

A photograph of a modern building with a prominent cylindrical section covered in green-tinted glass panels. The glass reflects the sky and surrounding environment. To the right, a taller building with a grid of windows is visible. The sky is overcast.

# Enhancing Building Energy and Environmental Assessment Certification (BEEAC)

By

**Emeka Efe Osaji**

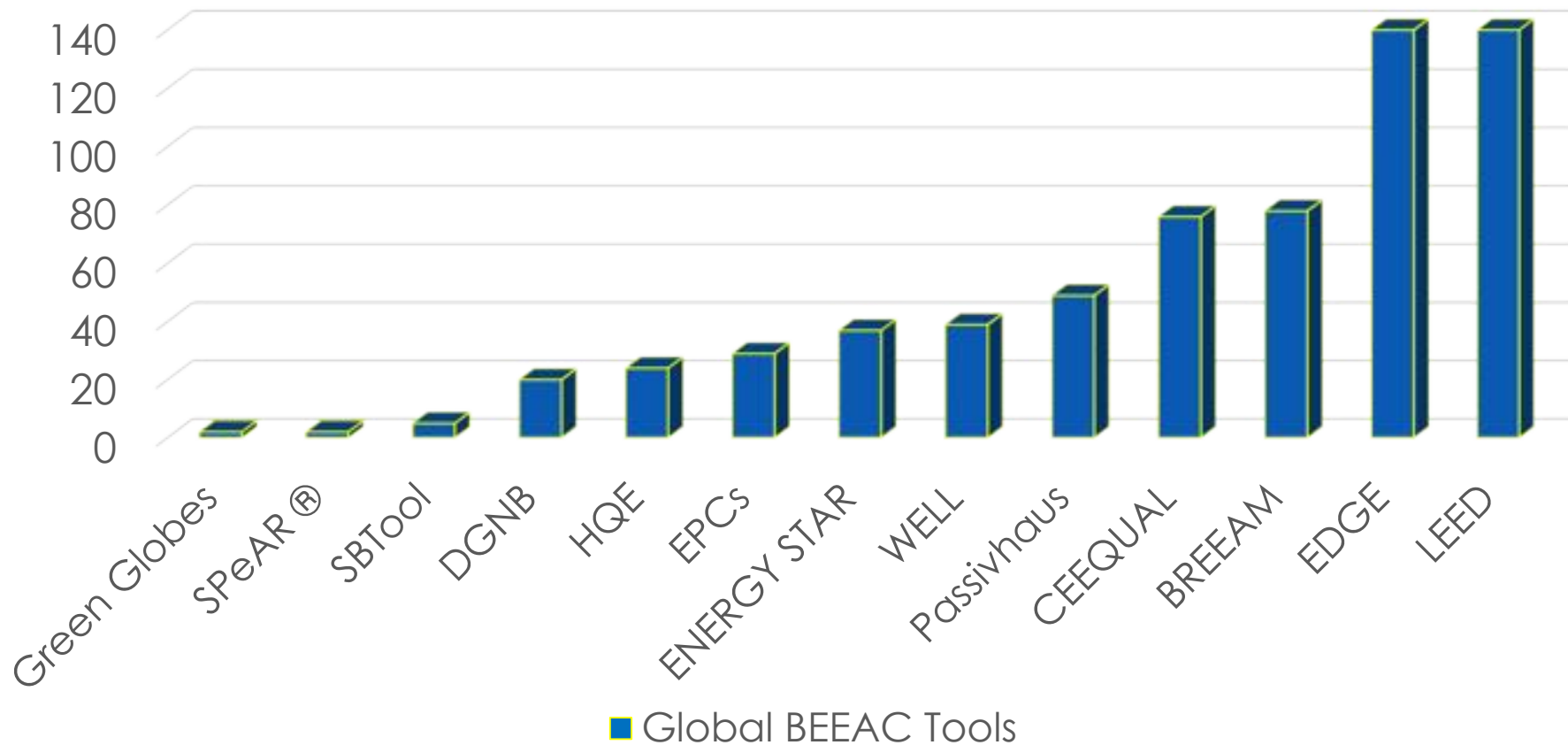
BES, BArch, MEnvSc, Assoc. AIA, MASHRAE, CEnv, CSci, FFB, FRSA, AoU

