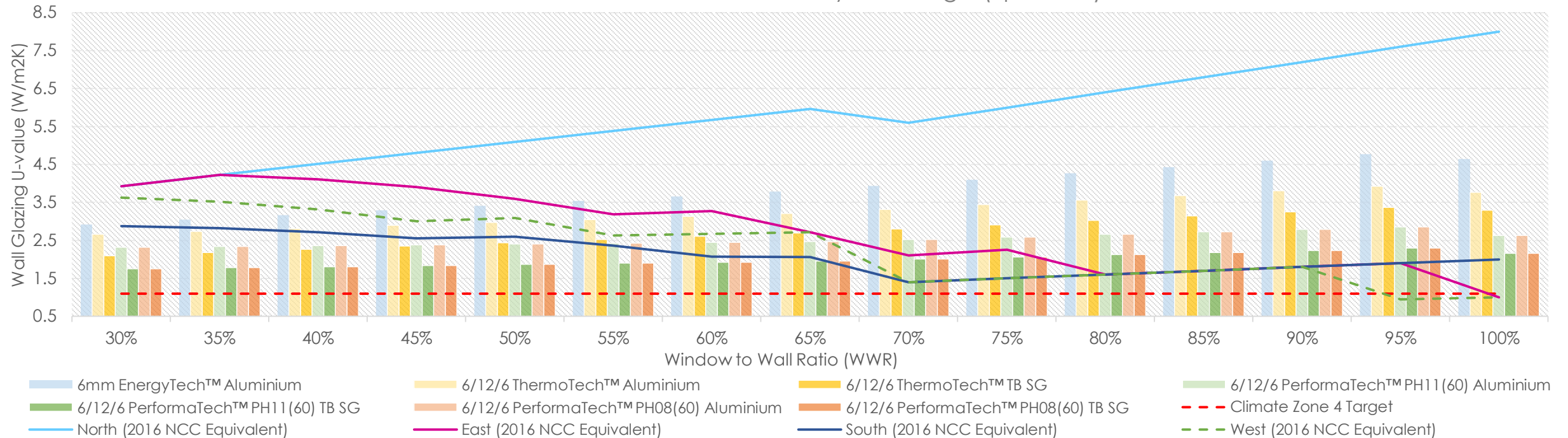
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 4.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 4 - Albury-Wodonga (Spandrel)



### NCC 2016

In Climate Zone 4, for building class 9c, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. Eastern and western façade U-value was important at higher WWRs, and the south façade had the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value, with significant emphasis on the north. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

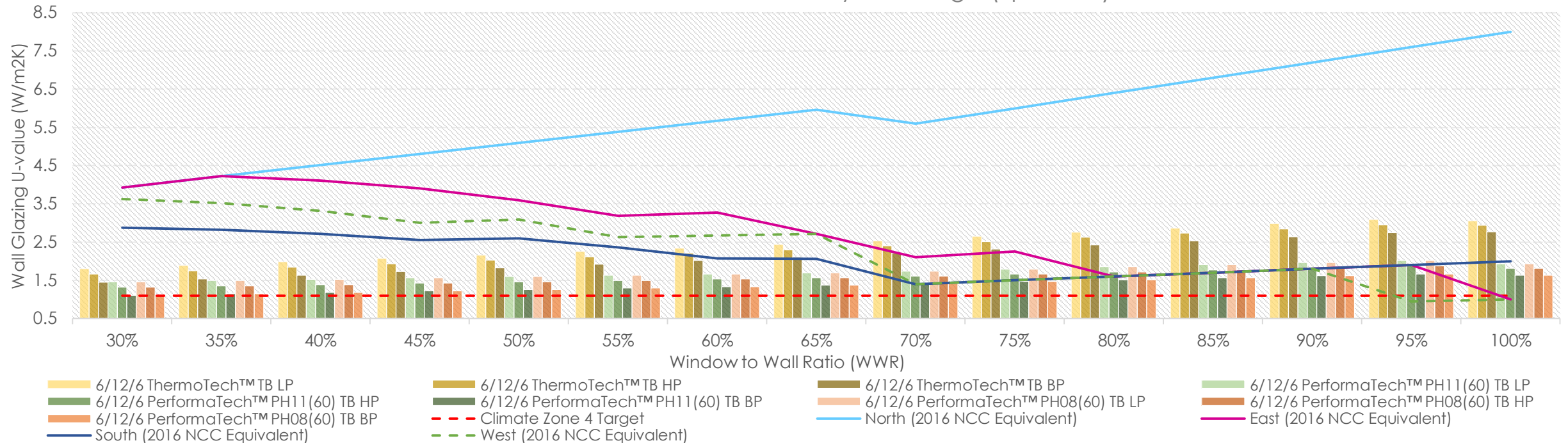
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 4.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 4 - Albury-Wodonga (Spandrel)



### NCC 2016

In Climate Zone 4, for building class 9c, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. Eastern and western façade U-value was important at higher WWRs, and the south façade had the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value, with significant emphasis on the north. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

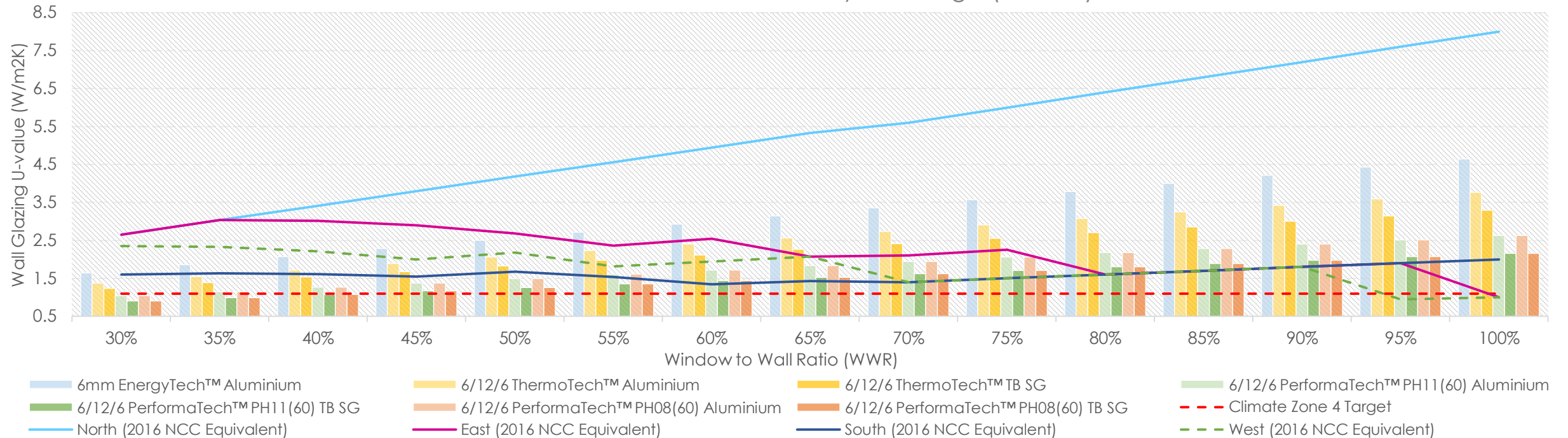
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 4.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 4 - Albury-Wodonga (Precast)



### NCC 2016

In Climate Zone 4, for building class 9c, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. Eastern and western façade U-value was important at higher WWRs, and the south façade had the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value, with significant emphasis on the north. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

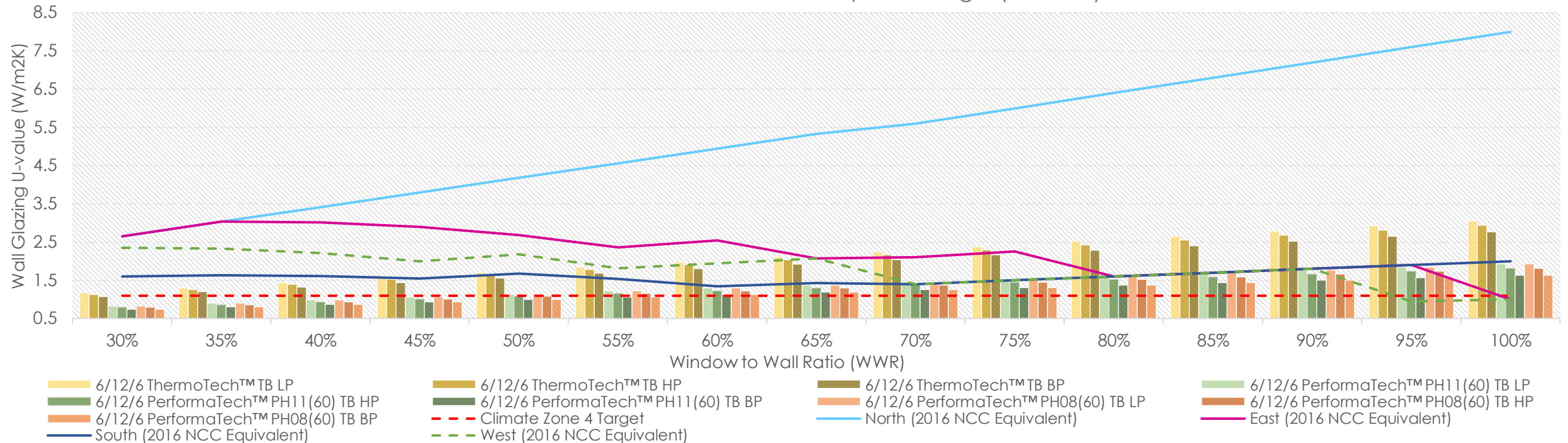
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 4.

# Climate Zone 4

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 4 - Albury-Wodonga (Precast)



### NCC 2016

In Climate Zone 4, for building class 9c, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. Eastern and western façade U-value was important at higher WWRs, and the south façade had the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façades are far more sensitive to U-value, with significant emphasis on the north. The new code applies U-value requirements in a far more stringent yet balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

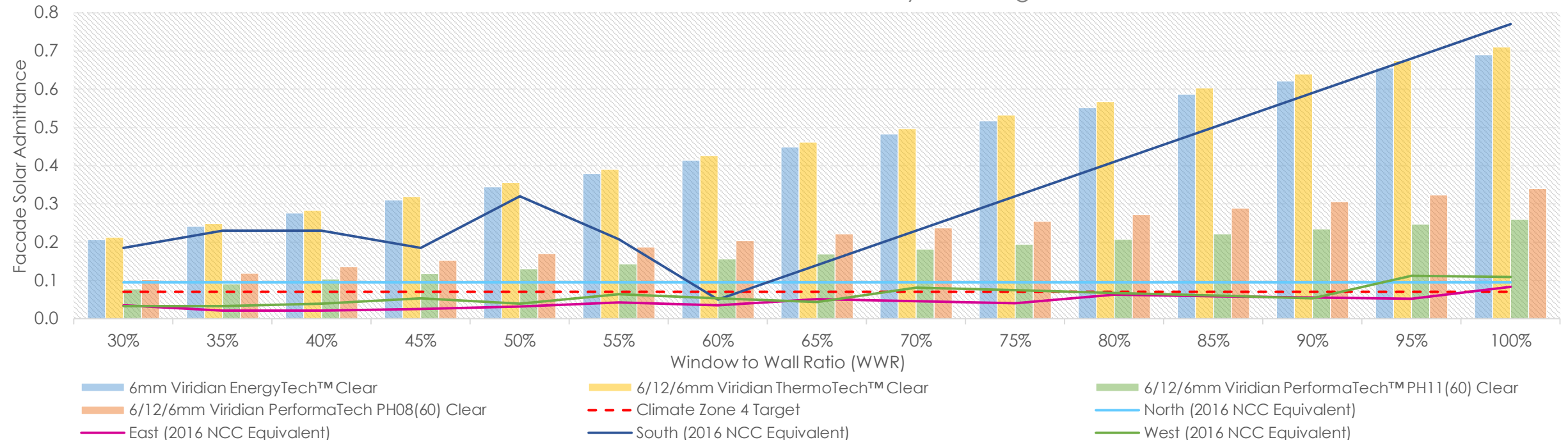
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <45% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 4.

# Climate Zone 4

## Method 1 - FSA Target Glazing

Class 9c, Climate Zone 4 - Albury-Wodonga



### NCC 2016

In Climate Zone 4, for building class 9c, previously there was a relaxed requirement for SHGC on the southern façade, as this orientation receives no direct solar. The north, west and east facing façades have particularly onerous SHGC requirements. The inconsistent results between 55-65% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

Compared to NCC 2016, the southern façade is significantly more sensitive to SHGC. The north 2016 FSA equivalent is similar to the 2019 requirement, however now more stringent. The west and east performance requirements are slightly more lenient for WWR <80% in comparison. Overall, the new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

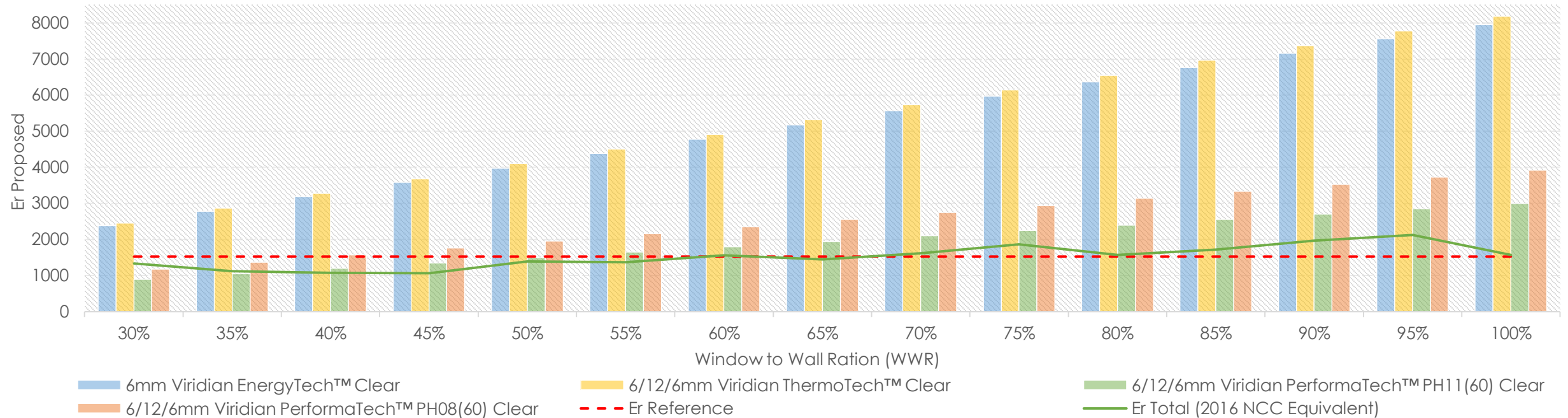
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 4.

# Climate Zone 4

## Method 2 - Class 2

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 4 - Albury-Wodonga



### NCC 2016

In Climate Zone 4, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the 2016 method 2 DTS provision tracks well with the previous code for WWR 50-75%.

### NCC 2019- What is the key change?

At low WWRs the 2019 Er requirement is more lenient than the 2016 equivalent, and at high WWRs the 2019 Er requirement is more stringent. The new code applies Er requirement in a more balanced way across various WWRs.

### When to Use Method 2 DTS provisions?

The new method 2 DTS provisions will only work for buildings with WWR < 55% and high performance glazing systems without vertical shading.

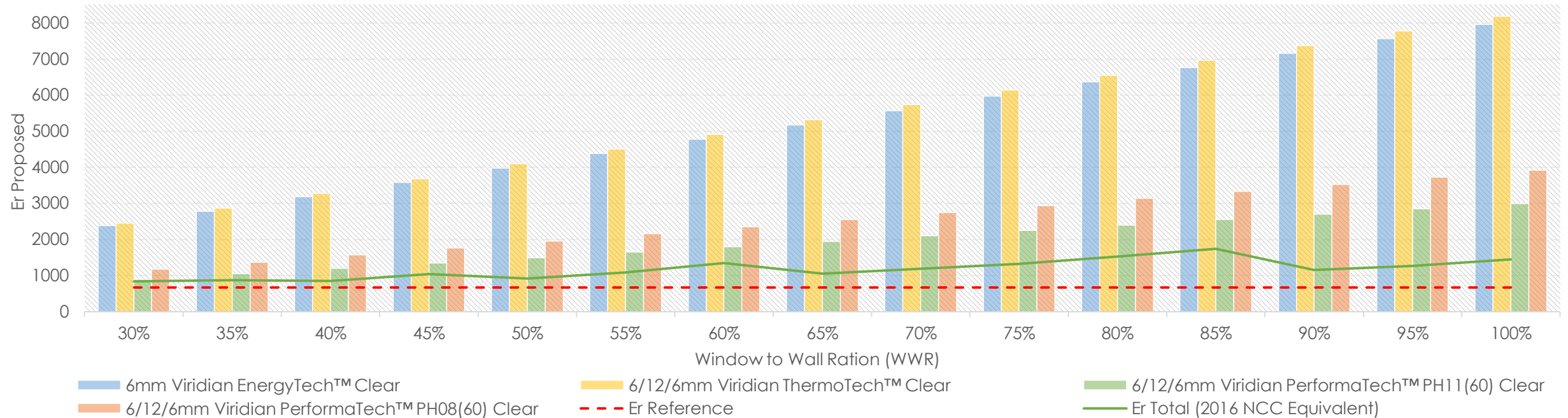
The JV3 modelling pathway will give the best results for the building where a WWR > 55% is desired. This pathway is also recommended for more complex building, and those with vertical shading.



# Climate Zone 4

## Method 2 - Class 3

Class 3, Climate Zone 4 - Albury-Wodonga



### NCC 2016

In Climate Zone 4, for building class 3, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements. There is greater difference between the performance requirements as the WWR increases.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 20-60% more stringent than the 2016 equivalent.

### When to Use Method 2 DTS provisions?

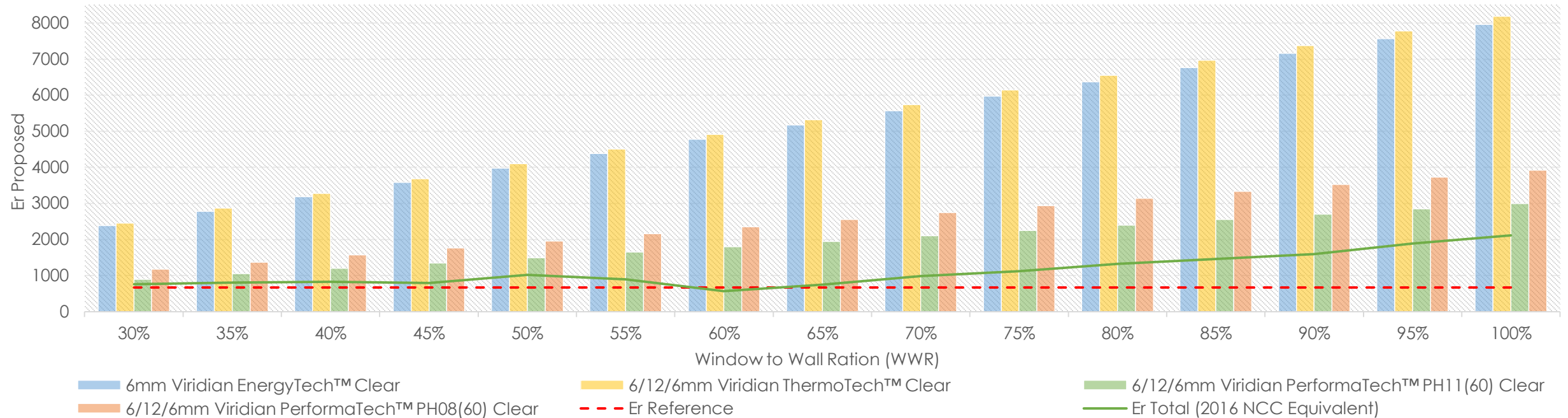
The new method 2 DTS provisions do not work well for this class and climate zone.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 4

## Method 2 - Class 9c

Class 9c, Climate Zone 4 - Albury-Wodonga



### NCC 2016

In Climate Zone 4, for building class 9c, the 2016 method 2 DTS provision tracks well with the previous code until WWR >60%, where thereafter there is increased stringency.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement becomes more stringent than the 2016 equivalent as the WWR increases from 60-100%.

### When to Use Method 2 DTS provisions?

The new method 2 DTS provisions do not work well for this class and climate zone.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

It is recommended that for Class 9c buildings, a JV3 model is always considered.

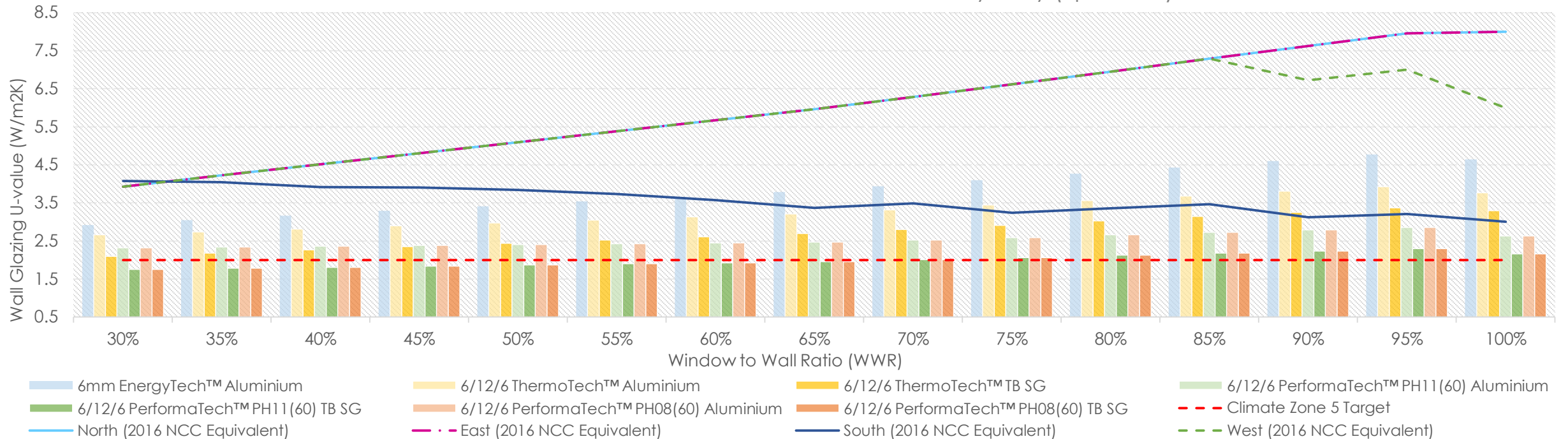
Climate Zone 5

Sydney

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 5 - Sydney (Spandrel)



### NCC 2016

In Climate Zone 5, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equivalent for the north, east and west façades <85% WWR. These performance values were not a governing factor in determining compliance. The south façade requirement was more onerous, however still achievable.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are far more sensitive to U-value, with particular emphasis on the north, east and west which are approximately 70% more stringent for a WWR of 80%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

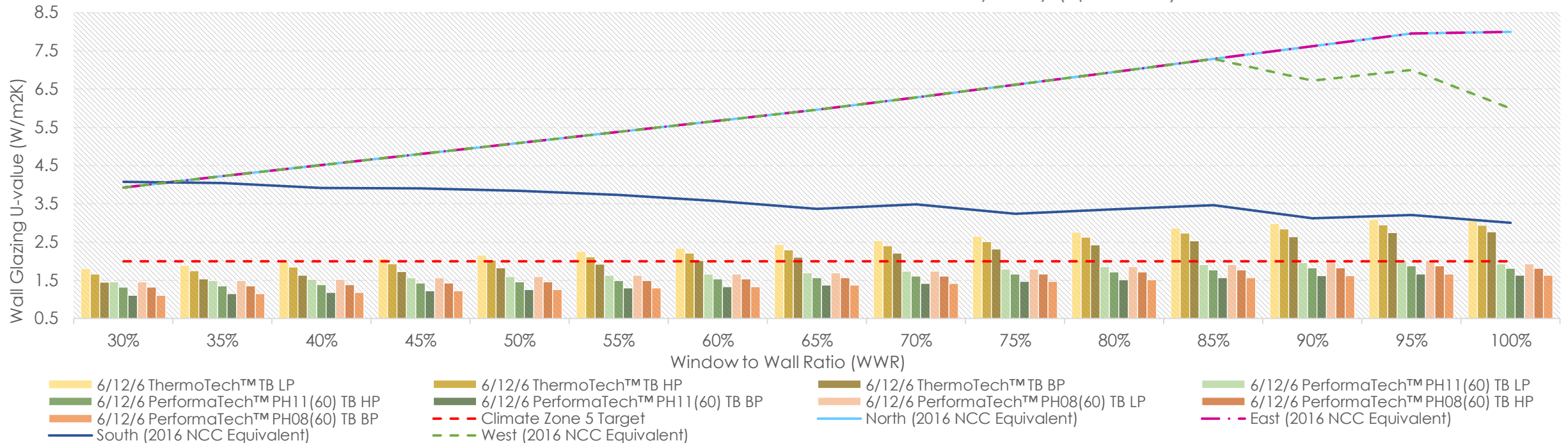
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 5 - Sydney (Spandrel)



### NCC 2016

In Climate Zone 5, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equivalent for the north, east and west façades <85% WWR. These performance values were not a governing factor in determining compliance. The south façade requirement was more onerous, however still achievable.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are far more sensitive to U-value, with particular emphasis on the north, east and west which are approximately 70% more stringent for a WWR of 80%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

