MODIFICATION RECOMMENDATION FORM

MPID 254 : DSU FREQUENCY REQUIREMENTS

RECOMMENDATION TO CER BY EIRGRID OF MODIFICATION TO GRID CODE.

ABSTRACT / TITLE OF MODIFICATION	DSU Frequency Requirements
MODIFICATION NUMBER	254
RECOMMENDED AT GCRP MEETING NUMBER	40
LIST OF GRID CODE SECTION(S) AFFECTED BY PROPOSED MODIFICATION:	CC.7.4
CURRENT GRID CODE VERSION :	5
MODIFICATION DESCRIPTION Overview **THE REASON FOR THE RECOMMENDED MODIFICATION**	Following consultation with industry through the Demand Side Unit Joint Grid Code Working Group the following modification was proposed by EirGrid. The modification puts an obligation on Demand Side Units to maintain their response when dispatched during frequency and RoCoF events. It also provides less onerous frequency requirements for Generation that operates as part of a Demand Side Unit that only synchronises for short periods of time to facilitate the smooth transfer of power and removes requirements on Generation operated in Standby Mode. It should be noted it is intended that CC.7.4 (k) be increased to 1 Hz/s when MPID 229 RoCoF Definition Proposal is fully implemented. For the avoidance of doubt, it is intended in line with CER/14/081 that units will be required to declare compliance during the commissioning process and therefore will be assessed against this new standard. The purpose of this modification is to put standards into the Grid Code that are necessary to ensure the system remains stable during frequency events. It also relaxes/removes standards against generation operated as part of a Demand Side Unit that operates in Lopping Mode, Automatic Mains Failure Mode or Standby Mode. The purpose of the specific frequency requirements on Generation that operates as part of a Demand Side Unit as per the modification relates to the TSO's concerns of potential dynamic and transient problems that could lead to material issues for the security of the power system. The following is the TSO's rationale: • The TSO cannot have confidence that if on-site Generation trips during a frequency event and the Individual Demand

	Sites also disconnect that in aggregate there will be a smooth transition without some further frequency deviation that could compromise the security of the power system. This is due to unknowns in timings of protection/control systems. • All protection/control systems require time to detect and react to a frequency event. However, if a generator is not designed to handle such frequencies/RoCoF it may fail (not due to protection) which means that the generator is off the system before protection/control systems have time to react again leading to further frequency deviation that could compromise the security of the power system. • Individual Demand Sites may change their mode of operation (i.e. no longer disconnect from the system during frequency events) without the TSO being informed or the control/protection systems may not operate as expected. • The incoming RfG Network Code requires that "Power Generating Modules" of 0.8 kW or more comply with frequency requirements and do not exclude generation on sites that disconnect during frequency events. While a small number of Individual Demand Sites operating with on-site Generation in Continuous Parallel Mode or Shaving Mode as part of a Demand Side Unit is unlikely to cause an issue, as frequency is a system-wide phenomenon and given the increased Demand Side Unit penetration that is expected in the coming years, there are potential material issues for the security of the system. By having separate requirements for generation to have the capability to be able to ride-through frequency events is prudent and gives the TSOs the necessary confidence that the system can be operated securely when DSUs are dispatched.
History of Progression through GCRPs, Working Group and/or Consultation	This modification was discussed at length at five DSU Joint Grid Code Working Group meetings (23/01/2014, 25/03/2015, 29/04/2014, 08/07/2014 and 02/09/2014) and was previously brought to GCRP meeting 39.
Summary Note of any Objections to the Recommended change from GCRP Members or Consultation Responses	DSU Operators have raised concern about the modification. The main issue highlighted is not with the wording but with regards how to prove compliance with the standards. The TSOs require an OEM statement or datasheet. A concern has also been raised about the interpretation of "capability" of "Generation" to "remain Synchronised". It should be noted that clauses (l), (m), (n), (o) and (p) relate to the ***capability of the generation*** and do not preclude Individual Demand Sites

	disconnecting from the system to protect equipment on-site.
Outcome of any GCRP Meeting Actions Relating to the Recommended Modification	At GCRP meeting 39 where this modification was first discussed the GCRP Chair requested that the modification be brought back to the DSU Joint Grid Code Working Group for further discussion and analysis. This was completed.
Implication of not implementing the Modification	This modification is required to give clarity to DSU Operators on EirGrid's frequency requirements for Generation that operates as part of a Demand Side Unit and to ensure the system remains stable during frequency events.

