Rainwater harvesting for the 21st Century: Identifying Deficits, Overcoming Obstacles

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Overview

Overcoming Obstacles

• Conflicting Messages

    • Unclear Guidance

        • Uncertainty on scale and skill

Identifying Deficits

• Assessing Receptivity

    • Perceptions of Health and Safety

        • Evidence for Water Saving Efficiency

            • Energy Consumption in Context

The Way Forward?

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Overcoming Obstacles

Conflicting Messages:

• CfSH – RWH needed for L5/6 (80l/p/d)

(DCLG, 2006)

Vs

• RWH increases CO_2 footprint of buildings

Latter only assesses AICC:
(EA, 2010)

• Does not include wider environmental/socio-economic cost-benefits e.g. storm attenuation/resilience/adaptability

• Uses 'future scenarios', but does not assess emerging gravity systems i.e. '*future systems*'

• **Carefully consider ALL aspects before it's ruled out!**

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Overcoming Obstacles

Unclear guidance on water-energy trade-offs:

• RWH is not the only water-saving technology that can increase energy/carbon consumption
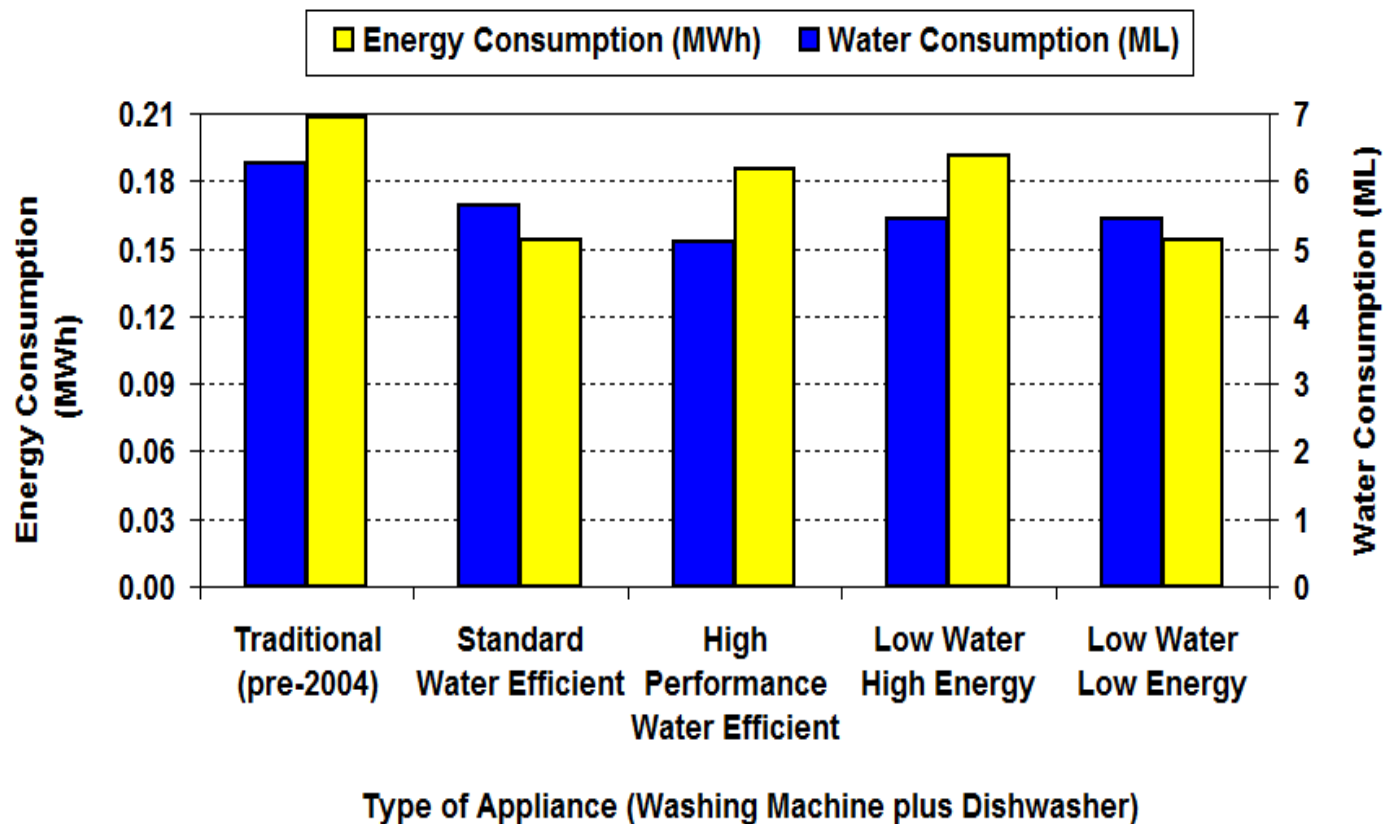
Do we stop installation of low water-high energy appliances?