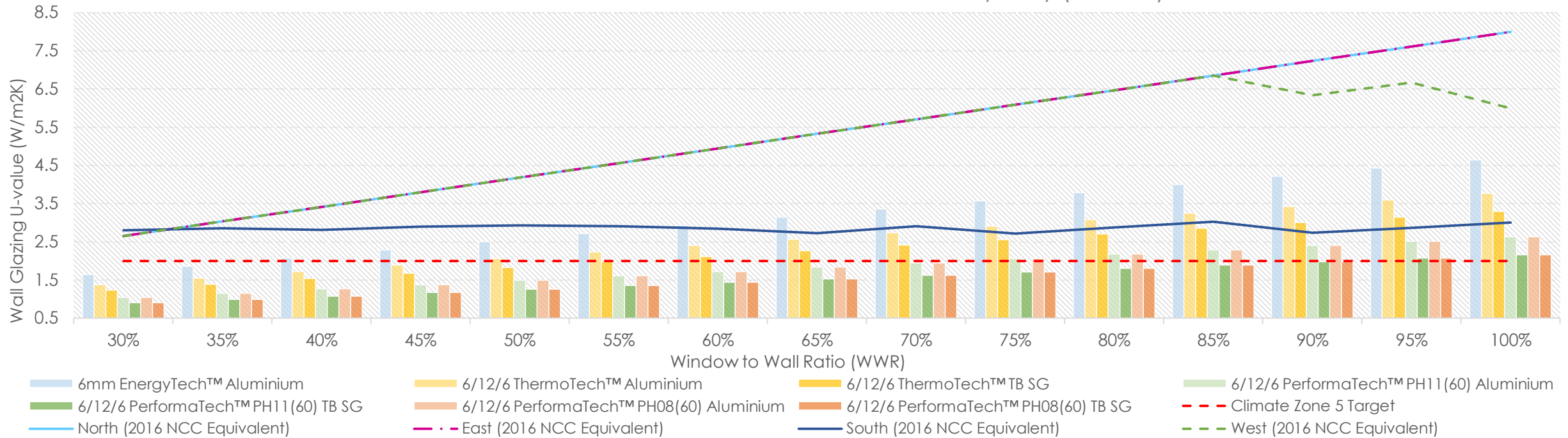
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 5 - Sydney (Precast)



### NCC 2016

In Climate Zone 5, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equivalent for the north, east and west façades <85% WWR. These performance values were not a governing factor in determining compliance. The south façade requirement was more onerous, however still achievable.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are far more sensitive to U-value, with particular emphasis on the north, east and west which are approximately 70% more stringent for a WWR of 80%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

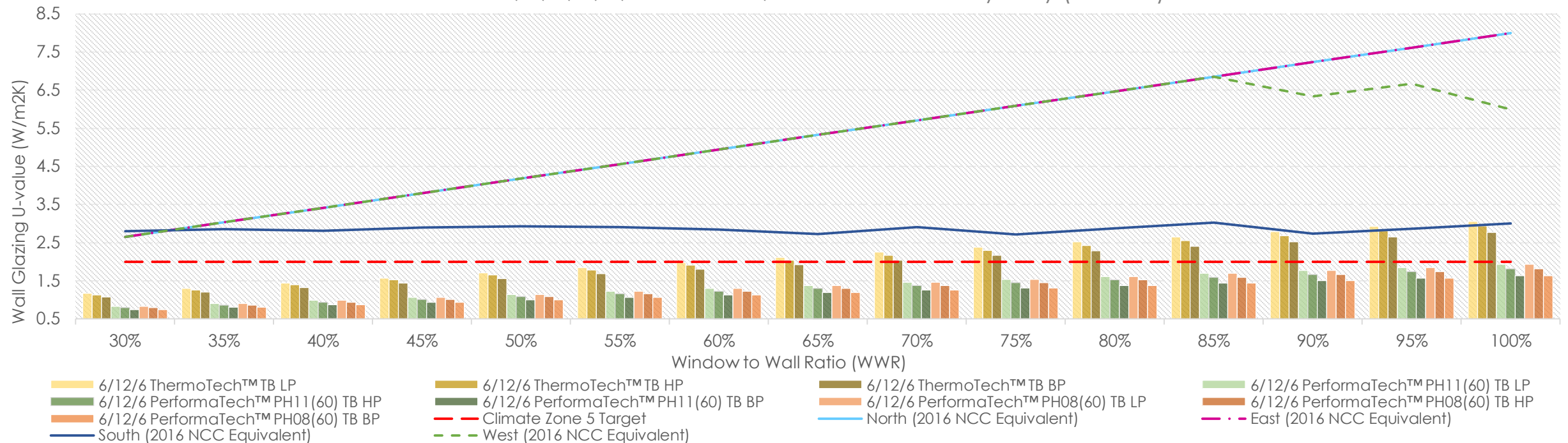
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 5 - Sydney (Precast)



### NCC 2016

In Climate Zone 5, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code wall glazing U-value requirement was equivalent for the north, east and west façades <85% WWR. These performance values were not a governing factor in determining compliance. The south façade requirement was more onerous, however still achievable.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, all façade orientations are far more sensitive to U-value, with particular emphasis on the north, east and west which are approximately 70% more stringent for a WWR of 80%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <65% WWR range, with high performance glazing systems.

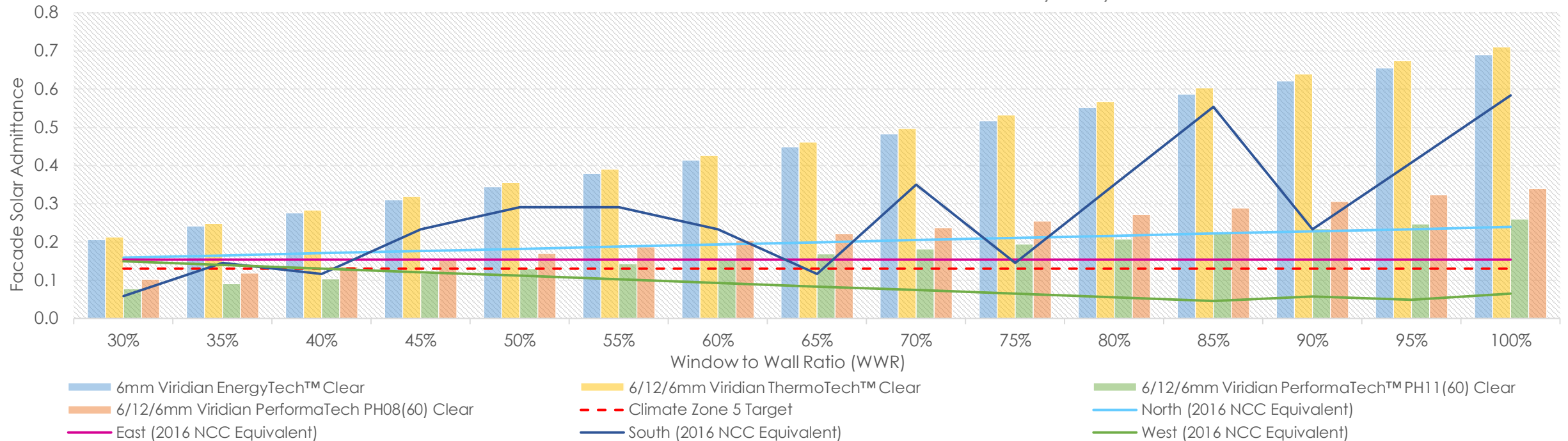
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - FSA Target Glazing

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 5 - Sydney



### NCC 2016

In Climate Zone 5, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, previously there was onerous SHGC requirements for the west facing façade, increasing proportionally with WWR. The inconsistent results for the southern façade orientation are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

Compared to NCC 2016, the southern façade is far more sensitive to SHGC for several WWRs. The east and west 2016 FSA equivalent is similar to the 2019 requirement, however now more stringent. The west orientation is now more lenient – particularly at high WWRs. Overall, the new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

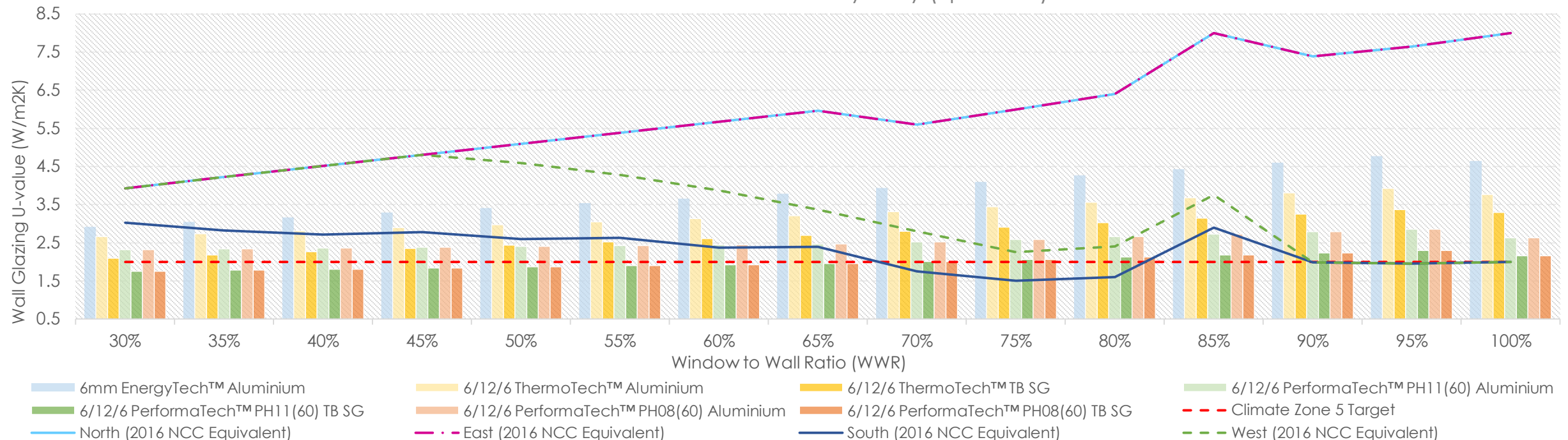
The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 5.



# Climate Zone 5

## Method 1 - U-value Target, Glazing & Spandrel

Class 3 - Climate Zone 5 - Sydney (Spandrel)



### NCC 2016

In Climate Zone 5, for building class 3, the NCC 2016 code was highly orientation specific. The wall glazing U-value requirement was equivalent for the north and east façades, and these performance values were not a governing factor in determining compliance. The south and west façade requirements were more onerous, particularly for high WWRs.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and east façade orientations are far more sensitive to U-value, approximately 75% more stringent for a WWR>80%. West and east façade requirements are more onerous for low WWRs, and unchanged for WWR>90%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <60% WWR range, with high performance glazing systems.

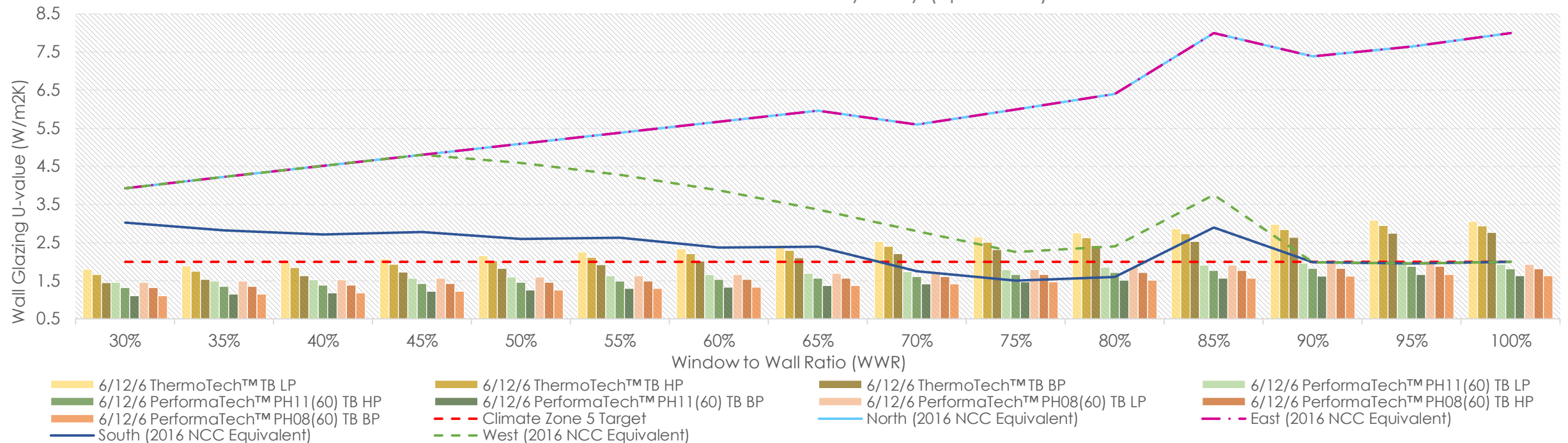
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Spandrel

Class 3 - Climate Zone 5 - Sydney (Spandrel)



### NCC 2016

In Climate Zone 5, for building class 3, the NCC 2016 code was highly orientation specific. The wall glazing U-value requirement was equivalent for the north and east façades, and these performance values were not a governing factor in determining compliance. The south and west façade requirements were more onerous, particularly for high WWRs.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and east façade orientations are far more sensitive to U-value, approximately 75% more stringent for a WWR>80%. West and east façade requirements are more onerous for low WWRs, and unchanged for WWR>90%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <60% WWR range, with high performance glazing systems.

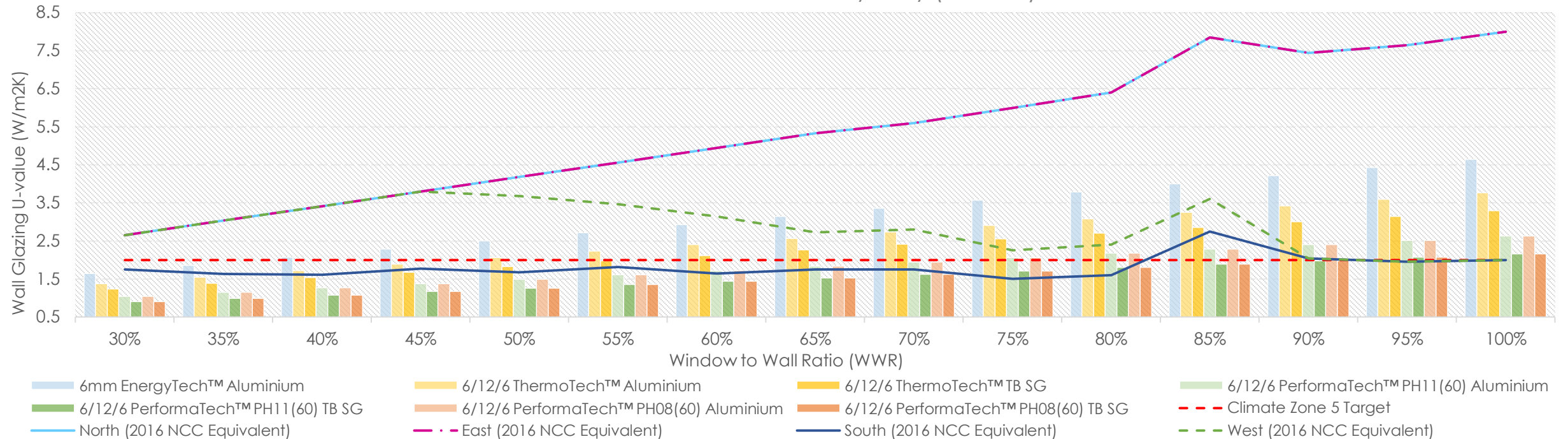
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Precast

Class 3 - Climate Zone 5 - Sydney (Precast)



### NCC 2016

In Climate Zone 5, for building class 3, the NCC 2016 code was highly orientation specific. The wall glazing U-value requirement was equivalent for the north and east façades, and these performance values were not a governing factor in determining compliance. The south and west façade requirements were more onerous, particularly for high WWRs.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and east façade orientations are far more sensitive to U-value, approximately 75% more stringent for a WWR>80%. West and east façade requirements are more onerous for low WWRs, and unchanged for WWR>90%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <60% WWR range, with high performance glazing systems.

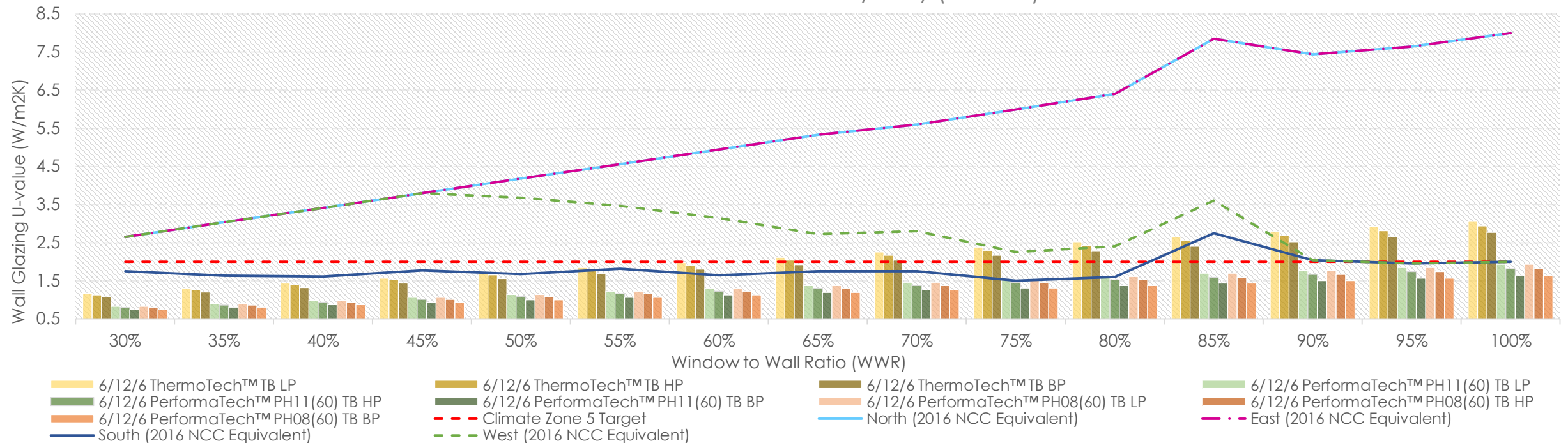
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Precast

Class 3 - Climate Zone 5 - Sydney (Precast)



### NCC 2016

In Climate Zone 5, for building class 3, the NCC 2016 code was highly orientation specific. The wall glazing U-value requirement was equivalent for the north and east façades, and these performance values were not a governing factor in determining compliance. The south and west façade requirements were more onerous, particularly for high WWRs.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and east façade orientations are far more sensitive to U-value, approximately 75% more stringent for a WWR>80%. West and east façade requirements are more onerous for low WWRs, and unchanged for WWR>90%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <60% WWR range, with high performance glazing systems.

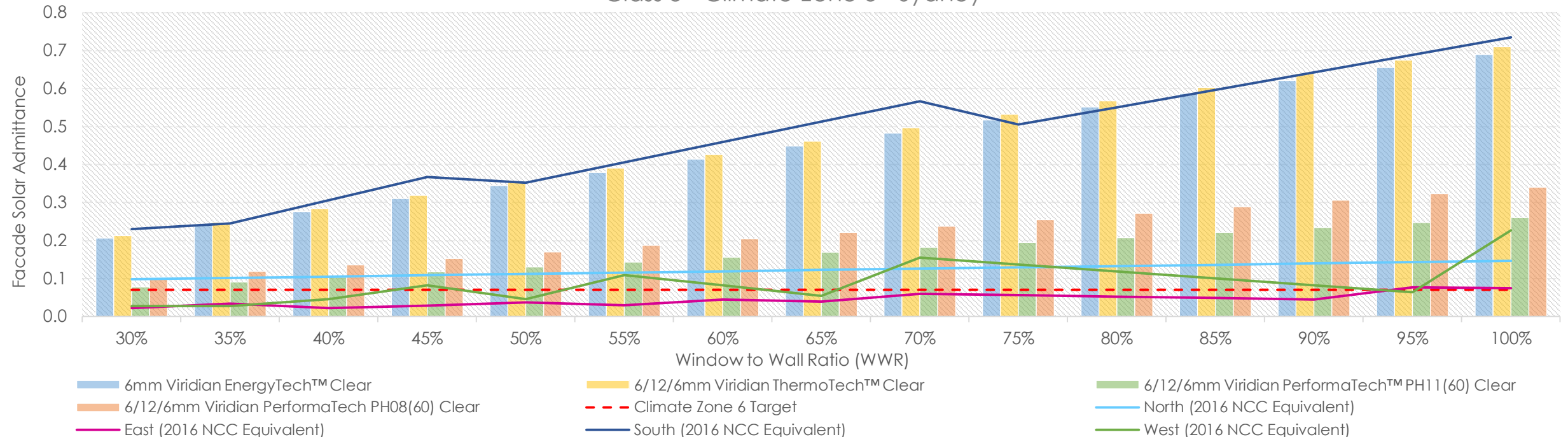
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - FSA Target Glazing

Class 3 - Climate Zone 5 - Sydney



### NCC 2016

In Climate Zone 5, for building class 3, previously there was no requirement for SHGC on the southern façade, as this orientation receives no direct solar. The north, west and east facing façades have more onerous SHGC requirements, with the east facing façade showing the highest performance requirements.

### NCC 2019- What is the key change?

Compared to NCC 2016, the southern façade is significantly more sensitive to SHGC. The remaining façade orientations are similar to the 2019 requirements, with the north generally more stringent and the east more lenient. Overall, the new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

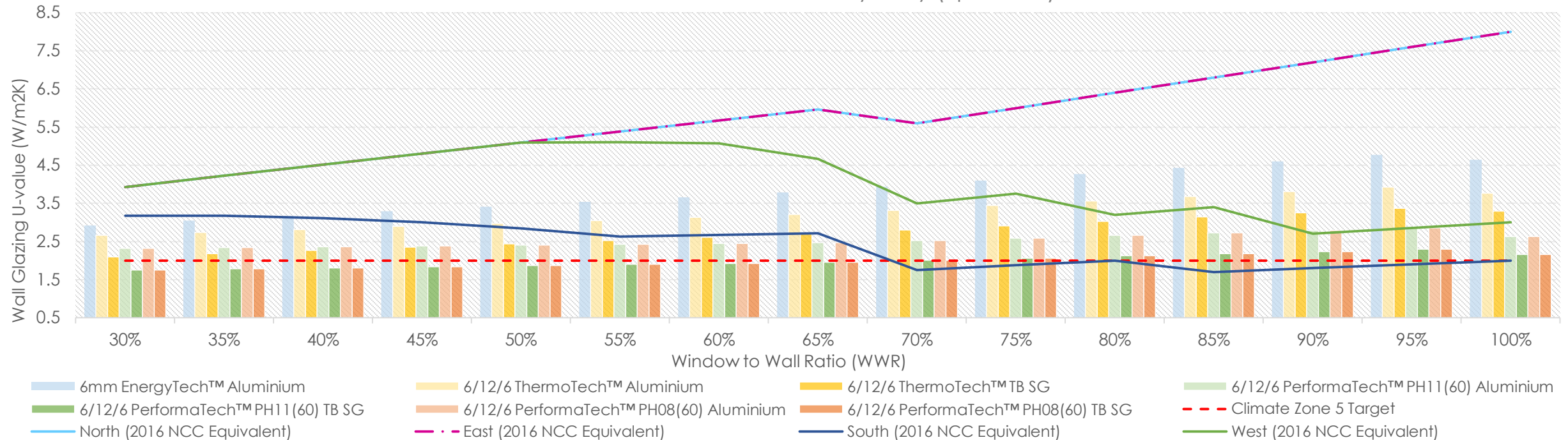
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 5.

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c - Climate Zone 5 - Sydney (Spandrel)



### NCC 2016

In Climate Zone 5, for building class 9c, the NCC 2016 code was highly orientation specific. The wall glazing U-value requirement was equivalent for the north and east façades, and these performance values were not a governing factor in determining compliance. The south and west façade requirements were more onerous, particularly for high WWRs.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and east façade orientations are far more sensitive to U-value, approximately 75% more stringent for a WWR>80%. West and south façade requirements are more onerous for low WWRs. The south façade requirement is relatively unchanged for WWR>70%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <60% WWR range, with high performance glazing systems.

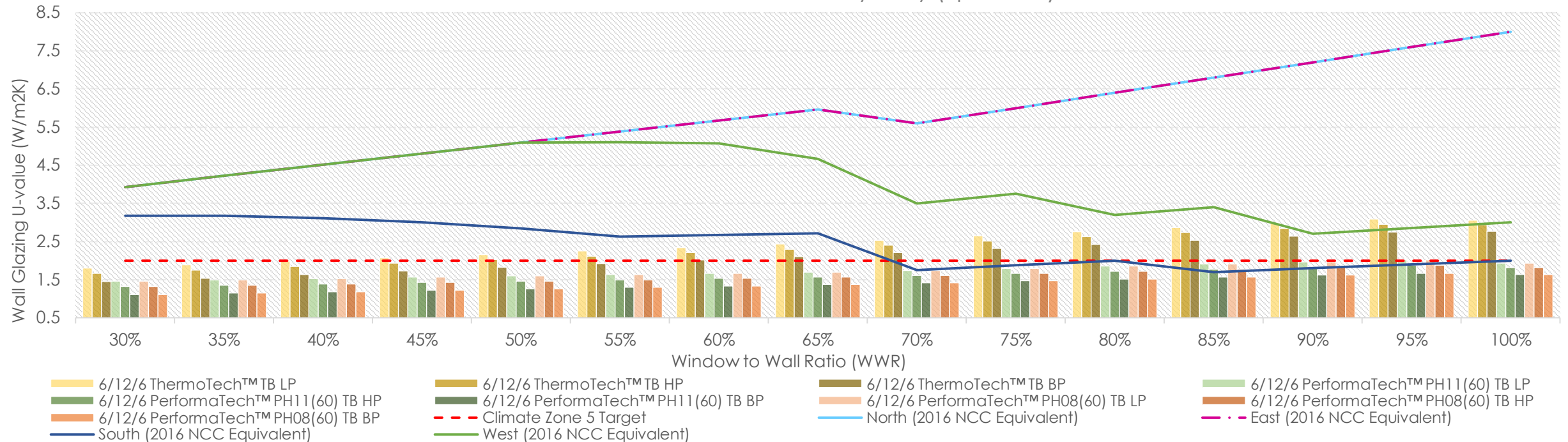
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c - Climate Zone 5 - Sydney (Spandrel)



### NCC 2016

In Climate Zone 5, for building class 9c, the NCC 2016 code was highly orientation specific. The wall glazing U-value requirement was equivalent for the north and east façades, and these performance values were not a governing factor in determining compliance. The south and west façade requirements were more onerous, particularly for high WWRs.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and east façade orientations are far more sensitive to U-value, approximately 75% more stringent for a WWR>80%. West and south façade requirements are more onerous for low WWRs. The south façade requirement is relatively unchanged for WWR>70%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <60% WWR range, with high performance glazing systems.

