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INTERNATIONAL CENTRE FOR INFRASTRUCURE FUTURES

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- Visit www.icif.ac.uk, @icif_live, #icifGC
- Read Our Infrastructure White Papers
- View our Research Outputs and recommended resources:
  - Interdependence and Resilience
  - Governance and Regulation
  - Business Models and Delivery Challenges
- Contact Dr Tom Dolan Thomas.dolan@ucl.ac.uk

#icifGC Add your Voice to our Infrastructure Grand Challenges World Café Conversations

#icifGC What are the most significant infrastructure service and system challenges we face? - Have Your Say

#icifGC Share your questions and see those raised by others

Infrastructure Grand Challenges

- **What are the potential benefits?**
- **How can we realise these?**
- **What is stopping us?**

Innovative business models and a focus on outcomes, value and purpose can deliver improved infrastructure delivery and performance

Infrastructure interdependence, system resilience, vulnerability, adaptability, flexibility require collaborative multi-disciplinary / cross-sectoral / systemic / holistic approaches

Low Carbon, resilience and sustainability must be at the core of all infrastructure planning, delivery and operations

Governance and Regulation are important tools to enable cross-sectoral communication, collaboration and decision making to improve performance and provision infrastructure systems

#icifGC
21st February 2017, ICE, London
Register: https://icifgrandchallenges.eventbrite.com

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A Conceptual Approach to Strategic Performance Indicators:

Making the Case For An Outcome-Oriented approaches to Infrastructure Performance Indicators and National Infrastructure Assessment

On behalf of Tom Dolan, Claire Walsh, Chris Bouch, Neil Carhart

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Understanding infrastructure: need, value and purpose

Ralitsa Hiteva, Kat Lovell, Tom Dolan and Neil Carhart (eds)

Coming soon in 2017

Targeted at those concerned with improving the quality of the outcomes enabled by infrastructure systems, this edited volume advocates deeper consideration of the purpose, value, and needs we expect to be fulfilled by, infrastructure systems. These concepts and the dynamics between them, frame the way we think about and use the interdependent infrastructure systems on which we depend. The volume puts forward opportunities to embed *people, nature and systems thinking* at the heart of infrastructure governance.

Presentation Based on

Research into Outcome-oriented Approach to Performance Indicators by by Tom Dolan, Neil Carhart, Claire Walsh and Chris Bouch nPapers on behalf of Infrastructure UK

http://www.icevirtuallibrary.com/doi/10.1680/jinam.16.00015 …
http://www.icevirtuallibrary.com/doi/10.1680/jinam.16.00016 …

And subsequent research undertaken by Tom Dolan in Connection to

The Significance of an Outcome-oriented Approach

- In the absence of a clearly articulated, shared, collaboratively developed and mutually understood **vision** comprising the **desired outcomes** that we expect infrastructure to enable, it is not possible to perform a full evaluation of how *actual* infrastructure system performance compares to *expected* infrastructure performance or meaningfully assess infrastructure system need.
- Therefore, **Outcome-oriented PI** (slides 4 and 5) are an essential and complimentary part of an approach to PI (slide 7) to support understanding of whole system performance.

Outcome Framing

- To support objective evaluation of performance and system need, desired outcomes must be framed terms that are:
  - **Solution Neutral:** not aligned with any specific solution or mode of delivery
  - **Sector Neutral:** not framed in terms of a specific infrastructure sector
  - **Technology Neutral**: not aligned with the incumbent or any other technology.

Process for Outcome-Oriented Performance Indicators

1 Identify, Understand and Structure Desired Outcomes
Purpose: Identify and articulate desired outcomes relevant to the infrastructure whose performance is to be measured.
Outputs: (i) in-depth multi-perspective discussion and analysis of the desired outcomes infrastructure is expected to enable; (ii) a structured list of desired outcomes (based on synthesis to integrate multiple perspectives).