**CIBSE ASHRAE Group Webinar Presentation**

**14th November 2018 at 1pm GMT**

# Global Coverage of BEEAC Tools

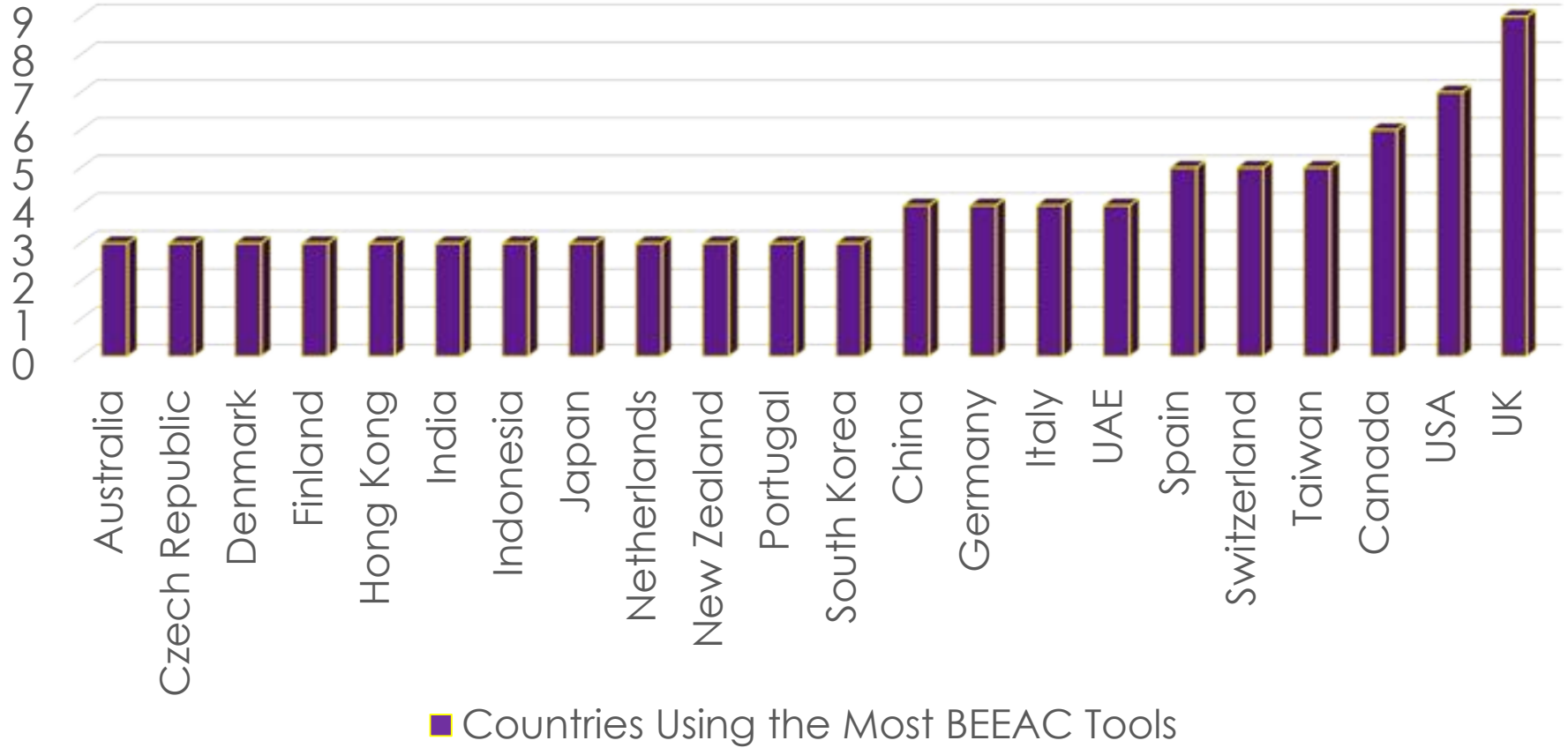
In at Least No.  
of Countries



- The Figure depicts the importance of 13 of the 55 Global BEEAC Tools based on the 78 to 140 number of countries where they are (or have been) used
- ½ of the top 4 important Global BEEAC Tools are UK Tools, i.e., **CEEQUAL & BREEAM**