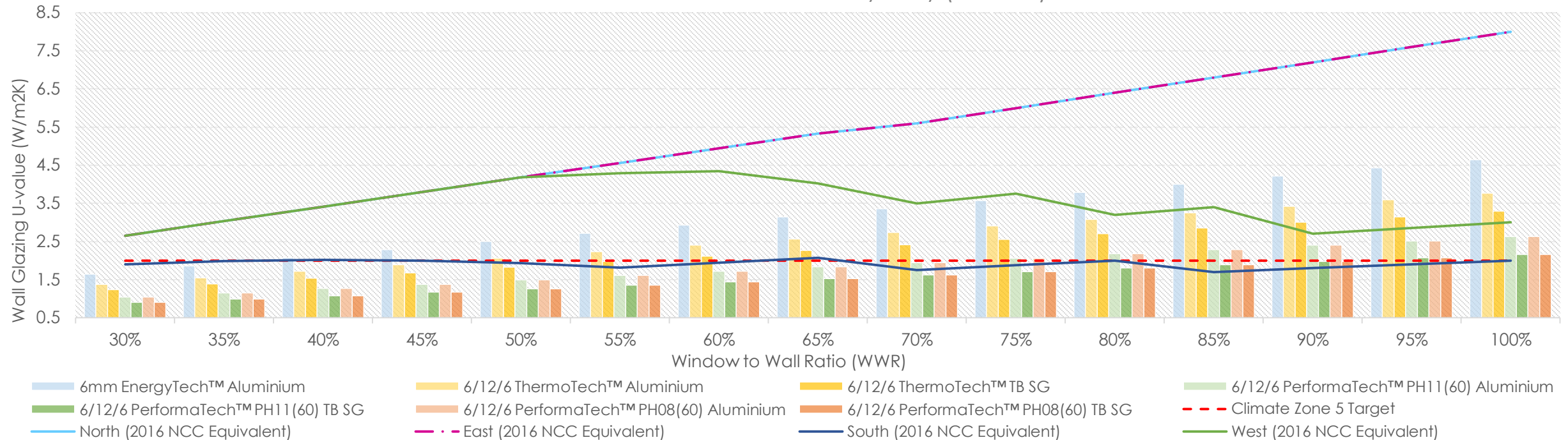
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - U-value Target, Glazing & Precast

Class 9c - Climate Zone 5 - Sydney (Precast)



### NCC 2016

In Climate Zone 5, for building class 9c, the NCC 2016 code was highly orientation specific. The wall glazing U-value requirement was equivalent for the north and east façades, and these performance values were not a governing factor in determining compliance. The south and west façade requirements were more onerous, particularly for high WWRs.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and east façade orientations are far more sensitive to U-value, approximately 75% more stringent for a WWR>80%. West and south façade requirements are more onerous for low WWRs. The south façade requirement is relatively unchanged for WWR>70%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <60% WWR range, with high performance glazing systems.

Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

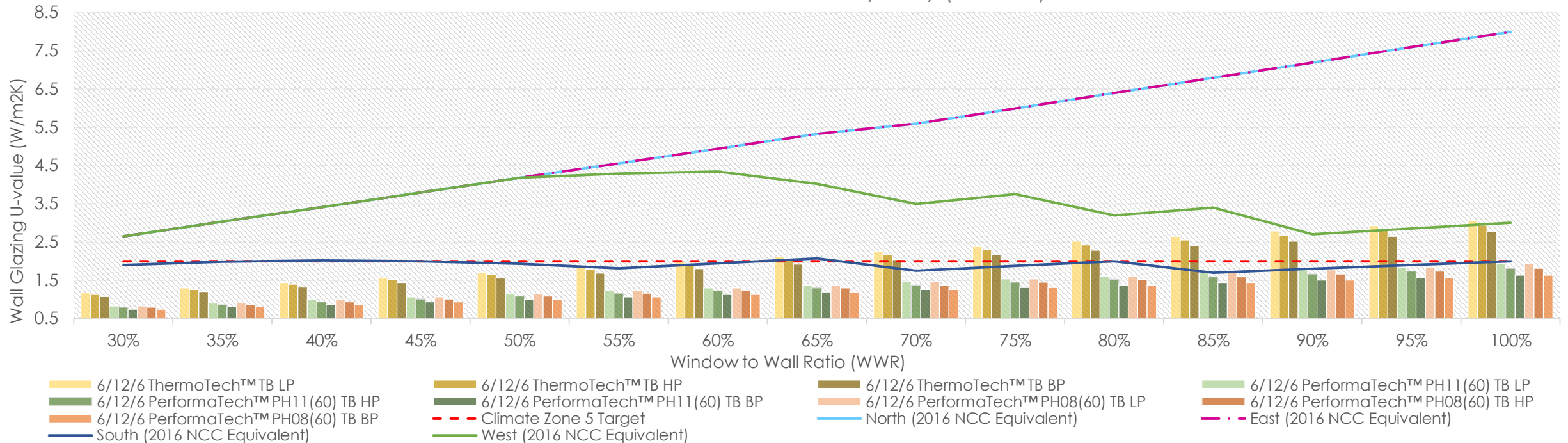
For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.



# Climate Zone 5

## Method 1 - U-value Target, Glazing & Precast

Class 9c - Climate Zone 5 - Sydney (Precast)



### NCC 2016

In Climate Zone 5, for building class 9c, the NCC 2016 code was highly orientation specific. The wall glazing U-value requirement was equivalent for the north and east façades, and these performance values were not a governing factor in determining compliance. The south and west façade requirements were more onerous, particularly for high WWRs.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and east façade orientations are far more sensitive to U-value, approximately 75% more stringent for a WWR>80%. West and south façade requirements are more onerous for low WWRs. The south façade requirement is relatively unchanged for WWR>70%.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for buildings in the <60% WWR range, with high performance glazing systems.

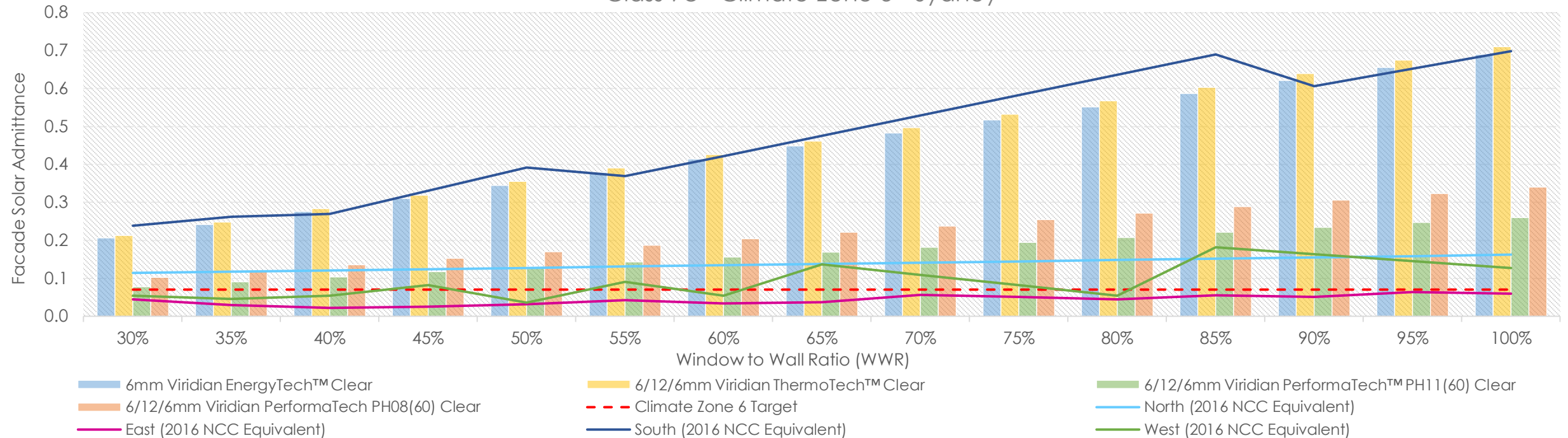
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 1 - FSA Target Glazing

Class 9c - Climate Zone 5 - Sydney



### NCC 2016

In Climate Zone 5, for building class 9c, previously there was no requirement for SHGC on the southern façade, as this orientation receives no direct solar. The north, west and east facing façades have more onerous SHGC requirements, with the east facing façade showing the highest performance requirements.

### NCC 2019- What is the key change?

Compared to NCC 2016, the southern façade is far more sensitive to SHGC. The remaining façade orientations are similar to the 2019 requirements, with the north generally now more stringent and the east more lenient. Overall, the new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

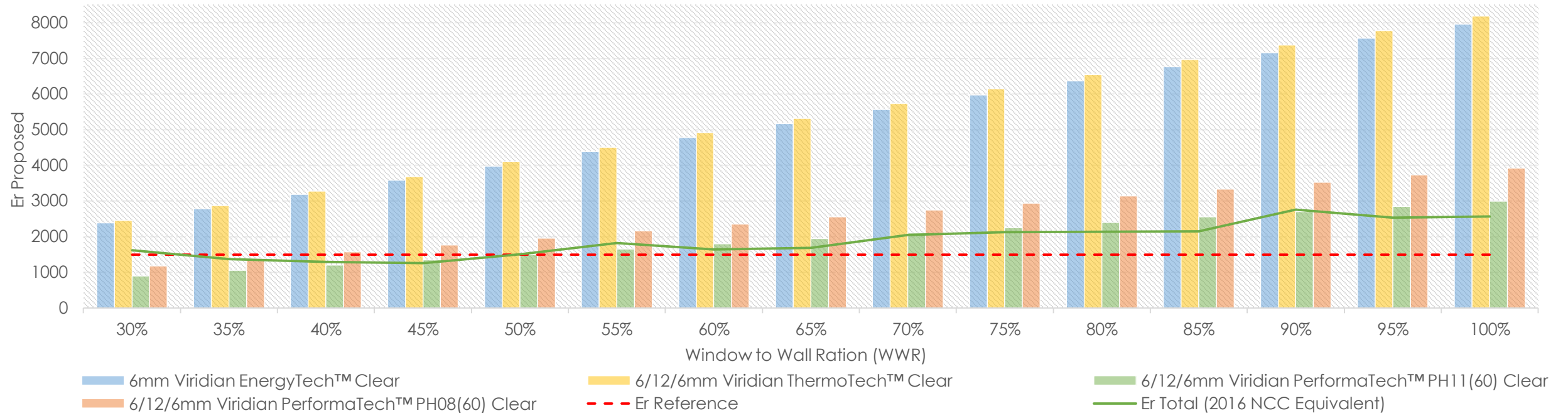
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 5.

# Climate Zone 5

## Method 2 - Class 2

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 5 - Sydney



### NCC 2016

In Climate Zone 5, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the 2016 method 2 DTS provision tracks well with the previous code until WWR >65%, where the 2016 code then becomes more lenient.

### NCC 2019- What is the key change?

As the WWR increases from 65-100%, the Er requirement becomes more stringent compared to the NCC 2016 code.

### When to Use Method 2 DTS provisions?

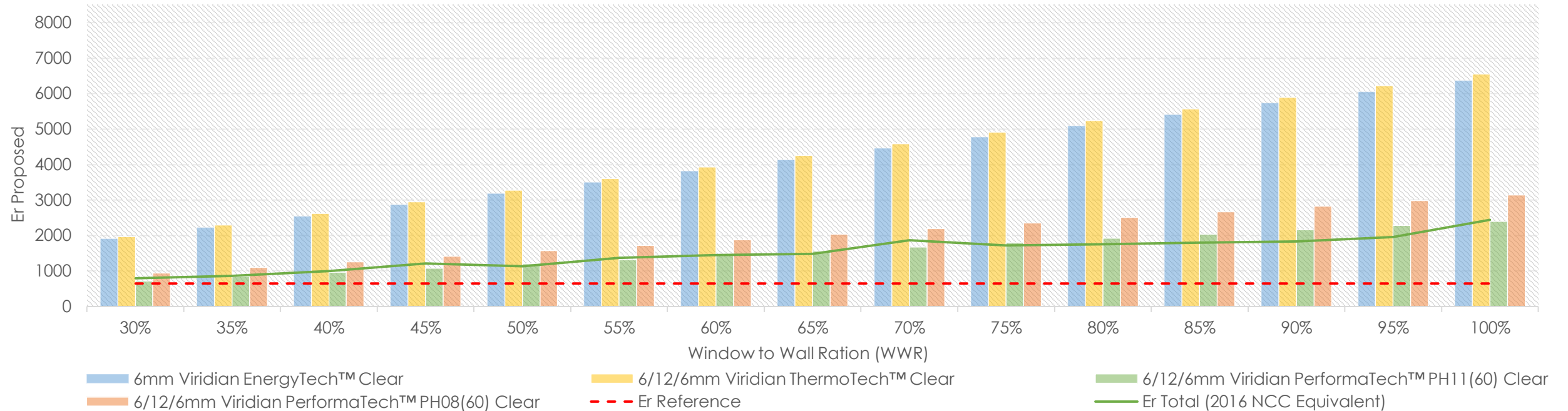
The new method 2 DTS provisions will only work for buildings with WWR < 55% and high performance glazing systems without vertical shading.

The JV3 modelling pathway will give the best results for the building where a WWR > 55% is desired. This pathway is also recommended for more complex building, and those with vertical shading.

# Climate Zone 5

## Method 2 - Class 3

Class 3 - Climate Zone 5 - Sydney



### NCC 2016

In Climate Zone 5, for building class 3, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements. There is greater difference between the performance requirements as the WWR increases.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 30-70% more stringent than the 2016 equivalent.

### When to Use Method 2 DTS provisions?

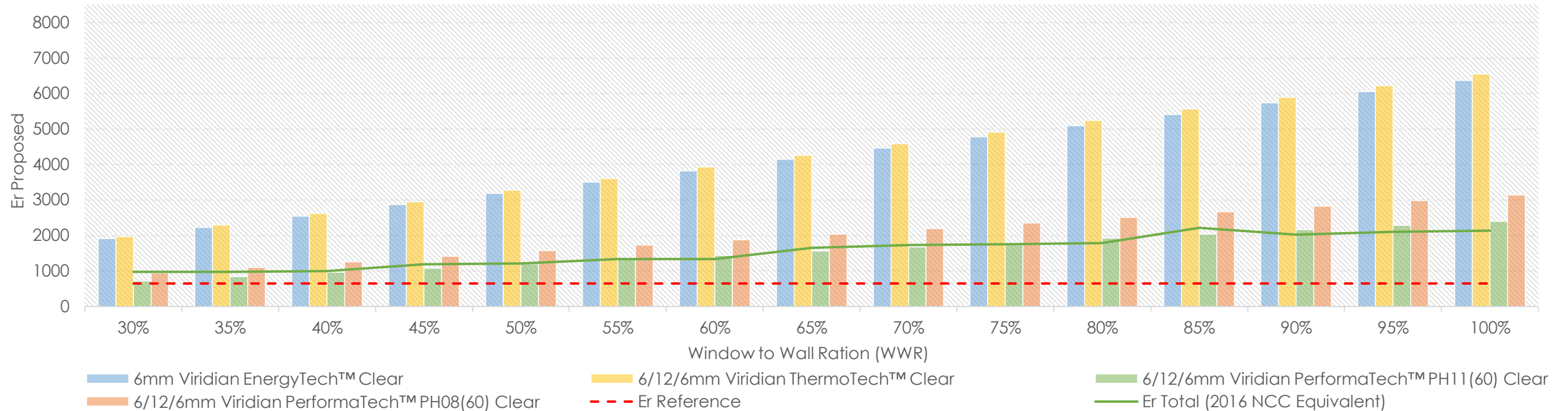
The new method 2 DTS provisions do not work well for this class and climate zone.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 5

## Method 2 - Class 9c

Class 9c - Climate Zone 5 - Sydney



### NCC 2016

In Climate Zone 5, for building class 9c, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements. There is greater difference between the performance requirements as the WWR increases.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 30-70% more stringent than the 2016 equivalent.

### When to Use Method 2 DTS provisions?

The new method 2 DTS provisions do not work well for this class and climate zone.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

It is recommended that for Class 9c buildings, a JV3 model is always considered.

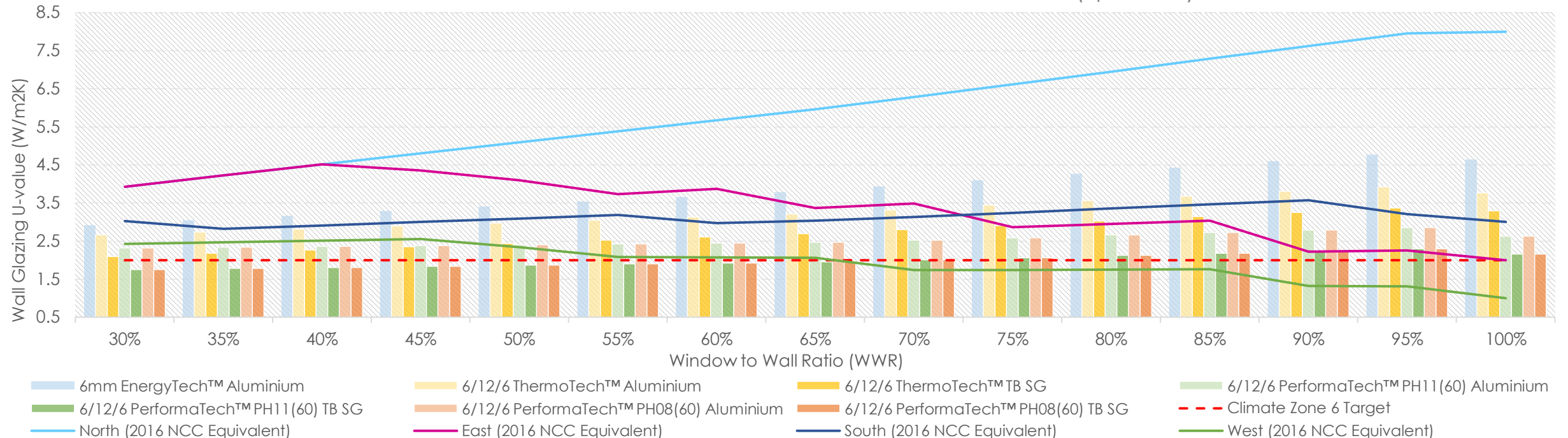
Climate Zone 6

Melbourne

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 6 - Melbourne (Spandrel)



### NCC 2016

In Climate Zone 6, for building classes Class 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance.

On all other Façade, U-value was critical, with the western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is significantly more sensitive to U-value, where as there is greater leniency on the U-value of the Western Façade. On the Southern and Eastern orientations, the new code is approximately 20% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

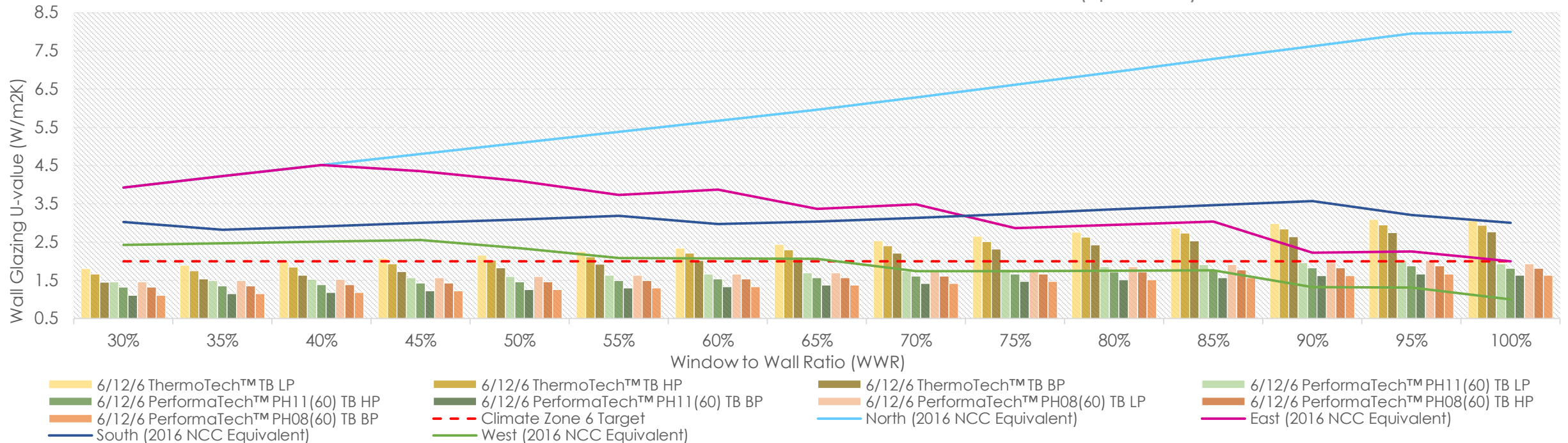
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 6 - Melbourne (Spandrel)



### NCC 2016

In Climate Zone 6, for building classes Class 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance.

On all other Façade, U-value was critical, with the western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is significantly more sensitive to U-value, where as there is greater leniency on the U-value of the Western Façade. On the Southern and Eastern orientations, the new code is approximately 20% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

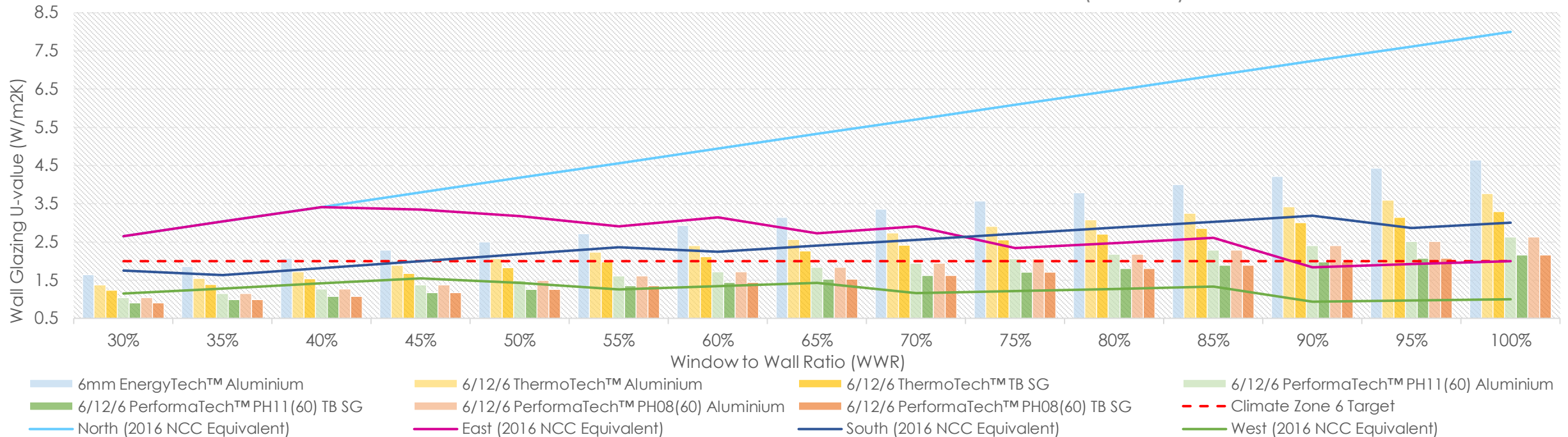
For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.



# Climate Zone 6

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 6 - Melbourne (Precast)



### NCC 2016

In Climate Zone 6, for building classes Class 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance.

On all other Façade, U-value was critical, with the western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is significantly more sensitive to U-value, where as there is greater leniency on the U-value of the Western Façade. On the Southern and Eastern orientations, the new code is approximately 20% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

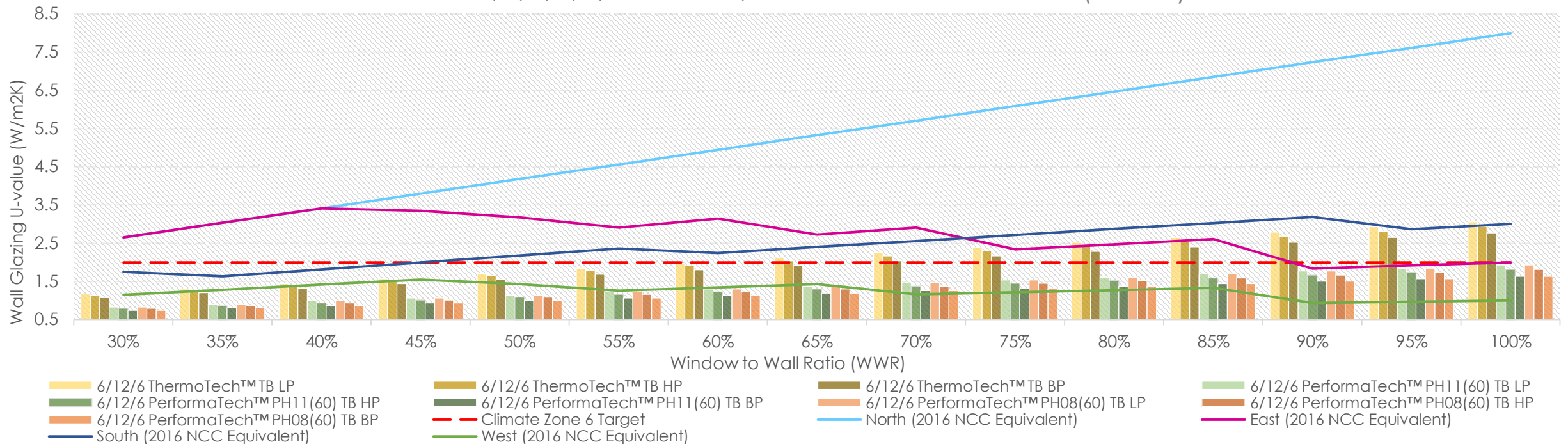
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 6 - Melbourne (Precast)



### NCC 2016

In Climate Zone 6, for building classes Class 2\*, 5, 6, 7, 8, 9a\* and 9b, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance.

