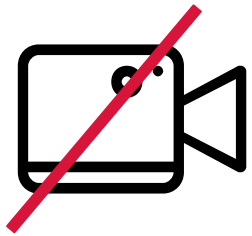
Targeted Stakeholder Consultation Workshop: Lighting in the Energy Savings Scheme

Wednesday, 9 September 2020

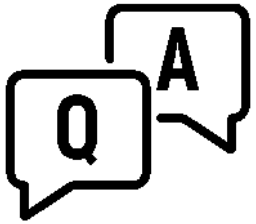
Workshop Rules and Interaction



Turn off your camera

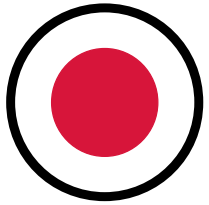
Mute yourself

Use the chat box



Dedicated Q&A time at the end

State your **name** & **organisation** if asking questions



We will be recording today's session.

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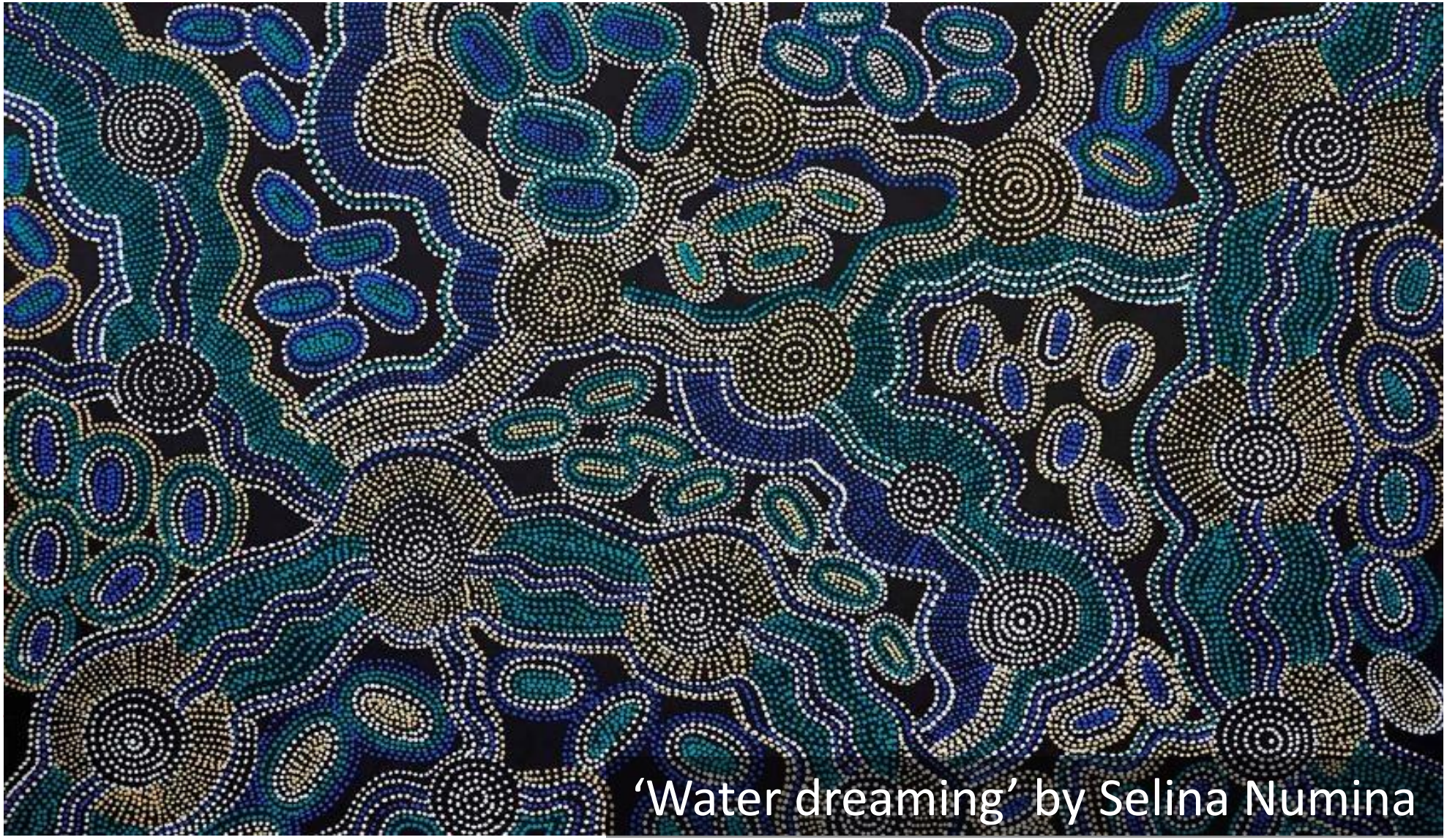
Acknowledgement of Country



Agenda

Time	Item
10.30 am	**Welcome and housekeeping** *Chris Froissard, Program Manager Education, DPIE*
10.35 am	**Background** *David Pryor, Senior Team Leader Energy Savings Scheme Development Team, DPIE*
10.42 am	**Research Findings** *Steven Beletich, Director, Beletich Associates*
10:52 am	**Proposed Transitional Arrangements** *Steven Beletich, Director, Beletich Associates*
11.00 am	**Engagement Session 1**
11.07 am	**Product Quality** *Steven Coyne, Director, Light Naturally*
11.15 am	**Engagement Session 2**
11.22 am	**Long Term Proposal** *Steven Beletich, Director, Beletich Associates*
11.30 am	**Engagement Session 3**
11.37 am	**Next Steps** *David Pryor, Senior Team Leader Energy Savings Scheme Development Team, DPIE*
11.40am	**Q&A**

Lighting methods in the ESS

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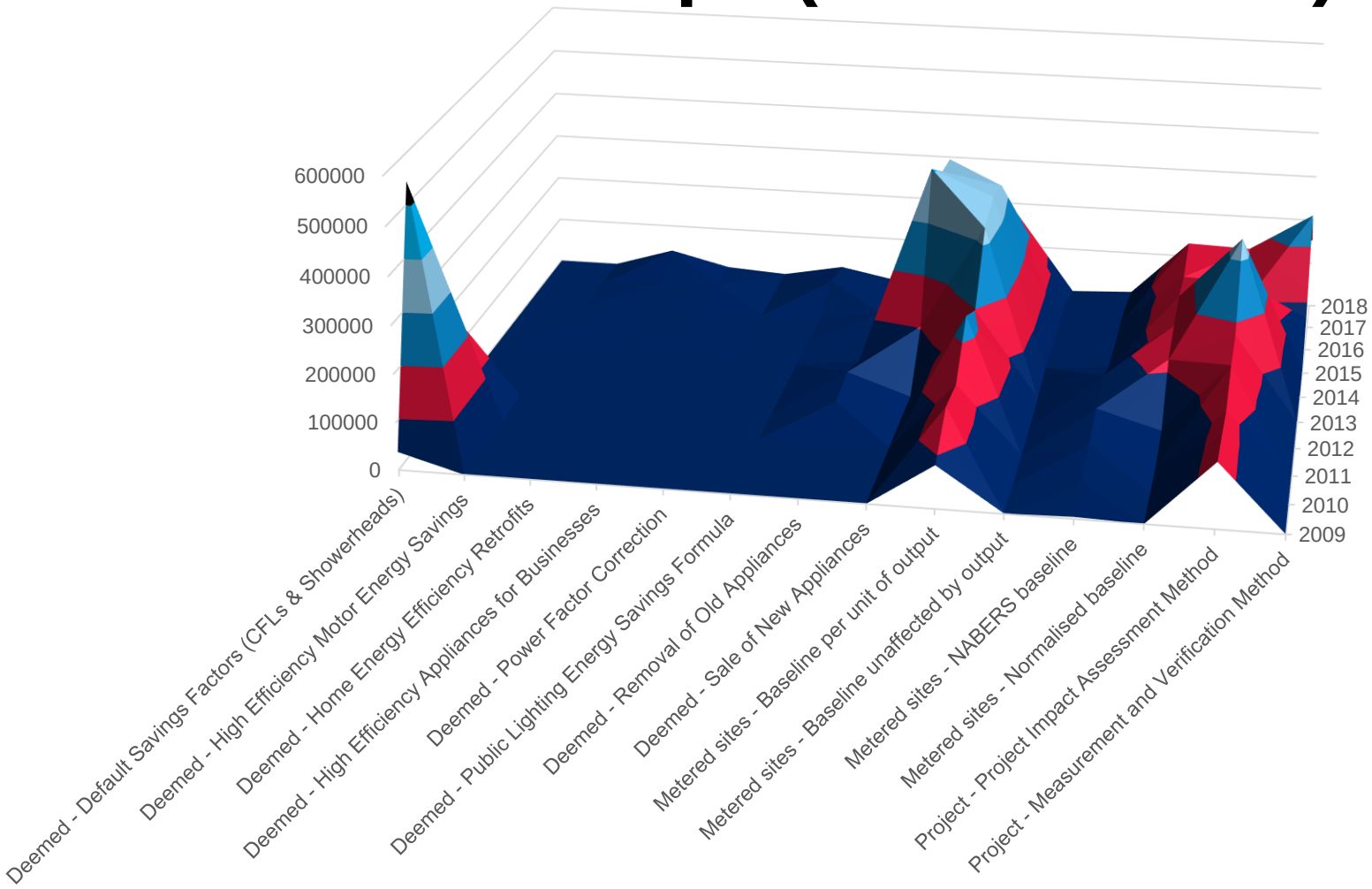
ESC Creation Landscape (w/out CLESF)



