



## **CONSULTATION PAPER FOR PROPOSED MODIFICATIONS TO THE TRANSMISSION CODE**

Closing date for submission of representations:  
01 Dec 2020, 5 p.m.

01 DEC 2020

ENERGY MARKET AUTHORITY  
991G Alexandra Road  
#01-29 Singapore 119975  
[www.ema.gov.sg](http://www.ema.gov.sg)

Please direct any enquiries by e-mail to: [EMA\\_ES@ema.gov.sg](mailto:EMA_ES@ema.gov.sg)

**Disclaimer:**

The information in this Consultation Paper is not to be treated by any person as any kind of advice. The Energy Market Authority shall not be liable for any damage or loss suffered as a result of the use of or reliance on the information given in this Consultation Paper.

## **1 Introduction**

- 1.1. The Transmission Code sets out the rights and obligations of the Transmission Licensee, together with the rights and obligations of users of the Transmission System. The Transmission Code also sets out the technical requirements to be met by those who seek to connect and operate installations on the transmission system.

## **2 Proposed modifications to the Transmission Code**

- 2.1. Pursuant to Section 1.6 of the Transmission Code, EMA seeks representations on the proposed modifications to the Transmission Code as set out in Appendix 1.
- 2.2. The proposed modifications are to update and clarify the technical requirements relating to, among other things, Generation Facility Design pertaining to Fuel Changeover capability, accuracy of Transmission Licensee's plans, safety procedures while carrying out works, power sector cyber security measures and Licensees' adequacy of manpower, critical spares and consumables.

## **3 Invitation to submit representations**

- 3.1. EMA invites written representations on the proposed modifications to the Transmission Code as set out in Appendix 1.
- 3.2. Please send your written representations by e-mail to:

[\*\*EMA\\_ES@ema.gov.sg\*\*](mailto:EMA_ES@ema.gov.sg)

Alternatively, you may send your written representations by post/fax to the following address:

*Electricity System Department  
Industry Regulation Division  
Energy Market Authority  
991G Alexandra Road, #01-29  
Singapore 119975.  
Fax: (65) 6 835 8020*

Please use the form set out in Appendix 2 for your representations.

- 3.3. Anonymous representations will not be considered.
- 3.4. All representations must be in writing and must reach EMA by 5 pm on 01 Dec 2020.

- 3.5. EMA will acknowledge receipt of all submitted representations electronically. Please contact Mr Tay Wei Ji at 6376 7581 if you have not received an acknowledgement of your submitted representation within two business days. EMA reserves the right to make public all or any part of any representation and/or to disclose the identity of the party who made the representation. Where a respondent considers any part of his representation to be confidential, he shall clearly mark and place such part of his representation as an annex.
- 3.6. This Consultation Paper shall constitute notice of the proposed modifications to the Transmission Code set out in Appendix 1, for the purpose of Section 1.6 of the Transmission Code.