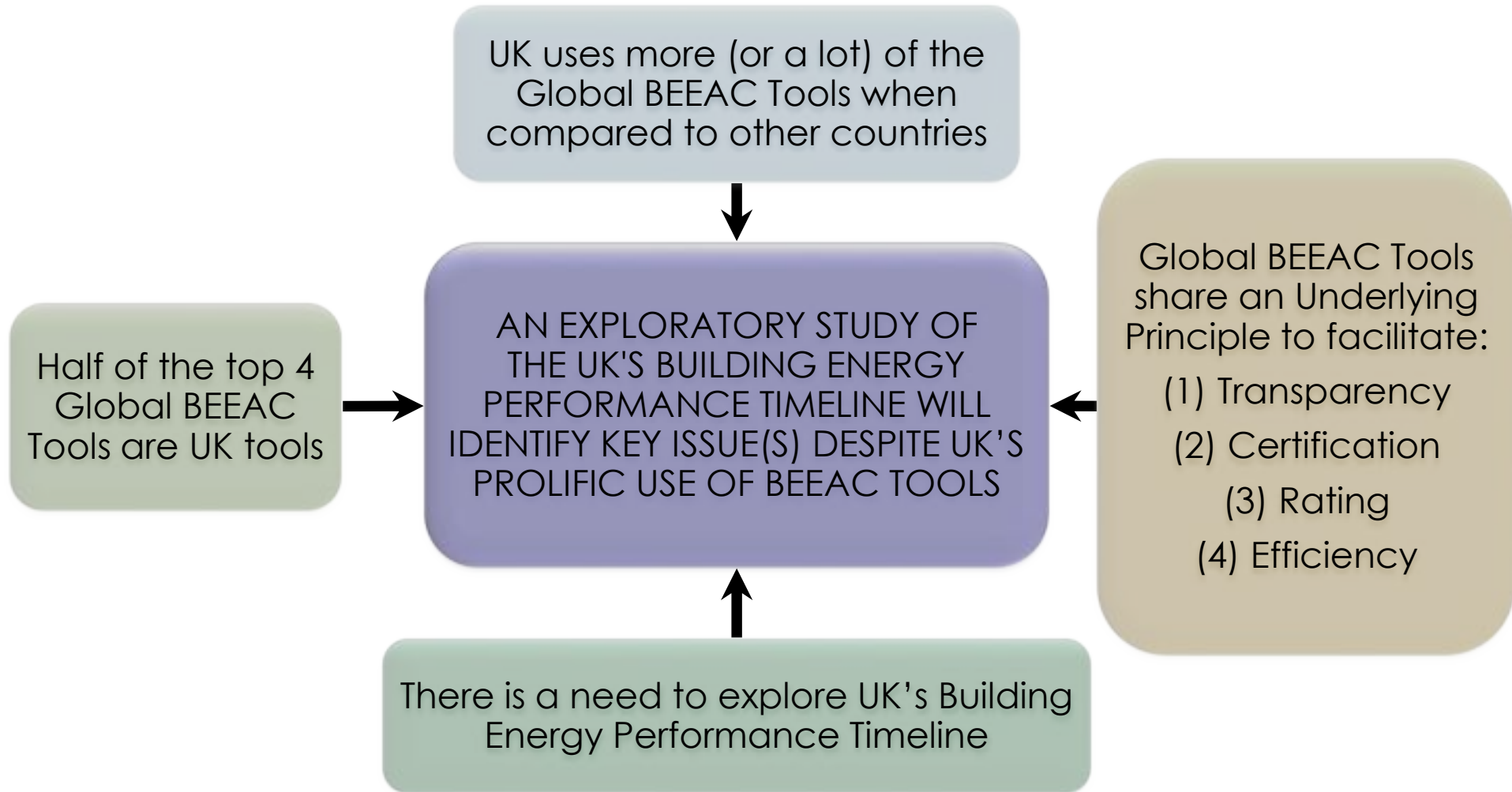
# Countries Using the Most BEEAC Tools

At Least No.  
of BEEAC Tools



○ The Figure depicts the UK uses more of the BEEAC Tools than other countries

# The Need to Explore UK's Building Energy Performance Timeline



- The Figure shows a need to explore UK's Building Energy Performance Timeline

# Key Issue Identified: Problems with DEC & ARs



DEC & AR transposed into regulations in 2007 & amended in 2012:

- By the UK Government
- In response to the EPBD

2

In Principle, Aim is:

- Transparency
- DEC Ratings
- AR Energy Saving Recommendations



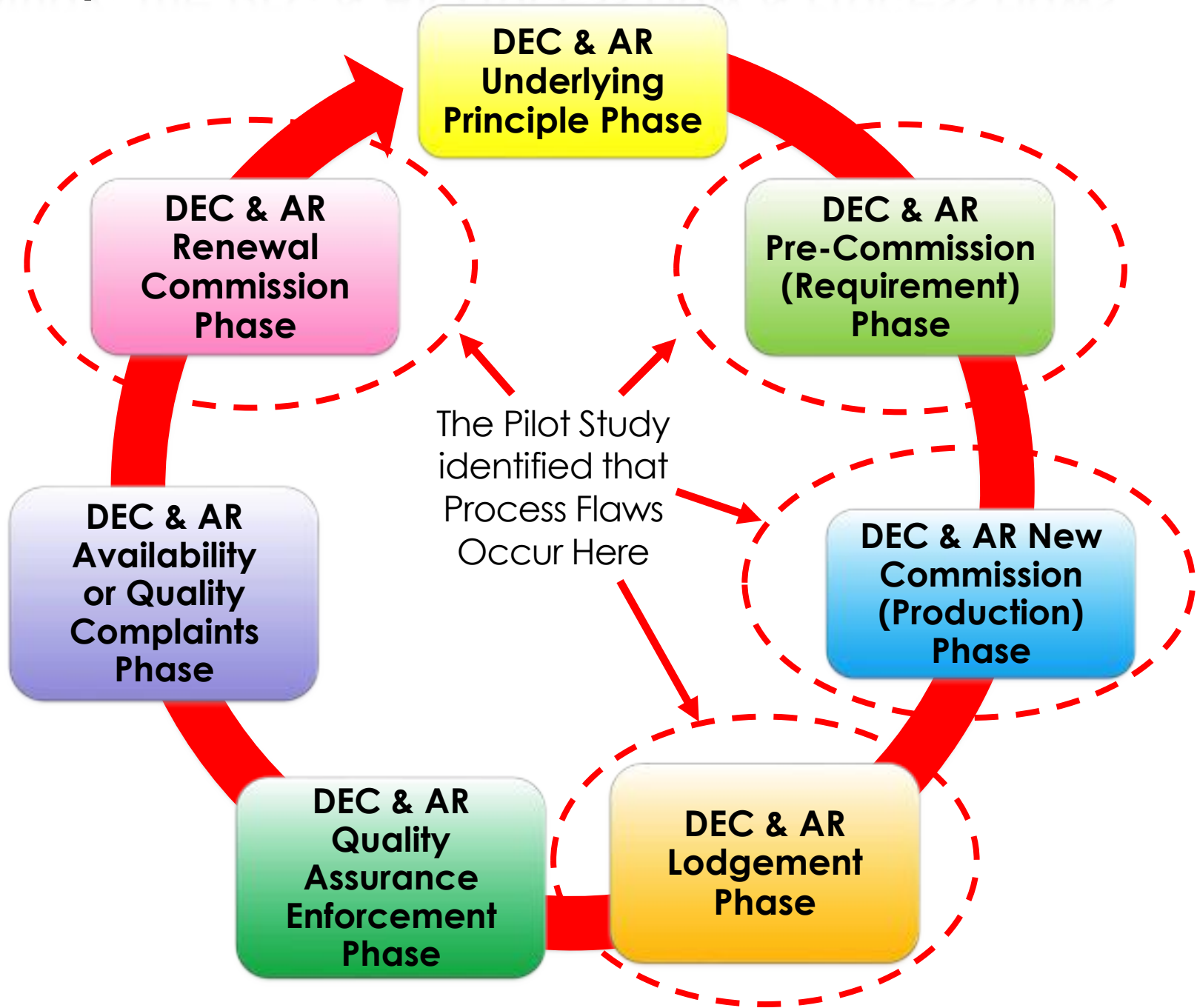
3

In Practice, Problem is:

- Non-Compliance
- Poor DEC Ratings
- AR Uncertainty
- Brexit Impacts?