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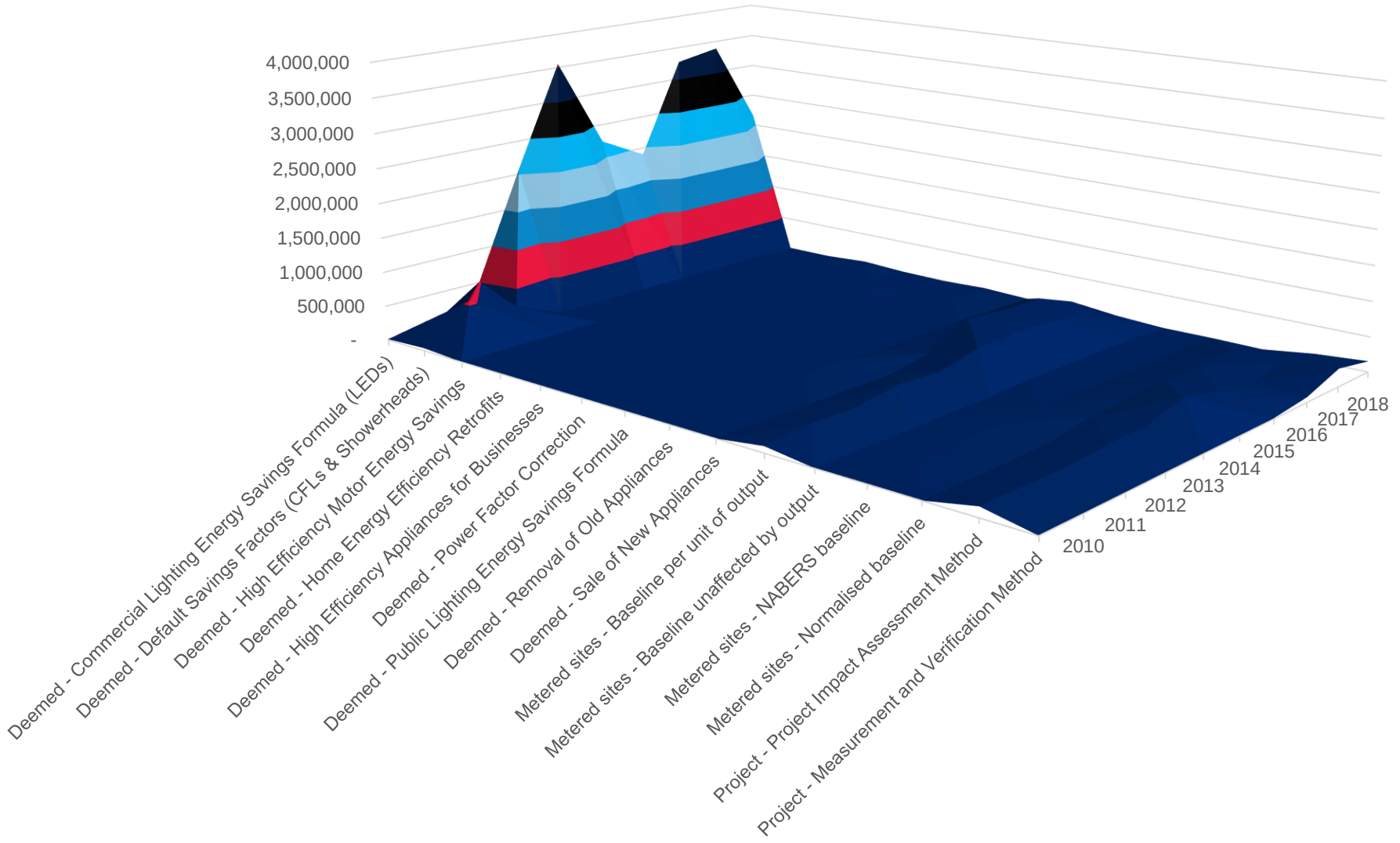

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Summary of lighting methods in the ESS

	Space/ building types	Lighting types incentivised	Higher incentives for regional areas	Co payment requirement	Calculation
Commercial lighting	Roads/public spaces, traffic signals or building lighting (excludes houses or non-common areas of apartment buildings)	Linear fluorescent lamps, compact fluorescent lamps, metal halide lamps, high pressure sodium lamps, LED lamps and luminaires, induction luminaires, other ELTs + *smart controls*	Y	Y $5/MWh of savings	2 sets of equations: baseline and upgrade energy consumption, whether BCA J6 applies Energy savings differ for different types of building/ space groups (office, industrial, retail, public, others)
HEER	Residential business or small business site	LED lamp and luminaire, CFLi, T5 linear fluorescent lamp, Edison screw	N apart from regional network factor	Y $30 for each upgrade	Electricity savings factors (e.g. MWh per lamp replaced) listed in simple look up tables for specific lighting upgrade activities
Public lighting	Roads/public spaces or traffic signals	Linear fluorescent lamps, compact fluorescent lamps, metal halide lamps, high pressure sodium lamps, LED lamps and luminaires, induction luminaires, other ELTs	N apart from regional network factor	N	Use of 3 equations to calculate energy savings Cannot be network service activities regulated under the National Electricity Law, including network infrastructure delivery

Previous studies

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Previous studies

1 November 2017

NSW Lighting Market Impact Evaluation (LMIE) accompanied by modelling

Common Capital & Beletich Associates

late 2017 – early 2018

Internal modelling: CLESF asset lifetimes

DPIE

2 August 2018

Review of Energy Savings Calculations w/ OEH Asset Lifetime Model

Beletich Associates

2017/2018 Rule Change

LMIE: Key takeaways

- ESS responsible for replacing 20% of NSW's inefficient lighting stock
- ESS helped bring high efficiency products to NSW at scale 2 to 3 years before they would have without
- By 2015, LEDs were becoming the dominant global lighting technology for new sales
- Outside new-build and refurbishment market, inefficient legacy lighting products are largely locked-in until buildings are refurbished (10-20yrs)
- For most buildings and lighting types, these projects are brought forward 7 to 10 years earlier than they would otherwise occur
- **Recommendation: The ESS Rule needs to be updated to reflect the eventual but inevitable upgrade of almost all NSW lighting to LEDs that the ESS has helped bring forward**

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Commercial Lighting asset lifetimes were updated in 2018 as a result of the LMIE study

What's next for lighting in the Scheme

- At current trends LEDs will soon replace most common lighting technologies
- NSW Government is considering how the ESS should best incentivise lighting in the future
- We commissioned Beletich Associates, Common Capital and Light Naturally to:
  - review and update ESS lighting methods to reflect the latest market and policy developments
  - provide detailed recommendations on the improved delivery of the lighting upgrades

