

## Customer Emission Level Definition

### *C4 System Technical Performance*

#### PS1, Question 1:

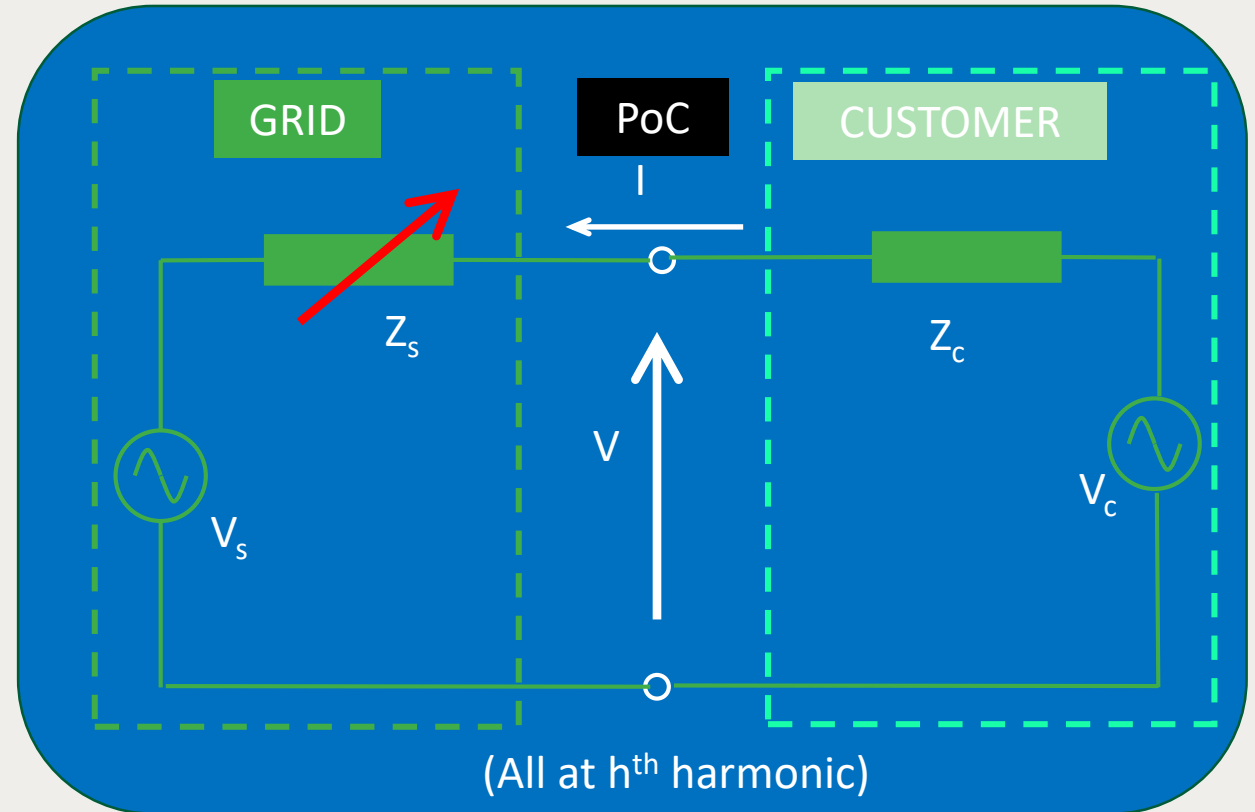
On the subject of management of power quality disturbances in evolving power systems, what are the difficulties/drawbacks with the existing approaches which require focus/development ensuring that the regulatory mechanisms, engineering methodologies and solutions are practical, robust and cost-effective?