RED-LINE VERSION

CC.7.4 Each **Demand Side Unit** shall, as a minimum, have the following capabilities:

(a) Able to provide **Demand Side Unit MW Response** between 0 MW and the **Demand Side Unit MW Capacity**;

(b) **Maximum Ramp Up Rate** not less than 1.67% per minute of **Demand Side Unit MW Response** as specified in the **Dispatch Instruction**;

(c) **Maximum Ramp Down Rate** not less than 1.67% per minute of **Demand Side Unit MW Response** as specified in the **Dispatch Instruction**;

(d) **Minimum Down Time** not greater than 30 minutes;

(e) **Maximum Down Time** not less than 2 hours;

(f) **Minimum off time** not greater than 2 hours; ~~and~~

(g) **Demand Side Unit MW Response Time** of not greater than 1 hour; ~~.~~

(h) maintain **Demand Side Unit MW Response** at **Transmission System Frequencies** in the range 49.5Hz to 50.5Hz;

(i) maintain **Demand Side Unit MW Response** at **Transmission System Frequencies** within the range 47.5Hz to 49.5Hz and 50.5Hz to 52Hz for a duration of 60 minutes;

(j) maintain **Demand Side Unit MW Response** at **Transmission System Frequencies** within the range 47.0Hz to 47.5Hz for a duration of 20 seconds required each time the **Frequency** is below 47.5Hz; and

(k) maintain **Demand Side Unit MW Response** for a rate of change of **Transmission System Frequency** up to and including 0.5 Hz per second as measured over a rolling 500 milliseconds period.

On-site **Generation** operated in **Continuous Parallel Mode** or **Shaving Mode** that forms part of a **Demand Side Unit**, shall, as a minimum, have the following capabilities:

(~~h~~l) operate continuously at normal rated output at **Transmission System Frequencies** in the range 49.5Hz to 50.5Hz;

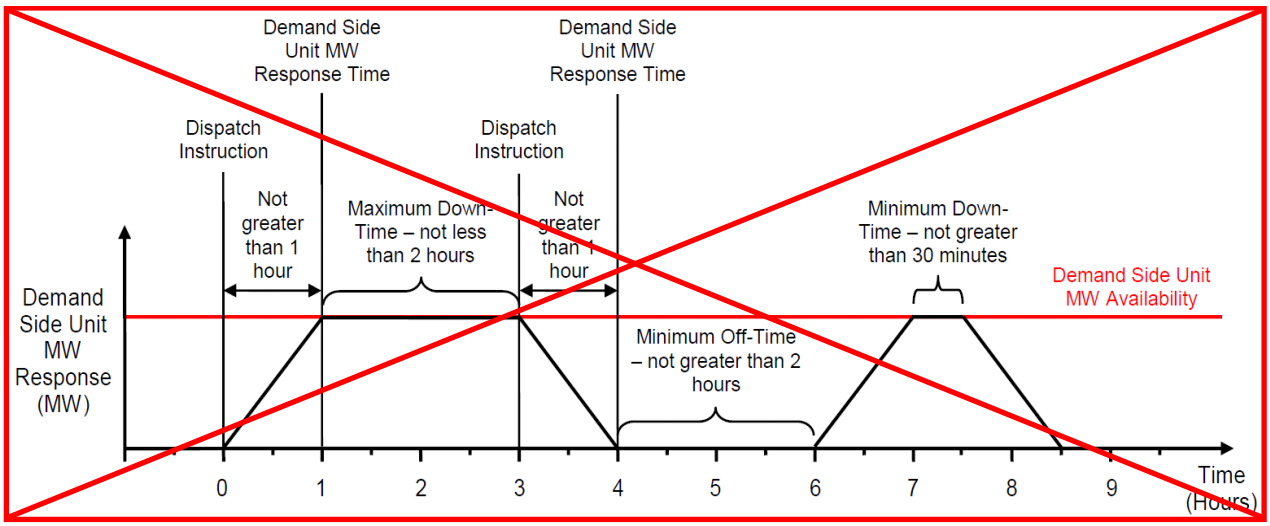
(~~i~~m) remain synchronised to the **Transmission System** at **Transmission System Frequencies** within the range 47.5Hz to 52.0Hz for a duration of 60 minutes;

(~~j~~n) remain synchronised to the **Transmission System** at **Transmission System Frequencies** within the range 47.0Hz to 47.5Hz for a duration of 20 seconds required each time the **Frequency** is below 47.5Hz; and

(~~k~~o) remain synchronised to the **Transmission System** during a rate of change of **Transmission System Frequency** of values up to and including 0.5 Hz per second.

On-site **Generation** operated in **Lopping Mode** or **Automatic Mains Failure Mode** that forms part of a **Demand Side Unit**, shall, as a minimum, have the following capabilities:

(p) operate continuously at normal rated output at **Transmission System Frequencies** in the range 49.5Hz to 50.5Hz;