~ End ~

**Table 1: Proposed Modifications to the Transmission Code**

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
<b>To amend 1.2.1 (f) – to change “electricity installation” to “electrical installation”</b>				
TC/2020/01	1.2.1 (f)	A <i>connected person</i> who is required to comply with this Code or certain provisions of this Code under the terms of a Connection Agreement or Retailer Use of System Agreement with the Transmission Licensee or by a condition of its electricity installation licence; and	A <i>connected person</i> who is required to comply with this Code or certain provisions of this Code under the terms of a Connection Agreement or Retailer Use of System Agreement with the Transmission Licensee or by a condition of its <del>electricity</del> <u>electrical</u> installation licence; and	To use the proper term “electrical installation”.
<b>Requirement for Transmission Licensee to complete approved projects within EMA approved completion dates</b>				
TC/2020/02	8.1.2	The Transmission Licensee, in formulating, its Ten-Year Transmission Development Plan, shall ensure that the <i>network</i> design and any addition of <i>network</i> elements shall not jeopardise the <i>security, reliability, stability</i> and adequacy of the <i>power system</i> . The Transmission Licensee shall prepare and submit, each year, a Ten-Year Transmission Development Plan to the <i>Authority</i> for approval.	The Transmission Licensee, in formulating, its Ten-Year Transmission Development Plan <u>or any adhoc <i>transmission network</i> development proposal (including but not limited to any proposal for asset renewal or <i>network enhancement</i>)</u> , shall ensure that the <i>network</i> design and any addition of <i>network</i> elements shall not jeopardise the <i>security, reliability, stability</i> and adequacy of the <i>power system</i> . The Transmission Licensee shall prepare and submit, each year, a Ten-Year Transmission Development Plan to the <i>Authority</i> for approval. <u>As and when necessary, or as and when required by the <i>Authority</i>, the Transmission Licensee shall submit such adhoc <i>transmission network</i> development proposal to the <i>Power System Operator</i> and the <i>Authority</i> for endorsement and approval</u>	Transmission Licensee shall submit ad-hoc transmission projects as and when required or as required by EMA, as per the current process. The Transmission Licensee is required to complete approved projects within EMA approved completion dates.

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
			<p><u>respectively. The Transmission Licensee shall complete approved proposals in the Ten-Year Transmission Development Plan and approved adhoc <i>transmission network</i> development proposals by the approved completion dates, unless otherwise specified by the <i>Authority</i>.</u></p>	
TC/2020/03	8.1.9	New Clause	<p><u>On an annual basis or as and when required by the <i>Authority</i>, the Transmission Licensee shall submit such proposed <i>distribution network</i> projects that are required by the <i>Authority</i> for the <i>Authority's</i> approval. The proposed <i>distribution network</i> projects shall include but shall not be limited to asset renewal and network enhancement projects. The Transmission Licensee shall complete the approved <i>distribution network</i> projects by the approved completion dates, unless otherwise specified by the <i>Authority</i>.</u></p>	<p>The Transmission Licensee is required to submit certain proposed distribution network projects as specified by EMA. This is to ensure that any proposed enhancement or renewal in the distribution network is adequate and cost-effective for the security and reliability of electricity supply.</p> <p>The Transmission Licensees shall also complete approved distribution network projects within EMA approved completion dates, so as to ensure timely completion of the projects for the security and reliability of electricity supply.</p>

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
<b>Cyber Security Measures</b>				
TC/2020/04	Appendix K2(c)	Implement stringent controls on use of all removable media and laptops in CII environment. Any removable media used in the CII shall be authorised only for dedicated use between specific servers, workstations and end-point devices.	Implement stringent controls on use of all removable media and laptops in CII environment. <del>Any</del> <u>All</u> removable media devices and laptops used in the CII shall be <u>owned and maintained by the CII Owners, and must be authorised only for dedicated use between specific servers, workstations, end-point devices, Programmable Logic Controllers (PLCs), RTUs, network switches and routers.</u>	To ensure all removable media devices and laptops used in the CII environment are owned and properly managed by the CII Owners based on prevailing cyber security requirements imposed by CSA.
TC/2020/05	Appendix K3(e)	Ensure that all CIIs shall be regularly patched to resolve software applications and operating system vulnerabilities and that all patches are up to date.	Ensure that all CIIs shall be regularly patched to resolve software applications and operating system vulnerabilities and that all patches are up to date, <u>and ensure that interim mitigating controls shall be in place to address the vulnerabilities if the patches cannot be implemented promptly.</u>	Systems that might not be able to implement patches timely due to operational constraints, interim mitigating measures must be put in place until patches can be implemented.
TC/2020/06	Appendix K4(b)	CII Owners shall provide updated copy of CII's network diagram annually or as and when there are changes to the network equipment in machine readable PDF format showing the following information but not limited to;...	CII Owners shall provide updated copy of CII's network diagram <u>and asset inventory lists</u> annually or as and when there are changes to the network equipment in machine readable PDF format showing the following information but not limited to;...	To better align with CSA's requirements under the Cybersecurity Code of Practice, section 4.1, where CIIOs have to identify and maintain a list of CII assets.