2 Explore Outcome Dimensions
Purpose: Decompose each desired outcome into a structured set of the outcome dimensions (and sub dimensions) of which it is comprised.
Outputs: (i) in-depth discussion and analysis of outcome dimensions; (ii) a conceptual map (with supporting justification) of the interconnected set of outcome dimensions that comprise each desired outcome.

3 Select Partial Indicators
Purpose: Identify partial indicators for each outcome dimension and sub-dimension mapped in Step 2.
Outputs: (i) in-depth discussion and analysis of how outcome dimensions can best be measured; (ii) a complete set of partial indicators for each desired outcome.

4 Headline Performance Indicators for Desired Outcomes
Purpose: Create one outcome-oriented performance indicator for each desired outcome.
Output: a fully justified method and formula to calculate a headline indicator for each desired outcome based on the partial indicators that comprise that desired outcome.

5 Evaluate and Fulfil Data Requirements
Purpose: Identify data availability gaps, and where needed develop the strategic case for additional data collection.
Outputs: (i) ensure data availability for all partial indicators (ii) only where data collection is not possible, propose and justify alternative partial indicators.

Regular Review and Evaluation

Process presented in more detail in two papers:

A Conceptual Approach to Strategic Performance Indicators - Read in full at: https://t.co/vgqufaRvAH
and
Applying a New Concept for Strategic Performance Indicators - Read in full at:
https://t.co/MSh8G3Icfn#infrastructure

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Identify Outcomes

1 Identify, Understand and Structure Desired Outcomes

Purpose: Identify and articulate desired outcomes relevant to the infrastructure whose performance is to be measured.

Outputs: (i) in-depth multi-perspective discussion and analysis of the desired outcomes infrastructure is expected to enable; (ii) a structured list of desired outcomes (based on synthesis to integrate multiple perspectives).