On all other Façade, U-value was critical, with the western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is significantly more sensitive to U-value, where as there is greater leniency on the U-value of the Western Façade. On the Southern and Eastern orientations, the new code is approximately 20% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

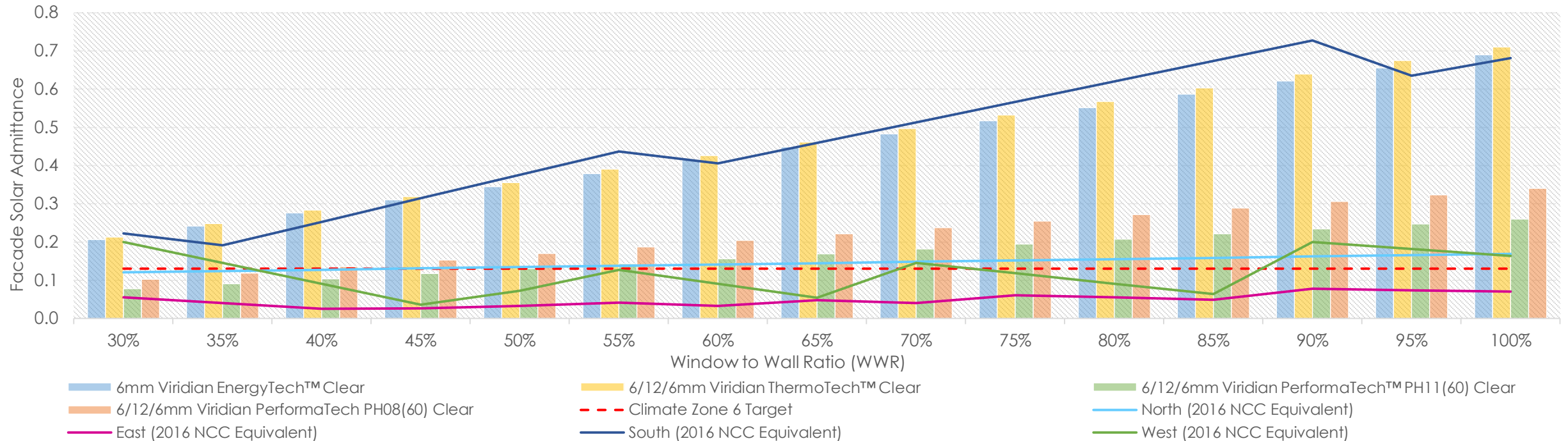
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 6

## Method 1 - FSA Target Glazing

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 6 - Melbourne



### NCC 2016

In Climate Zone 6, for building classes Class 2\*, 5, 6, 7, 8, 9a\* and 9b, previously there was no requirement for SHGC on the Southern Façade, as there is no direct solar onto this façade. The east and west facing facades have very low SHGC.

### NCC 2019- What is the key change?

The southern façade is significantly more sensitive to SHGC, compared to NCC 2016 when there was no requirements. The east and western facade SHGC have been made more lenient. The northern façade there has been minimal change.

The new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

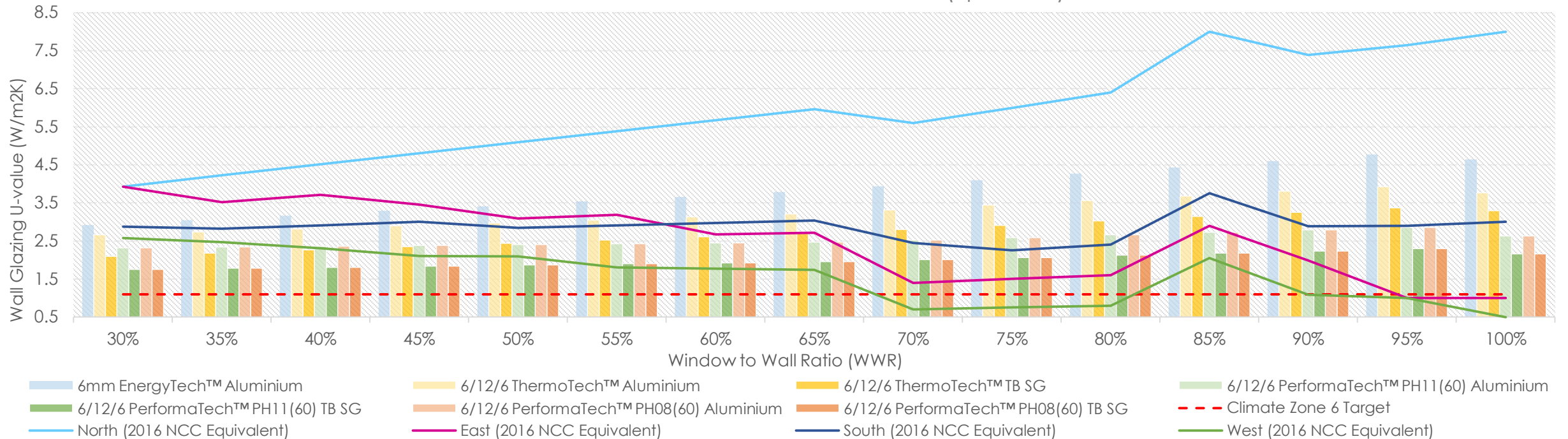
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 6.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 6.

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Spandrel

Class 3 - Climate Zone 6 - Melbourne (Spandrel)



### NCC 2016

In Climate Zone 6, for building classes Class 3, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance. On all other façades, U-value was critical, with the Western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is significantly more sensitive to U-value, where there is greater leniency on the U-value of the Western Façade for WWRs between 70-80%. On the Southern and Eastern orientations, the new code is approximately 50% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

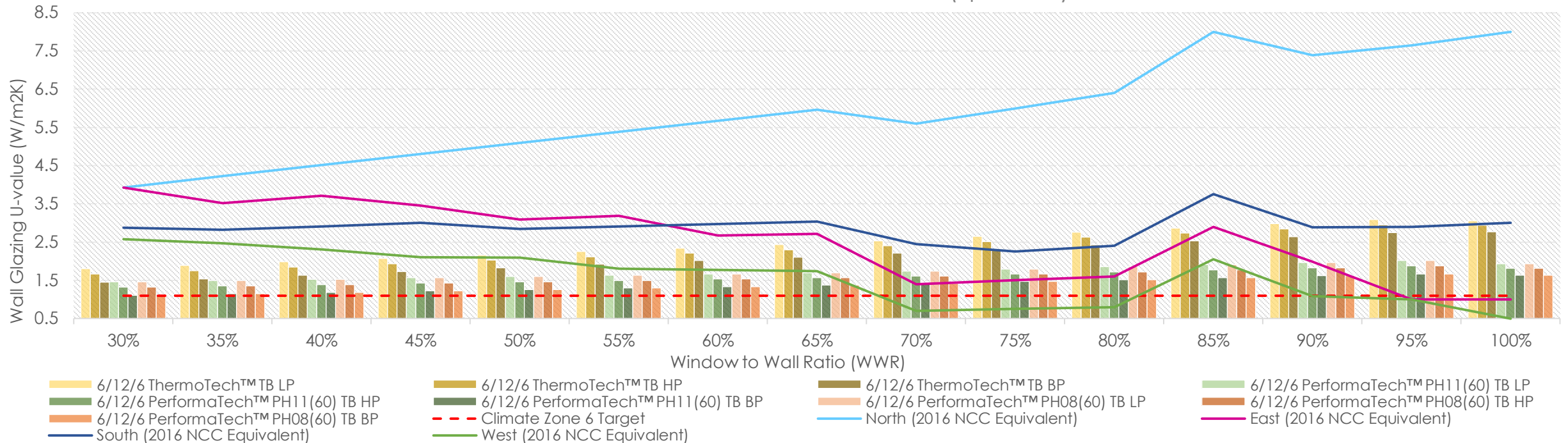
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 6.

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Spandrel

Class 3 - Climate Zone 6 - Melbourne (Spandrel)



### NCC 2016

In Climate Zone 6, for building classes Class 3, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance. On all other façades, U-value was critical, with the Western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is significantly more sensitive to U-value, where there is greater leniency on the U-value of the Western Façade for WWRs between 70-80%. On the Southern and Eastern orientations, the new code is approximately 50% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

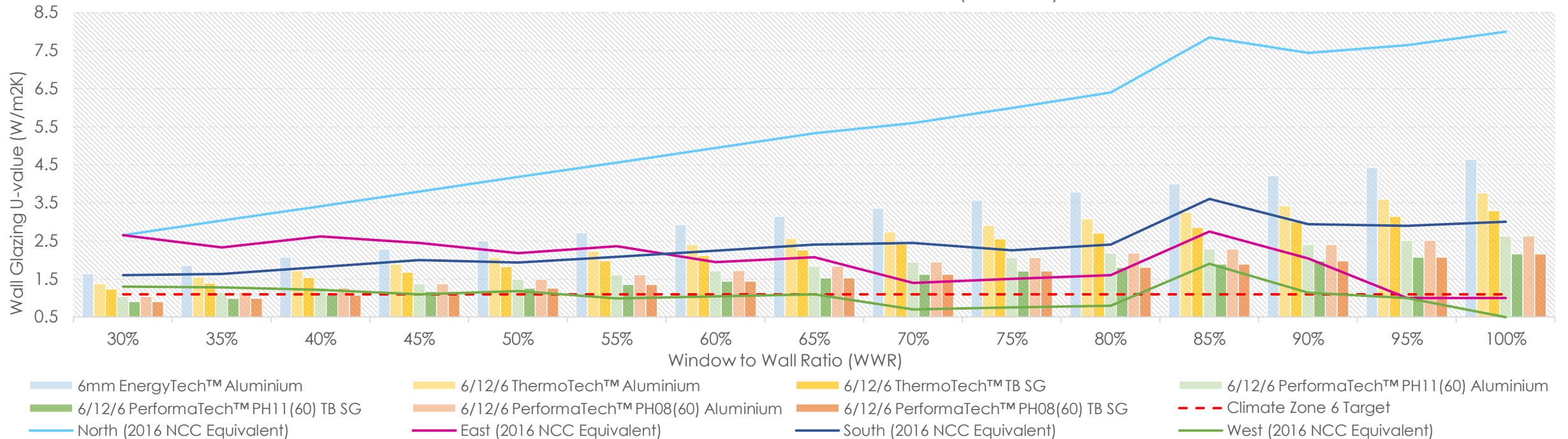
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 6.

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Precast

Class 3 - Climate Zone 6 - Melbourne (Precast)



### NCC 2016

In Climate Zone 6, for building classes Class 3, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance. On all other façades, U-value was critical, with the Western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is significantly more sensitive to U-value, where there is greater leniency on the U-value of the Western Façade for WWRs between 70-80%. On the Southern and Eastern orientations, the new code is approximately 50% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

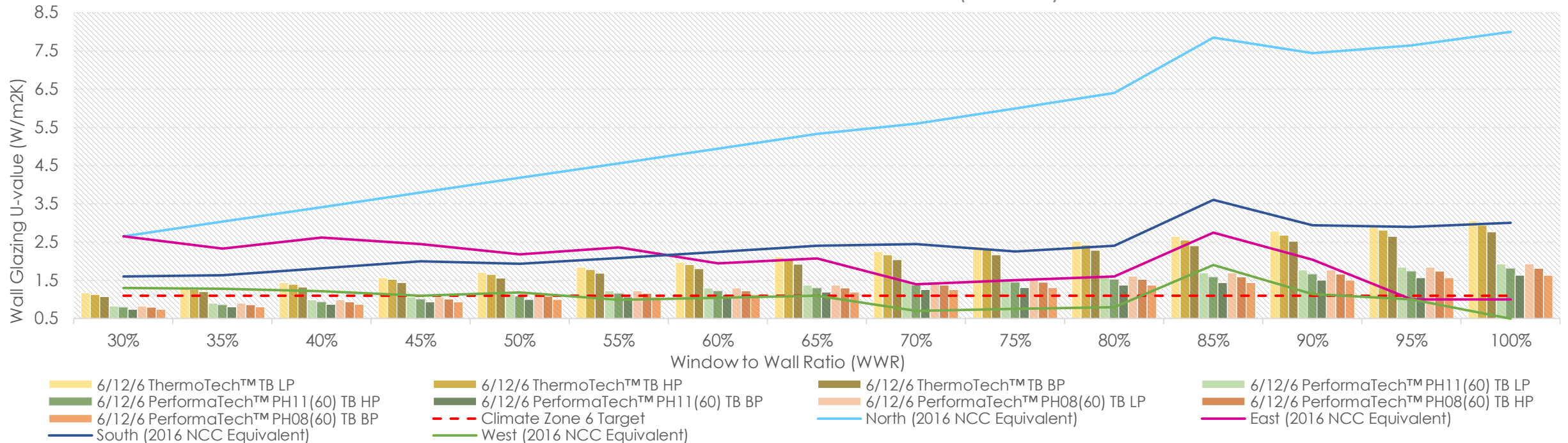
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 6.

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Precast

Class 3 - Climate Zone 6 - Melbourne (Precast)



### NCC 2016

In Climate Zone 6, for building classes Class 3, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance. On all other façades, U-value was critical, with the Western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is significantly more sensitive to U-value, where there is greater leniency on the U-value of the Western Façade for WWRs between 70-80%. On the Southern and Eastern orientations, the new code is approximately 50% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

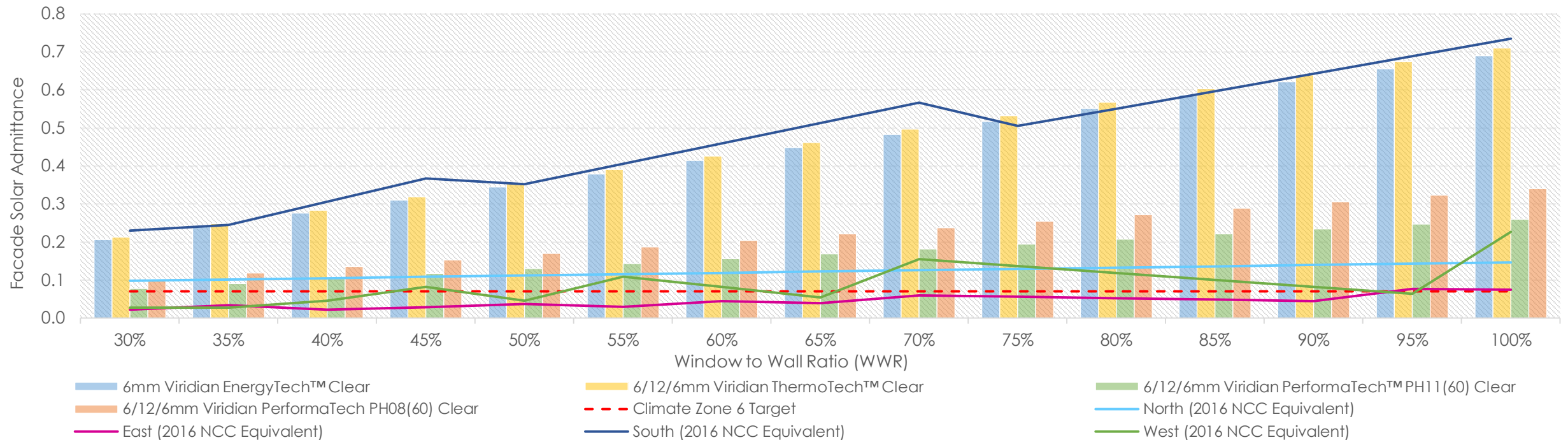
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 6.

# Climate Zone 6

## Method 1 - FSA Target Glazing

Class 3 - Climate Zone 6 - Melbourne



### NCC 2016

In Climate Zone 6, for building class 3, previously there was no requirement for SHGC on the Southern Façade, as there is no direct solar onto this façade. The east and west facing façades have very low SHGC.

### NCC 2019- What is the key change?

The Southern façade is now significantly more sensitive to SHGC, compared to NCC 2016 when there was no requirements. The east. There is approximately 20% increase in stringency to the northern and western façades.

The new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 6.

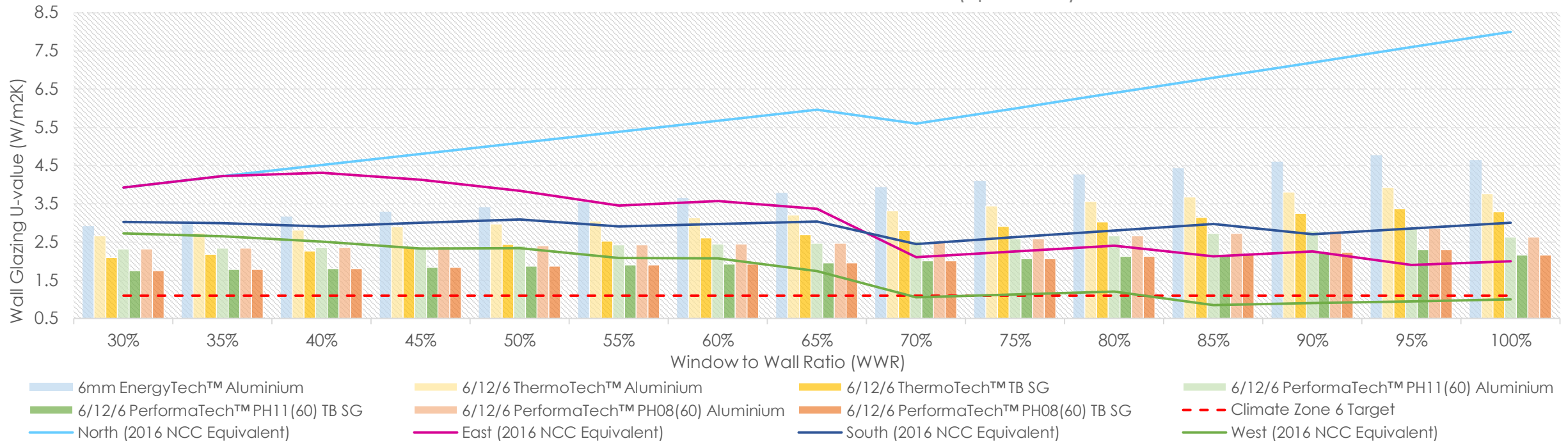
The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 6.



# Climate Zone 6

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c - Climate Zone 6 - Melbourne (Spandrel)



### NCC 2016

In Climate Zone 6, for building classes Class 9c, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance. On all other Façade, U-value was critical, with the Western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is now significantly more sensitive to U-value, where as there is greater leniency on the U-value of the western Façade. On the Southern and Eastern orientations, the new code is approximately 50% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

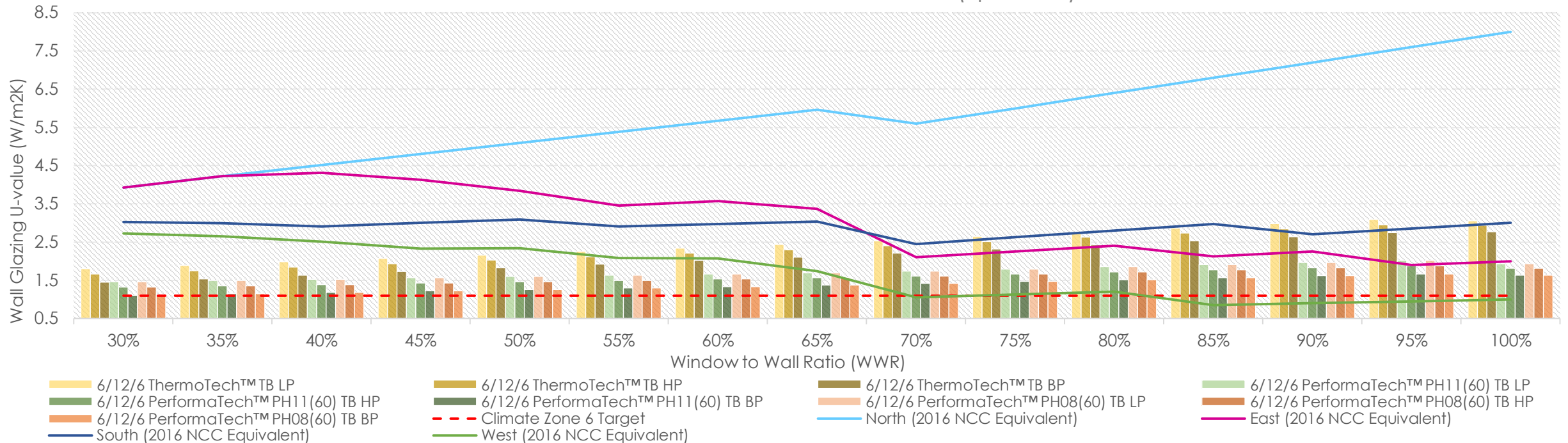
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 6.

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c - Climate Zone 6 - Melbourne (Spandrel)



### NCC 2016

In Climate Zone 6, for building classes Class 9c, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance. On all other Façade, U-value was critical, with the Western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is now significantly more sensitive to U-value, where as there is greater leniency on the U-value of the western Façade. On the Southern and Eastern orientations, the new code is approximately 50% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

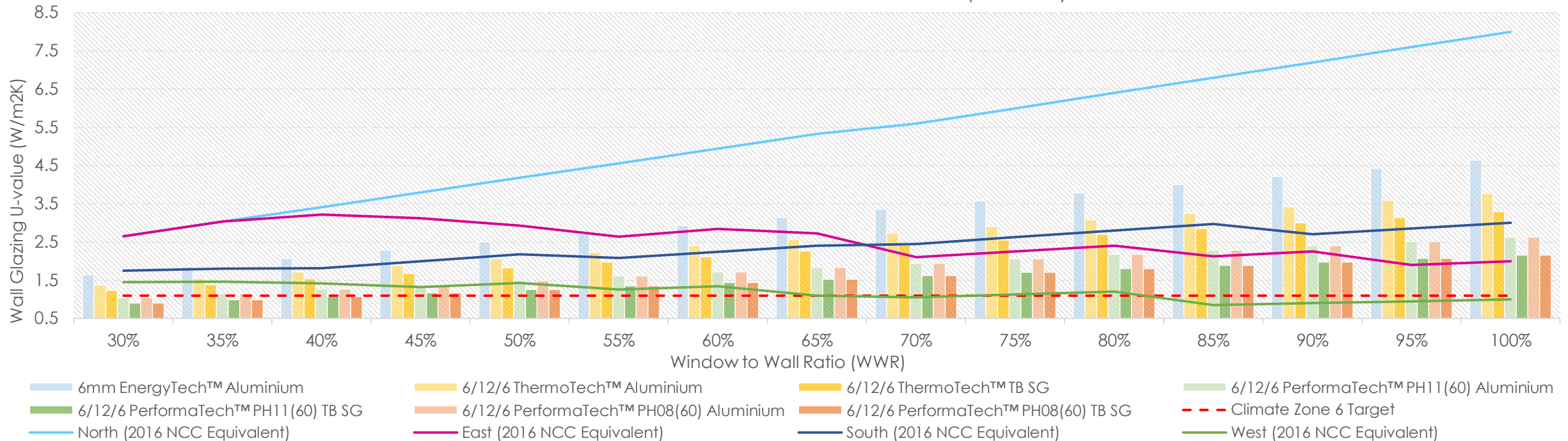
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 6.

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Precast

Class 9c - Climate Zone 6 - Melbourne (Precast)



### NCC 2016

In Climate Zone 6, for building classes Class 9c, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance. On all other Façade, U-value was critical, with the Western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is now significantly more sensitive to U-value, where as there is greater leniency on the U-value of the western Façade. On the Southern and Eastern orientations, the new code is approximately 50% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

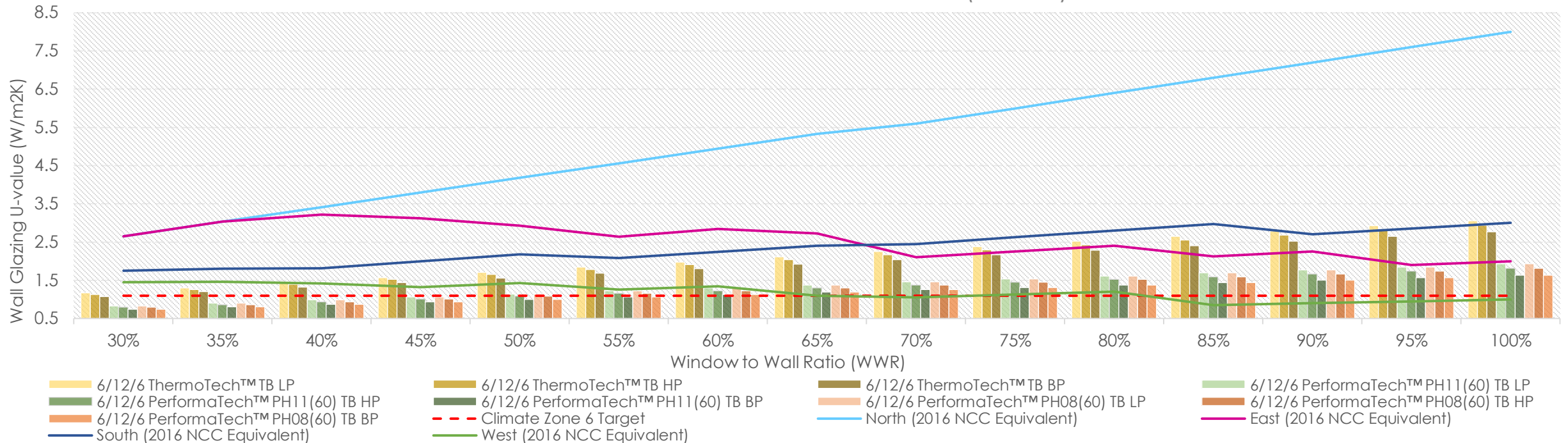
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 6.

# Climate Zone 6

## Method 1 - U-value Target, Glazing & Precast

Class 9c - Climate Zone 6 - Melbourne (Precast)



### NCC 2016

In Climate Zone 6, for building classes Class 9c, the NCC 2016 code, was highly orientation specific. On the North, U-value was not a governing factor to determine compliance. On all other Façade, U-value was critical, with the Western façade having the most stringent requirements for U-value.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the Northern façade is now significantly more sensitive to U-value, where as there is greater leniency on the U-value of the western Façade. On the Southern and Eastern orientations, the new code is approximately 50% more stringent. The new code applies U-value requirements in a more balanced way across the various façade orientation.

