GC0110 & GC0111 LFMS-O and FFCI

Energy Networks Association

GCRP

26 April 2018

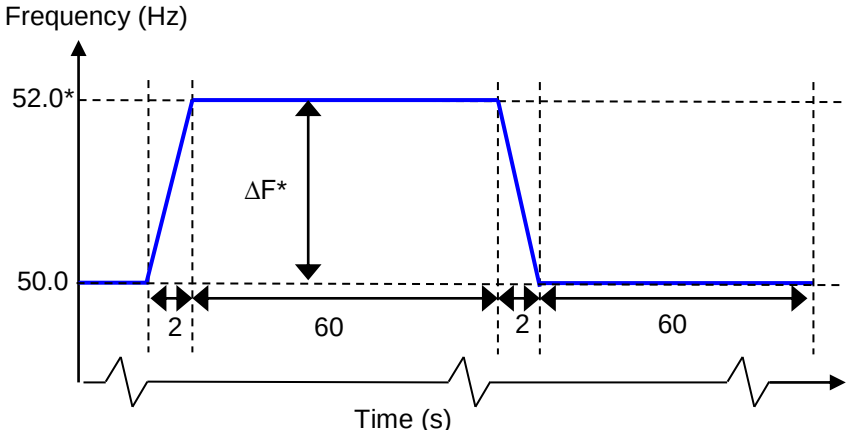
Agenda

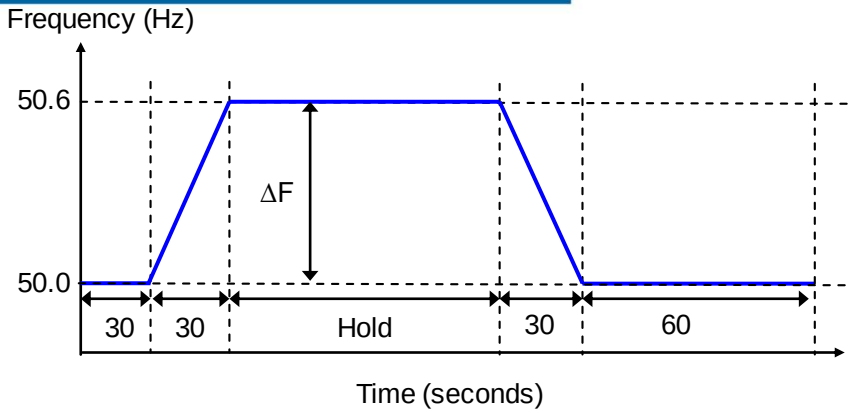
1. GC0110 LFMS-O for Type A and B
   GC0111 FFCI

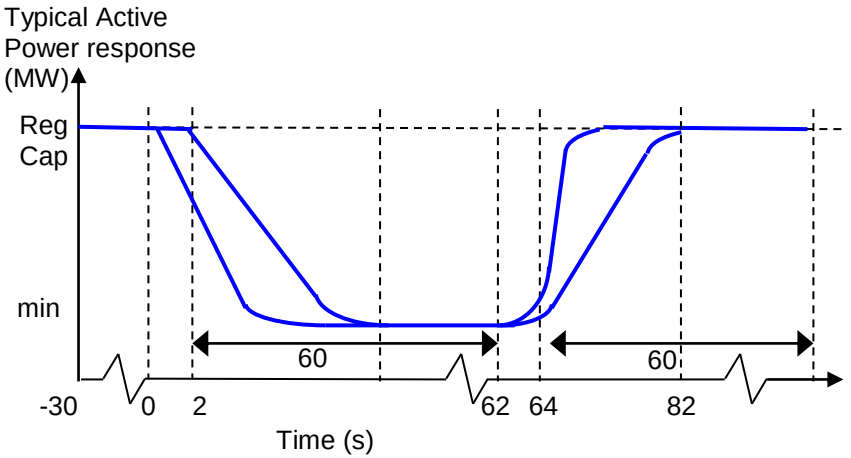
LFSM-O

- A new requirement for Type A and B distribution connected generation
- Not historically provided in isolation for Large or Medium Power Stations as they have always provided FSM
- LFSM-O testing requirements historically are mixed in with FSM tests
- Point of contention is how fast the response needs to be delivered – current G Code drafting is “within 10s, as much as possible”
- When taken in isolation of FSM, ie for Type A and B only, DNOs and Generators need to understand what constitutes compliance
- Also an issue in that the physical characteristics of modern high efficiency clean burn engine driven synchronous machines are slow to respond to active power set point changes