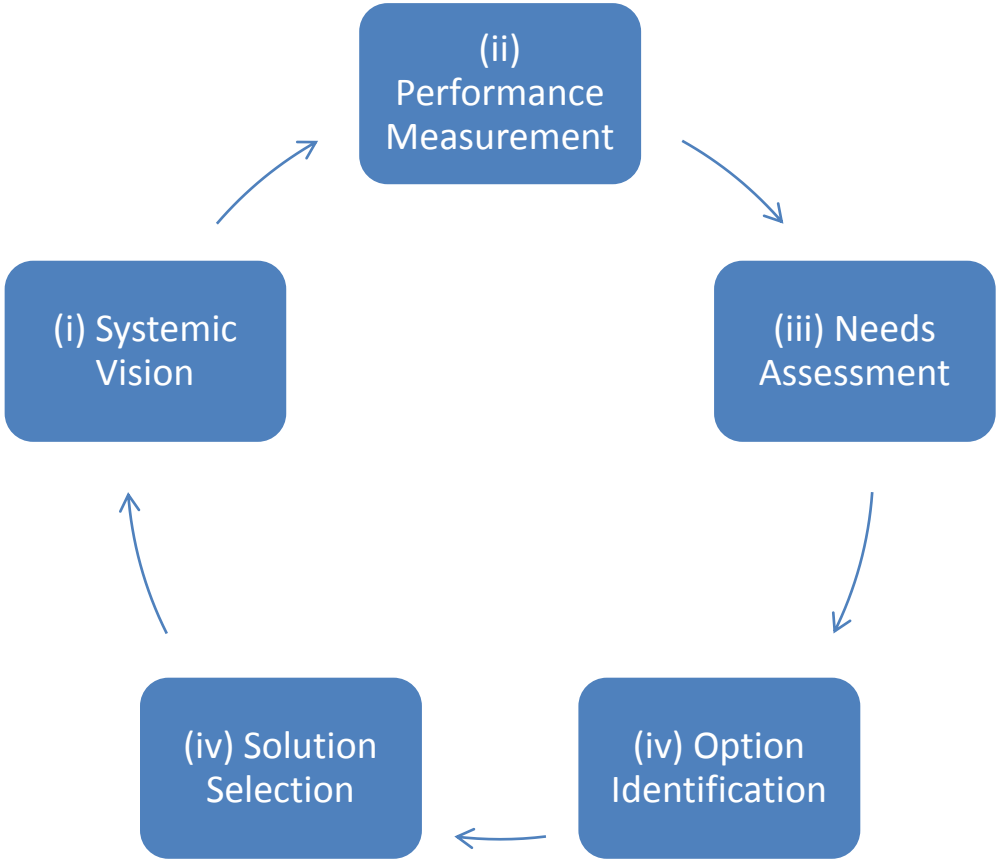
2 Explore Outcome Dimensions

Purpose: Decompose each desired outcome into a structured set of the outcome dimensions (and sub dimensions) of which it is comprised.

Outputs: (i) in-depth discussion and analysis of outcome dimensions; (ii) a conceptual map (with supporting justification) of the interconnected set of outcome dimensions that comprise each desired outcome.

A Systemic* Toolkit for Infrastructure Decisions

*collaborative, transparent, structured and flexible



An early version of this toolkit is referred to in:

Aligning Systemic Infrastructure Decisions with Social Outcomes
. doi: 10.1680/jcien.2016.169.4.147

More details are available from Dr Tom Dolan Thomas.dolan@ucl.ac.uk

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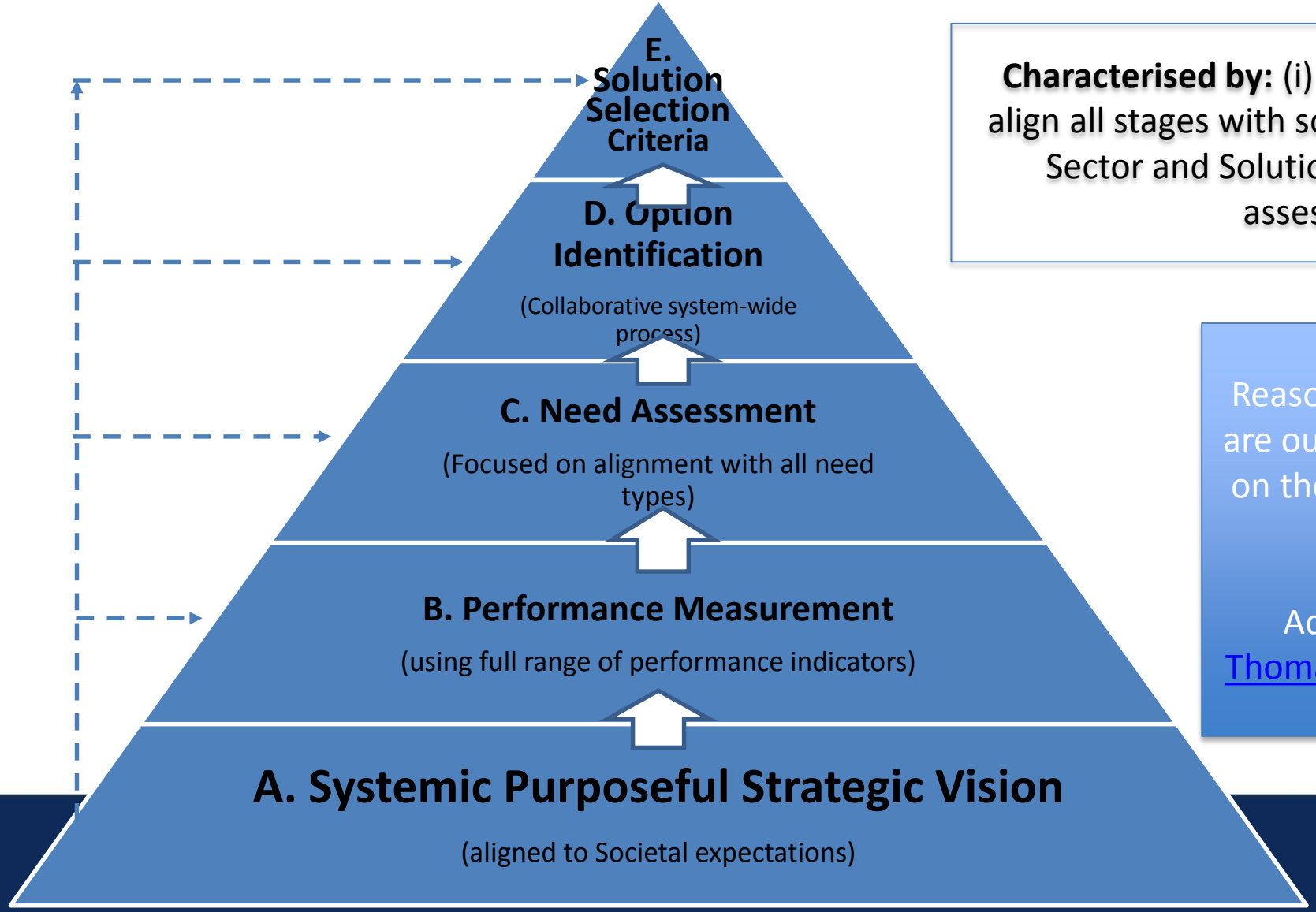
Systemic Purposeful Strategic Vision and Performance indicators* as a Foundation for Infrastructure Decision Making



