How to predict energy in use; a software providers viewpoint

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Introduction

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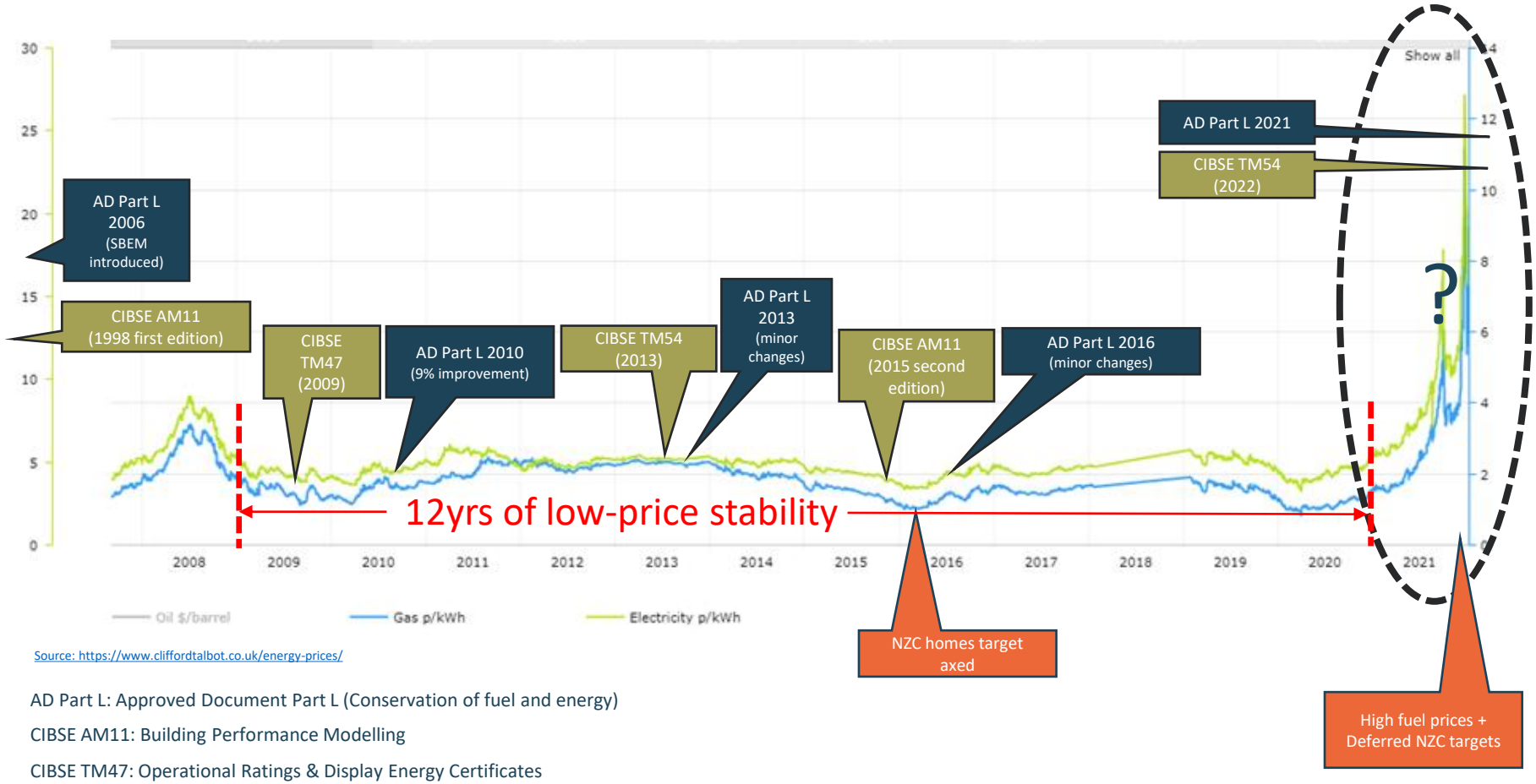
IES Services

Historical Context of Operational Energy Modelling vs. Energy Prices



Source: https://www.cliffordtalbot.co.uk/energy-prices/

AD Part L: Approved Document Part L (Conservation of fuel and energy)