# Pilot Study: The DEC & AR Process Flow & Process Flaws



# The Aim & Objectives



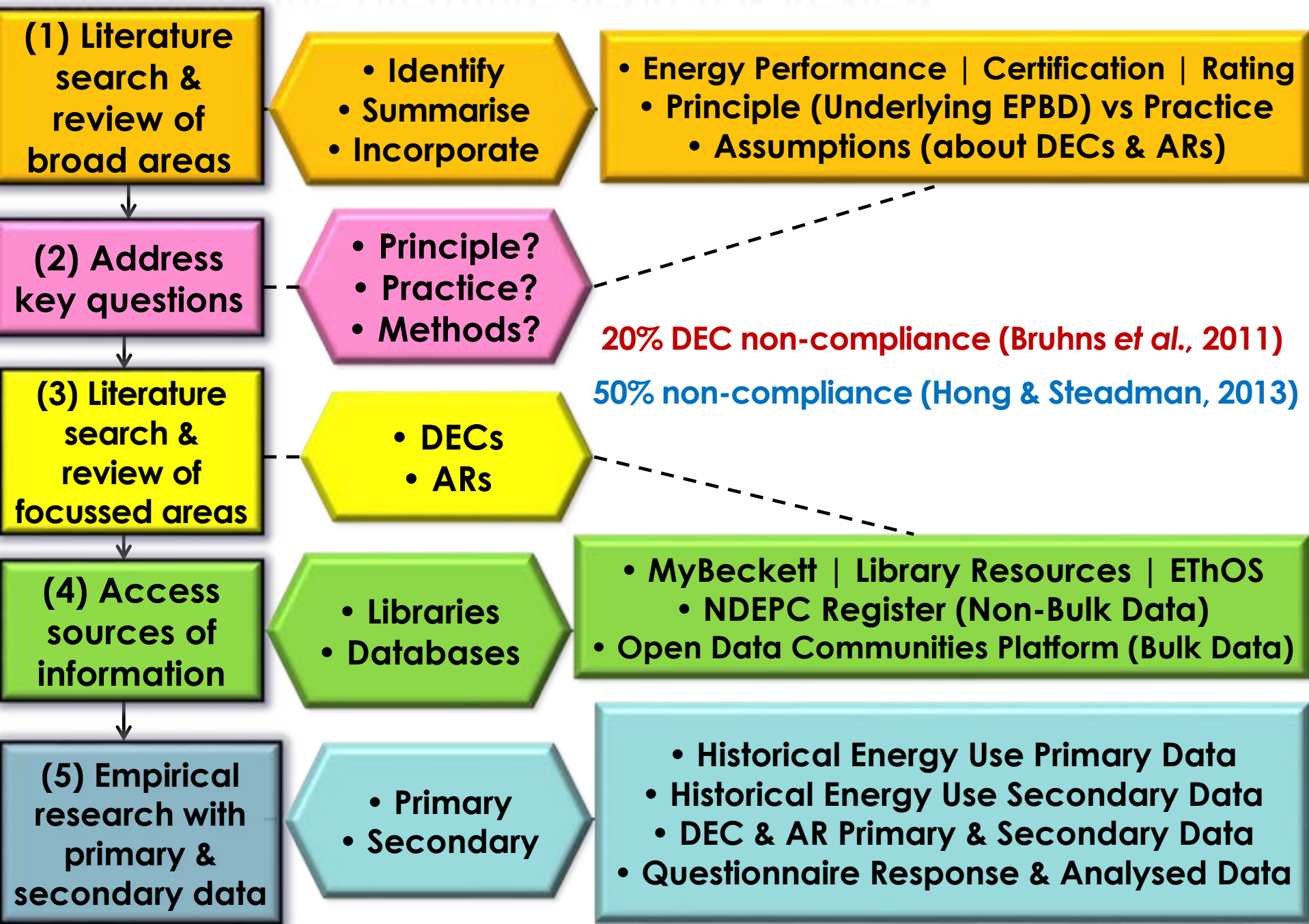
The Aim:  
To Analyse Government Compliance with the Principle of DEC's & ARs in England & Wales

## The Objectives To Determine:

- **How widespread the problems are for 510 Central Government buildings.**
- **How widespread the problems are for 215,237 buildings of 348 local authorities.**
- **Why the problems occur for Central & Local Governments in England & Wales.**
- **How the problems can be solved to improve the practice & principle of DEC's & ARs.**



# Protocol for the Literature Search & Review





# Protocol for Quantitative Analysis of Central Government DEC & ARs

**(1) Search DEC & ARs  
in England & Wales**

- Summarise Aspects
- Incorporate Key Aspects
- Update Assumptions

**(2) Address Questions**

- DEC & AR Non-Compliance? | DEC Ratings?
- Priority AR Energy Saving Recommendations?

**(3) Access Central  
Government Data &  
Information Sources**

- Access NDEPC Register
- Derive addresses for 510 DEC & ARs
- Retrieve & catalogue 104 DEC & ARs

**(4) Conduct  
Empirical Research**

- Use Primary Sources, e.g., Historical Data
- Use Secondary Sources, e.g., DEC & ARs

**(5) Conduct  
Quantitative  
Analysis**

- Use Content Analysis to retrieve 104 DEC Ratings
- Use Statistical Analysis to compare 104 Ratings
- Compare Priority AR Energy Saving Recommendations

# Findings: Comparison of UK Central Government DEC Ratings



vs.