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
<b>Accuracy of cable plans</b>				
TC/2020/07	9.4.2	The Transmission Licensee shall keep up-to-date digital mapping or records of their high voltage cables installed in and under public places, in such form as is accessible by other utilities service providers or such other persons who require such information for locating the high voltage cables prior to commencement of earthworks.	The Transmission Licensee shall keep up-to-date digital mapping or records of their high <u>and low</u> voltage cables installed in and under public places, in such form as is accessible by <u>government agencies</u> , other utilities service providers, or such other persons who require such information for locating the high and low voltage cables prior to commencement of earthworks, <u>or for infrastructure planning works or for other purposes as required by government agencies and agreed to by the Authority.</u> The Transmission Licensee shall also ensure that its digital mapping or records of high and low voltage cables are accurate and comply with the relevant requirements in the <u>Singapore Land Authority's Utility Survey Standard.</u>	<p>The Transmission Licensee is responsible to keep an up-to-date and accurate digital mapping or records of all its cables in the network (i.e. for both high and low voltage cables).</p> <p>Such digital mapping or records are provided to various parties such as government agencies and Licensed Cable Detection Workers, so as to facilitate their infrastructure planning works and cable detection works respectively. Inaccurate digital mapping or records could directly or indirectly cause project delays and cable damages. It is thus critical that the Transmission Licensee ensures that its digital mapping or records of high and low voltage cables are accurate and comply with the relevant requirements stipulated in the Utility Survey Standard). The Utility Survey Standard shall not apply to cables installed prior to the introduction of the Standard.</p>



Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
<b>Standards and Standing Operating Procedures</b>				
TC/2020/08	6.2.1 (c)	where applicable, comply with the standards set forth in Appendix I, or such other standards as may be acceptable to the Transmission Licensee.	<del>where applicable, comply with the standards set forth in Appendix I, or such other standards as may be acceptable to the Transmission Licensee.</del>	For clarity, section 6.2.1 (c) is proposed to be broken down into two parts – one is for requirements for connected persons' electrical installations (as proposed under section 6.2.2 below) and the other is for requirements for the Transmission Licensee and Generation Licensees (as proposed under sections 6.2.3). With the proposed introduction of sections 6.2.2 and 6.2.3, section 6.2.1 (c) is no longer required and is proposed to be removed.
TC/2020/09	6.2.2	New Clause	<u>All <i>connected persons</i> shall ensure that their electrical installations comply with the standards set forth in Appendix I where applicable, or such other standards as may be acceptable to the Transmission Licensee.</u>	This is the same requirement as the existing clause 6.2.1 (c).
TC/2020/10	6.2.3	New Clause	<u>The Transmission Licensee and Generation Licensees shall ensure that their plants and equipment comply with the requirements set forth under sections 8.4.1 and 8.4.2 respectively.</u>	To better align with the equipment design standards that the Transmission and Generation Licensees are required to comply with under the existing sections 8.4.1 and 8.4.2

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
TC/2020/11	6.2.2	6.2.2  The <i>Power System Operator</i> shall develop a system level Standing Operating Procedure.....	<u>6.2.24</u>  The <i>Power System Operator</i> shall develop a system level Standing Operating Procedure.....	Amended the numbering sequence
<b>Safety Procedures</b>				
TC/2020/12	10.1.15	The Transmission Licensee, Generation Licensee or <i>connected person</i> shall comply with all applicable or relevant safety procedures and practices to ensure the safety of personnel and/or plant at any time that work and/or testing is carried out.	<del>The Transmission Licensee, Generation Licensee or <i>connected person</i> shall comply with all applicable or relevant safety procedures and practices to ensure the safety of personnel and/or plant at any time that work and/or testing is carried out.</del>	To be deleted and replaced with the new section 10.7.2.
TC/2020/13	10.7	<b>New sub-section added in Transmission Code</b>	<b><u>Safety Procedures</u></b>	To include an additional sub-section to address the safety procedures when works or testing is carried out.
TC/2020/14	10.7.1	New clause added in Transmission Code	<u>The Transmission Licensee, Generation Licensee or <i>connected person</i> shall establish and maintain adequate safety measures and procedures to ensure the safety of the public or personnel and/or prevention of death/injury to any person or damage to any property for any work or testing carried out on any electric line or equipment belonging to or under the management or control of the Transmission</u>	To ensure the Transmission Licensee, Generation Licensee or connected person establish and maintain adequate safety procedures.