Overcoming Obstacles

Uncertainty on scale and skill:

- Interviews with SMEs

Five Implementation Deficit Categories

1) Expertise and Advice;
2) Guidance and Support;
3) Visibility and Access;
4) Confidence and Communication;
5) Finance and Consultation.

"Needed to know so much about all this technical stuff, which was all too much, both time and stress-wise."

"The system is not well organised enough to support everything and you're left to sort it out."

"...feeling like the guinea pig…"

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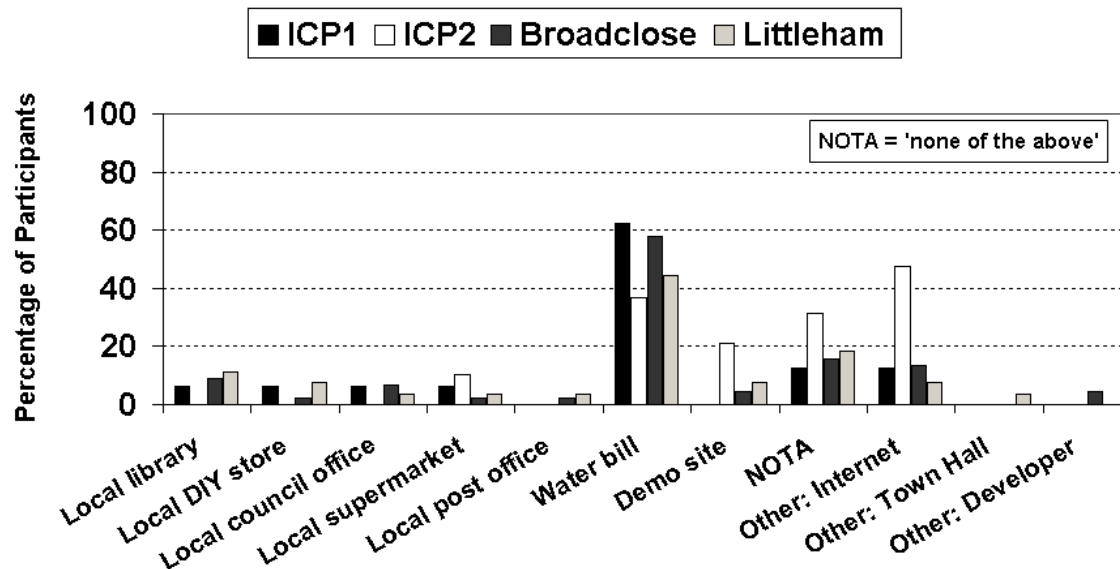# Why *aren't* more SMEs engaging with SWM/RWH?
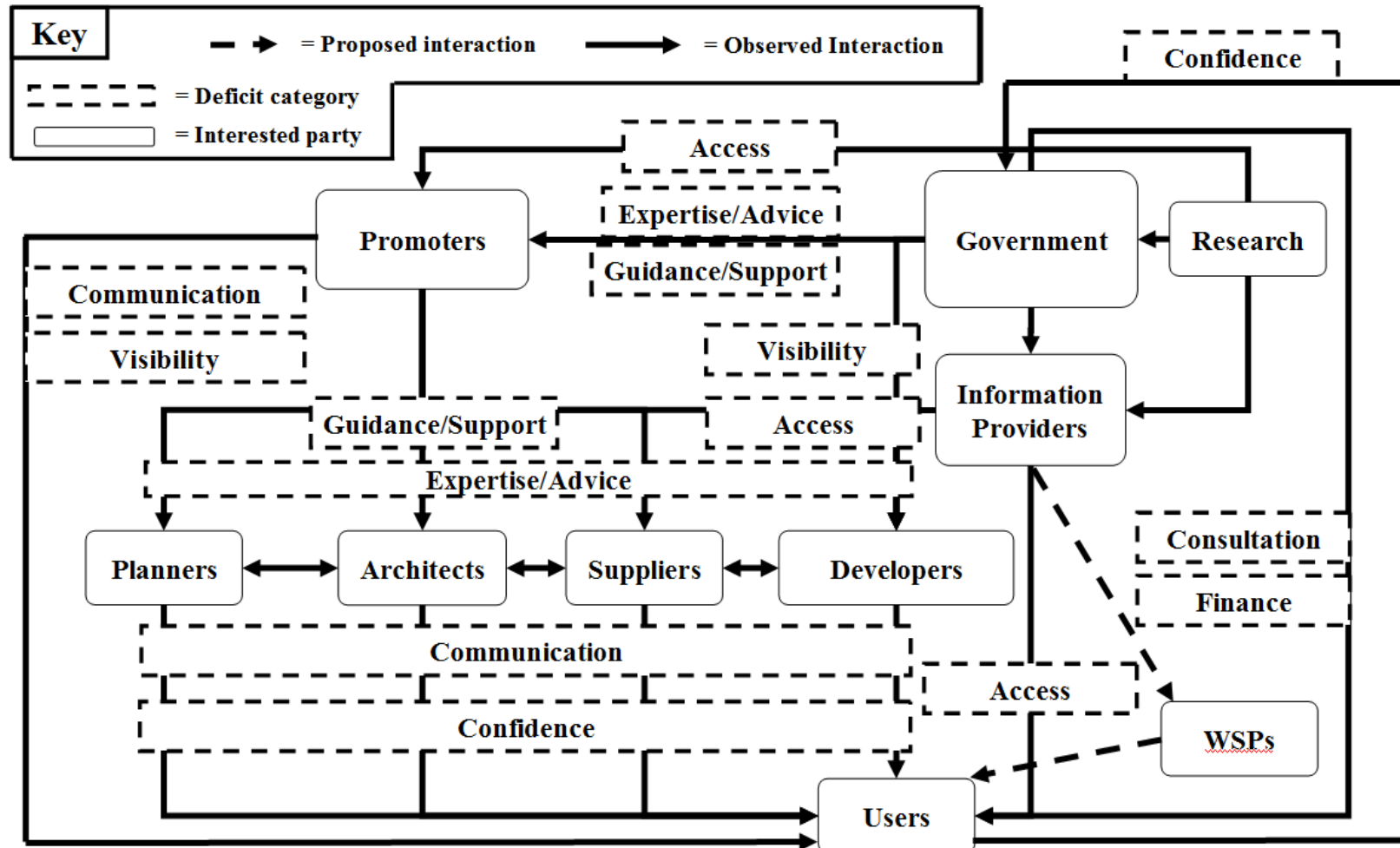
• **Primary reason: complexity of process – information gathering, support and implementation**
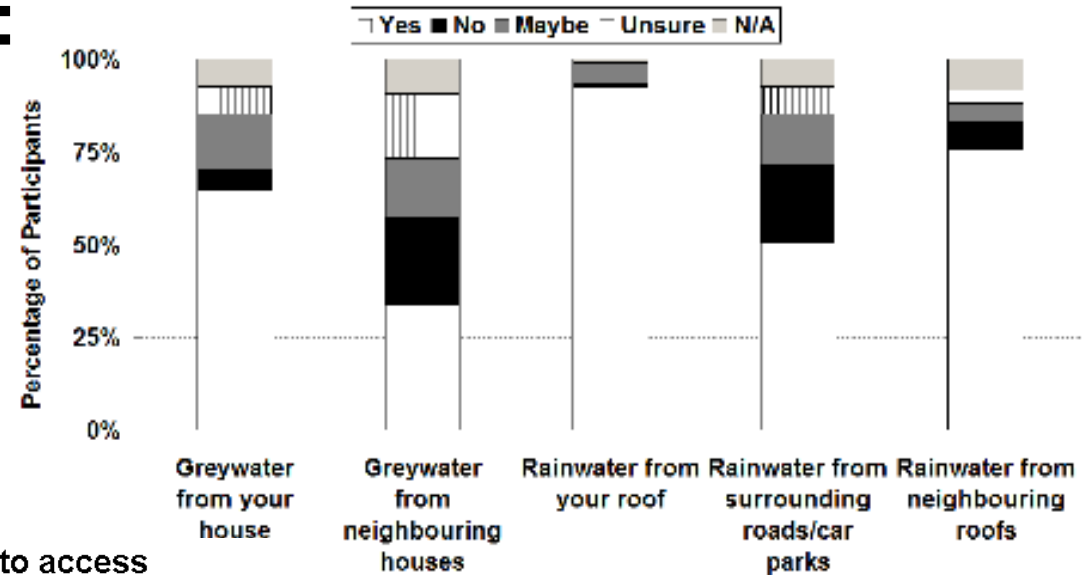
Identifying Deficits