DEC Ratings	A	B	C	D	E	F	G	N/A
No. of Buildings	0	6	14	24	24	11	25	406

# Findings: UK Central Government DEC Ratings Per Building Type



vs.



UK Central Govt. Bldg. Type	No.	DEC Ratings						
		A	B	C	D	E	F	G
Agencies & Other Public Bodies	62							
High Profile Groups	7							
Ministerial Departments	17							
Non-Ministerial Departments	15							
Prime Minister's Office	1							
Public Corporations	2							

# Findings: UK Central Government DEC & AR Non-Compliance



vs.

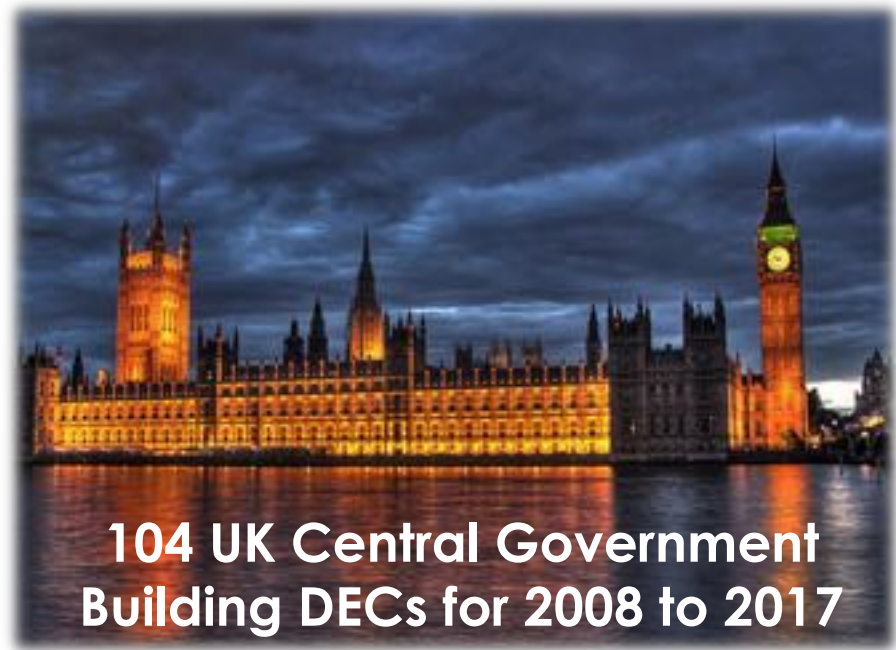


No. of UK Central Government Buildings	510
No. of Unavailable DECs & ARs	406
No. of Available DECs & ARs	104
Level of Non-Compliance	≈ 80%

# Findings: UK Central Government DEC Ratings vs. 2018 Target



**vs.**

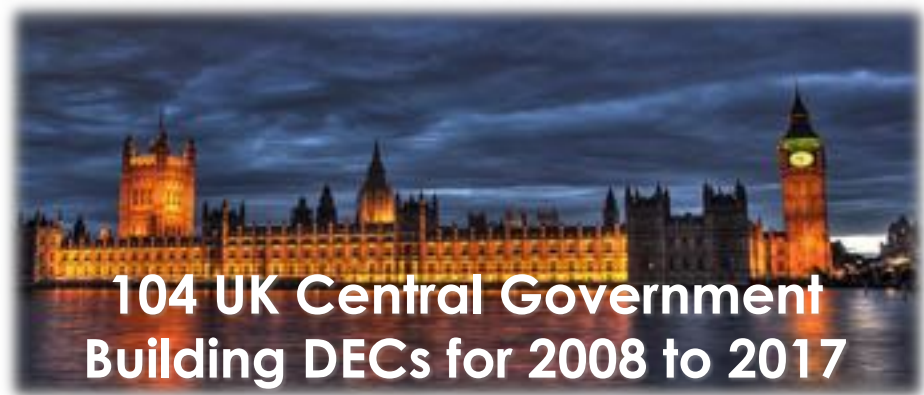


DEC Ratings	A	B	C	D	E	F	G
Government Property Unit 2018 Target	A	B	C	D			
No. of Buildings	0	6	14	24	24	11	25
<b>Total likely to meet target</b>	<b>44 (i.e. ≈ 42%)</b>						

# Findings: UK Central Government Priority AR Recommendations



vs.