Timothy J Browne, Australia

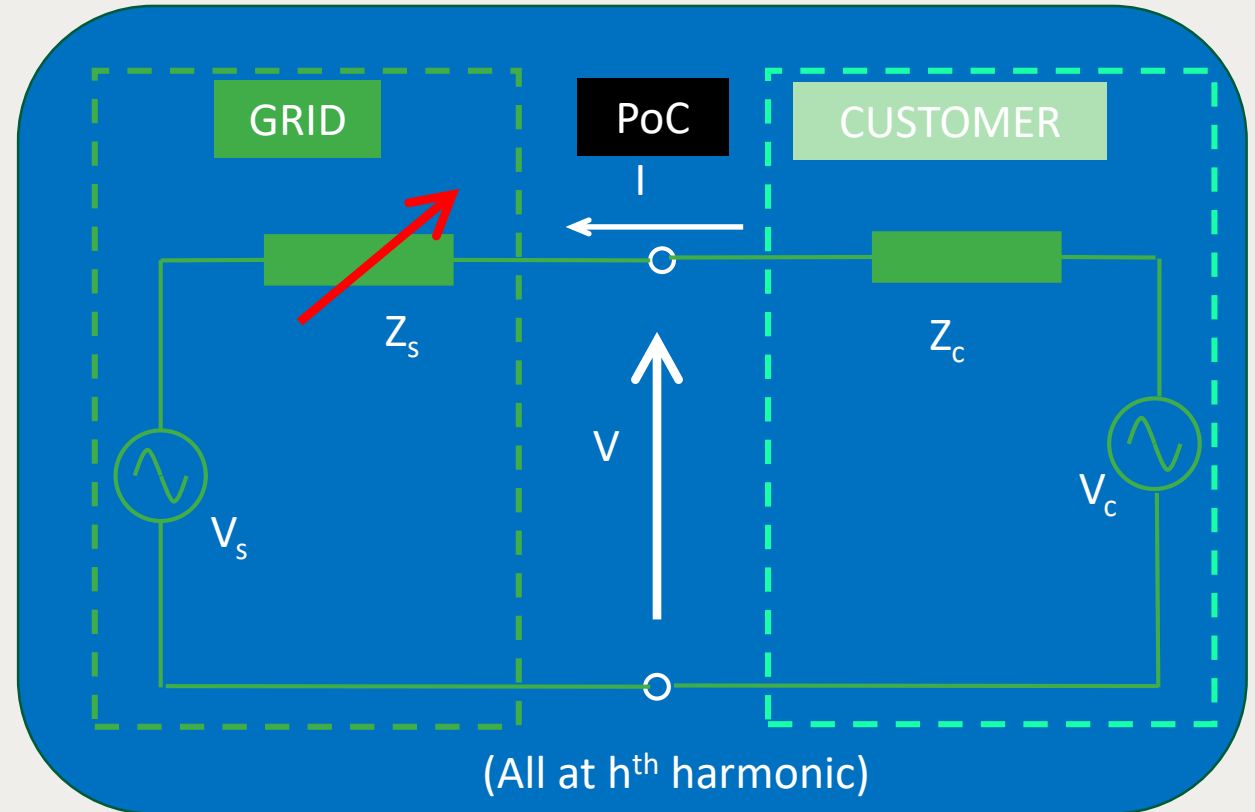
# Customer emission level is not well defined

- Traditional approach considers only harmonic sources on the customer side ( $V_c$ )
- Implied definition ignores impact of  $Z_c$  upon background sources  $V_s$
- Paper 10428 proposes “Global” method as an alternate approach to the customer emission level



# Allocated customer emission levels are onerous when incorporating multiple network operating conditions via impedance polygons

- Allocated emission level is determined from a single operating condition  $Z_s$
- Is compliance assessment meaningful if based solely on worst-case  $Z_s, Z_c$  combination?
- Customer still has to meet allocated  $E_{U_{hi}}$  even when  $Z_s, Z_c$  combination is not worst-case



# Limit structure alignment with grid objectives warrants revisiting

297 limits / plant  
(594 if considering separate limits  
for background amplification)

→ Can we reduce to only a few  
indices c.f. 49 individual limits  
per phase per aggregation  
interval?

e.g. Barr & Gosbell, “Power System  
Harmonic Limits for the Future”, *Proc.  
ICHQP, 2014*

- Opportunity to accept higher emission levels at one harmonic in return for reduced limits at other harmonics?

Renewed focus on managing long-term effects of harmonics on connected equipment