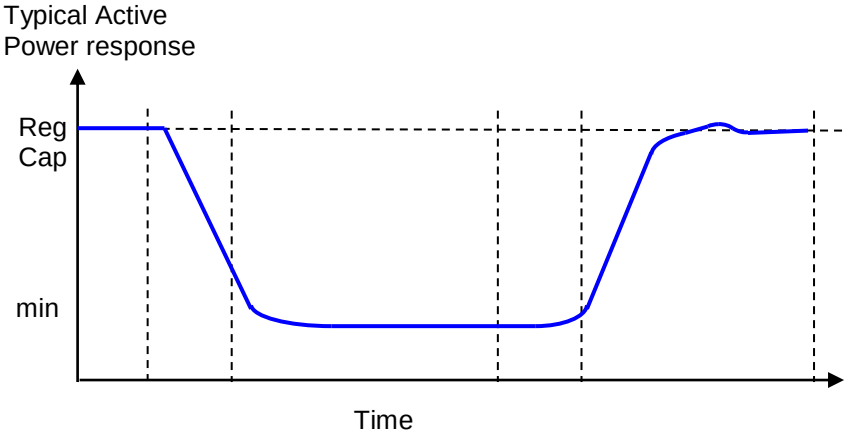
Existing G99 Drafting







Step Response



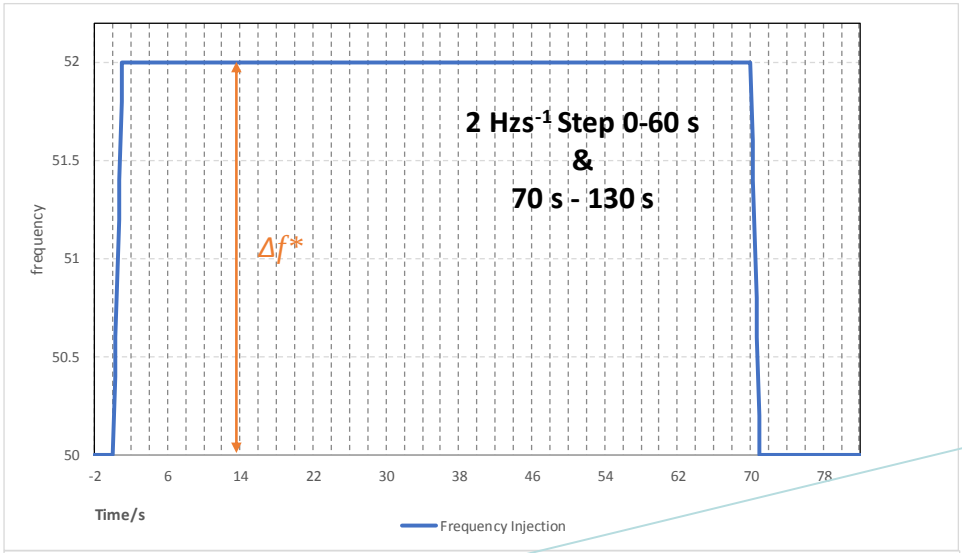
Ramp Response

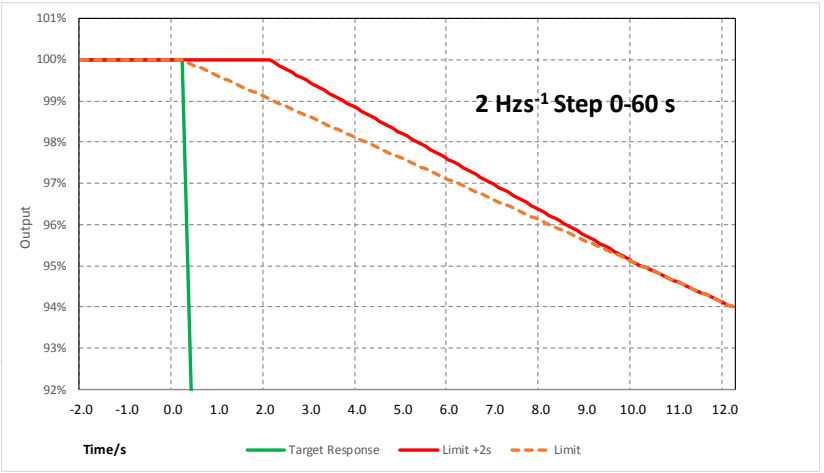
Note that the responses are “typical”, not “required”

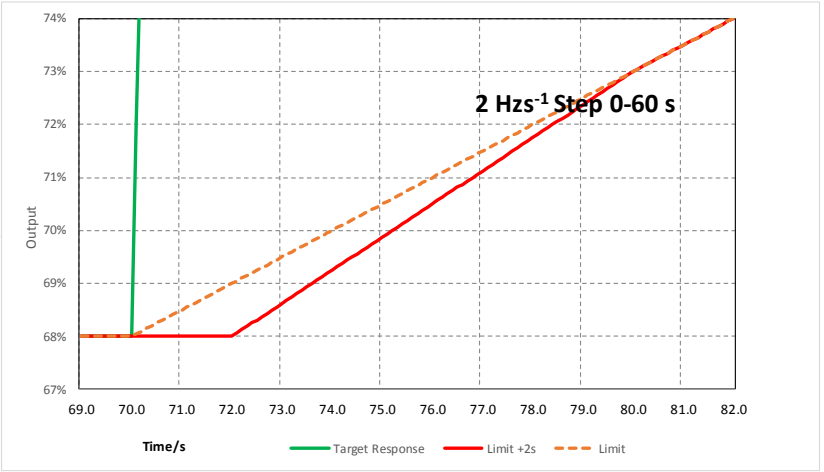
“As much as possible”