Assessing Awareness:

Receptivity

Broadclose & Innovation Centre

Which of the following sources would you consider using to flush a WC?
(All locations)

Legend: Yes | No | Maybe | Unsure | N/A

Percentage of Participants (100%, 75%, 50%, 25%, 0%)

Categories: Greywater from your house | Greywater from neighbouring houses | Rainwater from your roof | Rainwater from surrounding roads/car parks | Rainwater from neighbouring roofs

Where would be the best place for you to access information on rainwater harvesting systems?

Legend: ICP1 | ICP2 | Broadclose | Littleham

NOTA = 'none of the above'

Percentage of Participants (0, 20, 40, 60, 80, 100)

Categories: Local library | Local DIY store | Local council office | Local supermarket | Local post office | Water bill | Demo site | NOTA | Other: Internet | Other: Town Hall | Other: Developer

'…don't see it advertised; get solar panel things through the door, but not for water'.

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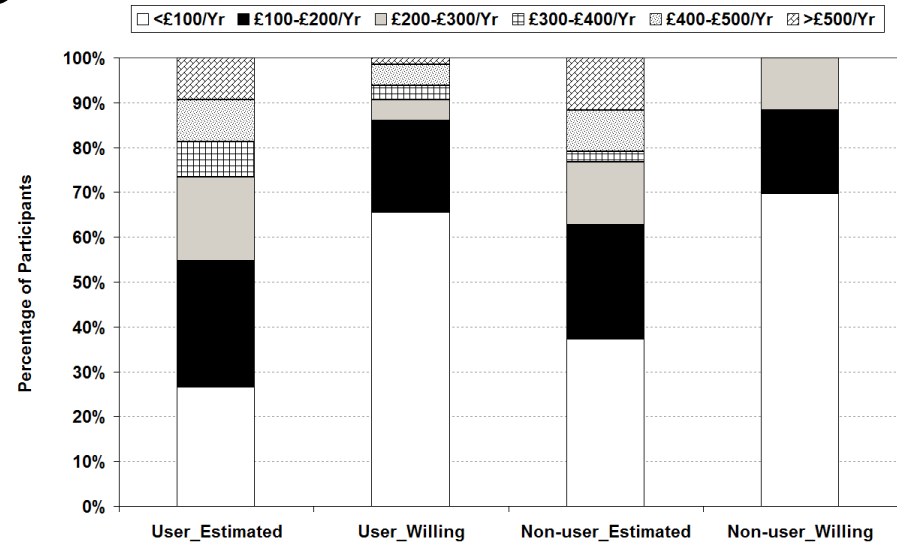Centre for Water Systems

Identifying Deficits

Assessing Awareness:

Acceptability

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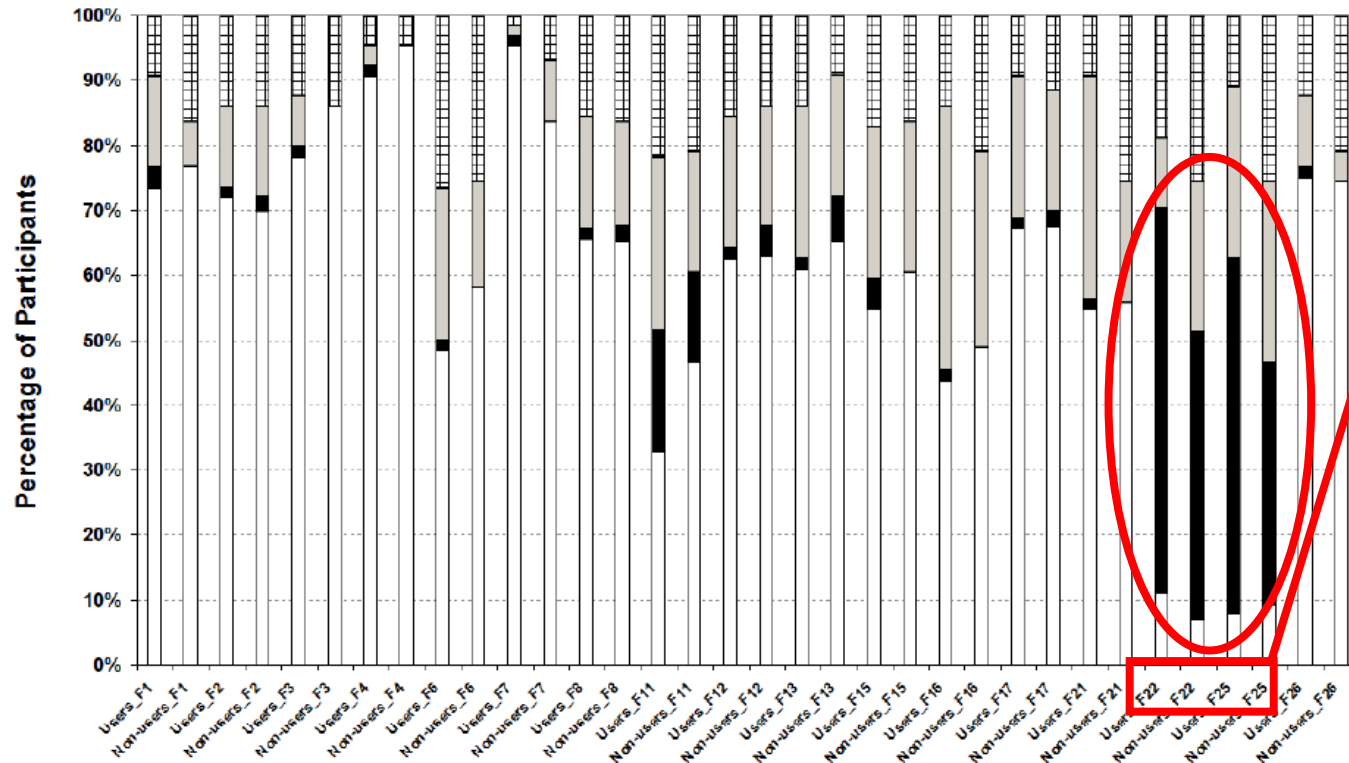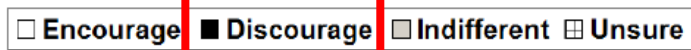
F_22: Having to pay for regular maintenance