### When to Use Method 1 DTS provisions?

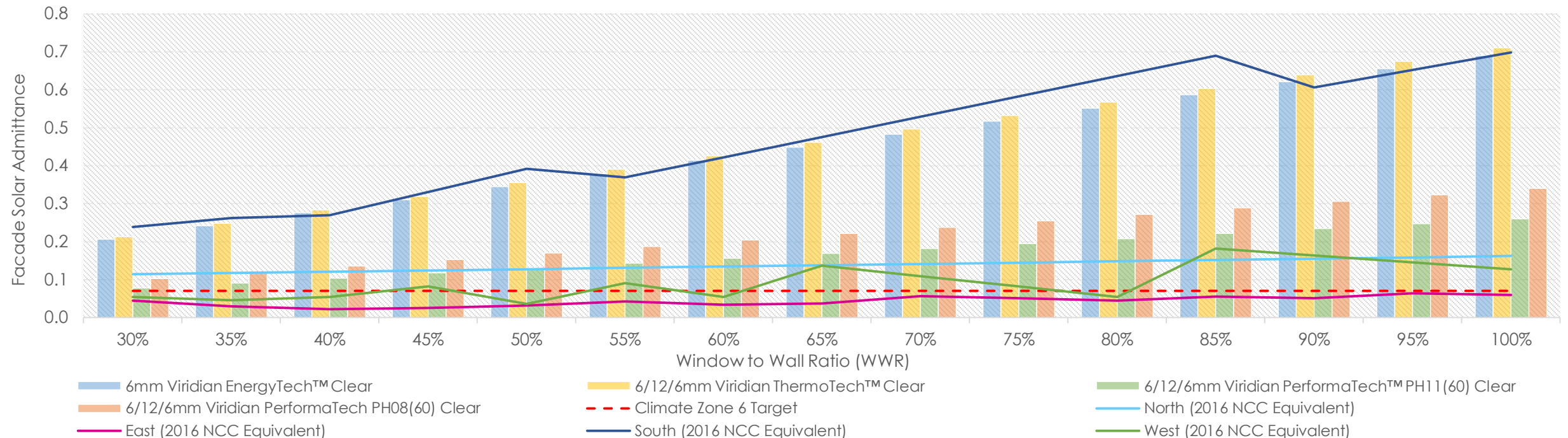
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 6.

# Climate Zone 6

## Method 1 - FSA Target Glazing

Class 9c - Climate Zone 6 - Melbourne



### NCC 2016

In Climate Zone 6, for building class 9c, previously there was no requirement for SHGC on the Southern Façade, as there is no direct solar onto this façade. The east and west facing facades have very low SHGC.

### NCC 2019- What is the key change?

The southern façade is now significantly more sensitive to SHGC, compared to NCC 2016 when there was no requirements. The east. There is approximately 20% increase in stringency to the Norther and Westerns facades.

The new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

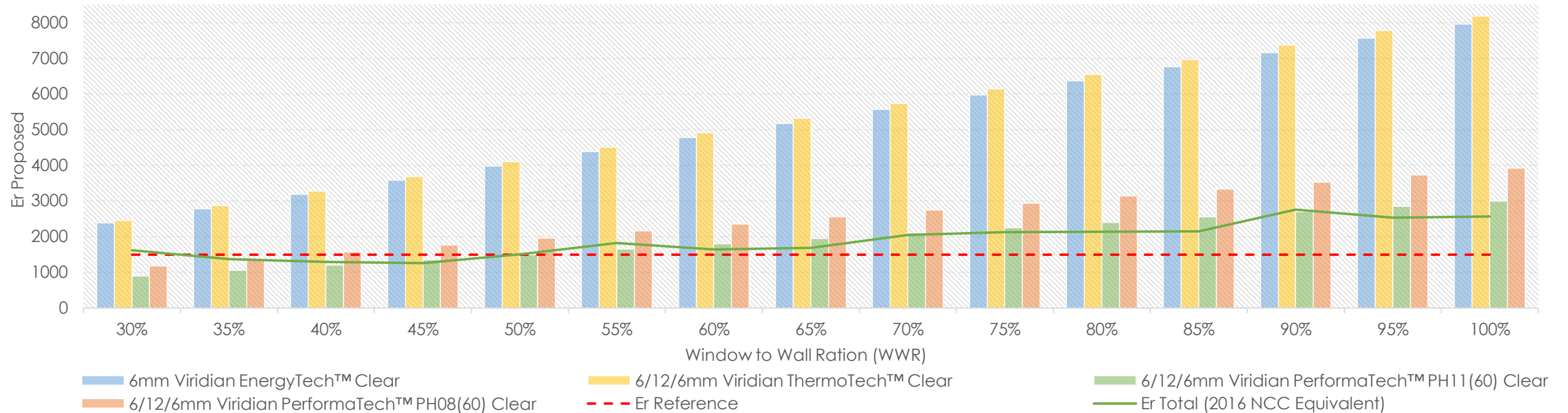
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 6.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 6.

# Climate Zone 6

## Method 2 - Class 2

Class 2\*, 5, 6, 7, 8, 9a\* and 9b - Climate Zone 6 - Melbourne



### NCC 2016

In Climate Zone 6, for building classes 9c, the method 2 DTS provision track well with the previous code until WWR >60%, where there is increased stringency.

### NCC 2019- What is the key change?

As the WWR increases from 60-100%, there is a 5-20% increase in stringency compared to NCC 2016, with the aim to reduce highly glazed facades under the DTS provision in the code.

### When to Use Method 2 DTS provisions?

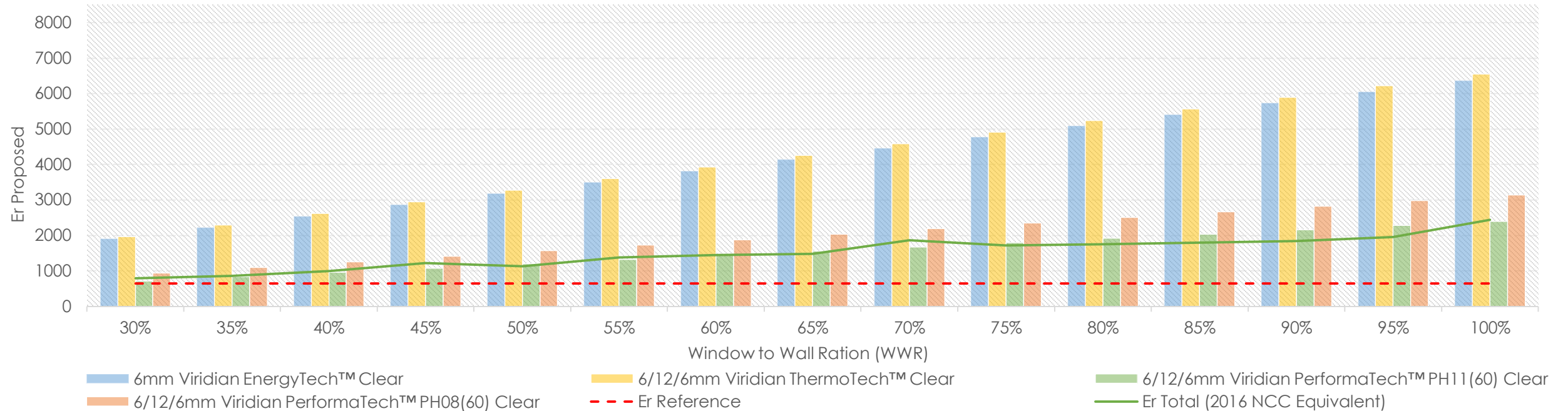
The new method 2 DTS provisions will work well for buildings with WWR <60% and high performance glazing systems without vertical shading.

The JV3 modelling pathway will give the best results for the building where a WWR >60% is desired. This pathway is also recommended for more complex building, and those with vertical shading.

# Climate Zone 6

## Method 2 - Class 3

Class 3 - Climate Zone 6 - Melbourne



### NCC 2016

In Climate Zone 6, for building class 3, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements. There is greater difference between the performance requirements as the WWR increases.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 20-70% more stringent than the 2016 equivalent.

### When to Use Method 1 DTS provisions?

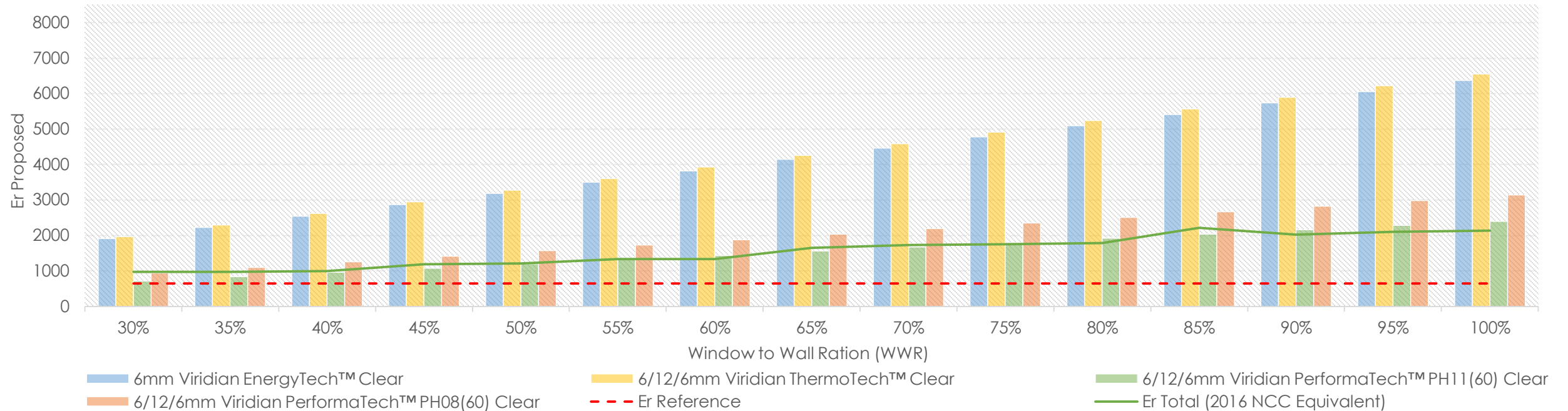
The new method 2 DTS provisions do not work well for this class and climate zone, unless the building has a WWR <35%, no vertical shading and a high performance glazing system is used.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 6

## Method 2 - Class 9c

Class 9c - Climate Zone 6 - Melbourne



### NCC 2016

In Climate Zone 6, for building classes 9c, there is a significant increase in stringency for building with a WWR > 40%.

### NCC 2019- What is the key change?

As the WWR increases from 40-100%, there is approximately a 5-40% increase in stringency compared to NCC 2016, with the aim to reduce highly glazed facades under the DTS provision in the code.

### When to Use Method 1 DTS provisions?

The new method 2 DTS provisions do not work well for this class and climate zone, unless the building has a WWR < 35%, no vertical shading and a high performance glazing system is used.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

It is recommended that for Class 9c buildings, a JV3 model is always considered.



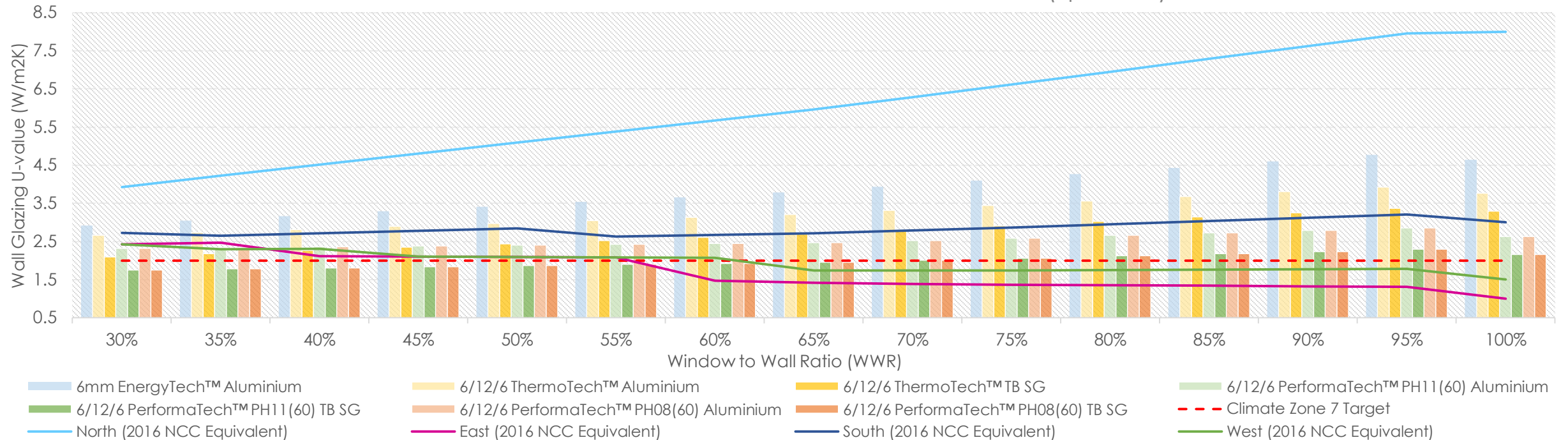
Climate Zone 7

Hobart

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 7 - Hobart (Spandrel)



### NCC 2016

In Climate Zone 7, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b with a spandrel-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance, with stringency increasing proportionally with WWR.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with an increased stringency of approximately 75% for WWR > 80%. The south façade performance requirement is now more onerous, and the west and east are now more lenient for WWR > 55%. The new code applies U-value requirements in a more balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

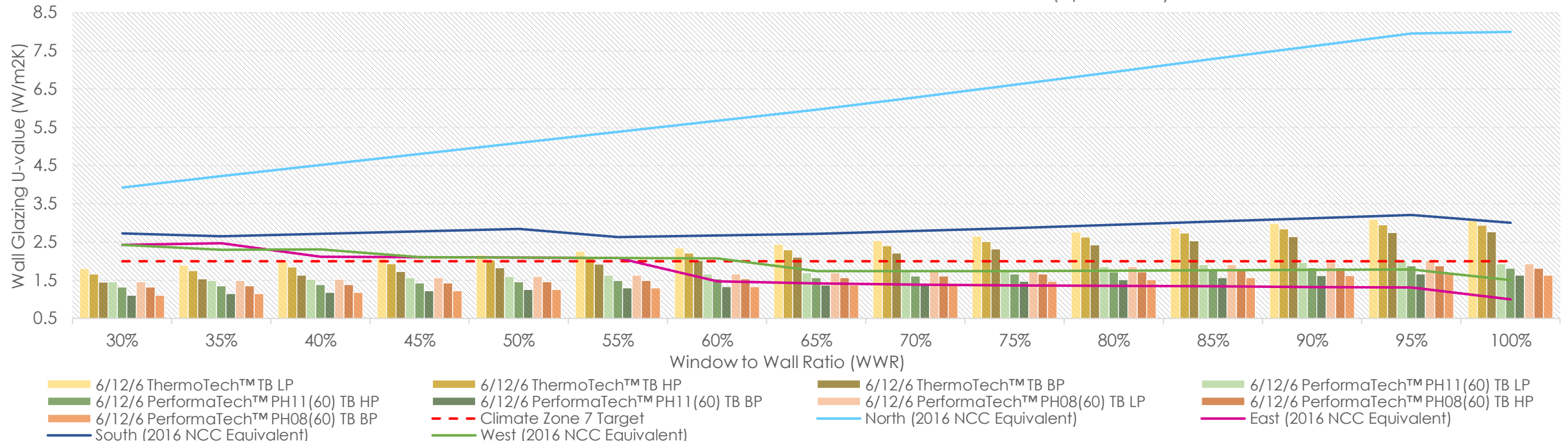
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 7 - Hobart (Spandrel)



### NCC 2016

In Climate Zone 7, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b with a spandrel-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance, with stringency increasing proportionally with WWR.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with an increased stringency of approximately 75% for WWR > 80%. The south façade performance requirement is now more onerous, and the west and east are now more lenient for WWR > 55%. The new code applies U-value requirements in a more balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

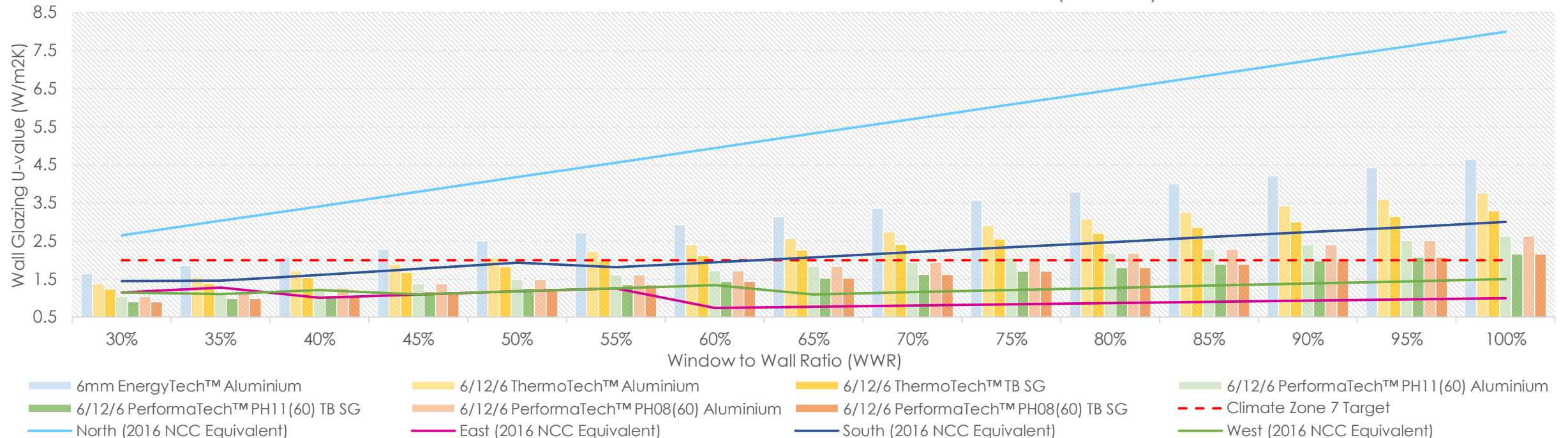
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 7 - Hobart (Precast)



### NCC 2016

In Climate Zone 7, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b with a precast-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east façade shows the most onerous U-value performance requirements.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous for WWR>60%, and the west and east are now more lenient throughout. The new code applies U-value requirements in a more balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

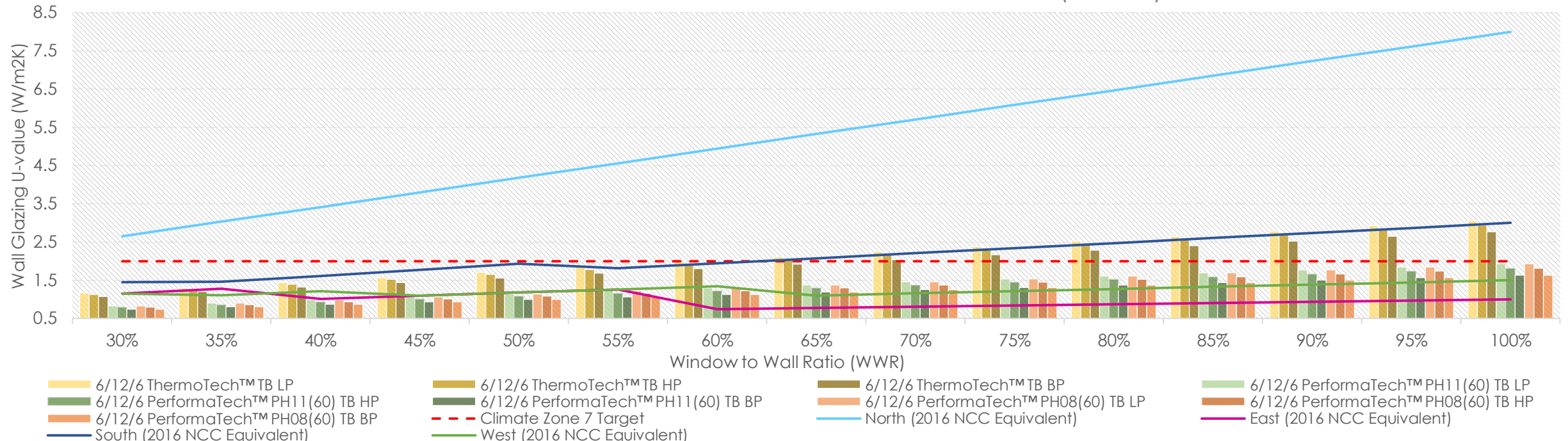
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 7 - Hobart (Precast)



### NCC 2016

In Climate Zone 7, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b with a precast-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east façade shows the most onerous U-value performance requirements.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous for WWR>60%, and the west and east are now more lenient throughout. The new code applies U-value requirements in a more balanced way across various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

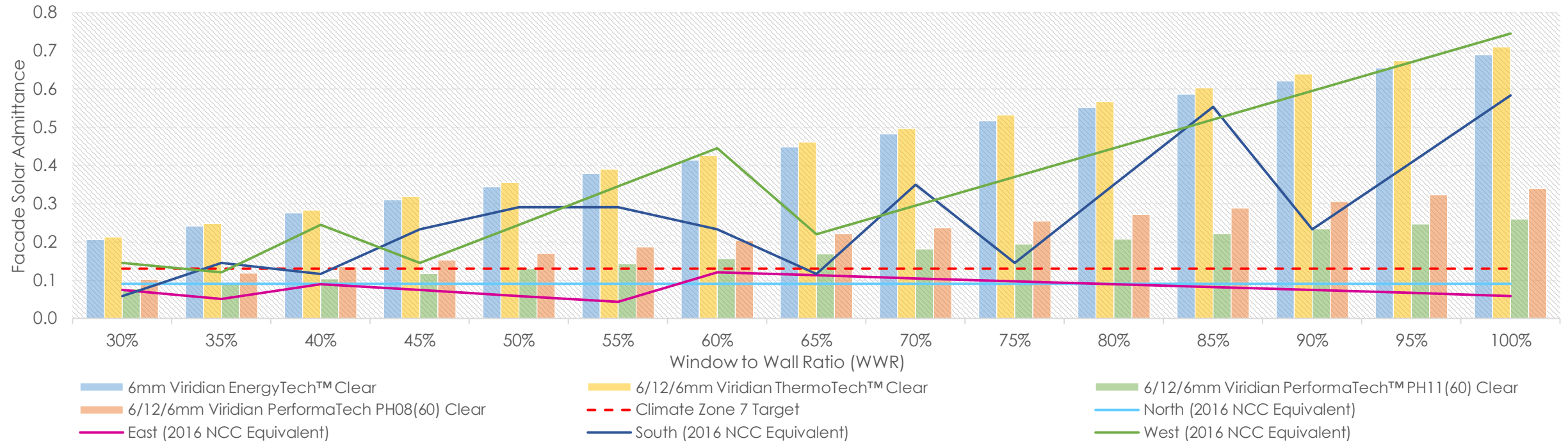
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 7

## Method 1 - FSA Target Glazing

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 7 - Hobart



### NCC 2016

In Climate Zone 7, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, previously there was onerous SHGC requirements for the north and east facing façades. The inconsistent results for the southern and western façade orientations are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

The southern and western façades are now significantly more sensitive to SHGC for some WWRs. The east and west 2016 FSA equivalent is similar to the 2019 requirement, however now generally more lenient. Overall, the new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

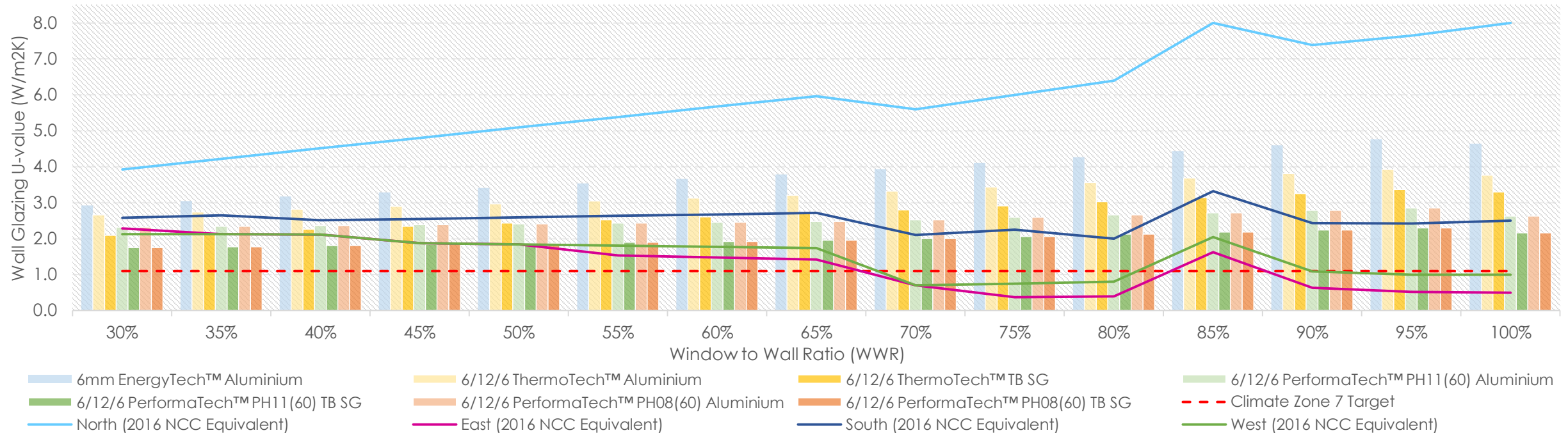
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 7.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, however there is a significant increase in the stringency for SHGC in climate zone 7.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 7 - Hobart (Spandrel)



### NCC 2016

In Climate Zone 7, for building class 3 with a spandrel-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east and west façades shows the most onerous U-value performance requirements. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous, and the west and east are now more lenient for WWR>70%.

### When to Use Method 1 DTS provisions?

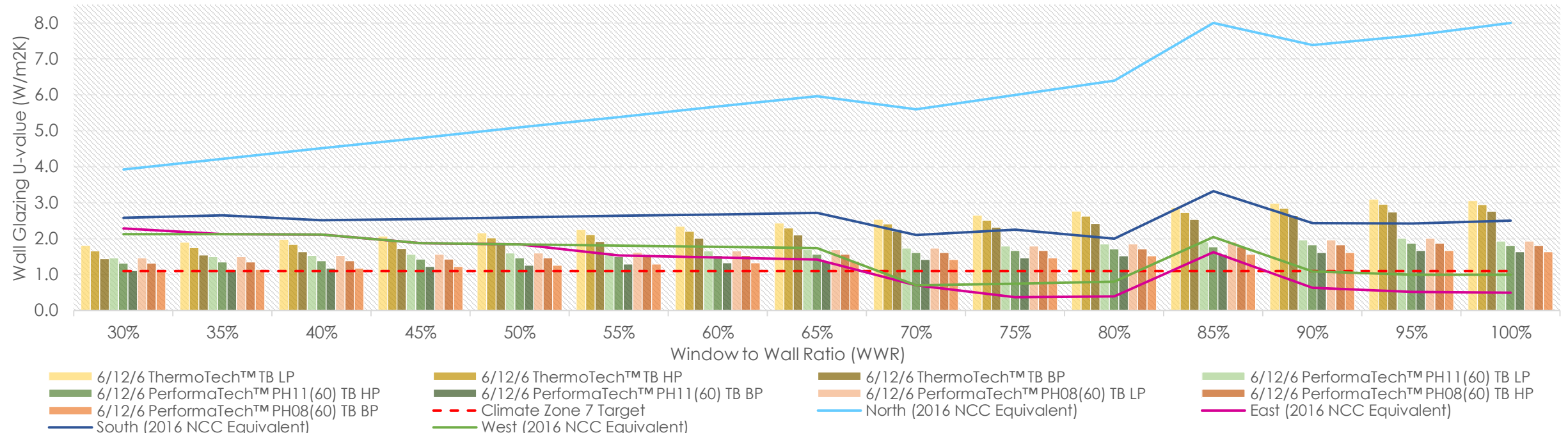
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 7.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 7 - Hobart (Spandrel)



### NCC 2016

In Climate Zone 7, for building class 3 with a spandrel-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east and west façades shows the most onerous U-value performance requirements. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous, and the west and east are now more lenient for WWR>70%.