- Typical/Expected LFSM-O droop is 10%; FSM droop 3% to 5%;
- LFMS-O is therefore ≈ 50% of FSM response
- So as much as possible is proposed to be 50% of the equivalent FSM response – but capped at 5% of Registered Capacity in 10s

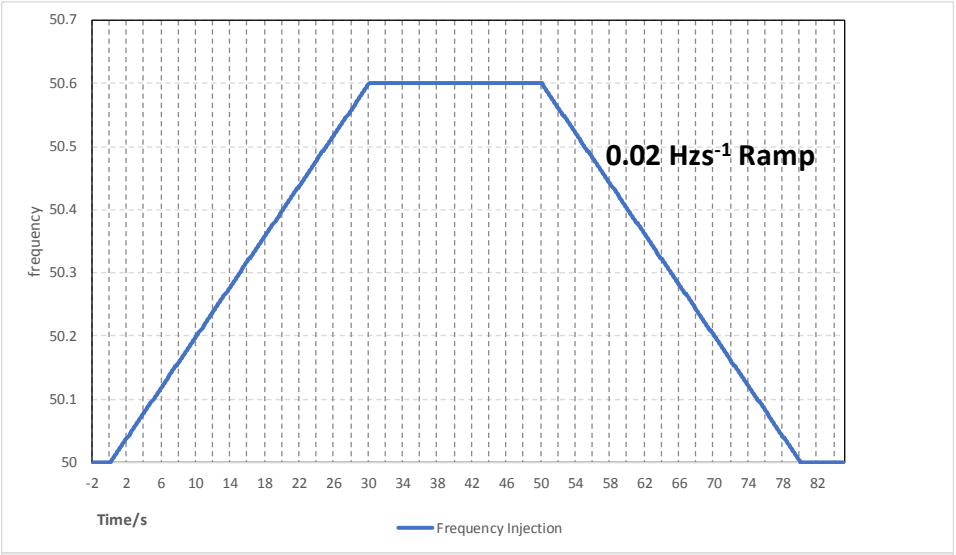
Would be presented as (1):