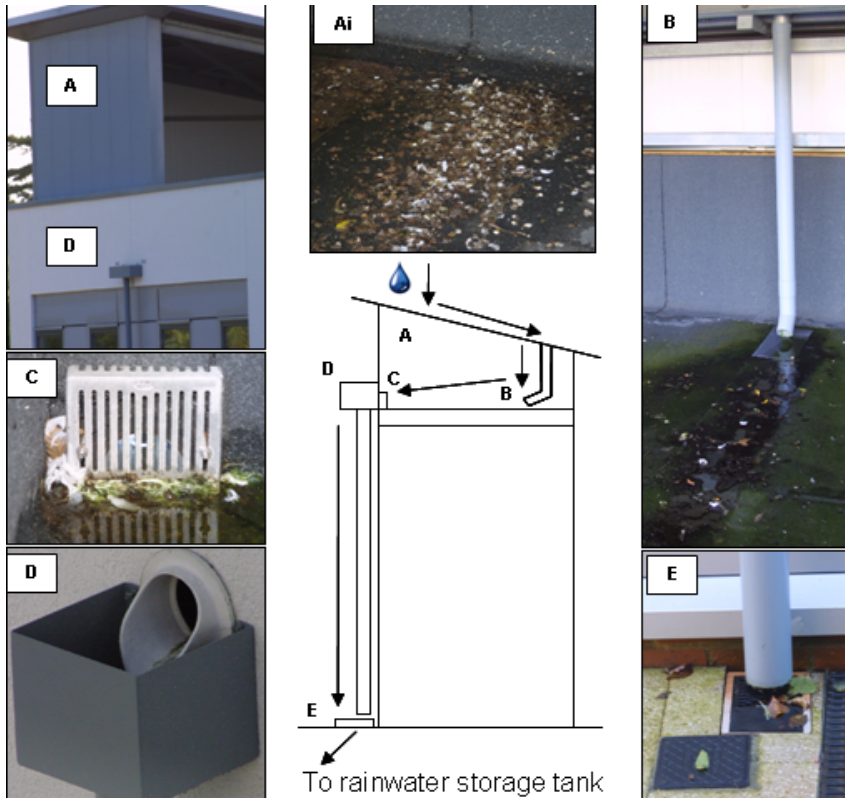**F_25: Having disruption to my home/life during installation**

Identifying Deficits
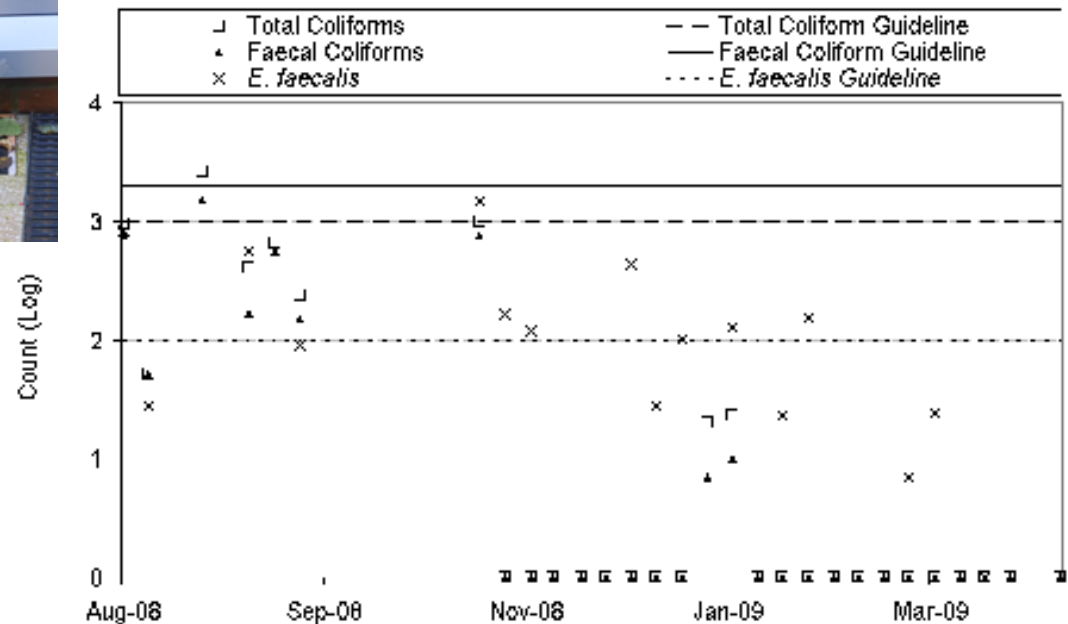
Perceptions of Health and Safety:

Innovation
Centre System

Building Design
Features

Microbiological
Quality

Identifying Deficits

Perceptions of Health and Safety:

Hazard	Exposure		Impact/DALY
Mental health	Anxiety		(-)
Illness	*E. faecalis* from WC flushing	Min	2.25×10^{-7}
		Mean	1.80×10^{-5}
		Max	2.15×10^{-4}
Illness	*Campylobacter* spp. from WC flushing with an innovative RWH system (Fewtrell *et al.*, 2009)		2.96×10^{-6}
Illness	*Campylobacter* spp. from WC flushing with a standard RWH system (Fewtrell *et al.*, 2008)		4.6×10^{-5}
Illness	*Campylobacter* spp. from WC flushing with a standard RWH system (Fewtrell and Kay, 2007b)		6.8×10^{-5}
Illness	WHO (2004) for drinking water		4.5×10^{-3}
Illness	**Suggested Screening Level (Fewtrell and Kay, 2008)**		5×10^{-5}
Lightning strike	(Fewtrell *et al,.* 2009)		2.1×10^{-6}