### When to Use Method 1 DTS provisions?

Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

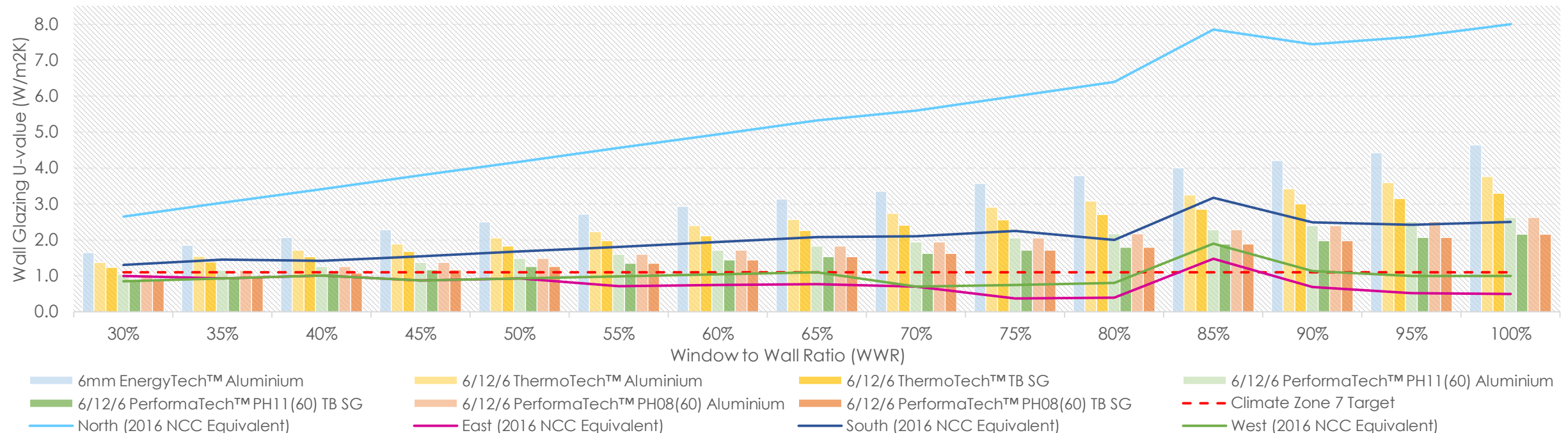
The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 7.



# Climate Zone 7

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 7 - Hobart (Precast)



### NCC 2016

In Climate Zone 7, for building class 3 with a precast-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east and west façades shows the most onerous U-value performance requirements. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous, and the west and east are now more lenient throughout.

### When to Use Method 1 DTS provisions?

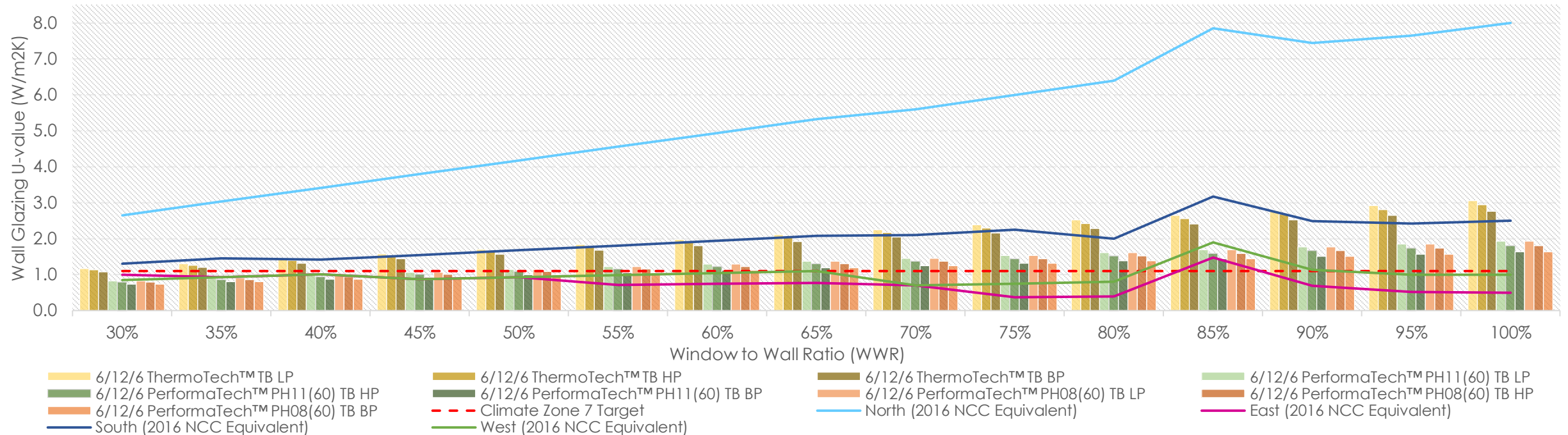
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 7.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 7 - Hobart (Precast)



### NCC 2016

In Climate Zone 7, for building class 3 with a precast-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east and west façades shows the most onerous U-value performance requirements. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous, and the west and east are now more lenient throughout.

### When to Use Method 1 DTS provisions?

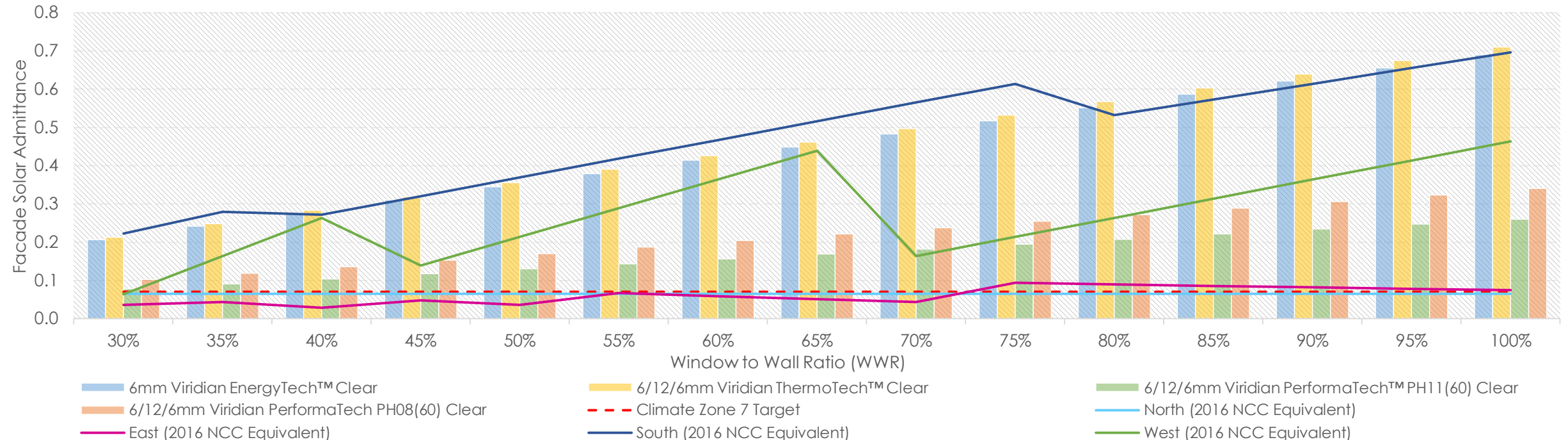
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 7.

# Climate Zone 7

## Method 1 - FSA Target Glazing

Class 3, Climate Zone 7 - Hobart



### NCC 2016

In Climate Zone 7, for building class 3, previously there was a relaxed requirement for SHGC on the southern façade, as this orientation receives no direct solar. The SHGC requirements for the north and east facing facades are more onerous. The inconsistent results for the western façade orientation is likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

The southern and western façades are now significantly more sensitive to SHGC. The east and west 2016 FSA equivalent is similar to the 2019 requirement, however now generally more lenient at low WWRs and slightly more stringent at high WWRs. Overall, the new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

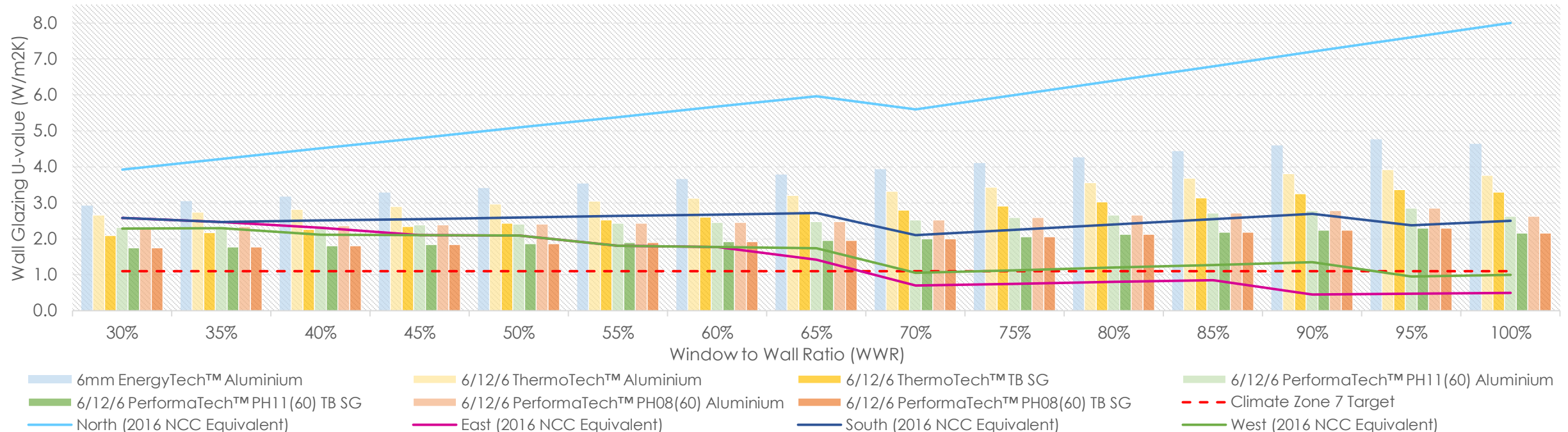
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 7.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, however there is a significant increase in the stringency for SHGC in climate zone 7.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 7 - Hobart (Spandrel)



### NCC 2016

In Climate Zone 7, for building class 9c with a spandrel-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east and west façades shows the most onerous U-value performance requirements. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous, and the east is now more lenient for WWR>70%.

### When to Use Method 1 DTS provisions?

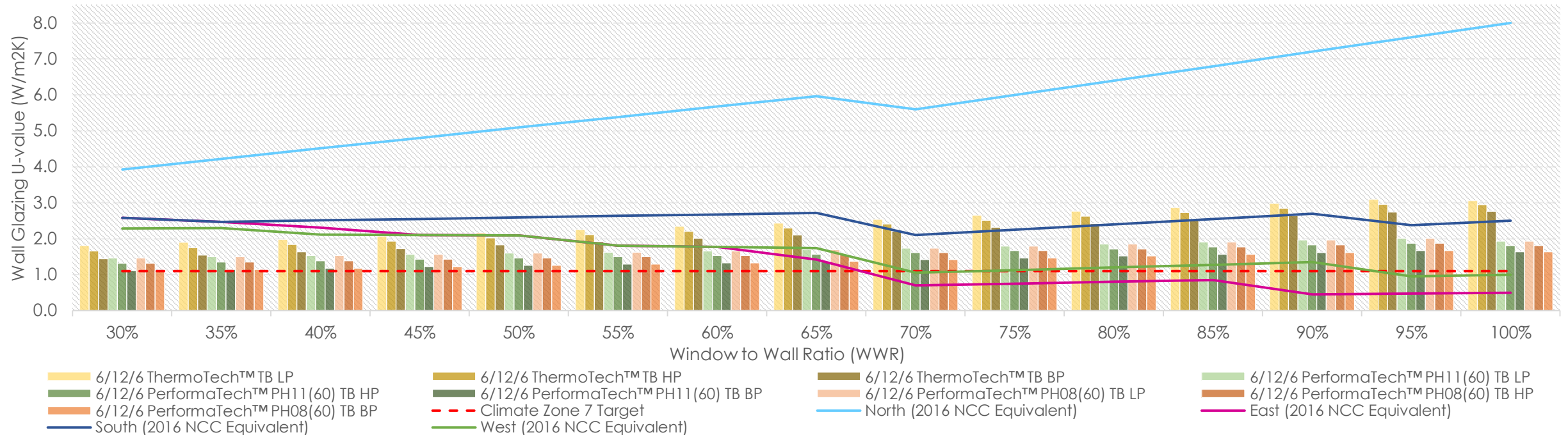
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 7.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 7 - Hobart (Spandrel)



### NCC 2016

In Climate Zone 7, for building class 9c with a spandrel-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east and west façades shows the most onerous U-value performance requirements. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous, and the east is now more lenient for WWR>70%.

### When to Use Method 1 DTS provisions?

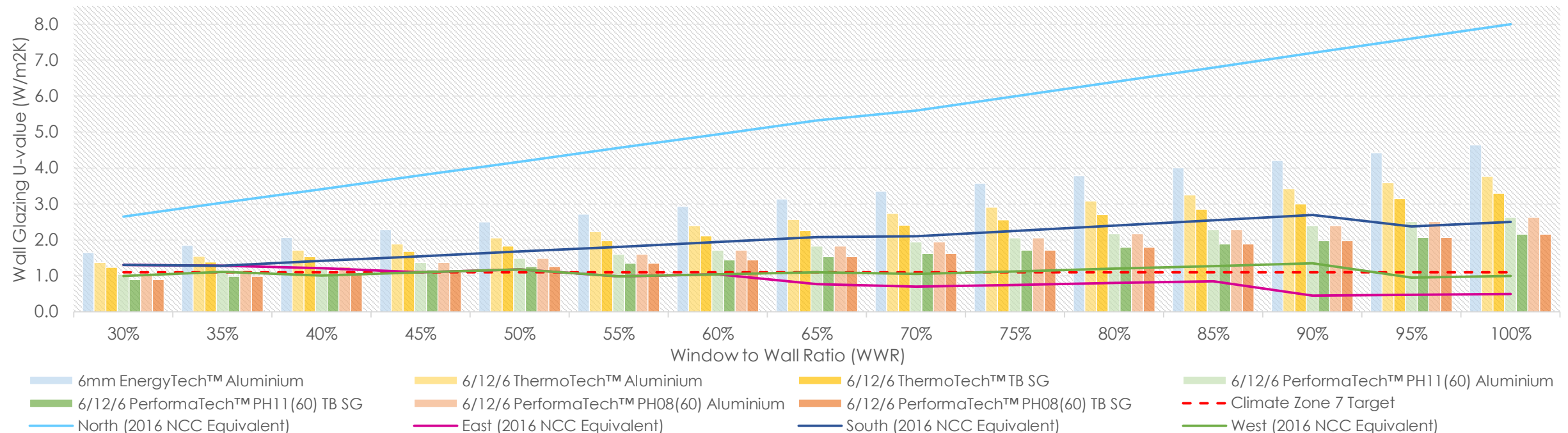
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 7.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 7 - Hobart (Precast)



### NCC 2016

In Climate Zone 7, for building class 9c with a precast-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east and west façades shows the most onerous U-value performance requirements. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous, and the east is now more lenient throughout.

### When to Use Method 1 DTS provisions?

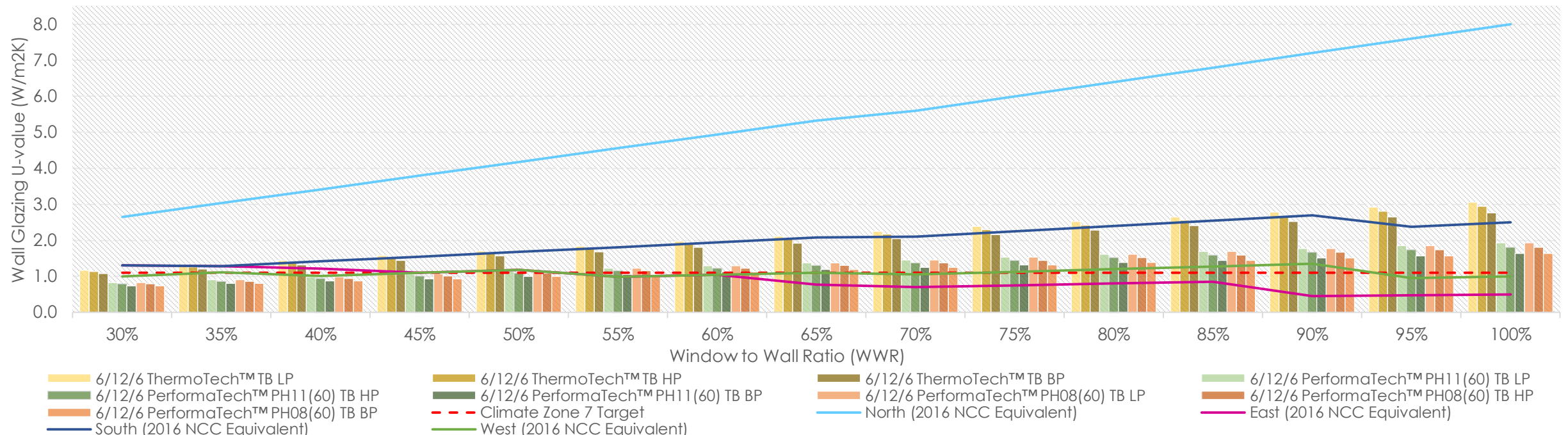
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 7.

# Climate Zone 7

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 7 - Hobart (Precast)



### NCC 2016

In Climate Zone 7, for building class 9c with a precast-glazing façade configuration, the NCC 2016 code was highly orientation specific. On the north, U-value was not a governing factor to determine compliance. All other façade orientations were far more sensitive to U-value performance. The east and west façades shows the most onerous U-value performance requirements. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the NCC 2016 code, the north façade is significantly more sensitive to U-value, with a increased stringency of approximately 75% for WWR>80%. The south façade performance requirement is now more onerous, and the east is now more lenient throughout.

### When to Use Method 1 DTS provisions?

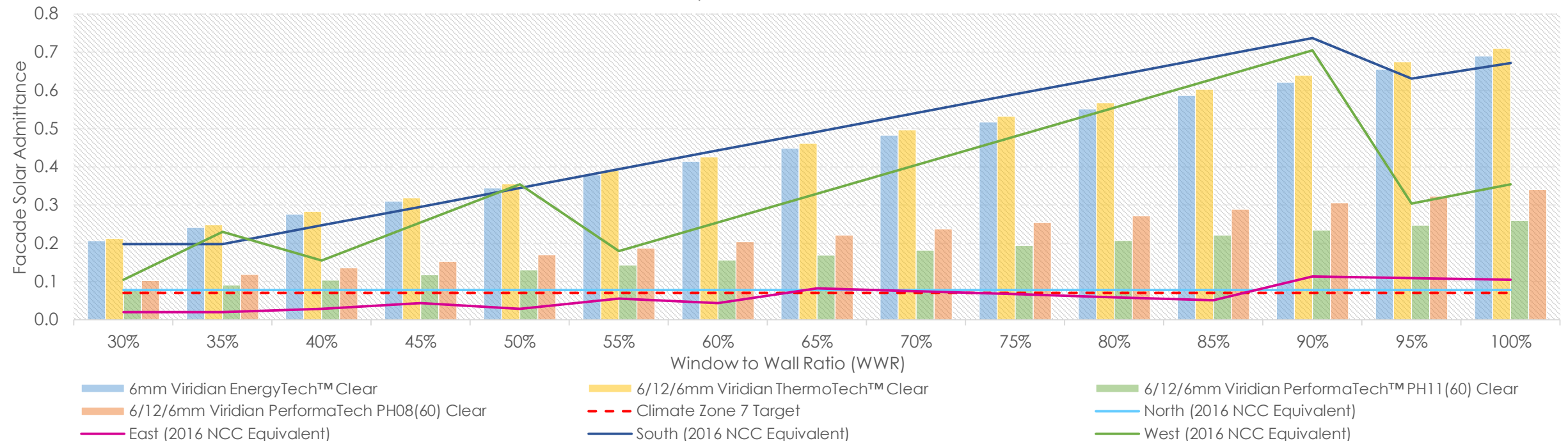
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <50% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 7.

# Climate Zone 7

## Method 1 - FSA Target Glazing

Class 9c, Climate Zone 7 - Hobart



### NCC 2016

In Climate Zone 7, for building class 9c, previously there was a relaxed requirement for SHGC on the southern façade, as this orientation receives no direct solar. The SHGC requirements for the north and east facing facades are more onerous. The inconsistent results for the western façade orientation is likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

The southern and western façades are now significantly more sensitive to SHGC. The east and west 2016 FSA equivalent is similar to the 2019 requirement, however now generally more lenient at low WWRs and slightly more stringent at high WWRs. Overall, the new code applies SHGC requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWR and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 7.

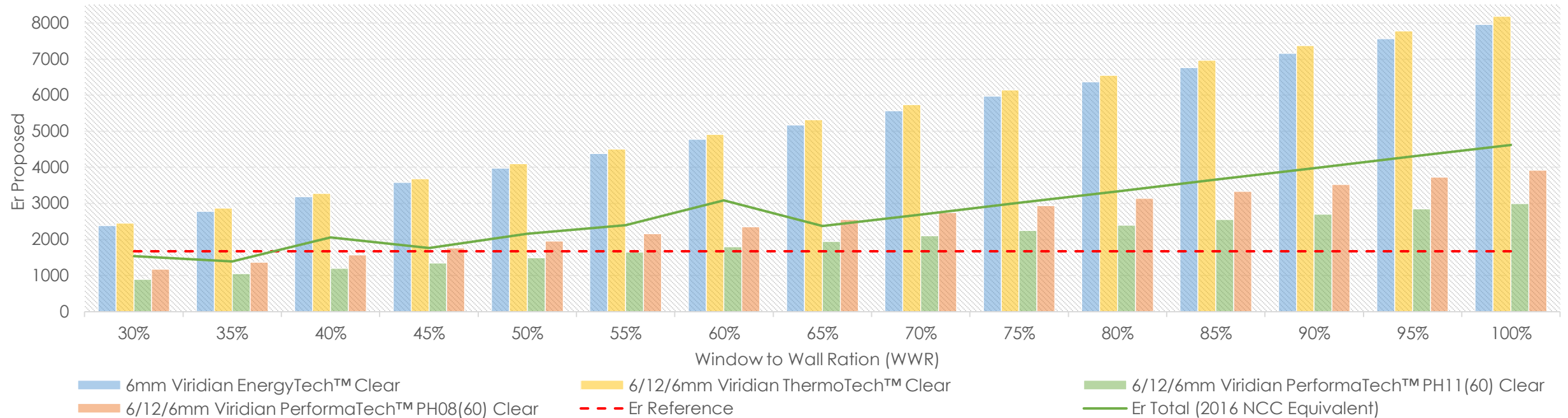
The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, however there is a significant increase in the stringency for SHGC in climate zone 7.



# Climate Zone 7

## Method 2 - Class 2

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 7 - Hobart



### NCC 2016

In Climate Zone 7, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements.

### NCC 2019- What is the key change?

The 2019 method 2 DTS provision tracks well with the previous code until WWR >45%, where there is then increased stringency. The NCC 2019 Er requirement is approximately 20-60% more stringent than the 2016 equivalent, increasing proportionally with WWR.

### When to Use Method 2 DTS provisions?

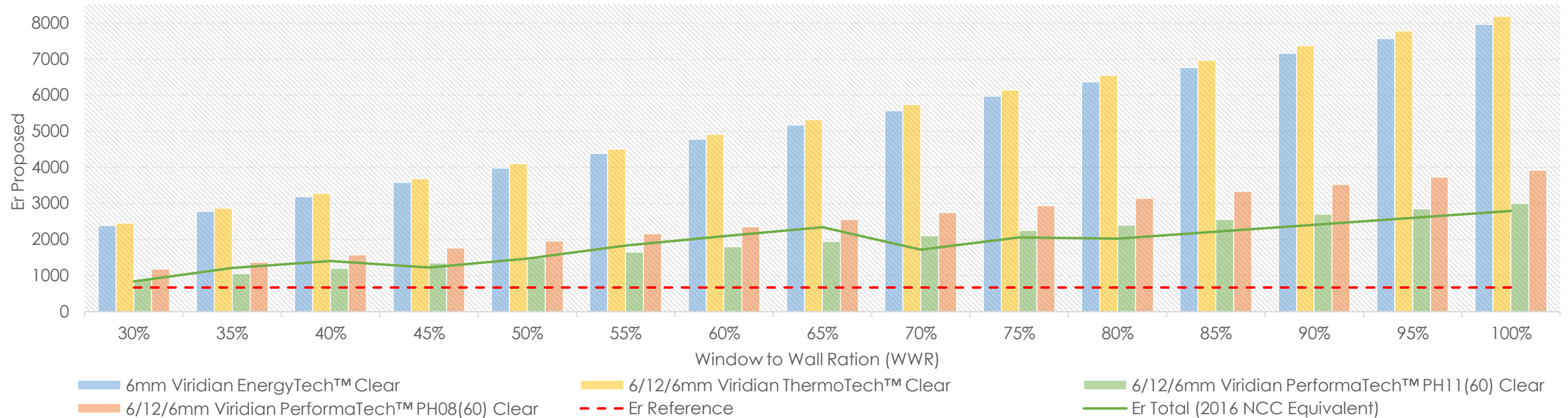
The new method 2 DTS provisions will work well for buildings with WWR <60% and high performance glazing systems without vertical shading.