CIBSE AM11: Building Performance Modelling

CIBSE TM47: Operational Ratings & Display Energy Certificates

CIBSE TM54: Evaluating Operational Energy Use at the Design Stage

Operational Energy Modelling Strategies

Type:	Software:	Compliance Requirement:	Modelling Strategy:	Characteristics:
Simple spreadsheets		Various	Manual calcs	Simple steady-state manual calculations.
Basic building energy models	VE-SBEM (Free) VE-DSM	Building Regulations Part L	Part L; SBEM & SAP.	Steady-state NCM Compliance Model.
			Part L; DSM.	Dynamic NCM Compliance Model.
Complex spreadsheets		Passivhaus	PHPP.	Detailed, steady-state energy model using PHPP.
Complex building energy models	Apache THERMAL CALCULATION AND SIMULATION ApacheHVAC HVAC SYSTEM SIMULATION INTERFACE MacroFlo MULTI-ZONE AIR MOVEMENT SunCast SOLAR SHADING ANALYSIS	GLA London Plan; Energy Monitoring	CIBSE TM54. BREEAM GN32 Energy Prediction NABERS. ASHRAE 90.1.	**Enhanced Building Energy Model (EBEM) inc.;** Dynamic computational modelling Multi-scenario modelling. Complex HVAC modelling. Meter strategy modelling. Dynamic lighting control modelling. Data expressed as a range of probable outcomes.
		BREEAM		
		NABERS		
		WELL Standard		
		LEED		
Digital twins	Apache THERMAL CALCULATION AND SIMULATION ApacheHVAC HVAC SYSTEM SIMULATION INTERFACE MacroFlo MULTI-ZONE AIR MOVEMENT SunCast SOLAR SHADING ANALYSIS + iSCAN	Net-Zero Carbon in use (new build)	NZC in practice. Various emerging protocols: • SFT Net Zero Public Sector Buildings Standard. • UKGBC Standard.	
		Net-Zero Carbon in use (existing)		**Digital-twin modelling;** Combination of **IES VE** digital model with actual recorded data using **IES iScan**.