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Research Findings

Beletich Associates, Light Naturally, Common Capital

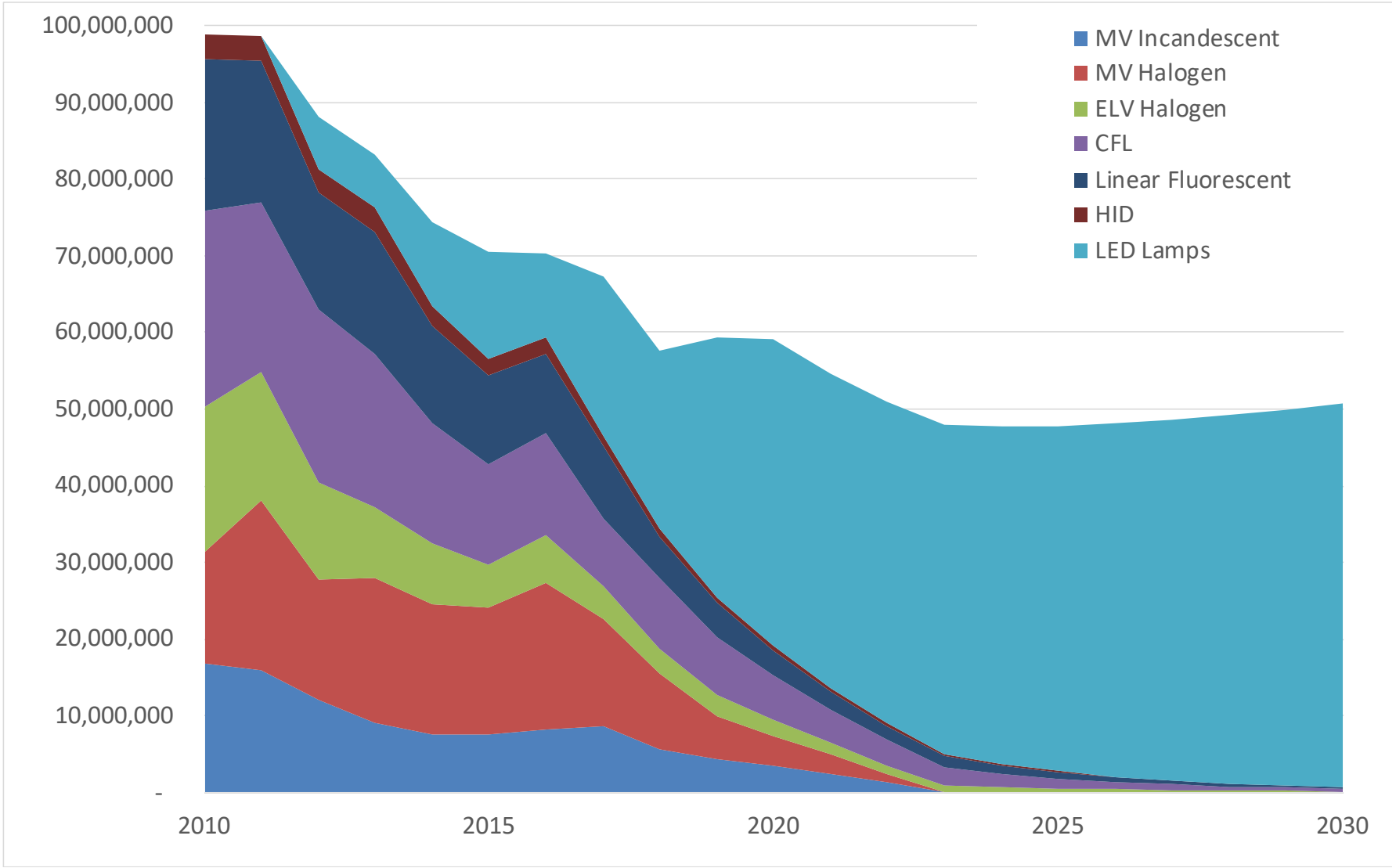
Objective

- Conduct a structural review and update ESS lighting methods to reflect the latest market and policy developments

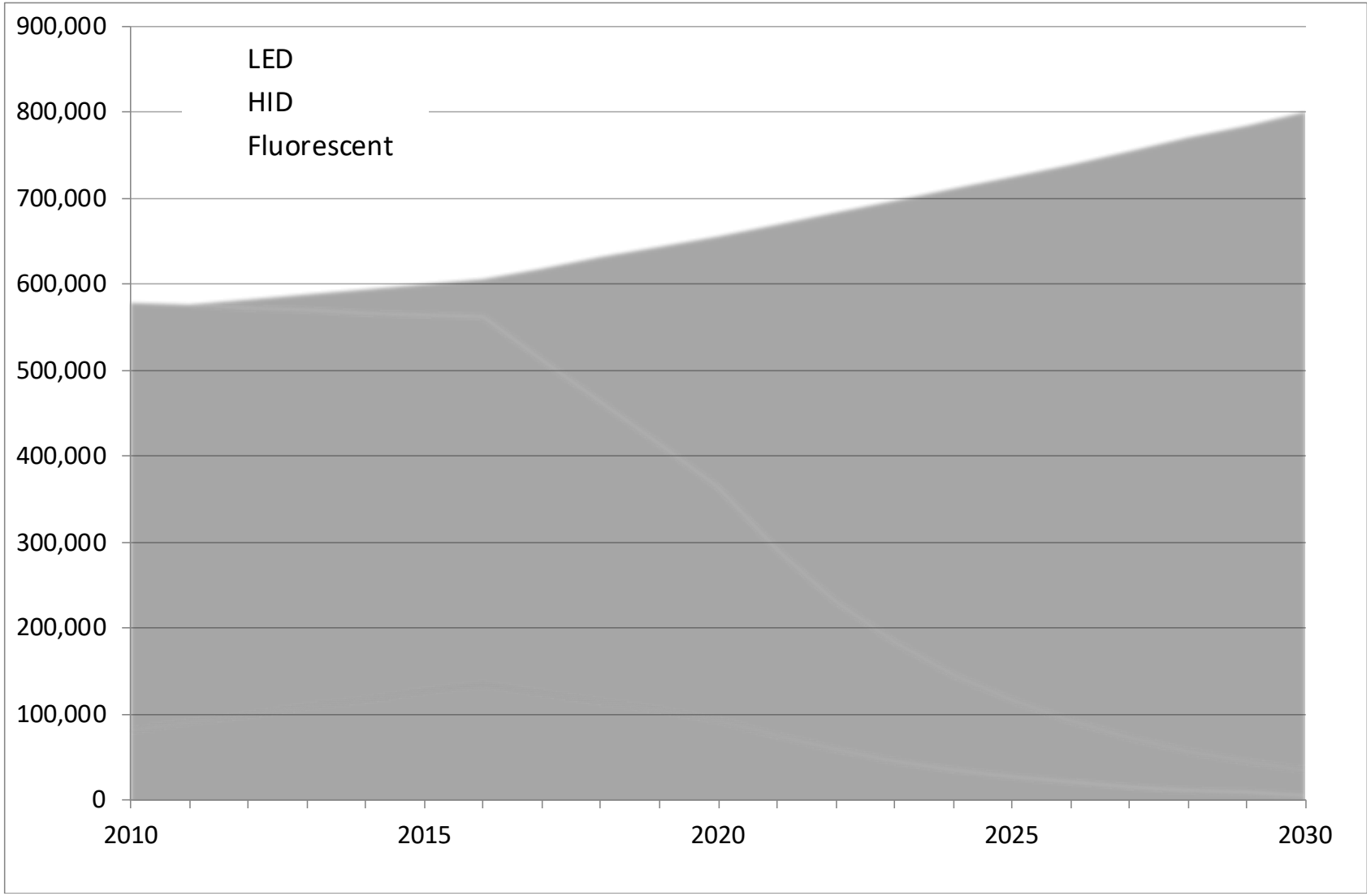
Interviews

- 20 x 1-hour telephone interviews
- 8 x ACPs
- 5 x product suppliers
- 3 x lighting designers
- 4 x industry associations
- Key outcomes built into recommendations

Modelling Example - Lamp Imports



Modelling Example - Luminaire Stocks (Road)



Other Issues Examined

- Regulatory impacts
  - Commercial building disclosure
  - National construction code
  - Minamata convention on mercury
  - NSW public lighting code
  - Phaseout of 240V incandescent / halogen lamps
  - MEPS for LED lamps
- Equipment eligibility and installation requirements
- Reducing complexity and red tape
- Peak demand savings
- PIAM&V

Key Conclusions

- Market baseline for *fixtures* has essentially transitioned entirely to LED
  - All fluorescent / HID / halogen fixtures replaced with LED (during refurb)
  - No energy savings once this occurs
- Energy savings therefore governed by the remaining life of incumbent fixture
  - “Mean time to refurb”
  - For spaces still fitted with fluorescent / HID / halogen, this is decreasing as these spaces are ageing
- “Mean time to refurb” is longer for *lower quality* spaces
  - Use *size* as a proxy for space quality
  - Larger = higher quality = shorter mean time to refurb

Key Conclusions (cont)

- Commercial Building Disclosure and NCC represent an opportunity
- Several ESS activities no longer additional, due to regulations
  - HEER E3 - PAR lamp
  - HEER E11 – ES/bayonet - replacement of incandescent or halogen lamp
  - Upgrading of mercury vapour lights
- MEPS product registration system (LED lamps) could be utilised
- Adopt minimum LED efficacy levels
- HEER electricity savings factors should be replaced with a formula
- Co-contribution has unintended consequence of encouraging poor performing products
- CLESF, PLESF, HEER and PIAM&V should all have consistent assumptions

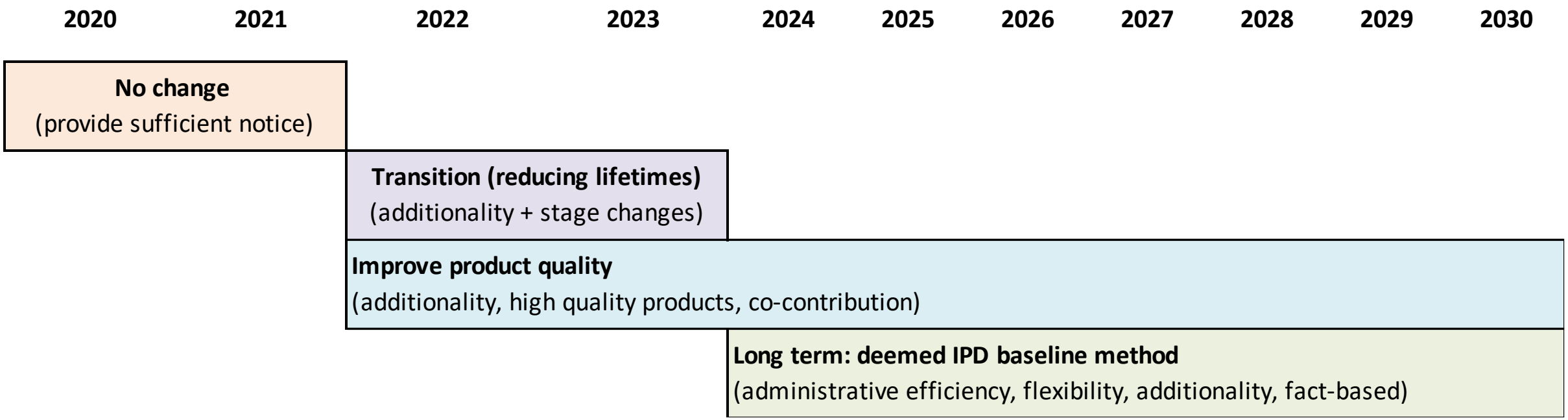
Principles Used to Develop Recommendations