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
			<u>Licensee, Generation Licensee or <i>connected person</i>.</u>	
TC/2020/15	10.7.2	New clause added in Transmission Code	<u>The Transmission Licensee, Generation Licensee or <i>connected person</i> shall comply with all applicable or relevant safety procedures, requirements and practices to ensure the safety of the public or personnel and/or prevention of death/injury to any person or damage to any property when any work or testing is carried out on any electric line or equipment belonging to or under the management or control of the Transmission Licensee, Generation Licensee or <i>connected person</i>.</u>	To ensure the Transmission Licensee, Generation Licensee or connected person comply with all applicable or relevant safety procedures.
<b>Transmission and Generation Licensees' critical spares and consumables</b>				
TC/2020/16	9.1.6	New clause added in Transmission Code	<u>The Transmission Licensee shall ensure that it has sufficient inventory of critical spares for the timely replacement of faulty parts of any of its network facilities or assets so that the facility or asset can be returned to service in the shortest possible time. The Transmission Licensee shall also ensure that it has sufficient inventory of consumables to enable continual operation of the Transmission Licensee's network facilities and assets.</u>	To ensure that Transmission Licensee's facility or asset can return to service in the shortest possible in the event of faulty parts or depleting consumables.

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
TC/2020/17	9.2.5	The Generation Licensee shall ensure that it has sufficient inventory of critical spares for timely replacement of faulty parts of any <i>generation facility</i> so that the <i>generation facility</i> can be returned to service in the shortest possible time. Without prejudice to the generality of the foregoing, the Generation Licensee shall in particular ensure that each <i>generation facility</i> which is a <i>combined-cycle plant</i> or gas turbine shall have one complete set of spare air filters within Singapore at all times.	The Generation Licensee shall ensure that it has sufficient inventory of critical spares for timely replacement of faulty parts of any <i>generation facility</i> so that the <i>generation facility</i> can be returned to service in the shortest possible time. <u>The Generation Licensee shall also ensure that it has sufficient inventory of consumables to enable continual operation of the Generation Licensee's <i>generation facilities</i>.</u> Without prejudice to the generality of the foregoing, the Generation Licensee shall in particular ensure that each <i>generation facility</i> which is a <i>combined-cycle plant</i> or gas turbine shall have one complete set of spare air filters within Singapore at all times.	To extend the requirement for keeping sufficient inventory to consumables so as to ensure that Generation Licensees' facilities can return to service in the shortest possible time in the event of depleting consumables.
<b>Licensees' manpower adequacy</b>				
TC/2020/18	6.1.5	New clause added in Transmission Code	<u>The Transmission Licensee, Generation Licensee and any connected person shall ensure that they have adequate and sufficiently trained and qualified manpower, to maintain and operate their <i>installations, generation facilities</i> and <i>auxiliaries</i> at all times.</u>	To ensure that Licensees and connected persons have sufficient skilled manpower to operate and maintain their assets in such a manner that it will not cause an adverse impact on the reliability and security of the power system.
<b>Switchhouse Facilities, Gas Receiving Facilities and Generation Facility Design</b>				
TC/2020/19	1.3	New Definition	"LNG" means Liquefied Natural Gas	