The JV3 modelling pathway will give the best results for the building where a WWR >60% is desired. This pathway is also recommended for more complex building, and those with vertical shading.

# Climate Zone 7

## Method 2 - Class 3

Class 3, Climate Zone 7 - Hobart



### NCC 2016

In Climate Zone 7, for building class 3, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 10-70% more stringent than the 2016 equivalent, increasing proportionally with WWR.

### When to Use Method 2 DTS provisions?

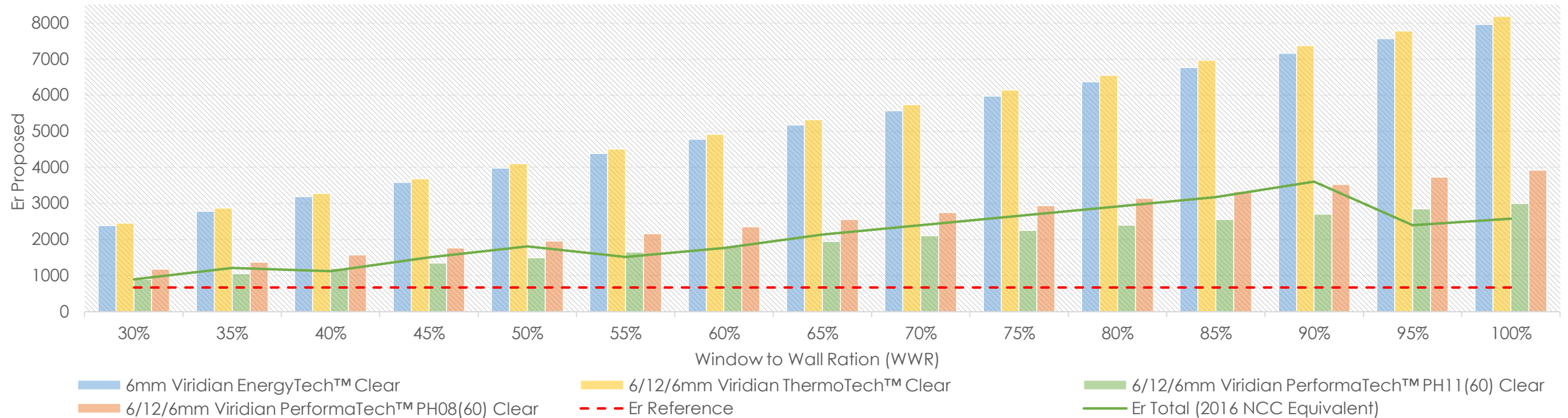
The new method 2 DTS provisions do not work well for this class and climate zone.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 7

## Method 2 - Class 9c

Class 9c, Climate Zone 7 - Hobart



### NCC 2016

In Climate Zone 7, for building class 9c, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 10-70% more stringent than the 2016 equivalent, increasing proportionally with WWR.

### When to Use Method 2 DTS provisions?

The new method 2 DTS provisions do not work well for this class and climate zone.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

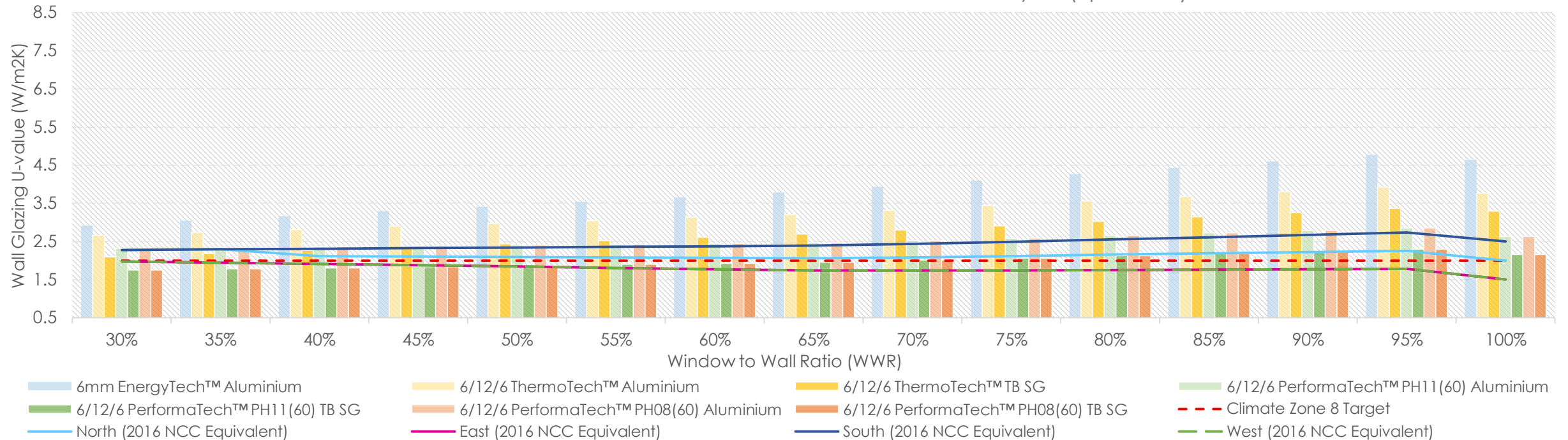
Climate Zone 8

Jindabyne

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 8 - Jindabyne (Spandrel)



### NCC 2016

In Climate Zone 8, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b with a spandrel-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was similar for all façade orientations. The east and west façade U-value requirements were marginally more stringent.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the south façade performance requirement is slightly more sensitive to U-value. The north requirement remains relatively unchanged, and the east and west façade orientations are now slightly more lenient. The new code applies U-value requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

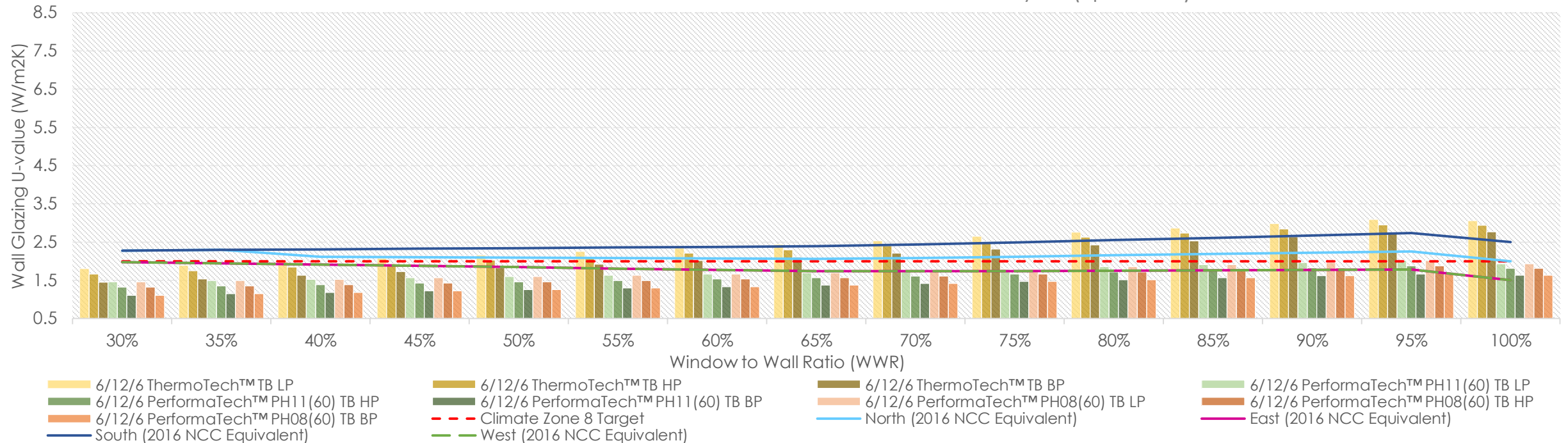
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Spandrel

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 8 - Jindabyne (Spandrel)



### NCC 2016

In Climate Zone 8, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b with a spandrel-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was similar for all façade orientations. The east and west façade U-value requirements were marginally more stringent.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the south façade performance requirement is slightly more sensitive to U-value. The north requirement remains relatively unchanged, and the east and west façade orientations are now slightly more lenient. The new code applies U-value requirements in a more balanced way across the various façade orientations.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

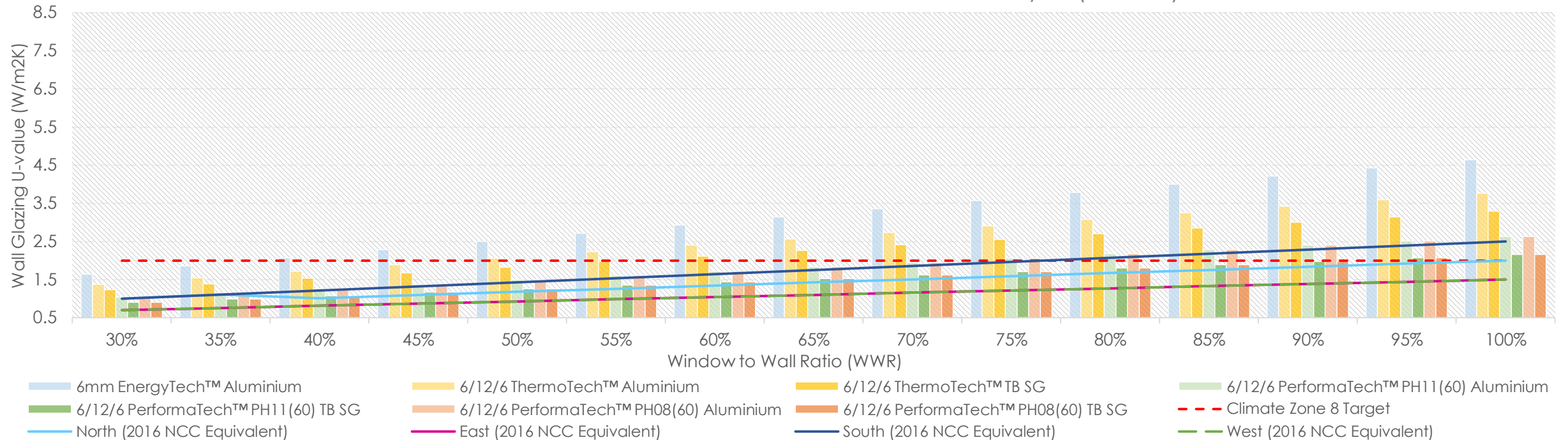
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 8 - Jindabyne (Precast)



### NCC 2016

In Climate Zone 8, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b with a precast-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was similar for all façade orientations. The east and west façade U-value requirements were marginally more stringent.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the south façade performance requirement is slightly more sensitive to U-value for high WWRs. The remaining façade orientations are now more lenient for all WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

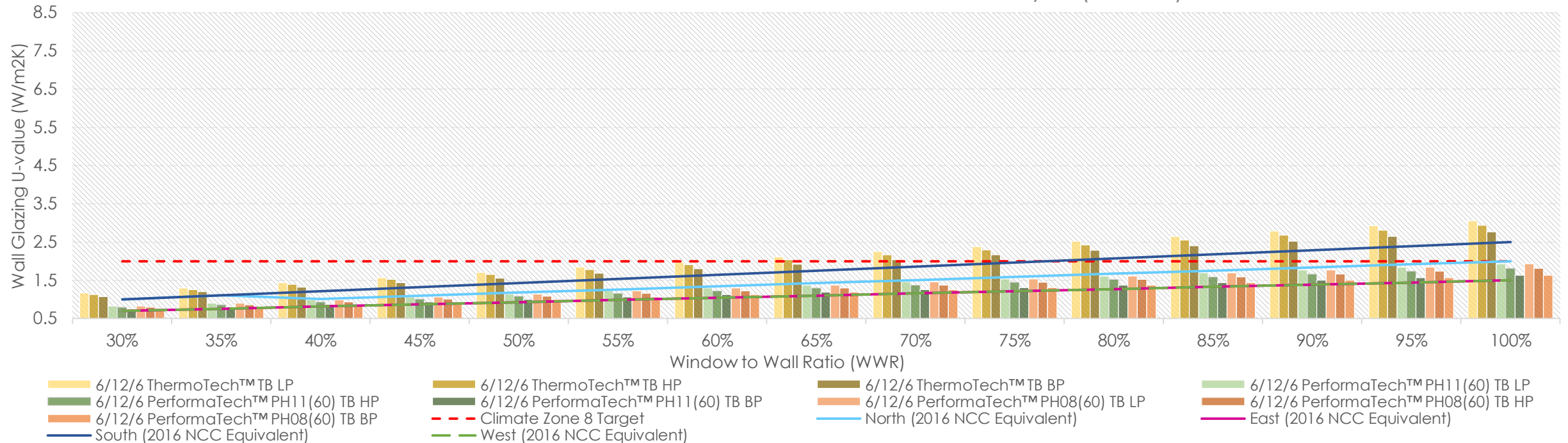
Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Precast

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 8 - Jindabyne (Precast)



### NCC 2016

In Climate Zone 8, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b with a precast-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was similar for all façade orientations. The east and west façade U-value requirements were marginally more stringent.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the south façade performance requirement is slightly more sensitive to U-value for high WWRs. The remaining façade orientations are now more lenient for all WWRs.

### When to Use Method 1 DTS provisions?

The new Method 1 DTS provisions will work well for building in the <60% WWR range, with high performance glazing systems.

Method 1 is likely to be effective in modelling low rise buildings with only horizontal shading. The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid.

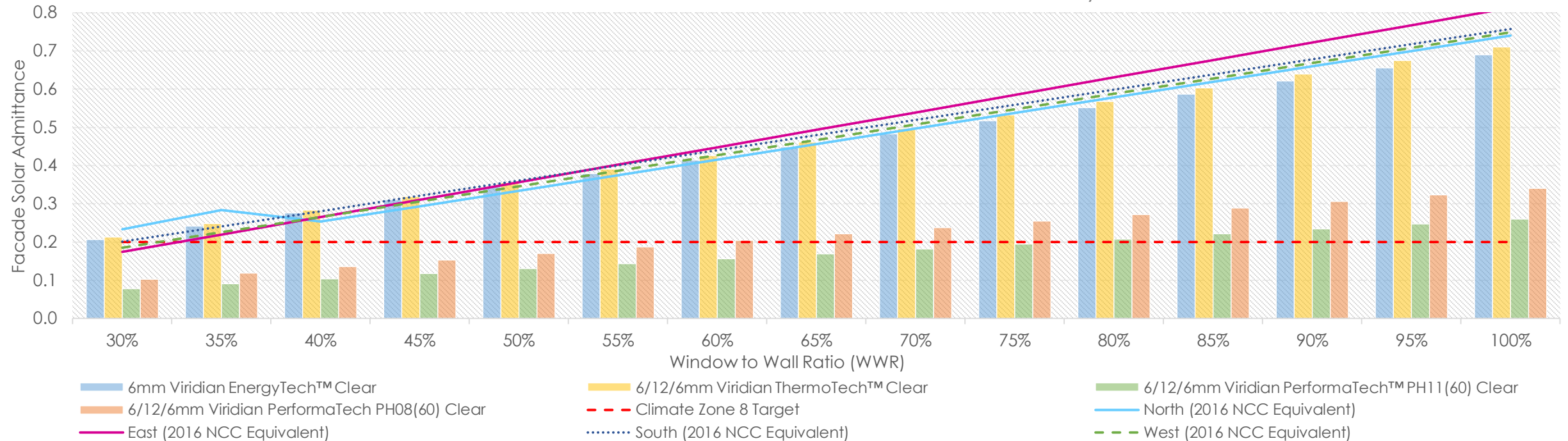
For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.



# Climate Zone 8

## Method 1 - FSA Target Glazing

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 8 - Jindabyne



### NCC 2016

In Climate Zone 8, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, previously there was no SHGC requirement for all façade orientations.

### NCC 2019- What is the key change?

For WWRs <40%, the 2019 performance requirement is comparable to 2016. For higher WWRs, all façade orientations are now significantly more sensitive to SHGC, with an increase in stringency of approximately 65% for 80% WWR.

### When to Use Method 1 DTS provisions?

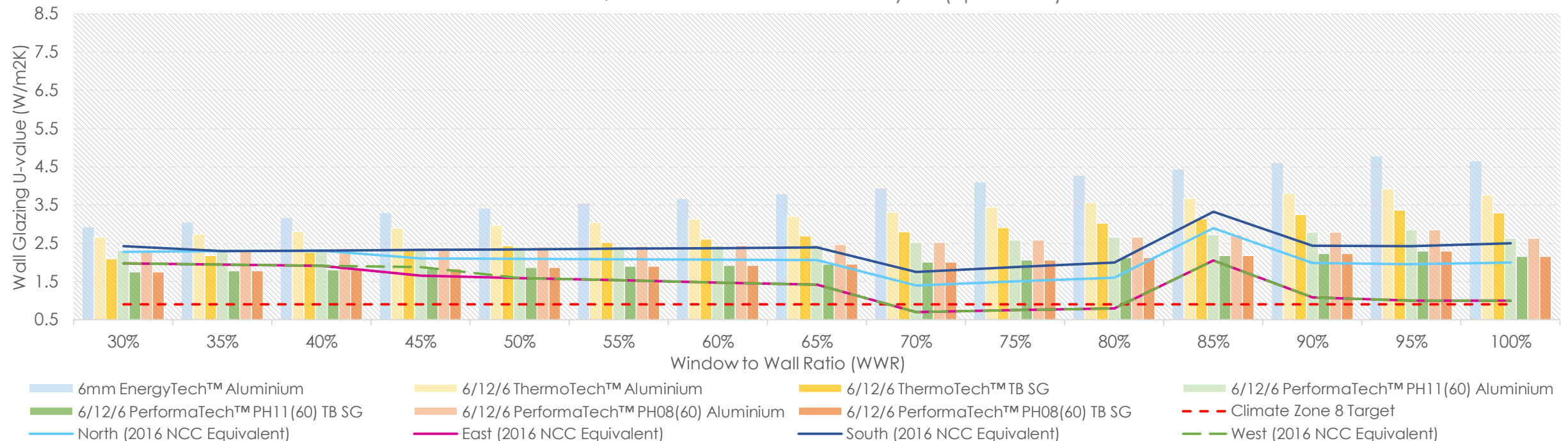
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require WWRs < 60% and high performance glazing systems, with a SHGC. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 8.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, however there is a significant increase in the stringency for SHGC in climate zone 8.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 8 - Jindabyne (Spandrel)



### NCC 2016

In Climate Zone 8, for building class 3 with a spandrel-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was relatively orientation specific. The east and west façade U-value requirements were more stringent than others. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, all façade performance requirements are more sensitive to U-value. The south façade performance is approximately 60% more stringent, and the east and west facades approximately 50% more stringent. Furthermore, the NCC 2019 wall-glazing U-value requirement of 0.9 W/m2k is the most onerous of all climate zones.

### When to Use Method 1 DTS provisions?

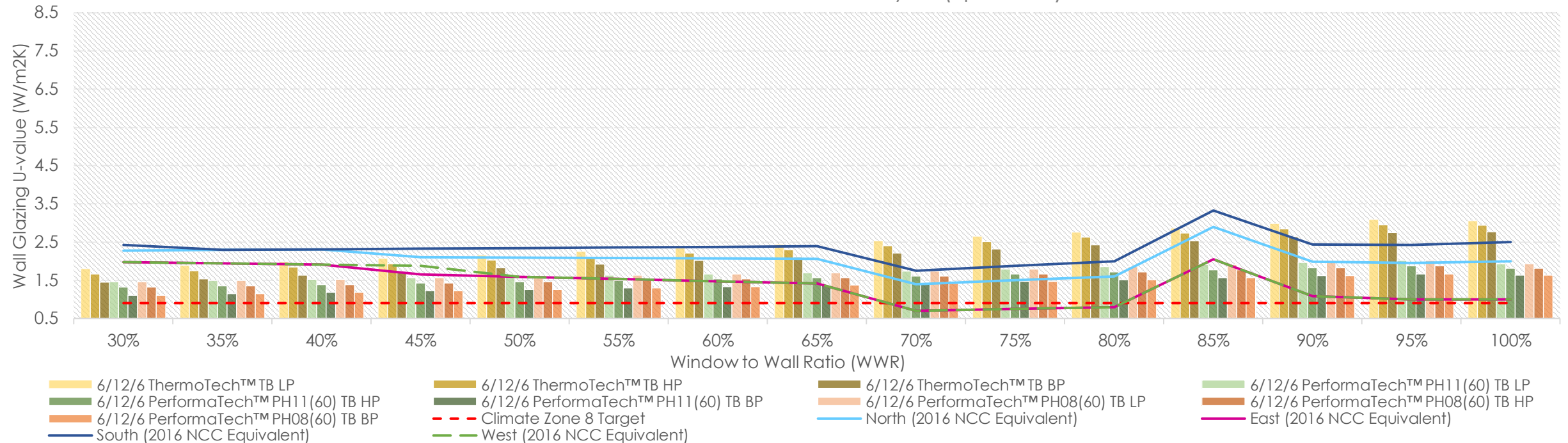
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <35% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 8.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Spandrel

Class 3, Climate Zone 8 - Jindabyne (Spandrel)



### NCC 2016

In Climate Zone 8, for building class 3 with a spandrel-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was relatively orientation specific. The east and west façade U-value requirements were more stringent than others. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, all façade performance requirements are more sensitive to U-value. The south façade performance is approximately 60% more stringent, and the east and west facades approximately 50% more stringent. Furthermore, the NCC 2019 wall-glazing U-value requirement of 0.9 W/m<sup>2</sup>k is the most onerous of all climate zones.

### When to Use Method 1 DTS provisions?

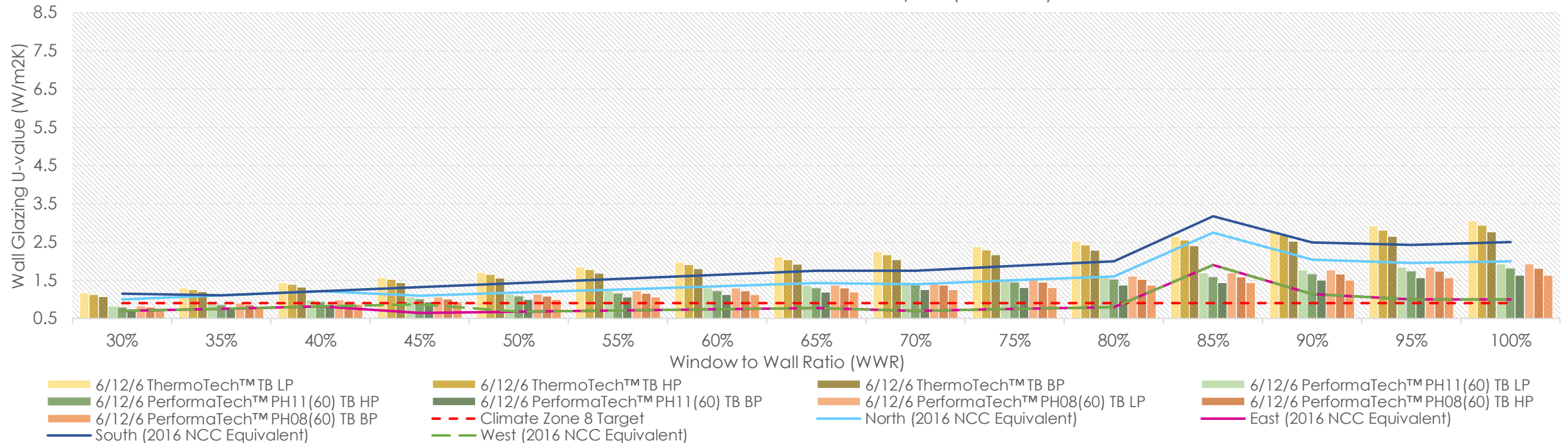
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <35% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 8.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 8 - Jindabyne (Precast)



### NCC 2016

In Climate Zone 8, for building class 3 with a precast-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was relatively orientation specific. The east and west façade U-value requirements were more stringent than others. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and south façade performance requirements are much more sensitive to U-value. The south façade performance is approximately 60% more stringent. The east and west façade performance is marginally more lenient. The NCC 2019 wall-glazing U-value requirement of 0.9 W/m2k is the most onerous of all climate zones.

### When to Use Method 1 DTS provisions?

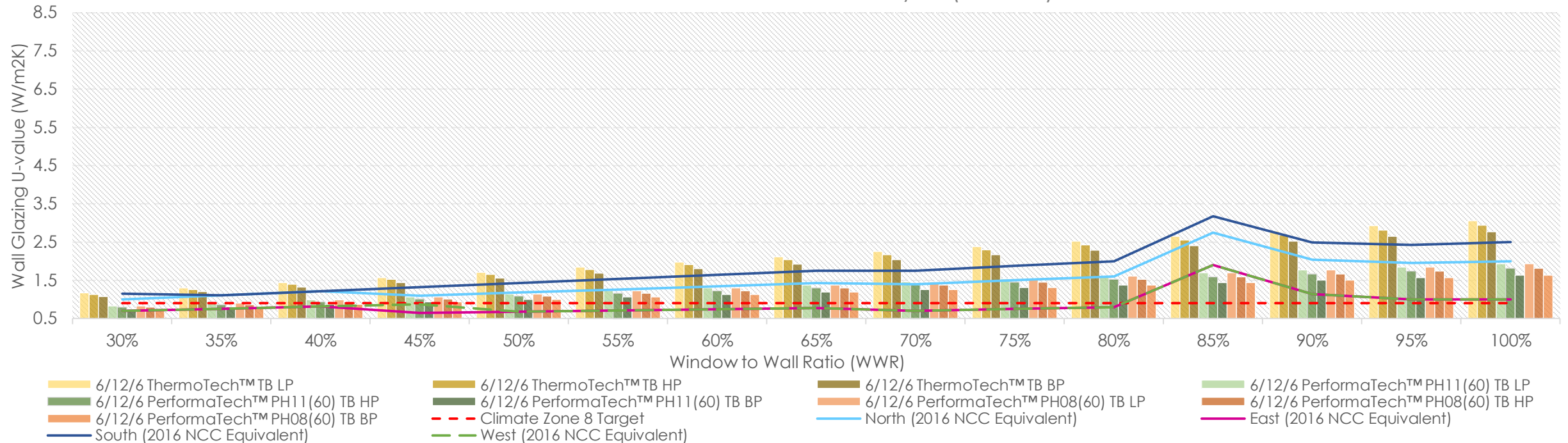
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <35% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 8.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Precast

Class 3, Climate Zone 8 - Jindabyne (Precast)



### NCC 2016

In Climate Zone 8, for building class 3 with a precast-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was relatively orientation specific. The east and west façade requirements were more stringent than others. The inconsistent results between 80-90% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, the north and south façade performance requirements are much more sensitive to U-value. The south façade performance is approximately 60% more stringent. The east and west façade performance is marginally more lenient. The NCC 2019 wall-glazing U-value requirement of 0.9 W/m<sup>2</sup>k is the most onerous of all climate zones.