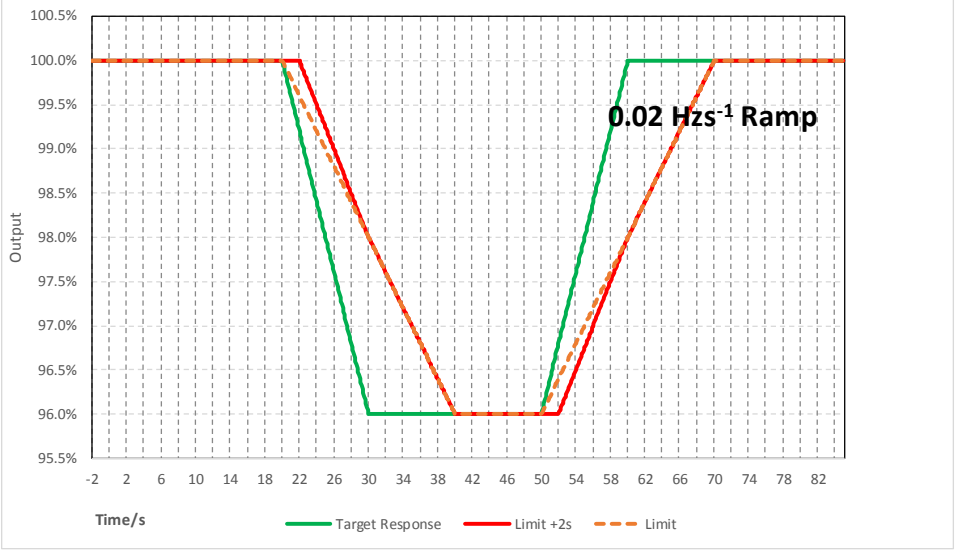






Would be presented as (2):





LFMS-O Proposal

- Create clear text requirements for LFSM-O performance
- Supplement with clear diagrammatic representation in G99
- Drafts of how this should appear have been circulated with the papers for this meeting, and subject to rapid review by an appropriate WG could be issued for early consultation