Demand Side Unit MW Response Time
Demand Side Unit MW Response Time
Dispatch Instruction
Dispatch Instruction
Not greater than 1 hour
Maximum Down-Time – not less than 2 hours
Not greater than 1 hour
Minimum Down-Time – not greater than 30 minutes
Demand Side Unit MW Availability
Demand Side Unit MW Response (MW)
Minimum Off-Time – not greater than 2 hours
0
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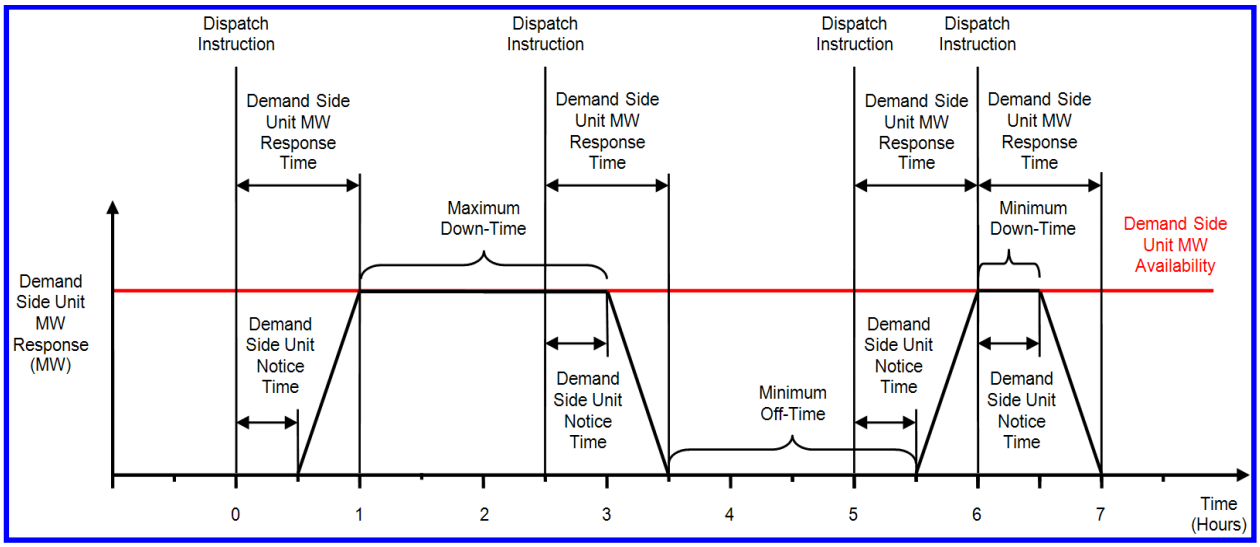
Time (Hours)


Dispatch Instruction
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Demand Side Unit MW Response Time
Demand Side Unit MW Response Time
Demand Side Unit MW Response Time
Demand Side Unit MW Response Time
Maximum Down-Time
Minimum Down-Time
Demand Side Unit MW Availability
Demand Side Unit MW Response (MW)
Demand Side Unit Notice Time
Demand Side Unit Notice Time
Minimum Off-Time
Demand Side Unit Notice Time
Demand Side Unit Notice Time
0
1
2
3
4
5
6
7
Time (Hours)

GREEN-LINE VERSION

CC.7.4 Each **Demand Side Unit** shall, as a minimum, have the following capabilities:

(a) Able to provide **Demand Side Unit MW Response** between 0 MW and the **Demand Side Unit MW Capacity**;

(b) **Maximum Ramp Up Rate** not less than 1.67% per minute of **Demand Side Unit MW Response** as specified in the **Dispatch Instruction**;

(c) **Maximum Ramp Down Rate** not less than 1.67% per minute of **Demand Side Unit MW Response** as specified in the **Dispatch Instruction**;

(d) **Minimum Down Time** not greater than 30 minutes;

(e) **Maximum Down Time** not less than 2 hours;

(f) **Minimum off time** not greater than 2 hours;

(g) **Demand Side Unit MW Response Time** of not greater than 1 hour;~~.~~

(h) maintain **Demand Side Unit MW Response** at **Transmission System Frequencies** in the range 49.5Hz to 50.5Hz;

(i) maintain **Demand Side Unit MW Response** at **Transmission System Frequencies** within the range 47.5Hz to 49.5Hz and 50.5Hz to 52Hz for a duration of 60 minutes;

(j) maintain **Demand Side Unit MW Response** at **Transmission System Frequencies** within the range 47.0Hz to 47.5Hz for a duration of 20 seconds required each time the **Frequency** is below 47.5Hz; and

(k) maintain **Demand Side Unit MW Response** for a rate of change of **Transmission System Frequency** up to and including 0.5 Hz per second as measured over a rolling 500 milliseconds period.

On-site **Generation** operated in **Continuous Parallel Mode** or **Shaving Mode** that forms part of a **Demand Side Unit**, shall, as a minimum, have the following capabilities:

(l) operate continuously at normal rated output at **Transmission System Frequencies** in the range 49.5Hz to 50.5Hz;

(m) remain synchronised to the **Transmission System** at **Transmission System Frequencies** within the range 47.5Hz to 52.0Hz for a duration of 60 minutes;

(n) remain synchronised to the **Transmission System** at **Transmission System Frequencies** within the range 47.0Hz to 47.5Hz for a duration of 20 seconds required each time the **Frequency** is below 47.5Hz; and

(o) remain synchronised to the **Transmission System** during a rate of change of **Transmission System Frequency** of values up to and including 0.5 Hz per second.

On-site **Generation** operated in **Lopping Mode** or **Automatic Mains Failure Mode** that forms part of a **Demand Side Unit**, shall, as a minimum, have the following capabilities:

(p) operate continuously at normal rated output at **Transmission System Frequencies** in the range 49.5Hz to 50.5Hz;