<b>Modification Ref. No.</b>	<b>Clause</b>	<b>Original Text</b>	<b>Modified Text</b>	<b>Reasons</b>
TC/2020/20	6.11	Switchhouse Facilities, Gas Receiving Facilities and Generation Facility Design	Switchhouse Facilities, Gas Receiving Facilities and Generation Facility Design <u>by Generation Licensee</u>	To make it clear that the Generation Licensee is required to comply with all the requirements set forth in section 6.11.
TC/2020/21	6.11.1	New Clause	<u>The Generation Licensee shall comply with the requirements set forth in sections. 6.11.2 to 6.11.4.</u>	To make it clear that the Generation Licensee is required to comply with all the requirements set forth in section 6.11.
TC/2020/22	6.11.1	6.11.1 The generating unit's step-up transformers and generating unit's switchboard.....	6.11.4 <u>2</u> The generating unit's step-up transformers and generating unit's switchboard.....	Amended the numbering sequence

<b>Modification Ref. No.</b>	<b>Clause</b>	<b>Original Text</b>	<b>Modified Text</b>	<b>Reasons</b>
TC/2020/23	6.11.2	6.11.2  The gas receiving facility, including its associated equipment, fuel gas compressor(s) and protection/control equipment for the supply of natural gas to the generating station for power generation shall be designed and operated in such manner that no single failure/outage shall cause simultaneous outage of two or more generating units at the generating station.	6.11. <del>23</del>  The gas receiving facility <u>and/or dedicated LNG regasification facility that is not connected to the gas supply system</u> , including its associated equipment, such as fuel gas compressor(s), <u>LNG regasification equipment/systems</u> and protection/control equipment for the supply of natural gas to the generating station for power generation shall be designed and operated in such manner that no single failure/outage shall cause simultaneous outage of two or more generating units at the generating station.	Amended the numbering sequence  To include new dimension of LNG regasification facility for supplying natural gas to the generating station for power generation.
TC/2020/24	6.11.3	6.11.3  All generating units shall be designed such that: .....	6.11. <del>34</del>  All generating units shall be designed such that: .....	Amended the numbering sequence
<b>Generation Facility Relating to Fuel Changeover Capability</b>				
TC/2020/25	1.3	New Definition	“alternate fuel” means a fuel type other than primary fuel (including natural gas).	To provide clarity on the definition of alternate fuel in the Code.
TC/2020/26	1.3	New Definition	“NEMS” means National Electricity Market of Singapore.	

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
TC/2020/27	1.3	New Definition	"EMC" means Energy Market Company.	
TC/2020/28	Appendix C1	<p><b>Preliminary Generating Unit Data to be Submitted for Consideration of Connection to the Transmission System</b></p> <p>Each Generation Licensee or Wholesaler (Generation) Licensee responsible for the <i>generation facility</i>, with the exception of solar photovoltaic systems, and seeking connection to the <i>transmission system</i> shall provide the information required in accordance with the format set forth in C.1.1 to C.1.3 of this Appendix. For solar photovoltaic <i>generating unit</i>, the Generation Licensee or Wholesaler (Generation) Licensee shall provide the information required in accordance with the format set forth in C7 of this Appendix.</p>	<p>Each Generation Licensee or Wholesaler (Generation) Licensee responsible for the <i>generation facility</i>, with the exception of solar photovoltaic systems, and seeking connection to the <i>transmission system</i> shall provide the information required in accordance with the format set forth in C.1.1 to C.1.3 of this Appendix <u>for both primary and alternate fuel (for generating units that are capable of operating and required to operate on alternate fuel)</u>. For solar photovoltaic <i>generating unit</i>, the Generation Licensee or Wholesaler (Generation) Licensee shall provide the information required in accordance with the format set forth in C7 of this Appendix.</p>	To provide clarity for <i>generation facility</i> that uses natural gas as the primary fuel and alternate fuel as listed in Appendix C of the Code.
TC/2020/29	6.11.3(f)	(f) each <i>generation facility</i> that uses natural gas as the primary fuel shall be designed with the capability of initiating on-load changeover either automatically through gas pressure setting or manually to <i>alternate fuel</i> that is stockpiled on-site. The fuel changeover trigger setting shall have sufficient margin above that of the <i>generation facility's</i> low gas pressure trip setting to ensure that the <i>generation facility</i> remains connected to the power system and operates at or above its	(f) each <i>generation facility</i> that uses natural gas as the primary fuel shall be designed with the capability of initiating on-load changeover either automatically through gas pressure setting or manually to <i>alternate fuel</i> that is stockpiled on-site. The fuel changeover trigger setting shall have sufficient margin above that of the <i>generation facility's</i> low gas pressure trip setting to ensure that the <i>generation facility</i> remains connected to the power system and operates at or above its minimum stable loading level during the entire process of fuel	To reference and include the requirements set forth in Appendix F13 of the Code.