- Additionality
  - All fixtures *will transition to LED* – this is a given
  - The additionality question becomes *when* this will happen
- Fact-based (e.g. reduce reliance on assumptions and utilise existing datasets)
- Administrative efficiency
- Flexible & future proof
- Subsidise only high quality products
- ACP commercial viability
  - Provide sufficient notice to make changes
  - Stage changes over time

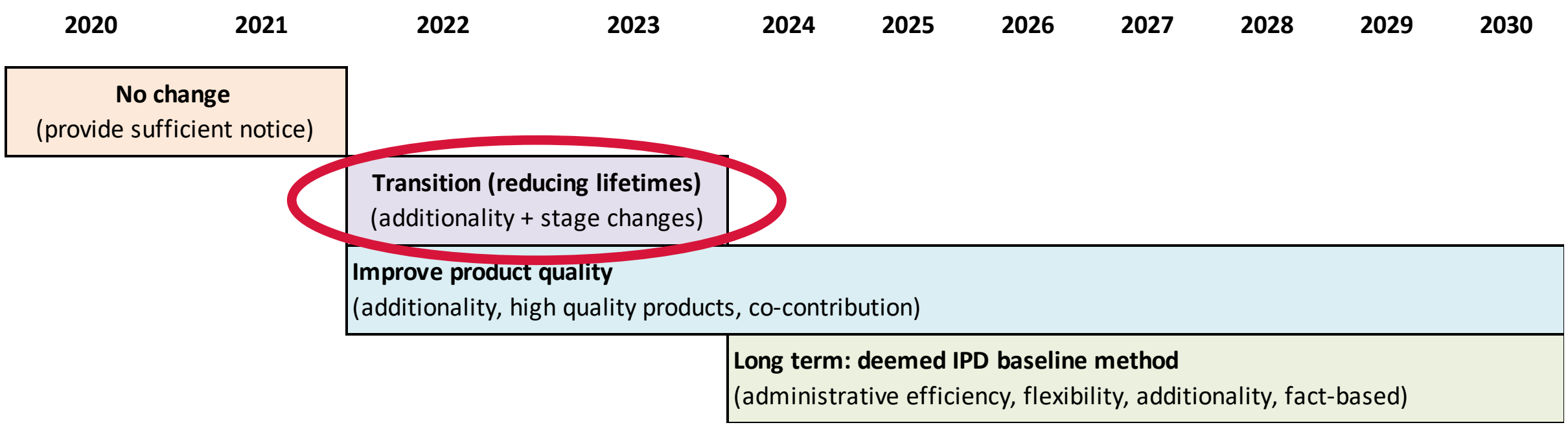
Options We Evaluated

- Do nothing
  - Risks credibility of the ESS
  - **We rejected this option**
- Recalculate energy savings – ‘by the book’
  - Rapid reduction in energy savings lifetimes
  - Risks commercial viability
  - **We rejected this option**
- Find a pathway through
  - Balance competing objectives
  - Future-proof lighting measures
  - **We chose this option**

Vision for ESS Lighting



Proposed Transitional Arrangements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No change
(provide sufficient notice)
Transition (reducing lifetimes)
(additionality + stage changes)
Improve product quality
(additionality, high quality products, co-contribution)
Long term: deemed IPD baseline method
(administrative efficiency, flexibility, additionality, fact-based)

Objectives

- Balance of:
  - Additionality
  - Commercial viability (stage changes)

Type	Size	Size Threshold	Av. Refurb Cycle (yrs)	Method	Lifetime Assigned (yrs)		
					2020-2021 (current)	2022	2023
Office	Small	<100MWh p.a. electricity bill	20	HEER	10.0	6.0	5.0
Office	Medium	Tenancies <1000m^2	20	CLESF	7.4	6.0	5.0
Office	Large	Tenancies >=1000m^2 and all base buildings	15	CLESF	7.4	3.5	2.5
Non-office commercial	Small	<100MWh p.a. electricity bill	20	HEER	10.0	6.0	5.0
Non-office commercial	Large	>=100MWh p.a. electricity bill	15	CLESF	7.3	3.5	2.5
Industrial	Small	<100MWh p.a. electricity bill	20	HEER	10.0	6.0	5.0
Industrial	Large	>=100MWh p.a. electricity bill	20	CLESF	11.7	6.0	5.0
Residential (fixture)	All		15	HEER	15.0	3.5	2.5
Public	All		20	PLESF	12.0	6.0	5.0

Assumptions Used

- Average refurb cycles increased in some cases (10 -> 15 years)
  - Generous assumption
- Spaces are 50% of the way through their life (refurb cycle) in 2018
  - Same assumption used in previous study
  - Translation: LEDs not installed before 2019
  - Generous assumption
- ESS lifetime (mean time to refurb) will decrease by 1 year, each year
- Residential lifetime = 15 years (influenced by ease of lamp replacement)
- Note we are talking about *averages* - there will always be overs and unders
- **If we adhered strictly to data, lifetimes would be significantly lower**

Engagement Session 1

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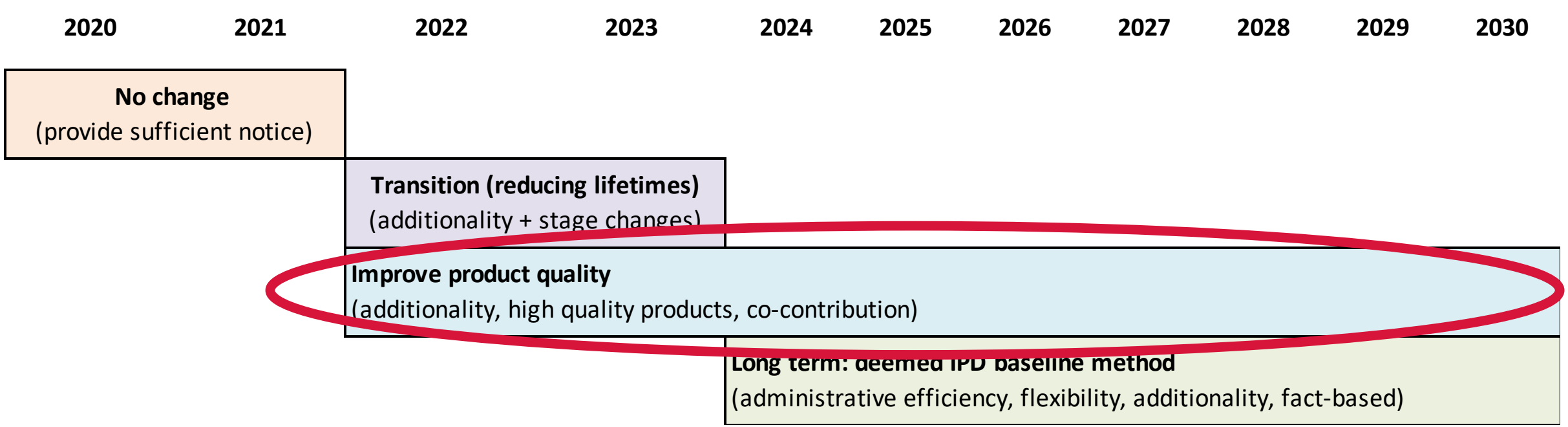
Product Quality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Objectives