Characterised by: (i) an Outcome-oriented approach to align all stages with societal expectations. (ii) Technology, Sector and Solution Neutral Framing for objective assessment at all stages

Reasons why such an approach is needed are outlined in the next slide. More details on the breakdown of each layer are given in slide 9.

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Purpose, Performance Indicators and System Need

To undertake a complete **Need Assessment** - 4 types of need must be evaluated

- Renewal/Maintenance
- Quantity
- Alignment
- System Health

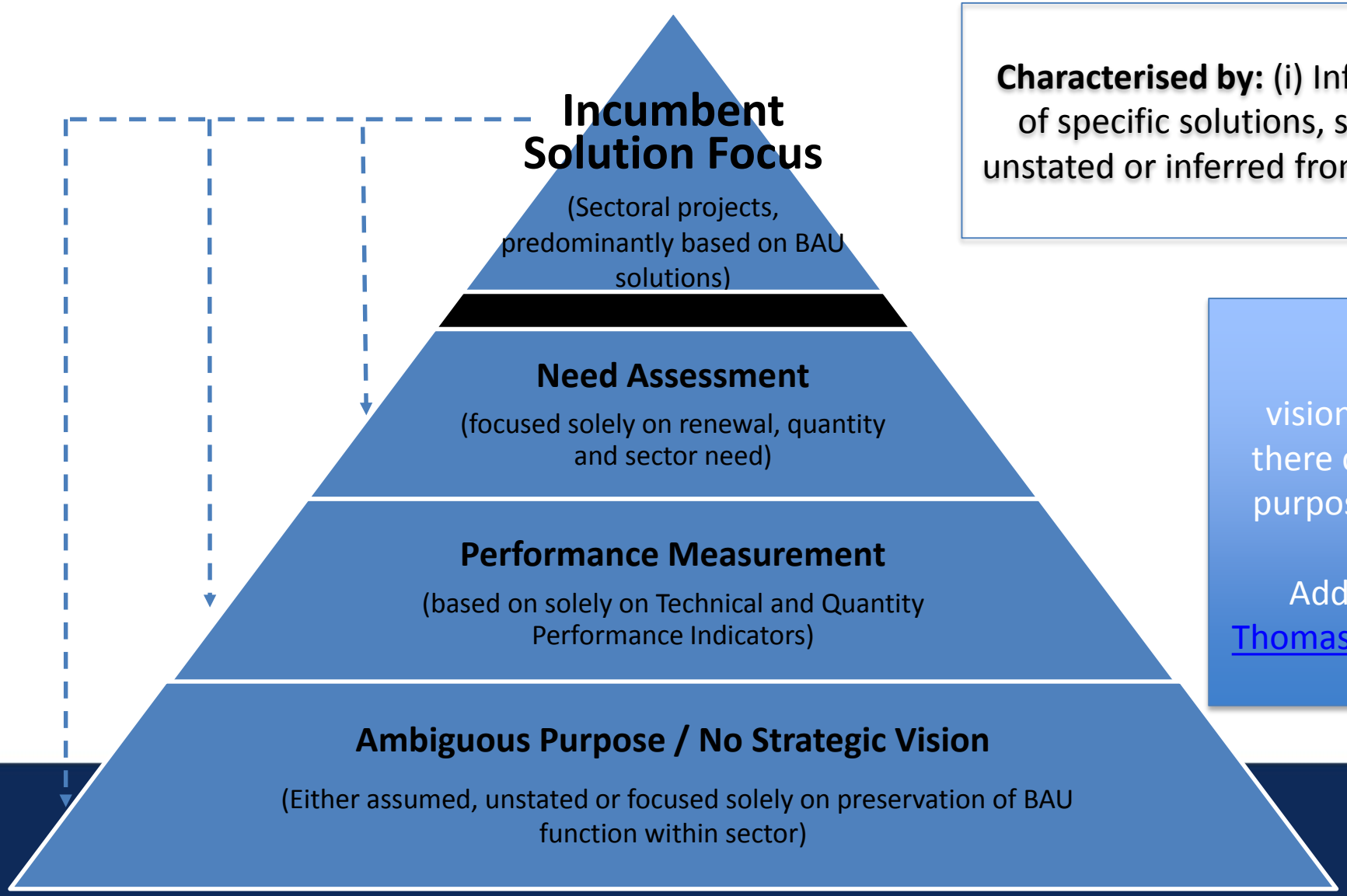
Each **Need type** requires a set of **Performance Indicators (PI)** capable of measuring it. These PI types are complimentary and it is not possible to meaningfully assess whole system performance withoututilising these acknowledging the recognising the importance of all PI types:

- Technical PI
- Quantity PI
- Outcome – Oriented PI (based on slides 2, 3 and 4)
- System Health PI

Basis for Decision Making	Cost	+	output linked criteria	+	Outcome-linked criteria (sector)	+	Impact on GDP	+	Systemic Outcome-linked criteria
Option Identification	Incumbent 1.0 Possibly incumbent 2.0			+	In Sector and immediate supply chain	+	System-Wide		
Need Assessment	Component Renewal	+	Quantity Gaps (current and projected)	+	Alignment gaps by sector	+	Alignment Gaps (GDP)	+	Systemic alignment Gaps
Performance Measurement	Technical Performance	+	Quantity of Provision	+	Outcome-oriented (sector)	+	Outcome-oriented (GDP)	+	Outcome-oriented (systemic)
Purpose	**a Strategic Systemic Vision** (comprising desired outcomes) **makes the above possible** (NB: An absence of Vision constrains at all levels– see slide 10)								

Basis for Decision Making	Cost	+	output linked criteria	+	[redacted]	+	Impact on GDP	+	[redacted]
Option Identification	Incumbent 1.0 Possibly incumbent 2.0	+	In Sector and immediate supply chain	+	System-Wide				
Need Assessment	Component Renewal	+	Quantity Gaps (current and projected)	+	[redacted]	+	[redacted]	+	[redacted]
Performance Measurement	Technical Performance	+	Quantity of Provision	+	[redacted]	+	[redacted]	+	[redacted]
Purpose	**No explicitly stated vision of Strategic Infrastructure System purpose or vision framed on a Sector by sector basis in terms of Outputs**								

Absence of systemic or outcome based vision Sector = > Risk Performance and Need Assessment Driven by: Incumbent Solution and BAU



Characterised by: (i) Infrastructure Need framed in terms of specific solutions, sectors or technology (ii) Purpose unstated or inferred from properties of incumbent solution

In the absence of clarity of vision/purpose/aspirational outcome, there can be a tendency to infer system purpose from incumbant solutions only

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