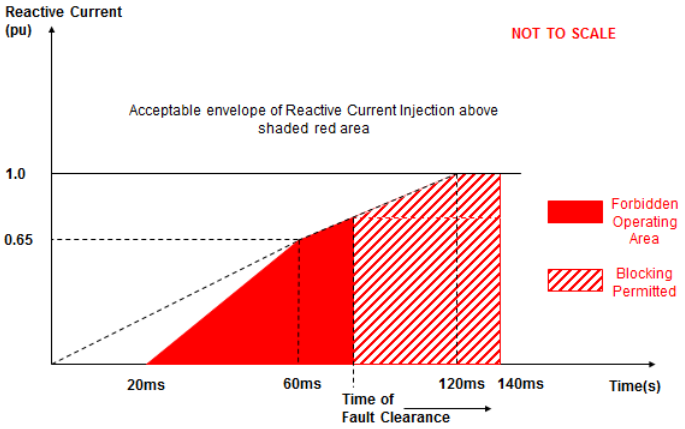
FFCI

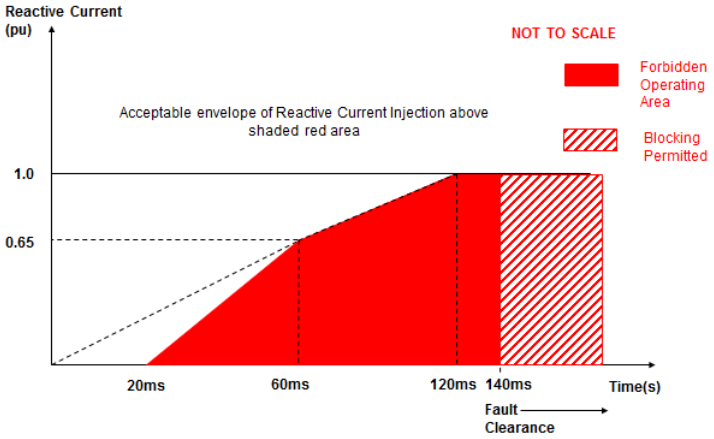
FFCI

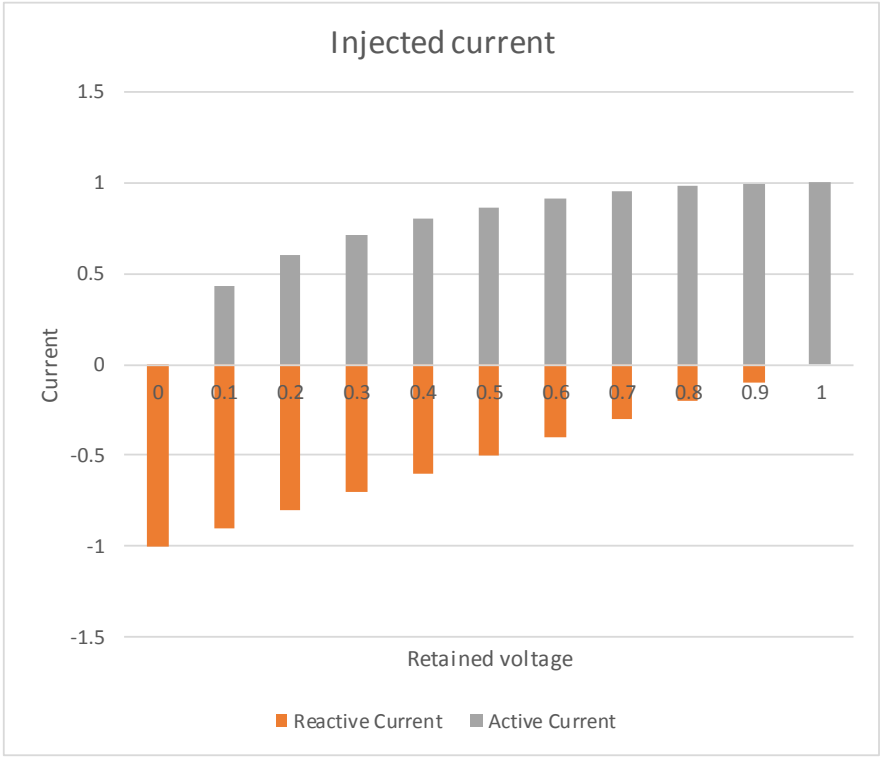
- ECC 6.3.16.1.2 refers to reactive current, implying the current is always to be in quadrature with the voltage
- The same paragraph states that reactive current will be in proportion to the retained voltage
- ECC 6.3.16.1.4 states that reactive current injected shall be in proportion and in phase with the change in system voltage at the connexion point.
- This implies that the injected current must always be purely reactive, and in phase with the voltage drop at the connexion point.
- In reality, it seems it is the total inject current that needs to be both proportional to and in phase with the voltage.
- The graphs in 6.3.16.1.2 show the reactive current limit against time, but do not attempt to show how current must vary with retained voltage.

Is there sufficient clarity re requirements

- Is there a case for somehow combing the existing graphical representation with one that includes how injected current might vary with voltage too?







FFCI Proposal

- Invite NG to try to redraft ECC 6.3.16.1 to improve clarity;
- Suggest a single WG meeting is probably enough to agree improved text
- Then proceed to Code Administration consultation on improved text

Code Administrator



Chrissie Brown

26 April 2018

Code Administrator Proposed Progression

- Panel is asked to:
  - Agree that these modifications will ***not*** have a material impact and therefore should be treated as Self-Governance
  - Agree that these modifications should be developed by a Workgroup ***without*** Workgroup Consultation
  - Agree that if yes to the question above that these discussions are held on Workgroup day (6 June 2018 for initial meeting pending prioritisation discussion)
  - Discuss and agree when Workgroup Report will should be issued to GCRP
  - Agree the Terms of Reference for the modification