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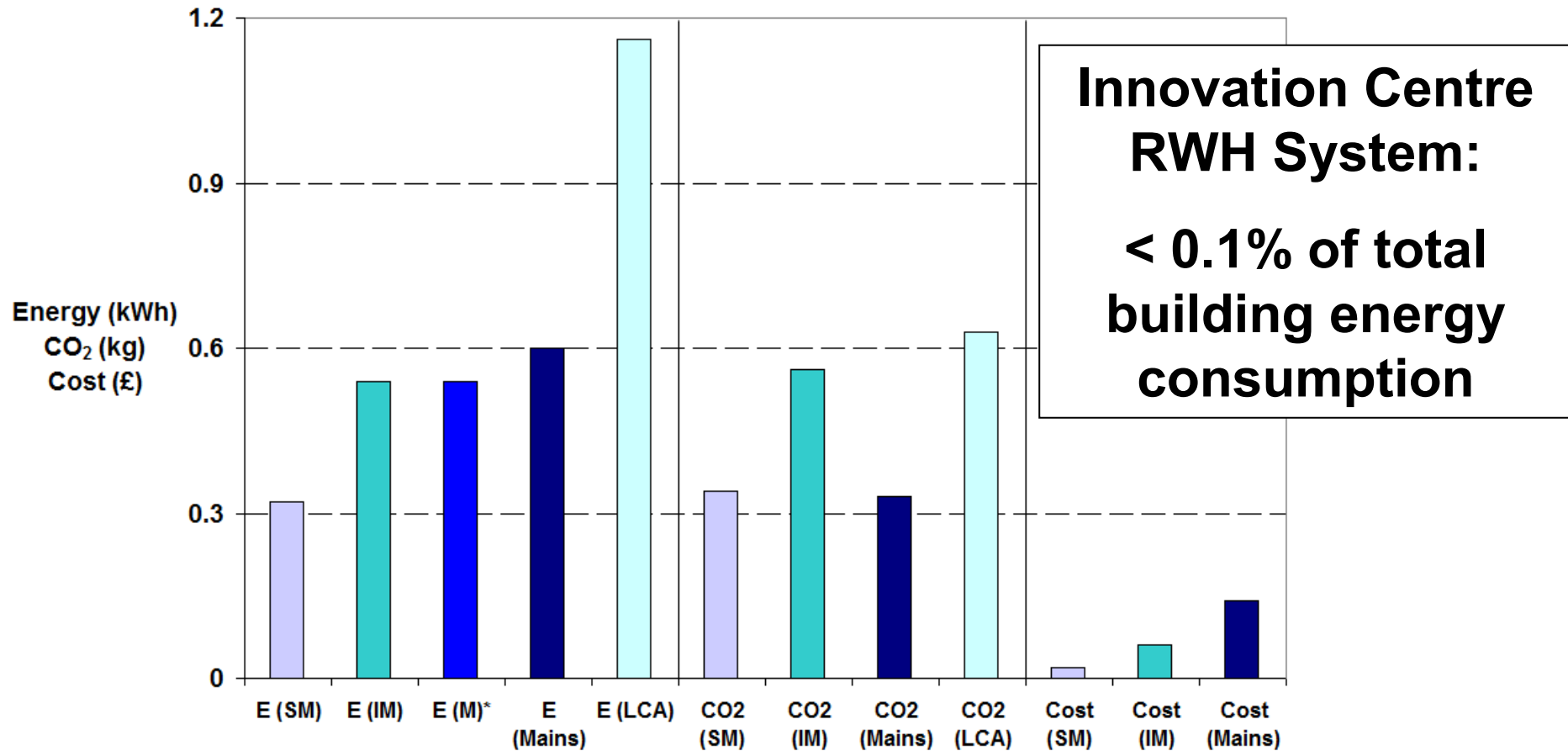
Identifying Deficits