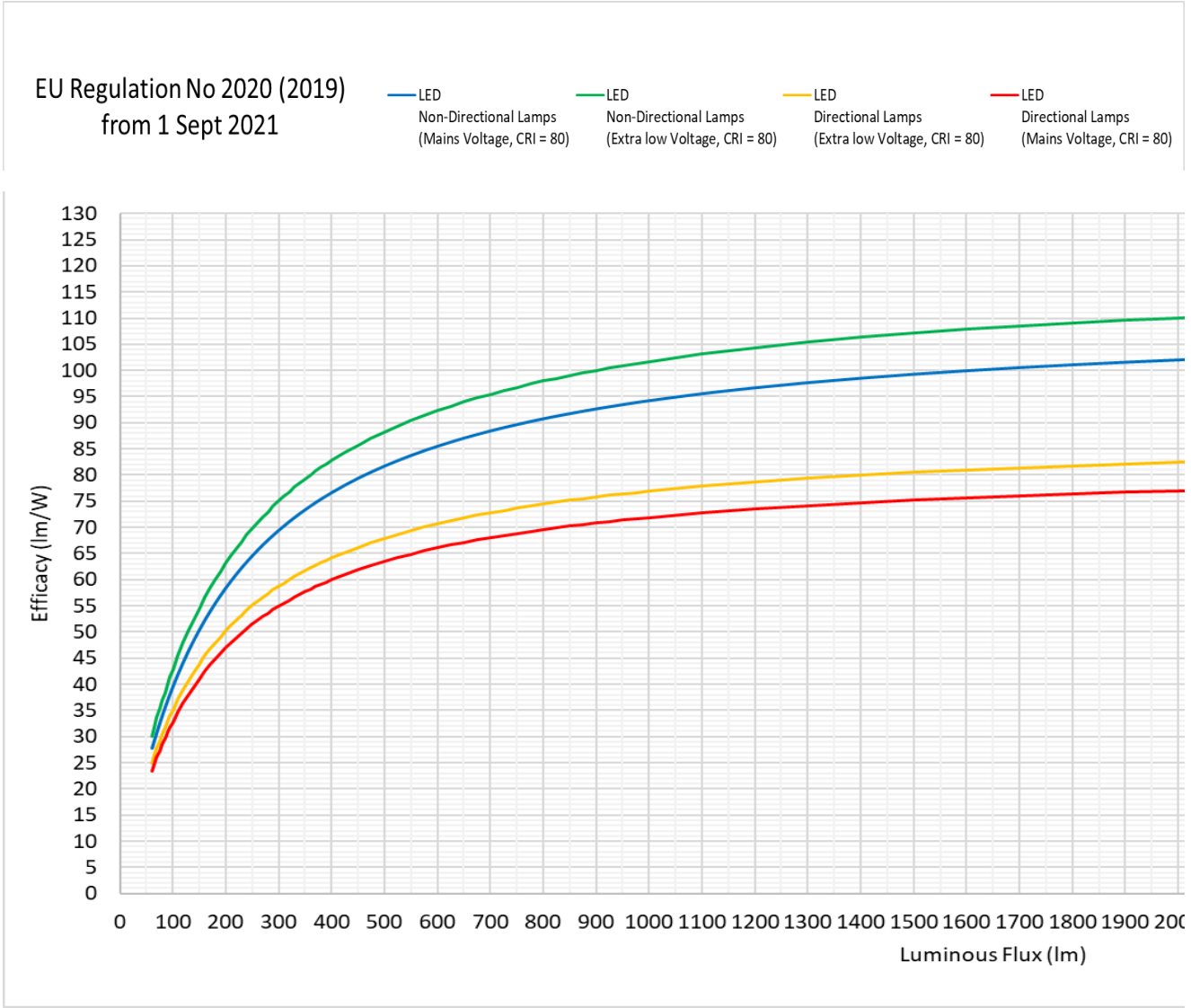
- Additionality
- Subsidise only high quality products
- Address co-contribution issue (encouraging poor performing products)

Underpin all Measures with Product Quality Requirements

- MEPS registration (lamps)
- HEPS levels (lamps + luminaires)
- Align energy savings calculations with these
- Remove some activities due to regulations
  - HEER E3 - PAR lamp
  - HEER E11 - Edison screw or bayonet lamp - replacement of incandescent or halogen lamp (replacement of CFL can remain)
  - Upgrading of mercury vapour lights

Proposed updates to MEPS for lamps

- Expansion of phaseout of incandescent lamps
  - Edison screw or bayonet GLS halogen lamps (E.11)
  - Incandescent PAR lamps (E.3)
- Introduction of LED lamp MEPS
  - Efficacy levels proposed to be aligned with EU levels for 1st Sept 2021
- Note: MEPS regulation requires registration approval of product before offering to market
  - Approval requires test evidence of meeting MEPS performance requirements



Current ESS lamp minimum requirements below MEPS

E.1

Existing Lamp and/or Luminaire	New Lamp and/or Luminaire	Minimum Efficacy (@462 lm)	New Lamp Circuit Power Category		
			≤5 W (lm/W)	≤10 W (lm/W)	≤15 W (lm/W)
Tungsten halogen Lamp (ELV) with Electronic Transformer or	LED Lamp only (EELVC)	EU Reg	66.2	66.2	66.2
		ESS	100	57.5	52*
Magnetic Transformer or Infrared coated (IRC) halogen Lamp	LED Lamp only (MELVC)	EU Reg	66.2	66.2	66.2
		ESS	115.5	52*	52*
(ELV) with Electronic Transformer or Magnetic transformer,	LED Lamp and Driver or LED Luminaire – recessed	EU Reg	61.9	61.9	61.9
with or without Luminaire	LED Lamp only – 240V Self Ballasted	ESS	92.4	48*	48*

* Based on Minimum efficacy requirement for product registration

E.2

Lamp Circuit Power of existing Lamp	Light Output of new End-User Equipmt (lm)	Minimum Efficacy		New Lamp Circuit Power Category				
				≤30 W (lm/W)	≤45 W (lm/W)	≤60 W (lm/W)	≤90 W (lm/W)	≤150 W (lm/W)
100W ≤ LCP < 150W	≥1,500	Non-Dir	EU Reg	99.2				
			ESS	50.0				
		Dir	EU Reg	75.3				
			ESS	50.0				
150W ≤ LCP < 200W	≥2,500	Non-Dir	EU Reg	103.6	103.6			
			ESS	83.3	55.5			
		Dir	EU Reg	78.1	78.1			
			ESS	83.3	55.5			
200W ≤ LCP < 300W	≥3,500	Non-Dir	EU Reg		105.7	105.7		
			ESS		77.8	58.3		
		Dir	EU Reg		79.5	79.5		
			ESS		77.8	58.3		
300W ≤ LCP < 500W	≥5,700	Non-Dir	EU Reg			107.6	107.6	
			ESS			95.0	63.3	
		Dir	EU Reg			80.7	80.7	
			ESS			95.0	63.3	
500W ≤ LCP	≥10,000	Non-Dir	EU Reg				109.1	109.1
			ESS				111.1	66.7
		Dir	EU Reg				81.7	81.7
			ESS				111.1	66.7

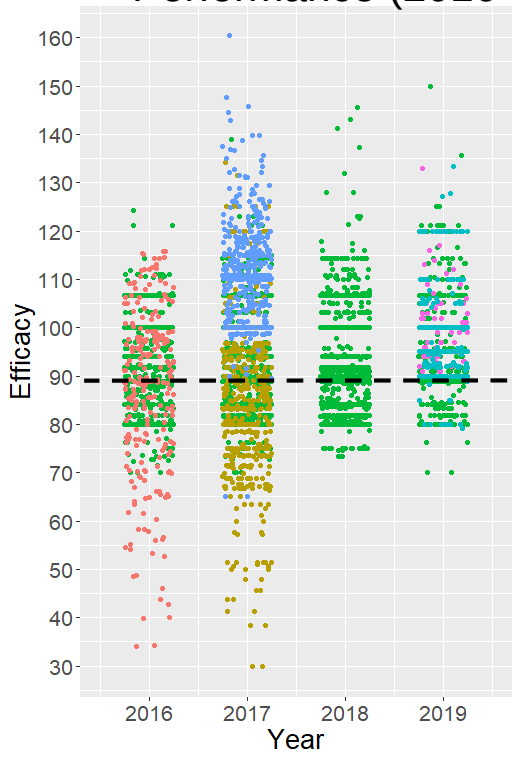
Product performance providing program Additionality

- With current BAU replacements being LED technology and MEPS+ performance for lamps, ESS program needs to deliver additionality beyond this
- Can be achieved by setting Higher Efficiency Performance requirements for ESS registration of products thereby securing savings that are greater than BAU.
    - HEPS typically sets the efficacy requirements at the level achieved by the top 20% of products on the market for that category of product.

MEPS and efficacy distribution of products

Non-directional LED Lamps:

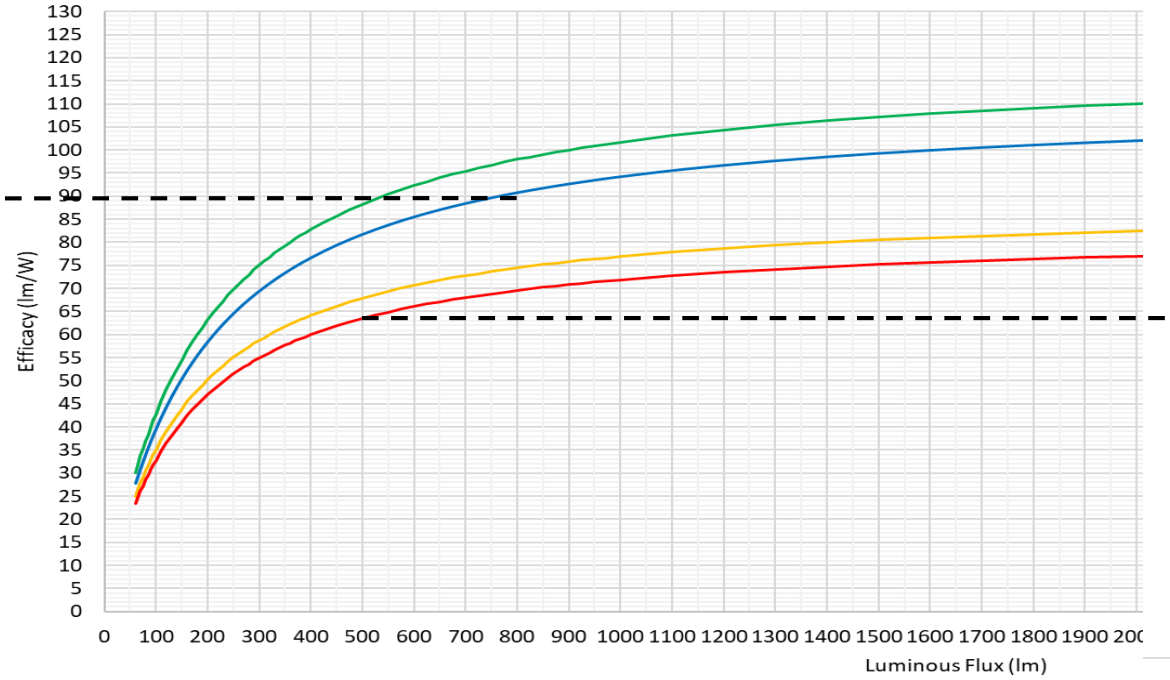
Performance (2016 – 2019)