## Priority AR Recommendations For DEC G Ratings

No.

Expert assessment of AC systems in accordance w/ CIBSE TM 44

10

Specific measures to reduce hot water wastage

10

Automated controls & monitoring systems to electrical equipment

9

Energy management techniques introduction

9

Expert review of lighting strategies for upgrades & implementation plan

9

Regular inspections of the building fabric to check on insulation

6

**'Fabric First' Approach Does Not Appear To Have Been Prioritised As Much As Other More Frequent AR Recommendations**

# Protocol for Quantitative Analysis of Local Government DEC & ARs (1)

## (1) Search DEC & ARs in England & Wales

- Summarise Aspects
- Incorporate Key Aspects
- Update Assumptions

## (2) Address Questions

- DEC & AR Non-Compliance? | DEC Ratings?
- Priority AR Energy Saving Recommendations?

## (3) Access Local Authority (LA) Data & Information Sources

- Access Open Data Communities Platform
- Derive information for 353 Local Authorities in England
- Derive information for 22 Local Authorities in Wales
- Retrieve, catalogue & clean 215,237 DEC & ARs for 348 LAs

## (4) Conduct Empirical Research

- Use Primary Sources, e.g., Historical Data
- Use Secondary Sources, e.g., DEC & ARs

## (5) Conduct Quantitative Analysis

- Use Content Analysis to retrieve 215,237 Ratings of 348 LAs
- Use Statistical Analysis to compare 215,237 Ratings of 348 LAs
  - Compare Priority AR Energy Saving Recommendations

# Northern England Local Government (LGA) DEC Ratings vs 2018 Target

Northern England	No. of LGAs	Percentage Distribution of Lodged DEC Ratings A (Best Performing) to G (Worst Performing)							
		Approximate %							
		A	B	C	D	E	F	G	E to G Total
North East	13	1%	6%	24%	37%	20%	7%	5%	32%
North West	40	1%	5%	20%	38%	24%	8%	5%	37%
Yorkshire & Humber	23	1%	6%	20%	35%	24%	9%	6%	39%

**Unfortunately, between 32% to 39% of Northern England DEC Ratings will not meet a Government Property Unit (GPU) target of attaining 'A to D' DEC Ratings by 2018**



# Local Government Authorities' Non-Compliance with DEC's & ARs



vs.



Number of Local Government Authorities (LGAs) in England	353
Number of Local Government Authorities in Wales	22
Total Number of LGAs in England & Wales	375
Number of LGAs in England & Wales with DEC's & ARs	348
Level of Non-Compliance	7.2 %