Evidence of Water Saving Efficiency:
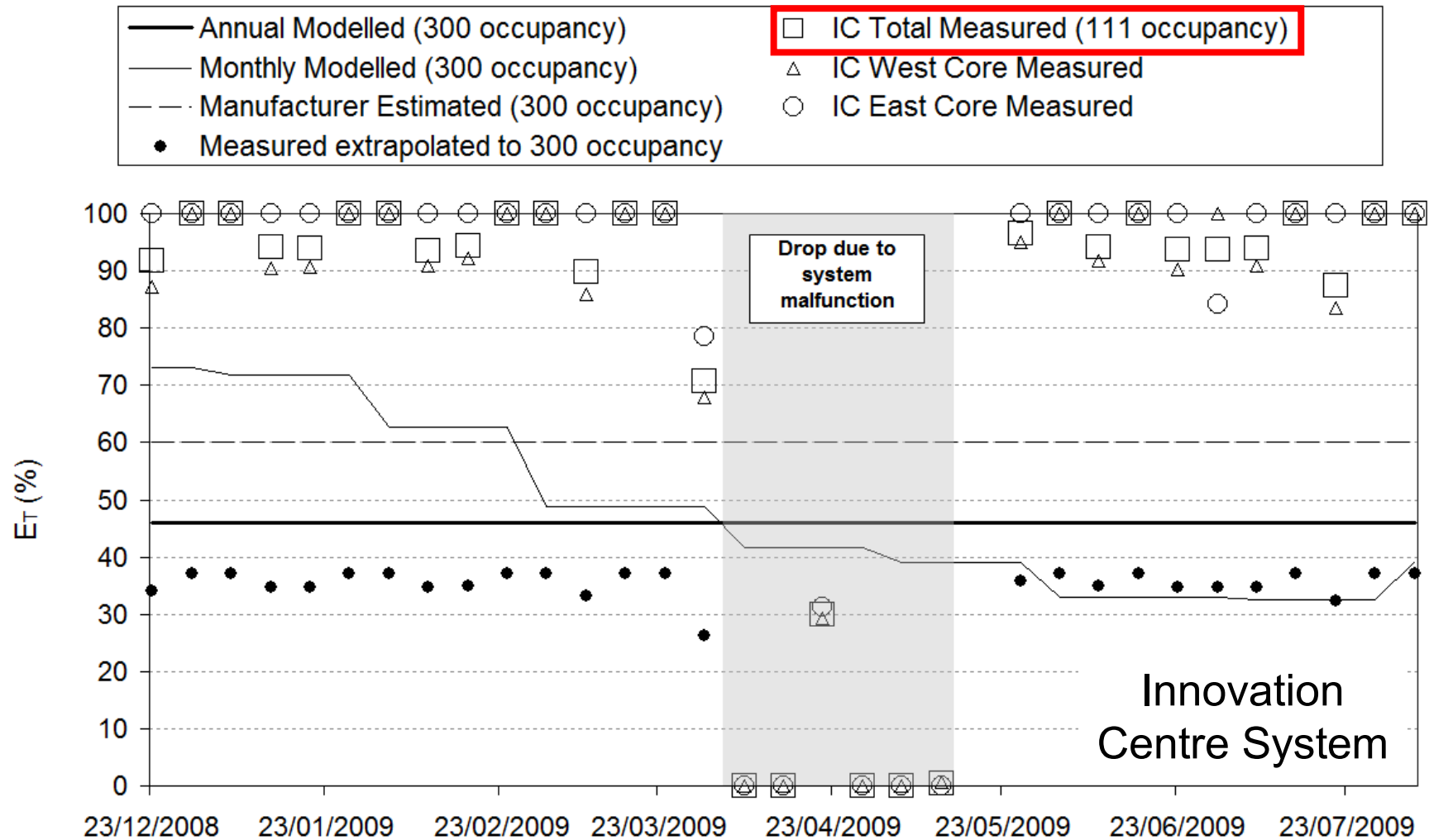
- Greater visibility of **REAL data** for **REAL systems** at **DIFFERENT SCALES**