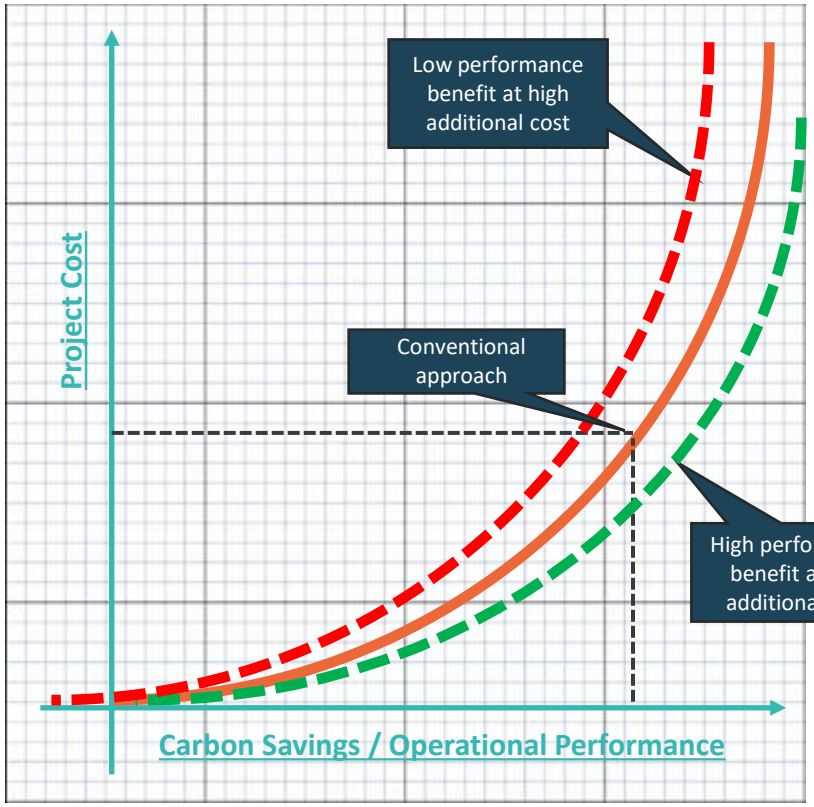
Industry Trend

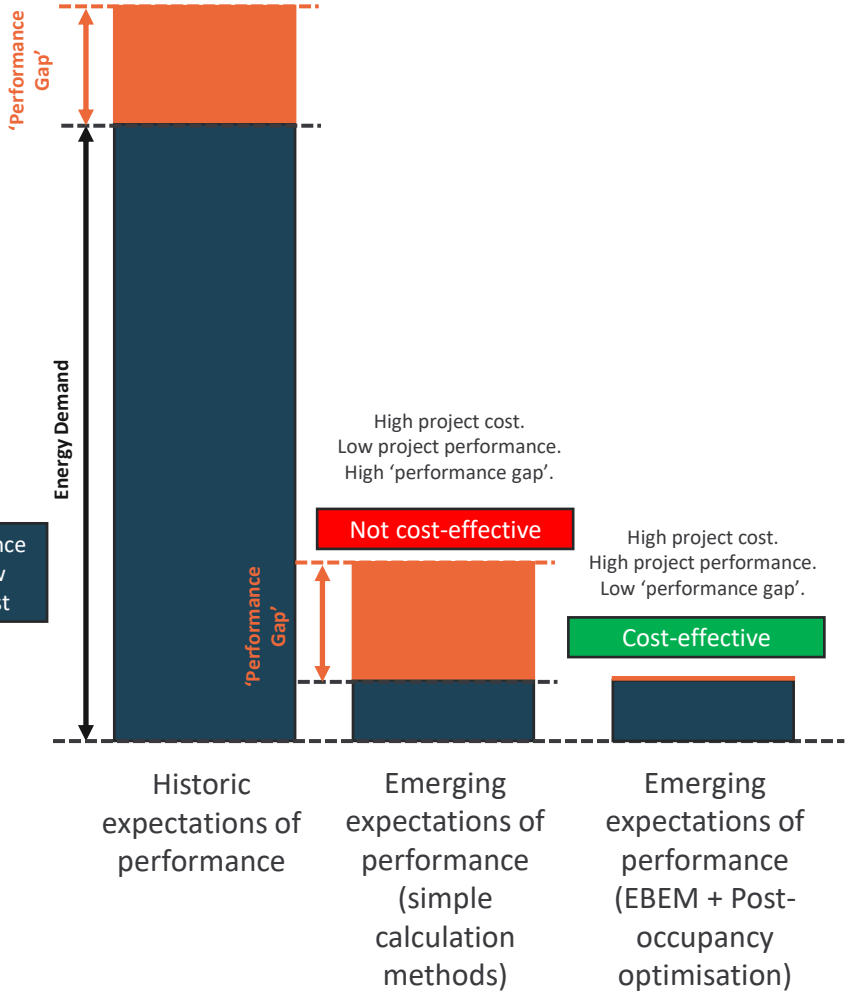
Increasing Complexity

Increasing Accuracy

Increasing data volume

Why Does Accuracy Need to Improve?





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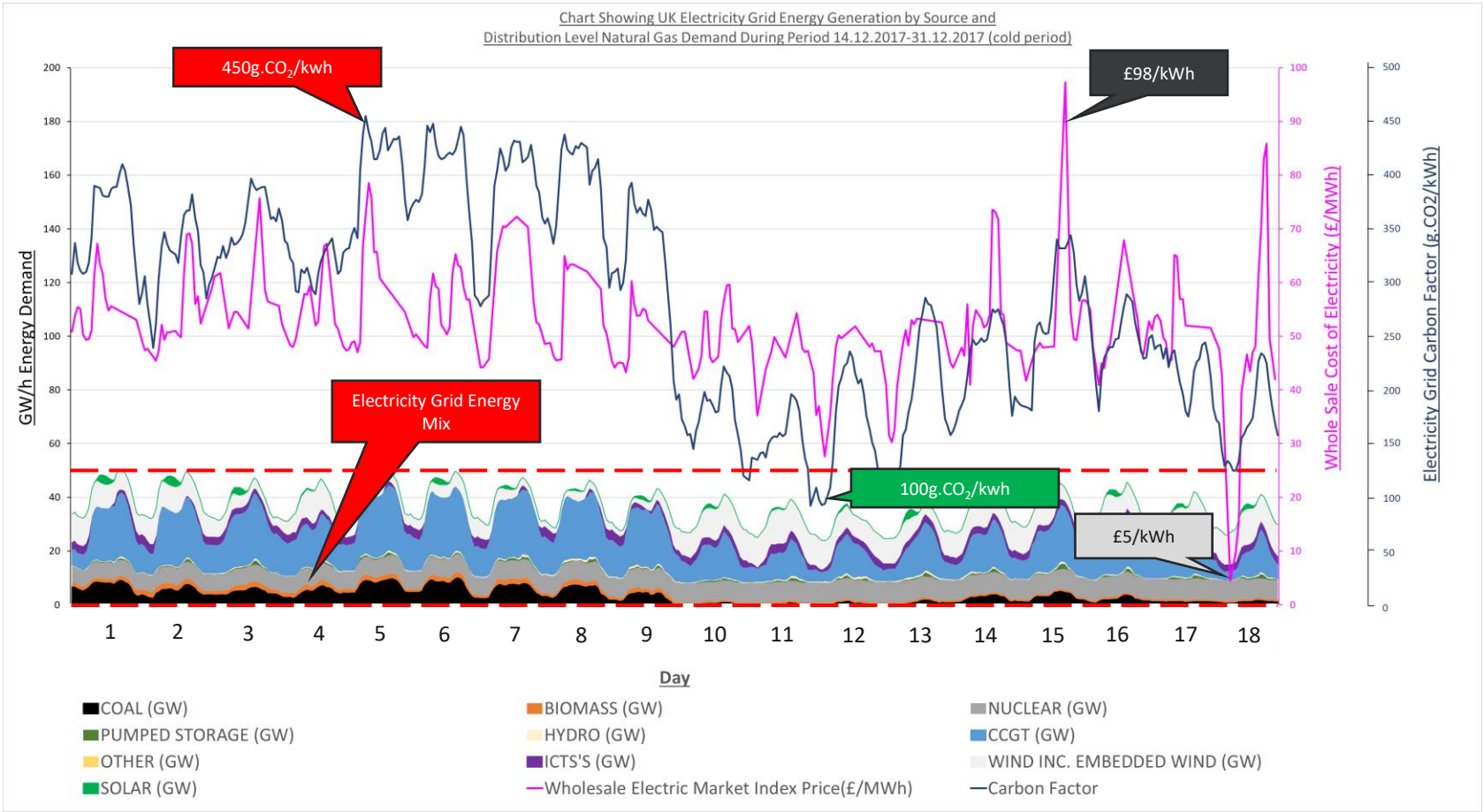