### When to Use Method 1 DTS provisions?

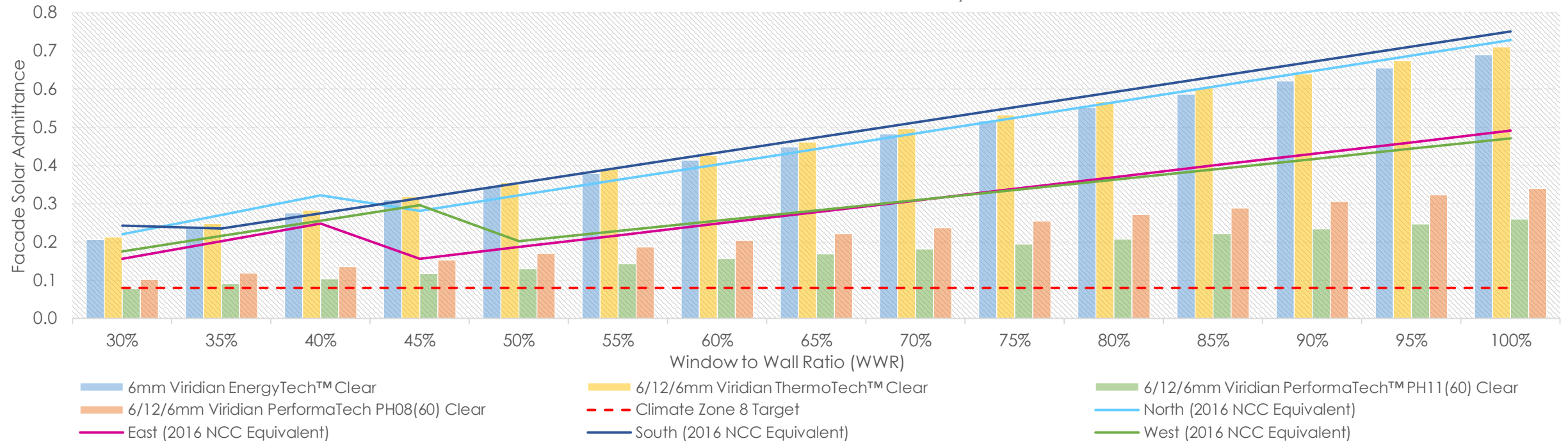
Class 3 buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <35% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 3 buildings in climate zone 8.

# Climate Zone 8

## Method 1 - FSA Target Glazing

Class 3, Climate Zone 8 - Jindabyne



### NCC 2016

In Climate Zone 8, for building class 3, previously there was no SHGC requirement for north and south façade orientations, and slightly more stringent yet achievable requirements on the east and west. For low WWRs, all orientations are similar. The inconsistent results at 45% WWR are likely due to anomalies in trying to equate the 2016 and 2019 code.

### NCC 2019- What is the key change?

The NCC 2019 performance requirement is now far more stringent for all façade orientations, increasing proportionally with WWR. At 80% WWR, north and south façade orientations are approximately 65% more stringent, the west and east façade orientations are approximately 50% more stringent.

### When to Use Method 1 DTS provisions?

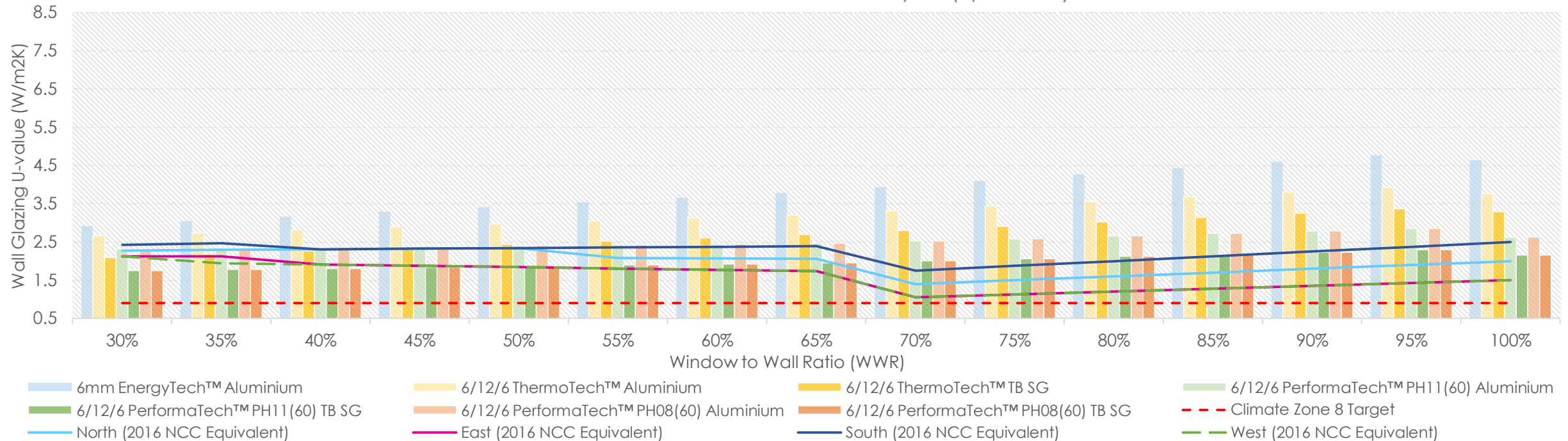
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWRs and SHGC < 0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 8.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 8.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 8 - Jindabyne (Spandrel)



### NCC 2016

In Climate Zone 8, for building class 9c with a spandrel-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was relatively orientation specific. The east and west façade U-value requirements were more stringent than others.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, all façade performance requirements are more sensitive to U-value. The south façade performance is approximately 60% more stringent, and the east and west facades approximately 50% more stringent. The NCC 2019 wall-glazing U-value requirement of 0.9 W/m2k is the most onerous of all climate zones.

### When to Use Method 1 DTS provisions?

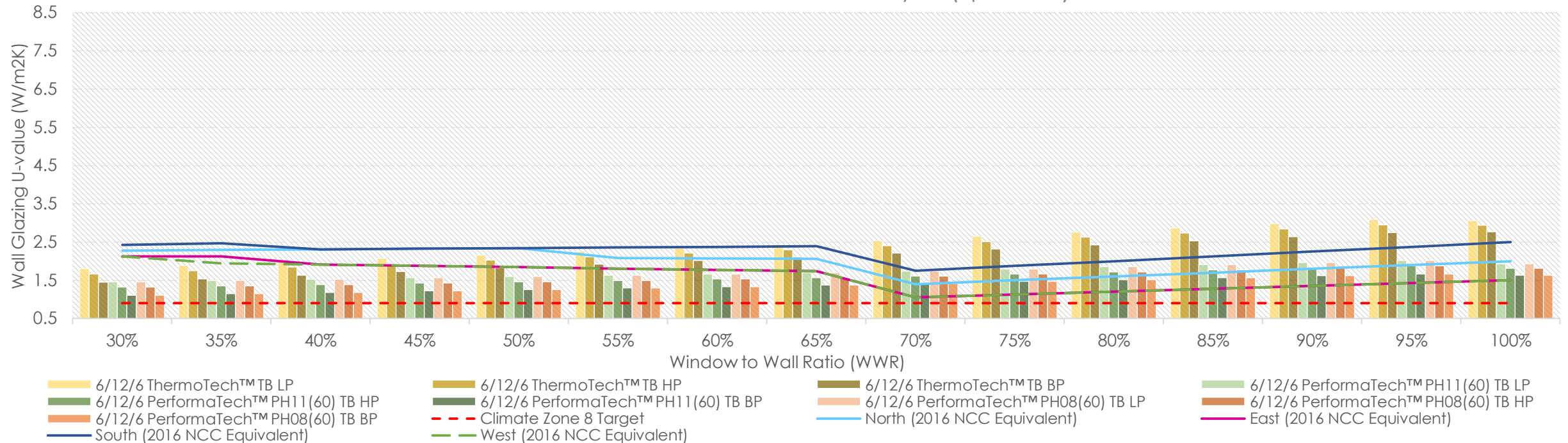
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <35% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 8.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Spandrel

Class 9c, Climate Zone 8 - Jindabyne (Spandrel)



### NCC 2016

In Climate Zone 8, for building class 9c with a spandrel-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was relatively orientation specific. The east and west façade U-value requirements were more stringent than others.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, all façade performance requirements are more sensitive to U-value. The south façade performance is approximately 60% more stringent, and the east and west facades approximately 50% more stringent. The NCC 2019 wall-glazing U-value requirement of 0.9 W/m<sup>2</sup>k is the most onerous of all climate zones.

### When to Use Method 1 DTS provisions?

Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <35% able to meet the wall-glazing U-value performance requirement.

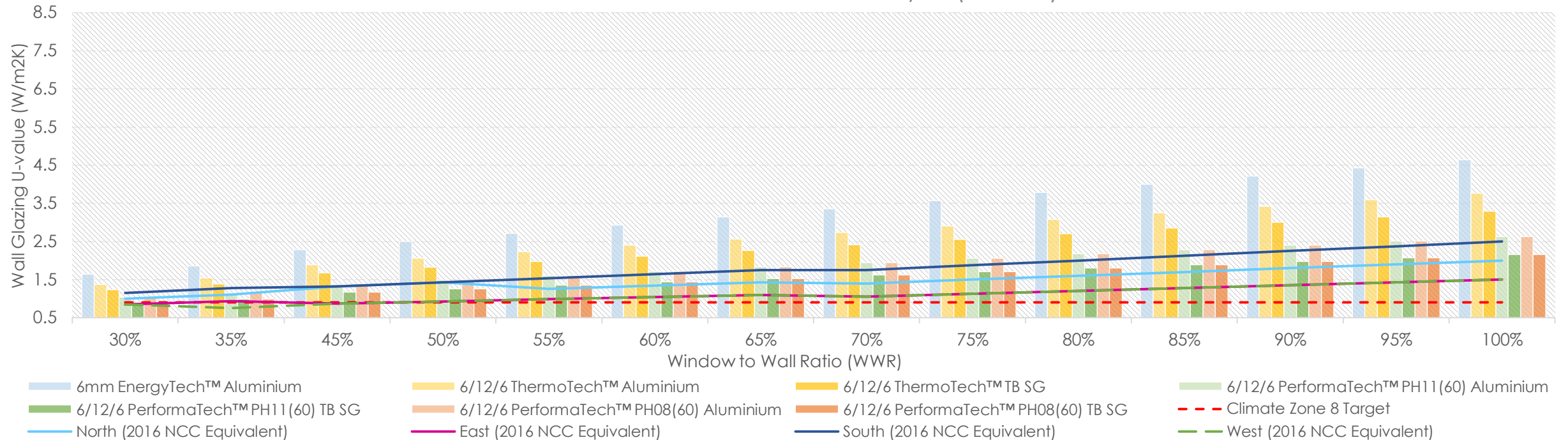
The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 8.



# Climate Zone 8

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 8 - Jindabyne (Precast)



### NCC 2016

In Climate Zone 8, for building class 9c with a precast-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was relatively orientation specific. The east and west façade U-value requirements were more stringent than others.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, all façade performance requirements are more sensitive to U-value, particularly at high WWRs. The south façade performance is approximately 60% more stringent, and the east and west facades approximately 30% more stringent. The NCC 2019 wall-glazing U-value requirement of 0.9 W/m<sup>2</sup>K is the most onerous of all climate zones.

### When to Use Method 1 DTS provisions?

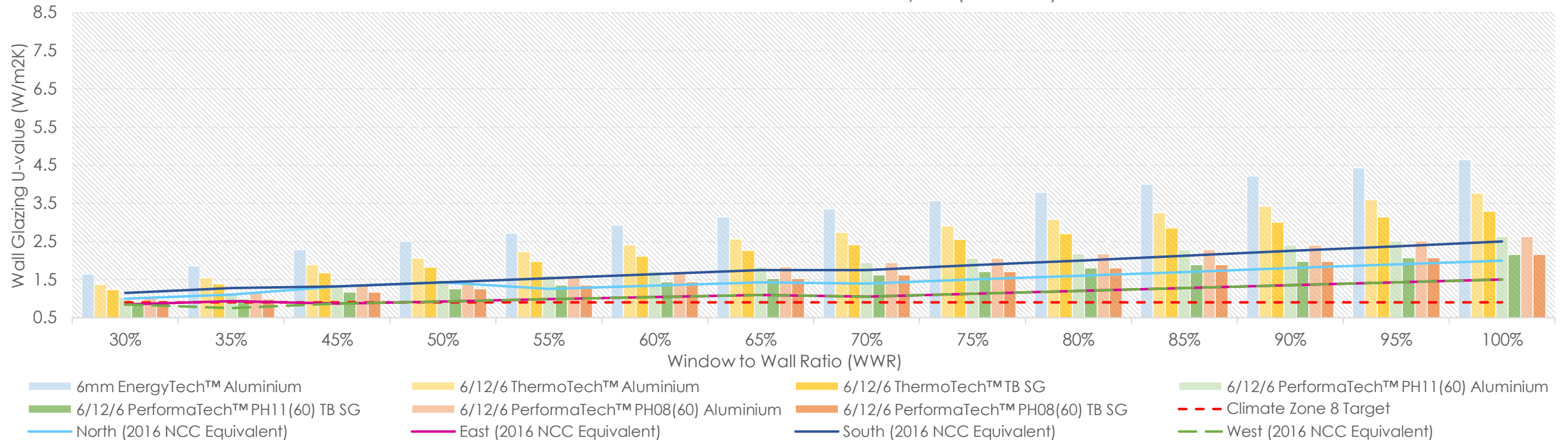
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <35% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 8.

# Climate Zone 8

## Method 1 - U-value Target, Glazing & Precast

Class 9c, Climate Zone 8 - Jindabyne (Precast)



### NCC 2016

In Climate Zone 8, for building class 9c with a precast-glazing façade configuration, the NCC 2016 code wall glazing U-value requirement was relatively orientation specific. The east and west façade U-value requirements were more stringent than others.

### NCC 2019- What is the key change?

When compared to the new NCC 2016 code, all façade performance requirements are more sensitive to U-value, particularly at high WWRs. The south façade performance is approximately 60% more stringent, and the east and west facades approximately 30% more stringent. The NCC 2019 wall-glazing U-value requirement of 0.9 W/m2k is the most onerous of all climate zones.

### When to Use Method 1 DTS provisions?

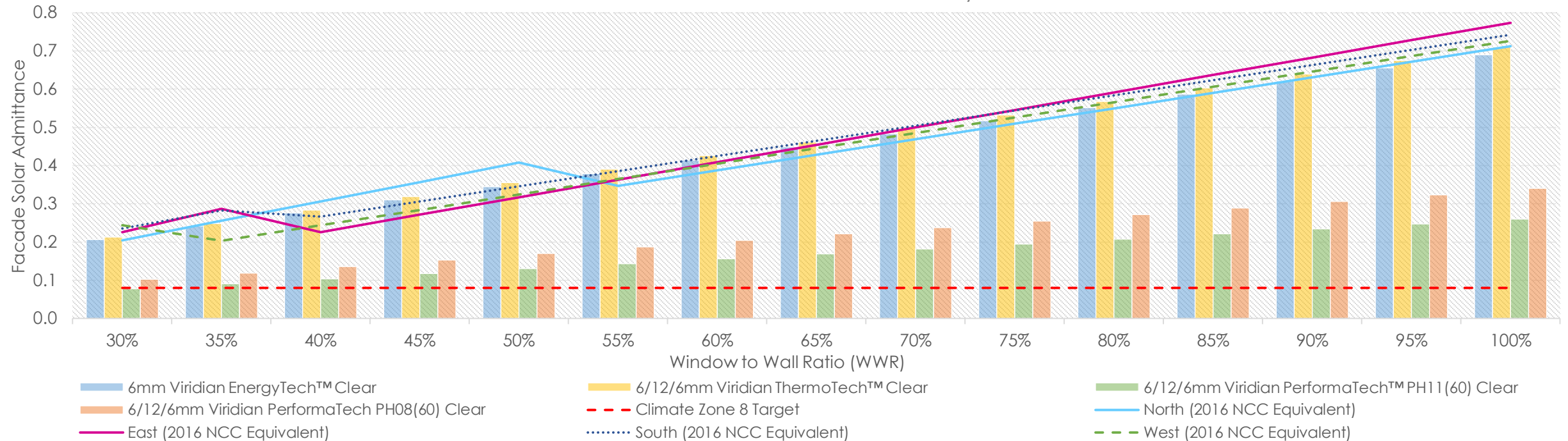
Class 9c buildings fail to satisfy the new Method 1 DTS provisions, with only high performance glazing systems, combined with precast walls and WWRs <35% able to meet the wall-glazing U-value performance requirement.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1 dominant glazed façade and others that are predominately solid. The JV3 modelling pathway will give the best results for this building class, however there is still a significant increase in the stringency for class 9c buildings in climate zone 8.

# Climate Zone 8

## Method 1 - FSA Target Glazing

Class 9c, Climate Zone 8 - Jindabyne



### NCC 2016

In Climate Zone 8, for building class 9c, previously there was no SHGC requirement for all façade orientations.

### NCC 2019- What is the key change?

The NCC 2019 performance requirement is now far more stringent for all façade orientations, increasing proportionally with WWR. At 80% WWR, the performance requirement is approximately 65% more stringent than the 2016 NCC equivalent.

### When to Use Method 1 DTS provisions?

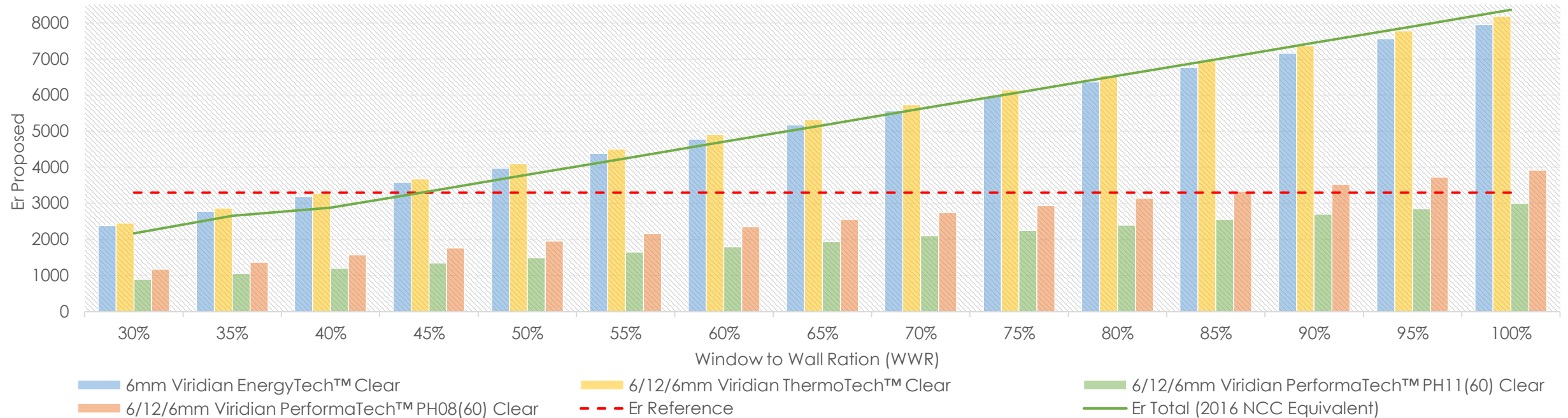
As the FSA is a new performance metric in the NCC 2019 code, the requirement with regard to SHGC has been made significantly more onerous and compliance will require low WWRs and SHGC <0.2. The SHGC has been significantly reduced on the south to the detriment of good passive solar design in climate zone 8.

The new DTS provisions do not account for buildings with vertical shading. Where only horizontal shading is considered, Method 2 DTS could be considered. The JV3 modelling pathway will give the best results for the building class, but there is a significant increase in the stringency for SHGC in climate zone 8.

# Climate Zone 8

## Method 2 - Class 2

Class 2\*, 5, 6, 7, 8, 9a\* and 9b, Climate Zone 8 - Jindabyne



### NCC 2016

In Climate Zone 8, for building classes 2\*, 5, 6, 7, 8, 9a\* and 9b, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements, for WWR>45%.

### NCC 2019- What is the key change?

For WWR>45%, the NCC 2019 Er requirement is approximately 20-60% more stringent than the 2016 equivalent, increasing proportionally with WWR.

### When to Use Method 2 DTS provisions?

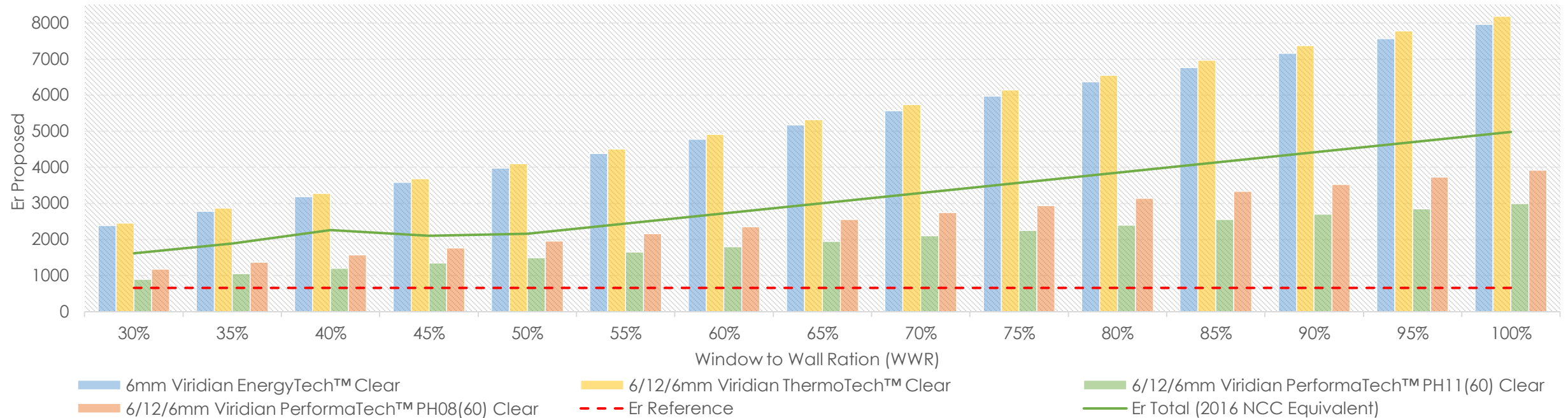
The new method 2 DTS provisions will work well for buildings with any WWR, as long as high performance glazing systems are used.

For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 8

## Method 2 - Class 3

Class 3, Climate Zone 8 - Jindabyne



### NCC 2016

In Climate Zone 8, for building class 3, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 40-85% more stringent than the 2016 equivalent, increasing proportionally with WWR.

### When to Use Method 2 DTS provisions?

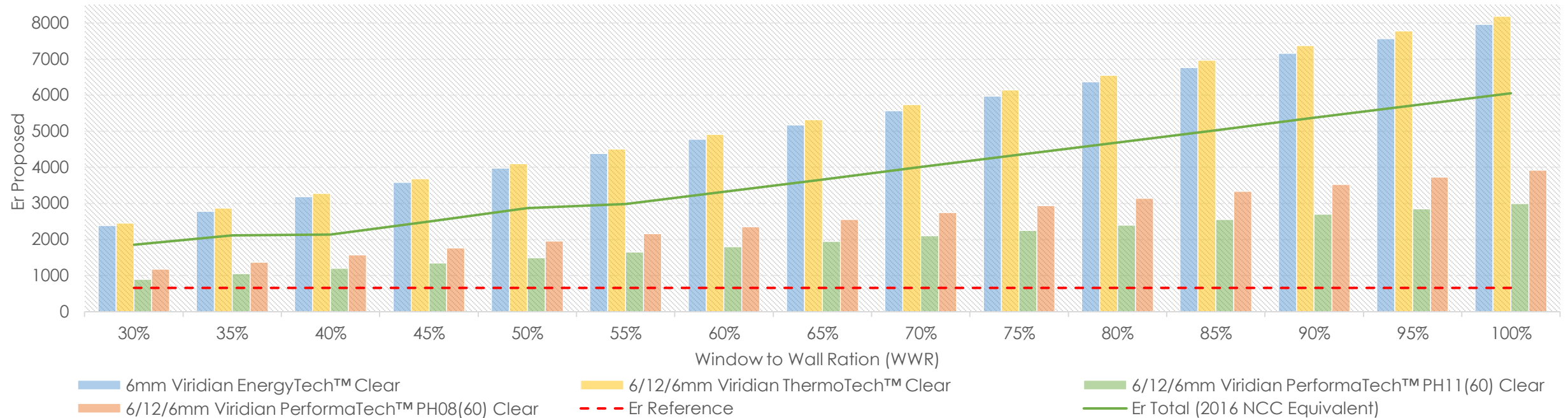
The new method 2 DTS provisions do not work well for this class and climate zone.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

# Climate Zone 8

## Method 2 - Class 9c

Class 9c, Climate Zone 8 - Jindabyne



### NCC 2016

In Climate Zone 8, for building class 9c, the 2016 NCC method 2 DTS provisions are more lenient than the 2019 NCC requirements.

### NCC 2019- What is the key change?

The NCC 2019 Er requirement is approximately 40-85% more stringent than the 2016 equivalent, increasing proportionally with WWR.

### When to Use Method 2 DTS provisions?

The new method 2 DTS provisions do not work well for this class and climate zone.

The DTS Method 2 pathway may work well when the building has varied WWRs, or 1-2 dominant glazed façades and others that are predominately solid. For more complex buildings, and those with vertical fins, it is recommended to use the JV3 modelling pathway.