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons																		
		<p>minimum stable loading level during the entire process of fuel changeover operation. The <i>generation facility</i> shall continue to supply electricity to the power system after completion of the fuel changeover process.</p>	<p>changeover operation. The <i>generation facility</i> shall continue to supply electricity to the power system after completion of the fuel changeover process. <u>In addition, <i>generation facilities</i> registered with EMC on or after 1 January 2020 shall also adhere to requirements as set forth in Appendix F13.</u></p>																			
TC/2020/30	Appendix F8	<p><b>Spinning Reserve Requirements of Frequency Sensitive Plant</b></p> <p>F8.1 Each <i>generating unit</i> must be capable of providing minimum primary reserve as follows:</p> <table border="1" data-bbox="528 751 1014 1129"> <thead> <tr> <th></th> <th><i>Generating unit</i> MW Output as a % of Rated MW capacity</th> <th>Primary reserve as a % of Rated MW Capacity</th> </tr> </thead> <tbody> <tr> <td>(i)</td> <td>90</td> <td>5</td> </tr> <tr> <td>(ii)</td> <td>75 Minimum Stable Load to</td> <td>9</td> </tr> </tbody> </table>		<i>Generating unit</i> MW Output as a % of Rated MW capacity	Primary reserve as a % of Rated MW Capacity	(i)	90	5	(ii)	75 Minimum Stable Load to	9	<p>F8.1 Each <i>generating unit</i> must be capable of providing minimum primary reserve <u>for both primary and <i>alternate fuel</i></u>. <u>The Spinning Reserve Requirements for primary and <i>alternate fuel</i> are as follows:</u></p> <table border="1" data-bbox="1072 783 1559 1161"> <thead> <tr> <th></th> <th><i>Generating unit</i> MW Output as a % of Rated MW capacity</th> <th>Primary reserve as a % of Rated MW Capacity</th> </tr> </thead> <tbody> <tr> <td>(i)</td> <td>90</td> <td>5</td> </tr> <tr> <td>(ii)</td> <td>75 Minimum Stable Load to</td> <td>9</td> </tr> </tbody> </table>		<i>Generating unit</i> MW Output as a % of Rated MW capacity	Primary reserve as a % of Rated MW Capacity	(i)	90	5	(ii)	75 Minimum Stable Load to	9	<p>To provide clarity for generation facility to be capable of providing minimum primary reserve for both primary and alternate fuel. The Spinning Reserve Requirements for primary and alternate fuel.</p>
	<i>Generating unit</i> MW Output as a % of Rated MW capacity	Primary reserve as a % of Rated MW Capacity																				
(i)	90	5																				
(ii)	75 Minimum Stable Load to	9																				
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(i)	90	5																				
(ii)	75 Minimum Stable Load to	9																				
TC/2020/31	Appendix F	New insertion of F13	<p><b><u>F13 Fuel Changeover Requirements</u></b></p> <p><u>F13.1 This section states the design and technical requirements for new/repowered <i>generation facility</i> registered with EMC as a</u></p>	<p>Given the limited line-pack within the gas transmission networks, the additional requirements set out for new/repowered <i>generation facility</i> are necessary in order to provide</p>																		