# Northern England DEC & AR Lodgement: If Benchmarked Against VOA (Valuation Office Agency) Statistics



**vs.**

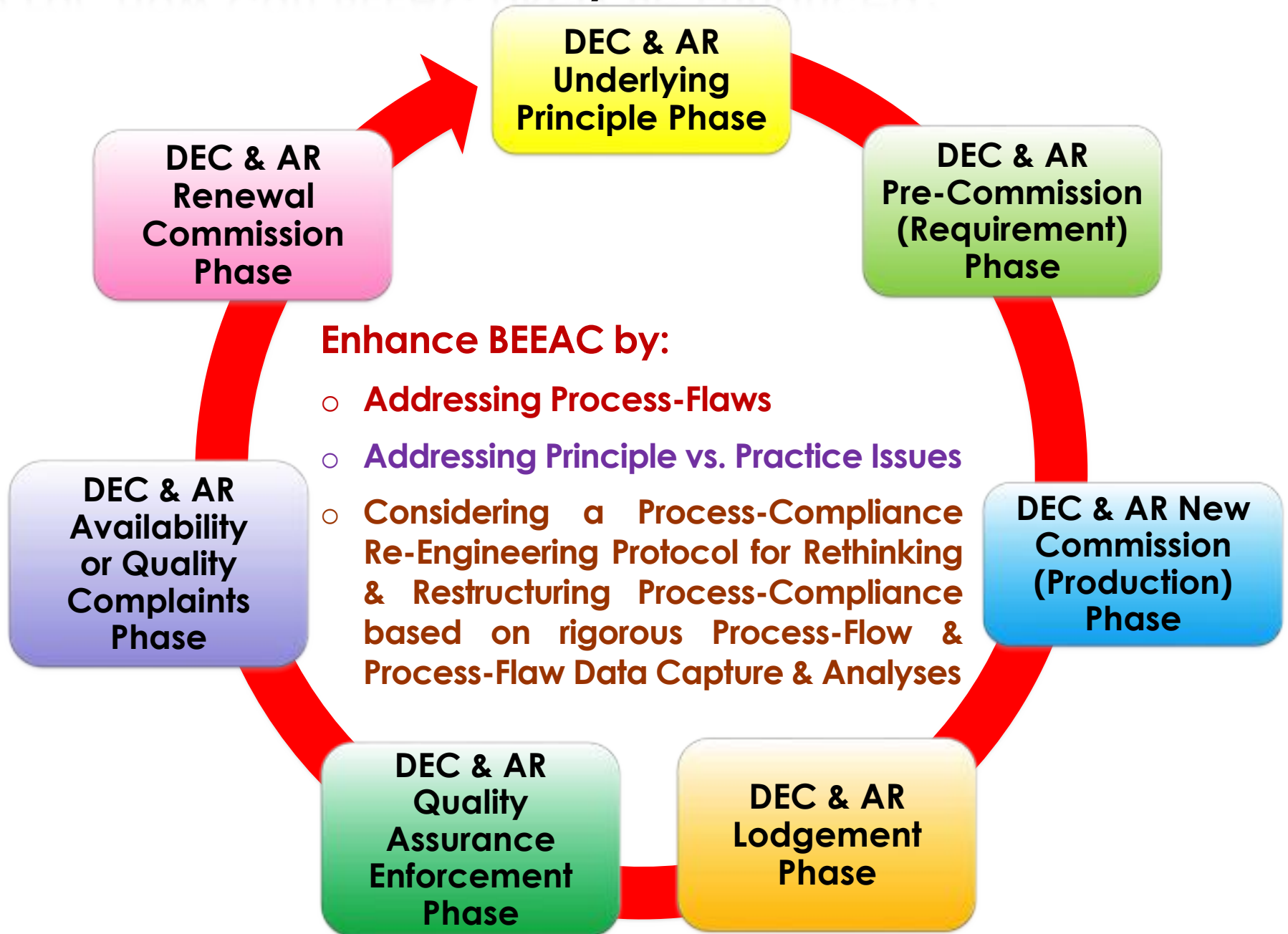


Description	North East	North West	Yorkshire & Humber	Total
Non-Domestic Rating Stock / Number of Rateable Properties	83,490	266,120	192,830	542,440
Number of DEC & AR Lodgement	11,155	29,617	22,659	63,431
Non-Lodgement	72,335	236,503	170,171	479,009
Percentage of Non-Lodgement	87%	89%	88%	88%

# Protocol for Quantitative & Qualitative Analyses of LGA DECs & ARR

England & Wales Regional & LA Distribution	No. of LAs	Percentage Distribution of Lodged DECs Rated A (Best Performing) to G (Worst Performing), & ARRs						
		A	B	C	D	E	F	G
North East LAs								
North West LAs								
Yorkshire & the Humber LAs								
East Midlands LAs								
West Midlands LAs								
East of England LAs								
South East LAs								
South West LAs								
London								
Wales	22							

# So Far, How Can BEEAC Likely Be Enhanced?



# Thank You for Attending & Listening

**CIBSE ASHRAE Group:**

<http://www.cibseashrae.org/>

**Email:**

[e.osaji@hotmail.com](mailto:e.osaji@hotmail.com)



Contact Details

**LinkedIn:**

<http://www.linkedin.com/pub/emeka-efe-osaji/70/2bb/a03>

## Have a Great Day & Feel Free to Contact Me

# References

- Osaji, E.E., Glew, D. and Johnston, D. (2017) Do Display Energy Certificates (DECs) Work? In: Gorse, C. (Ed.) **International Sustainable Ecological Engineering Design for Society (SEEDS) Conference 2017: Conference Proceedings, September 13-14, 2017, Leeds UK**. Leeds: LSI Publishing, pp. 532-553. ISBN 978-0-9955690-2-7. Available at: [http://www.leedsbeckett.ac.uk/as/cebe/seeds/seeds2017\\_proceedings.pdf](http://www.leedsbeckett.ac.uk/as/cebe/seeds/seeds2017_proceedings.pdf)



- Osaji, E.E., Glew, D. and Johnston, D. (2017) Setting an Example? **CIBSE Journal**, December, pp. 34-35. Available at: <https://www.cibsejournal.com/archive/PDFs/CIBSE-Journal-2017-12.pdf>