- Time of use is of increasing importance to carbon & cost performance modelling (seasonal & daily).
- Highly granular simulations are necessary (sub-hourly).
- Emerging simulation and calculation tools will be required to assess the impact of load-shifting.

Enhanced Building Energy Models (EBEMs)

Required Input:

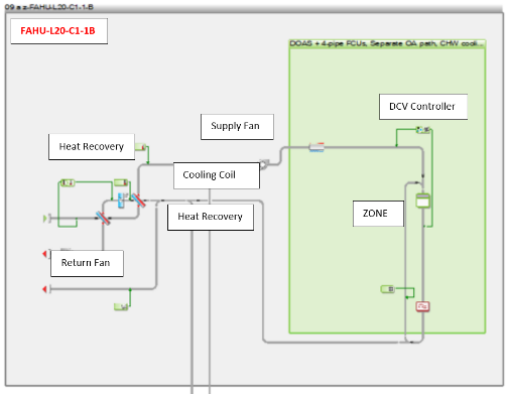
Accurate Operational Energy Model.

Desired Outcomes:

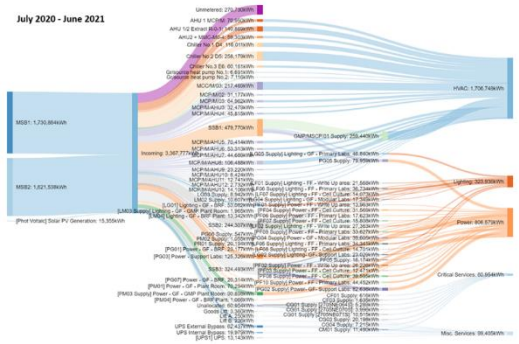
Accurate Operational Carbon Model.

Accurate Operational Cost Model.

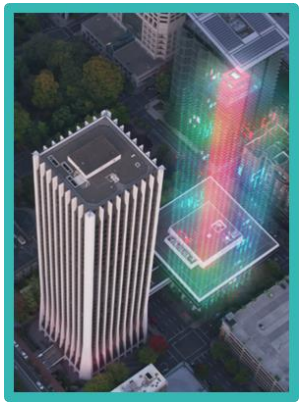
Apache HVAC modelling.



Detail Metering Strategy modelling.



Post-occupancy calibration via digital twin.



Summary:

- Growing demand to reduce ‘the compliance gap’ via detailed modelling.
- Growing usage of ‘Enhanced Building Energy Models’, such as CIBSE TM54.
- From June 15th Non-domestic buildings >1,000m² will require a forecast of actual energy use via a methodology such as CIBSE TM54.
- Accurate modelling will be essential for the transition to Net Zero-Carbon.

Thank You

Any Questions?

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