Identifying Deficits
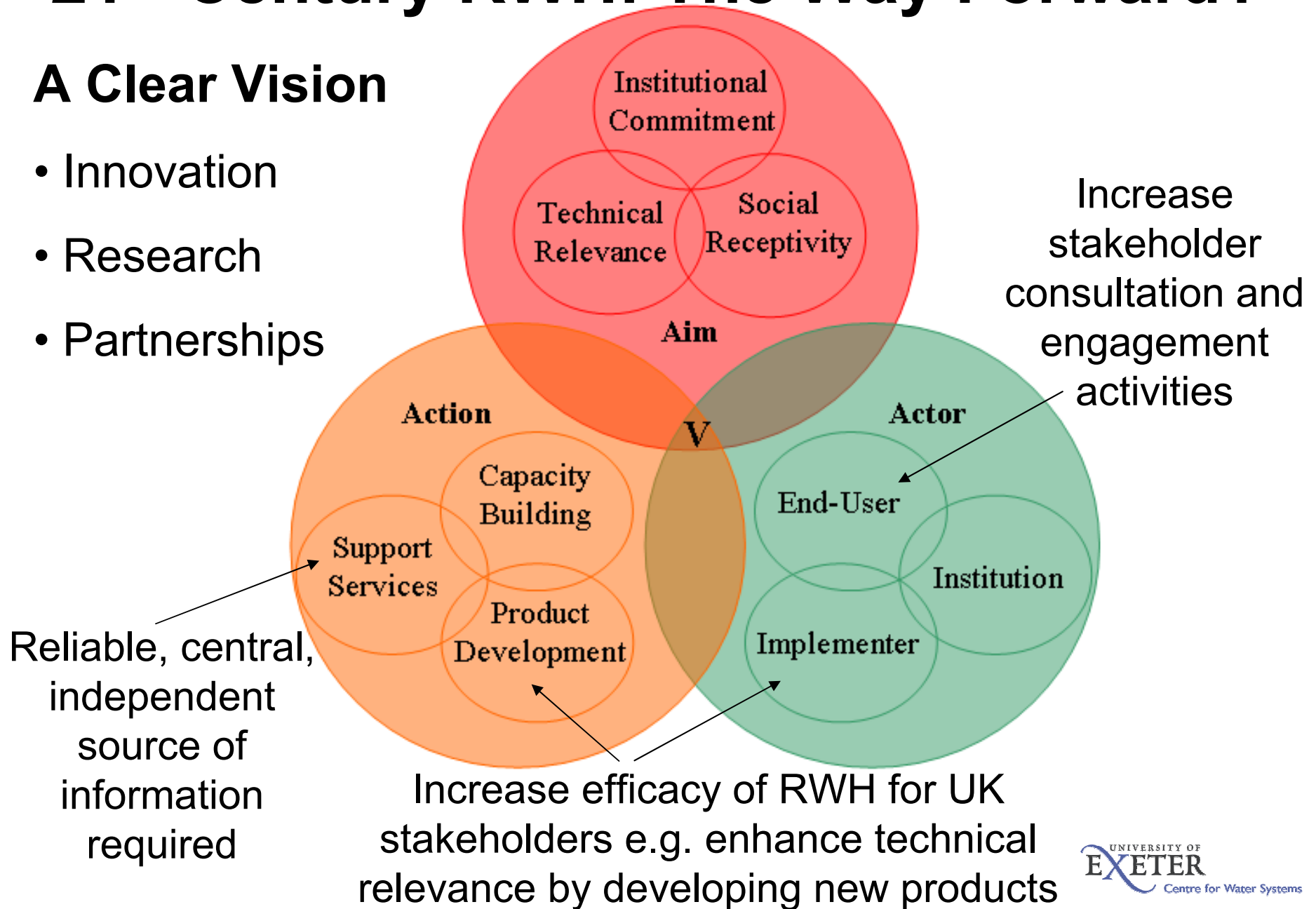
Energy Consumption in Context:

Innovation Centre RWH System:

< 0.1% of total building energy consumption

E = energy consumed	CO₂ = carbon dioxide emitted	Cost = cost of energy used	SM = Simple Method
IM = Improved Method	M = Measured	Mains = mains water equivalent	LCA = full embedded & operational impact
* = Australian Study (domestic systems; Gardner *et al.*, 2008)			

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21st Century RWH: The Way Forward?

A Clear Vision

- Innovation

- Research

- Partnerships

Increase stakeholder consultation and engagement activities

Reliable, central, independent source of information required

Increase efficacy of RWH for UK stakeholders e.g. enhance technical relevance by developing new products

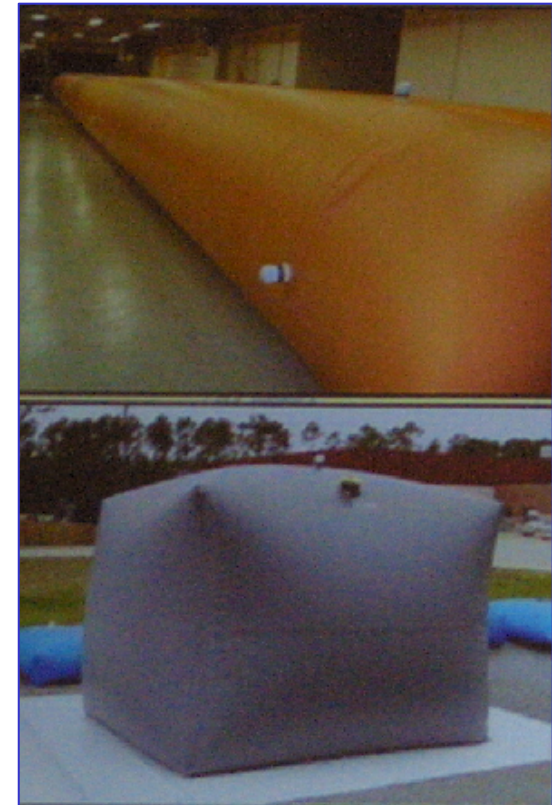UNIVERSITY OF EXETER Centre for Water Systems

Conclusions

- Consider both **social** *and* **technical** perspectives

- **Fully understand** trade-offs, deficits and obstacles

- **Clarify and overcome** deficits and obstacles

- Find a **'vision'** for RWH in the UK fit for the 21st century

- **Provide** appropriate support, guidance and expertise

- **Connect** innovation efficacy with market opportunities

- Look beyond energy and carbon to issues of adaptivity, scale and skill……

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The Future of Rainwater Harvesting in Buildings
University of Exeter, 21st January 2011

**Rainwater Harvesting for the 21st Century:
Identifying Deficits, Overcoming Obstacles**

QUESTIONS?

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