Source

- ASEAN Test data
- Aust. Market Survey
- Energy Star
- India Register
- Japan Register
- Thailand Register

MEPS

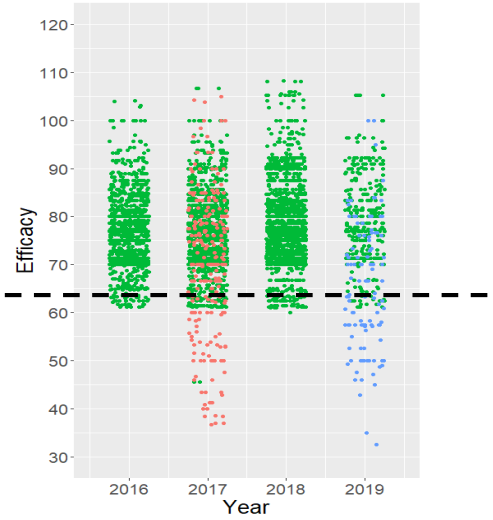


EU Regulation No 2020 (2019)
from 1 Sept 2021

- LED Non-Directional Lamps (Mains Voltage, CRI = 80)
- LED Non-Directional Lamps (Extra low Voltage, CRI = 80)
- LED Directional Lamps (Extra low Voltage, CRI = 80)
- LED Directional Lamps (Mains Voltage, CRI = 80)

Directional LED Lamps:

Performance (2016 – 2019)

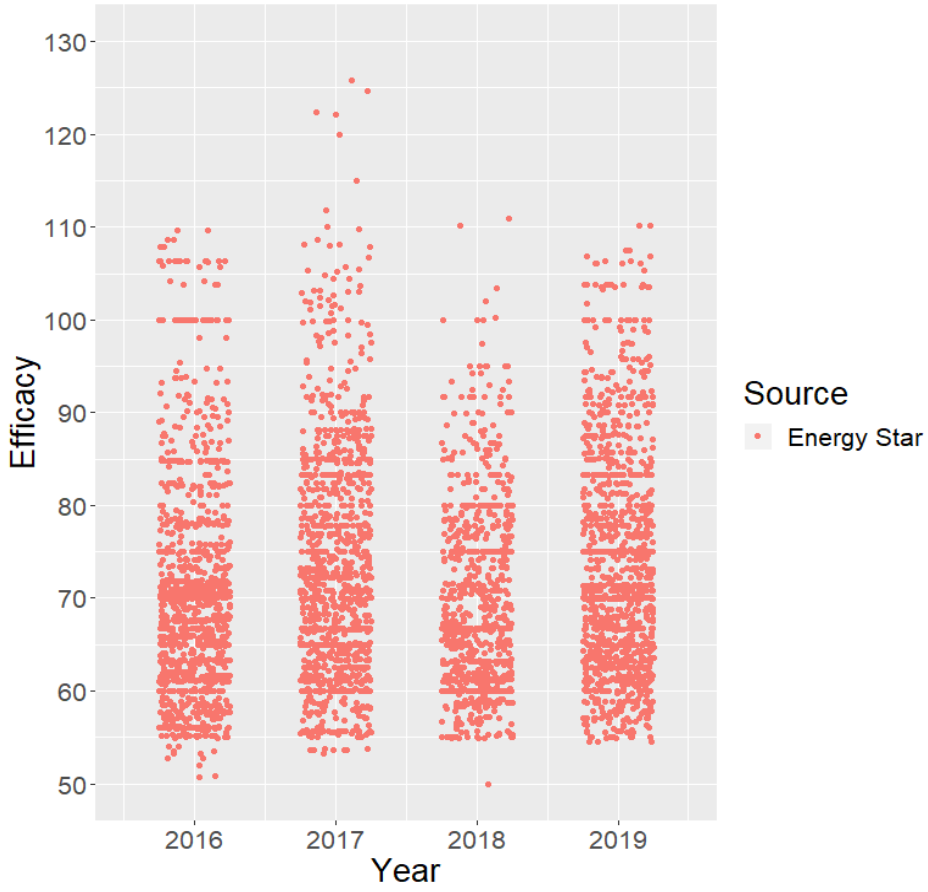


Source

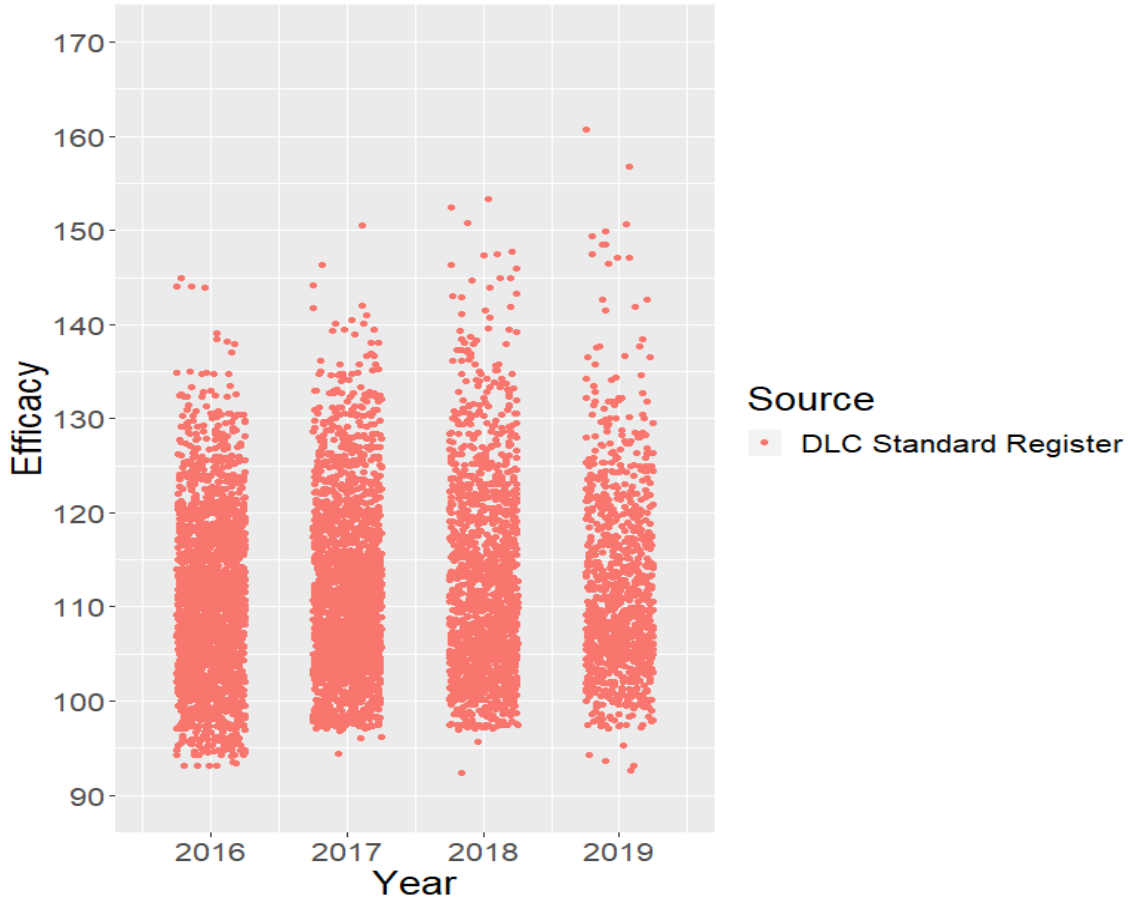
- Aust. Market Survey
- Energy Star

Efficacy distribution of products on registers

LED Luminaires Performance (2016 – 2019)



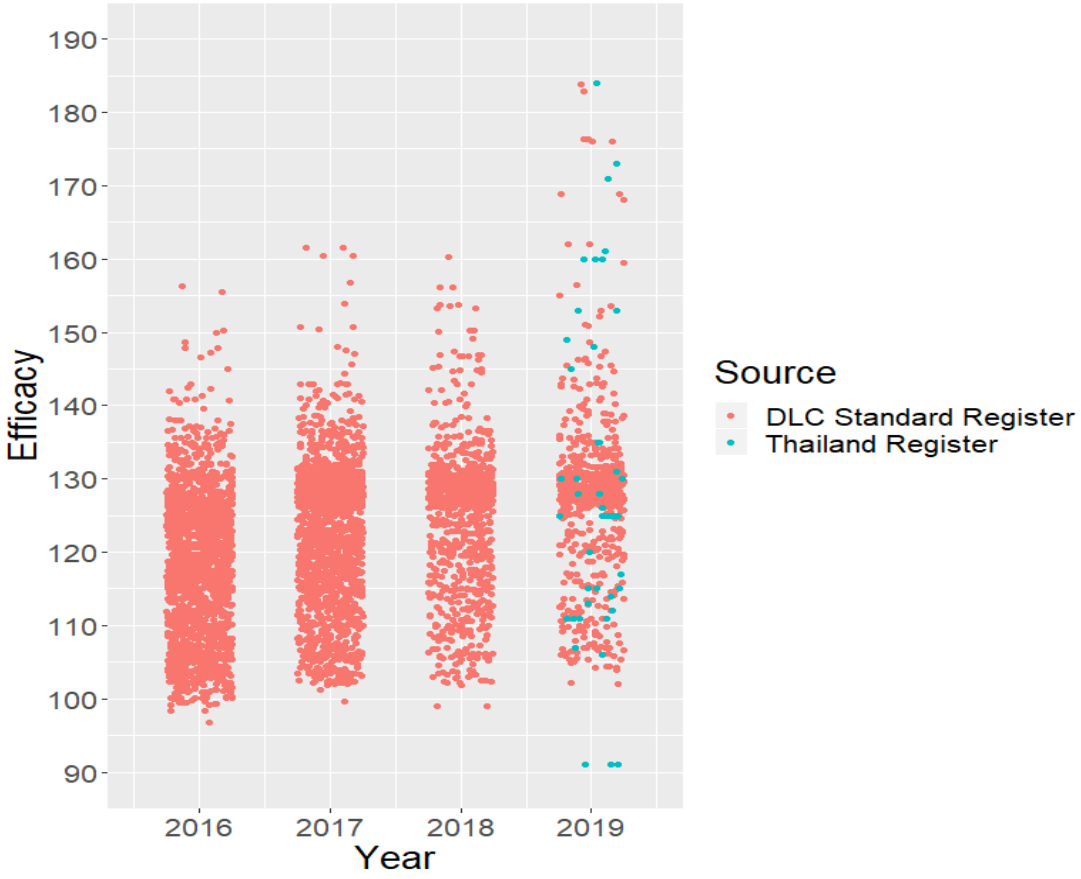
Downlights



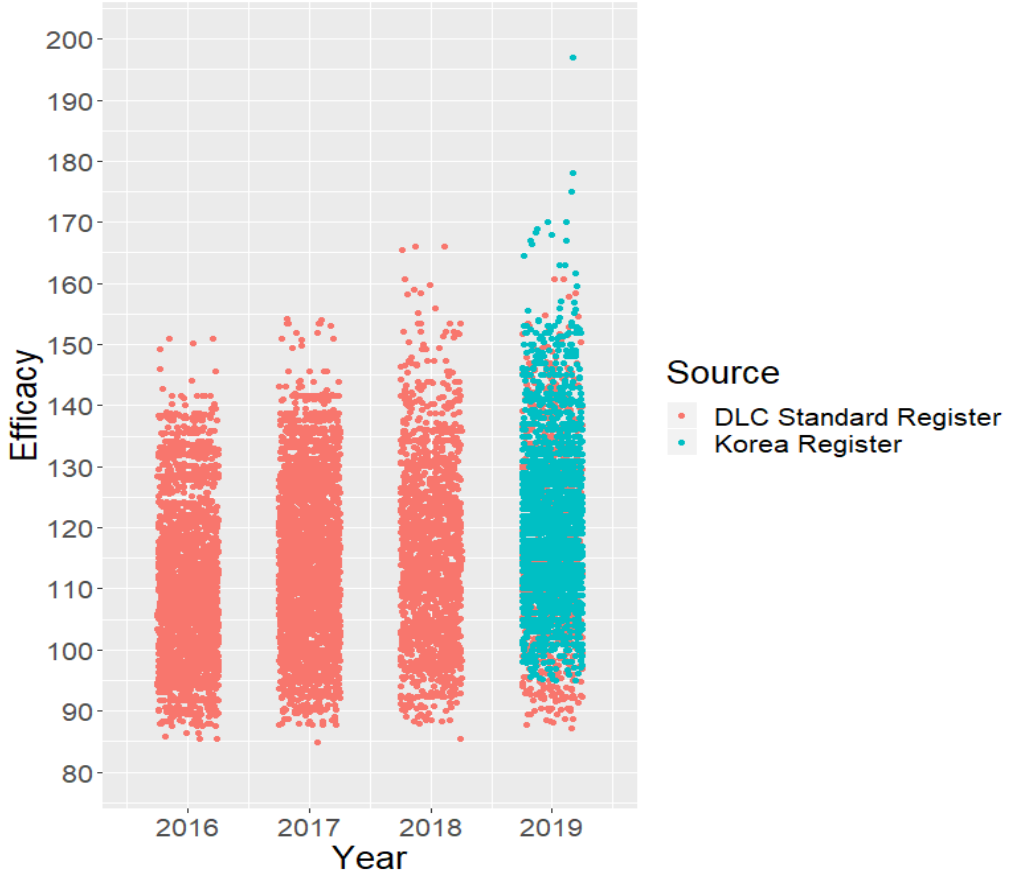
Troffer/Grid

Efficacy distribution of products on registers

LED Luminaires Performance (2016 – 2019)



High/Low Bay



Roadway

Electricity Savings Factor Calculations

ESS Electricity Savings Factor tables create dis-incentive for improved product offering due to lack of increase in savings factors with “stepped” LCP categories. Continuous scale provides more potential for savings.

Existing Lamp and/or Luminaire	New Lamp and/or Luminaire	Minimum Efficacy for New Lamp Circuit Power			Potential for Additional MWh Savings	
		≤5 W (lm/W)	≤10 W (lm/W)	≤15 W (lm/W)	5.1 W	10.1 W
Tungsten halogen Lamp (ELV) with Electronic Transformer or Magnetic Transformer or Infrared coated (IRC) halogen Lamp (ELV) with Electronic Transformer or Magnetic transformer, with or without Luminaire	LED Lamp only (EELVC)	99.8	49.9	33.3	18%	25%
	LED Lamp only (MELVC)	115.5	57.8	38.5	17%	18%
	LED Lamp and Driver or LED Luminaire – recessed LED Lamp only – 240V Self Ballasted	92.4	46.2	30.8	13%	13%

Engagement Session 2

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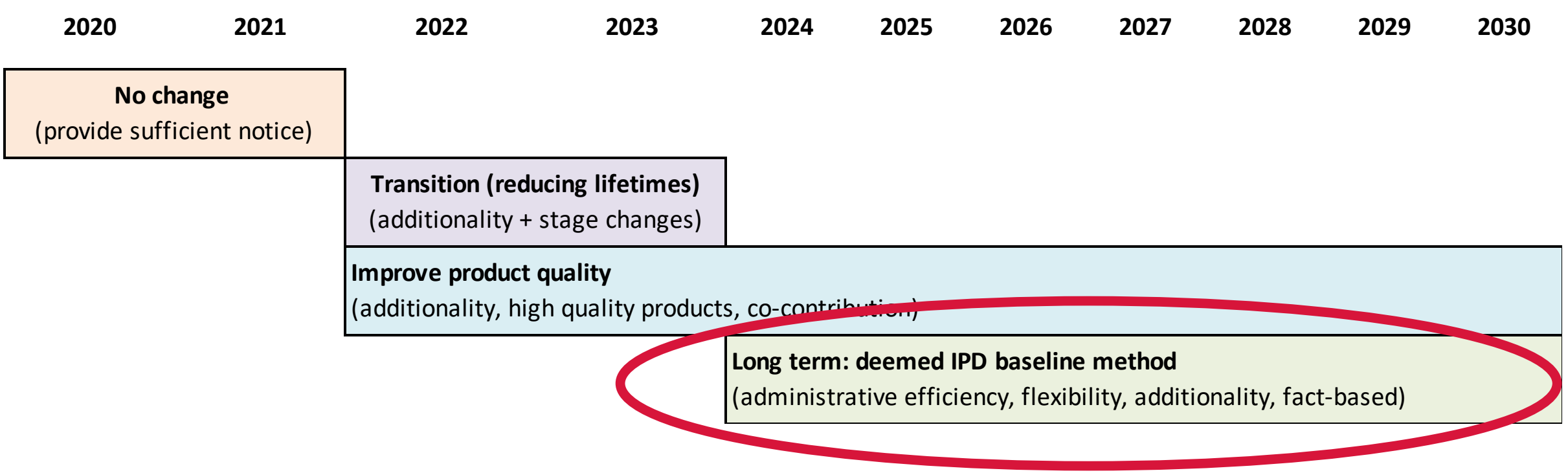
Long Term Proposal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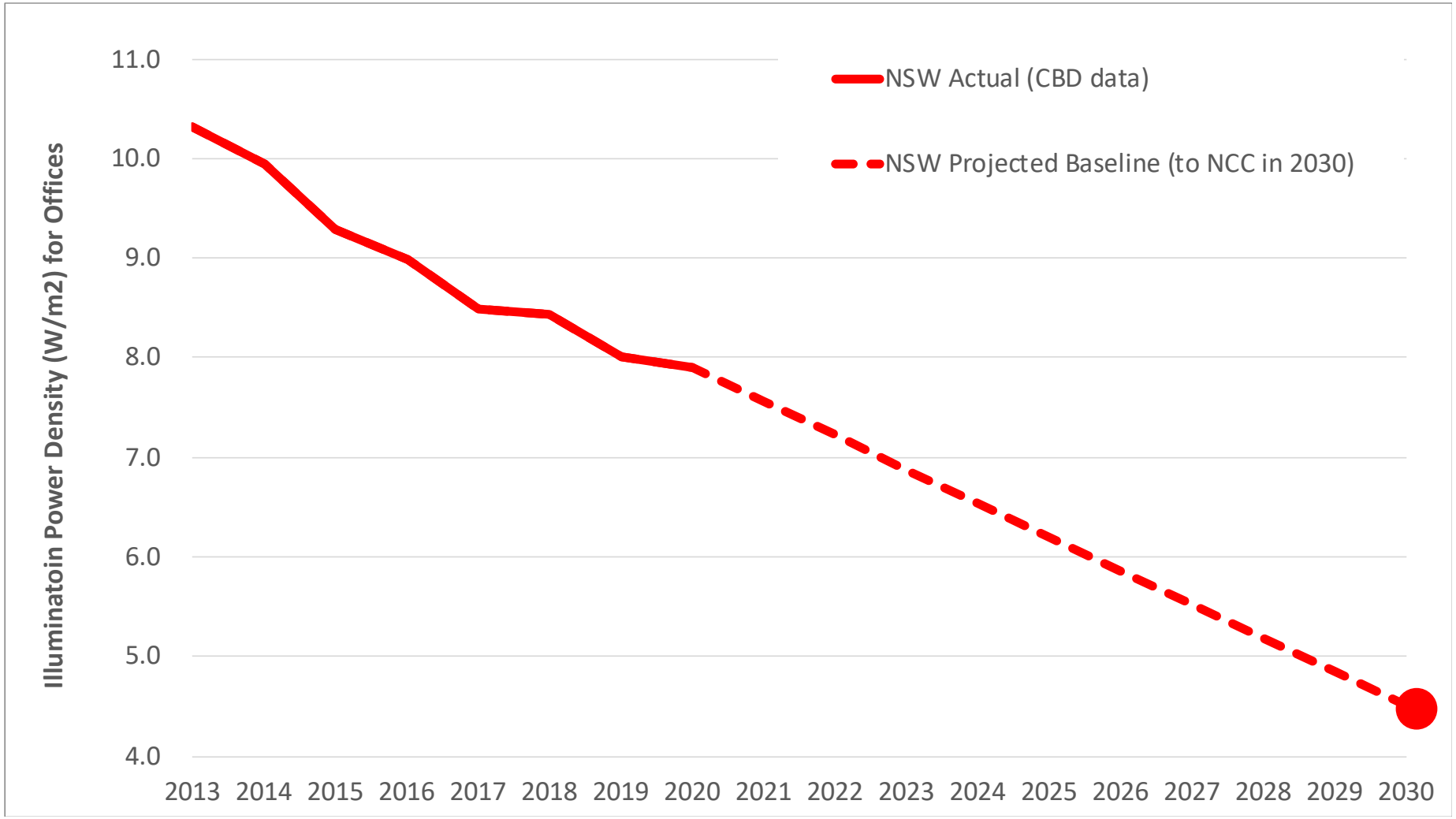
Long term: deemed IPD baseline method
(administrative efficiency, flexibility, additionality, fact-based)

Objectives

- Administrative efficiency
- Flexible and future-proof (e.g. LEDs can replace LEDs)
- Additionality
- Fact-based

CBD Dataset (large offices)



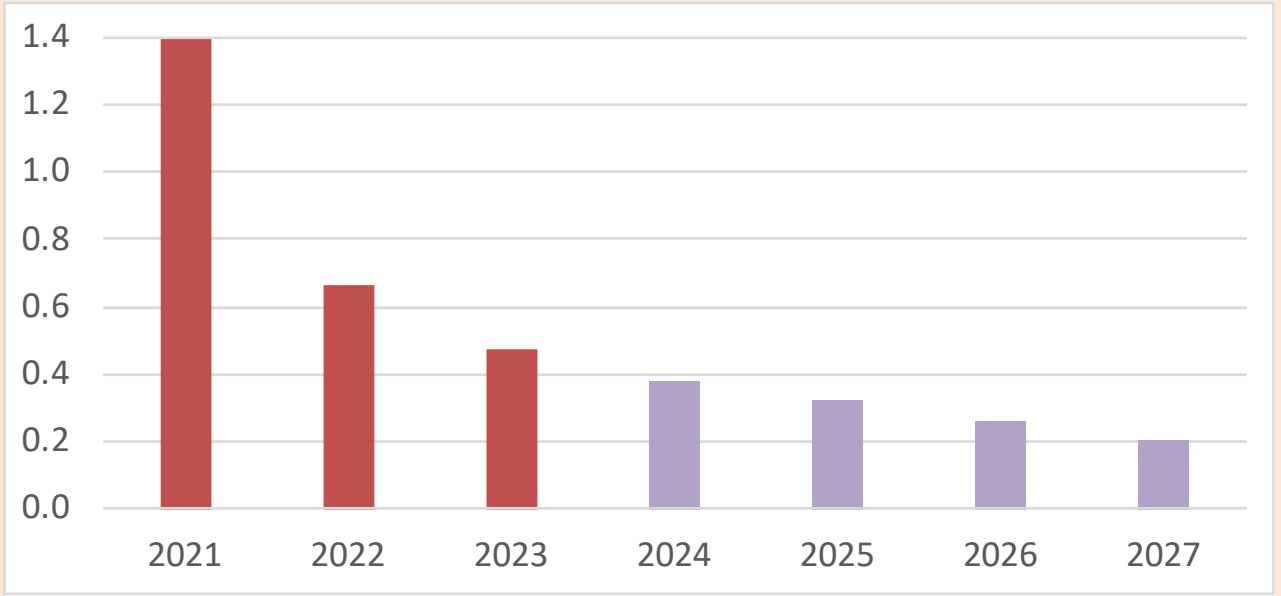
Long Term Proposal: “Deemed IPD Baseline”

- Key metric becomes illumination power density (IPD)
  - Use CBD/NABERS assessors
- Installations must meet NCC IPD limits (current at the time)
- ESCs quantities assigned based on a "deemed IPD baseline"
  - Offices: from CBD dataset
  - Other space types: TBD - (possibly) trend down to 2019 NCC limits by 2030
- Reset lifetime to nominal 10 years
- Align lighting controls factors with NCC
- Possibility to leverage from CBD and NCC

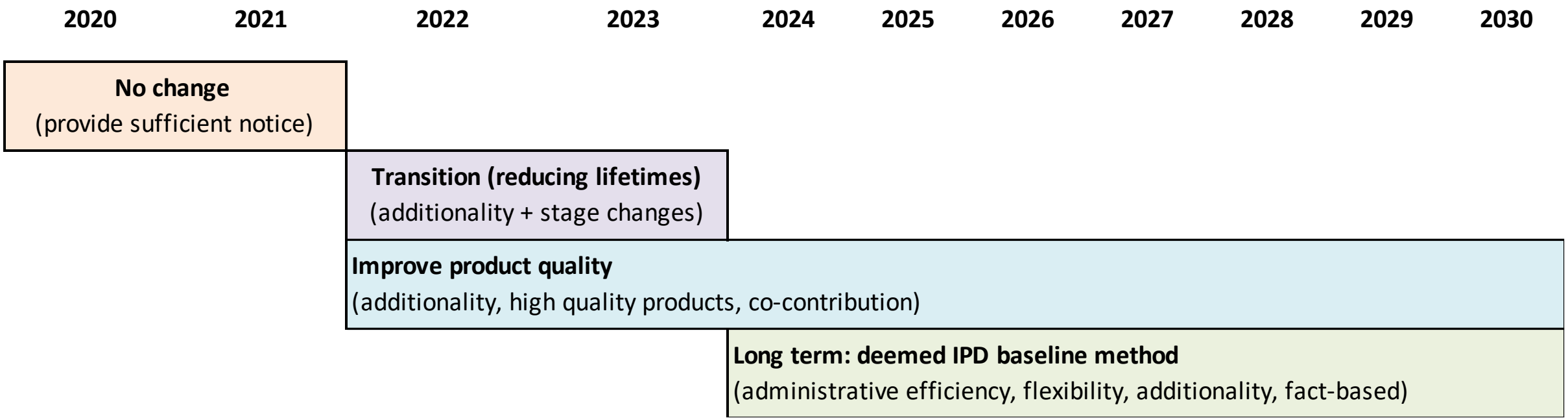
Example ESC calculation for large office: 25W LED to replace 88W troffer

ESC calculations for large office: 25W LED to replace 88W troffer

2021	2022	2023	2024	2025	2026	2027
Current	Transitional		Deemed IPD baseline			
1.40	0.66	0.47	0.38	0.32	0.26	0.20



Conclusion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Engagement Session 3

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Next Steps

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Your Feedback

- The feedback from today will be incorporated into the research recommendations
- We will propose changes to the Rule, based on the research recommendations
- Public Consultation on proposed Rule changes is scheduled for mid-2021
- We expect to finalise the Rule changes in the second half of 2021
- The new lighting requirements are expected to commence in July 2022

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Q&A

Use Chat Pod | State Name & Organisation

Please answer poll questions