Modification Ref. No.	Clause	Original Text	Modified Text	Reasons								
			<p><u>generation registered facility on or after 1 January 2020. Each generation facility,</u></p> <p><u>(a) that uses natural gas as primary fuel shall be designed to operate at its rated MW Capacity with a low gas pressure trip setting no greater than 16barg measured at the System Offtake Point in accordance to the definition of the Gas Network Code (GNC) Section A. Refer to Figure F13.1.a. for an illustration.</u></p> <p><u>(b) shall comply with the requirements in Table 13.1.b for fuel changeover (FCO) operations. Refer to Figure 13.1.b for an illustration.</u></p> <p style="text-align: center;"><b>Table 13.1.b</b></p> <table border="1" data-bbox="1043 756 1592 1326"> <thead> <tr> <th data-bbox="1043 756 1292 986"><u>Generating Facility Rated MW Loading on Primary Fuel (%) prior to FCO initiation</u></th> <th data-bbox="1292 756 1592 986"><u>Generating Facility Permissible Loading Level for FCO to Alternate Fuel (if loading or de-loading is required) <sup>1</sup> (%)</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="1043 986 1292 1099">Above 80%</td> <td data-bbox="1292 986 1592 1099">Deload to not lower than 80% loading</td> </tr> <tr> <td data-bbox="1043 1099 1292 1217">Between 60% to 80%</td> <td data-bbox="1292 1099 1592 1217">No change in loading</td> </tr> <tr> <td data-bbox="1043 1217 1292 1326">Below 60%</td> <td data-bbox="1292 1217 1592 1326">Load to not more than 60% loading</td> </tr> </tbody> </table>	<u>Generating Facility Rated MW Loading on Primary Fuel (%) prior to FCO initiation</u>	<u>Generating Facility Permissible Loading Level for FCO to Alternate Fuel (if loading or de-loading is required) <sup>1</sup> (%)</u>	Above 80%	Deload to not lower than 80% loading	Between 60% to 80%	No change in loading	Below 60%	Load to not more than 60% loading	<p>sufficient time for a successful completion of fuel changeover (FCO) operation to alternate fuel (i.e. diesel) via a low gas trip pressure setting.</p> <p>The requirements relating to <i>generation facility</i> FCO capabilities are necessary to ensure there is no significant loss in generation output due to loading or de-loading. Each FCO process has to be completed within ten (10) minutes to ensure the secure operation of the power system in the event of a natural gas supply disruption.</p>
<u>Generating Facility Rated MW Loading on Primary Fuel (%) prior to FCO initiation</u>	<u>Generating Facility Permissible Loading Level for FCO to Alternate Fuel (if loading or de-loading is required) <sup>1</sup> (%)</u>											
Above 80%	Deload to not lower than 80% loading											
Between 60% to 80%	No change in loading											
Below 60%	Load to not more than 60% loading											

Modification Ref. No.	Clause	Original Text	Modified Text	Reasons
			<p><u><sup>1</sup> FCO can be initiated and performed without any loading and/or de-loading within these range of MW loading level while operating under primary fuel.</u></p> <p><u>(c) shall complete the FCO operation, including loading or deloading to the designated loading level to enable FCO to commence if required, starting up of other support systems such as alternative fuel auxiliary system and etc., within ten (10) minutes upon initiation of fuel changeover process.</u></p> <p><u>(d) Upon completion of the FCO, the <i>generating facility</i> shall be capable of ramping up to its NEMS scheduled load prior to the initiation of the FCO process or to the maximum loading level of the <i>generation facility</i> operating in <i>alternate fuel</i>, whichever is lower. Subsequently, the <i>generation facility</i> shall be put on Automatic Generation Control (AGC) and free governor mode immediately.</u></p>	

**Figure F13.1.a** –Demarcation of System Off-take Point in accordance to Gas Network Code (GNC)

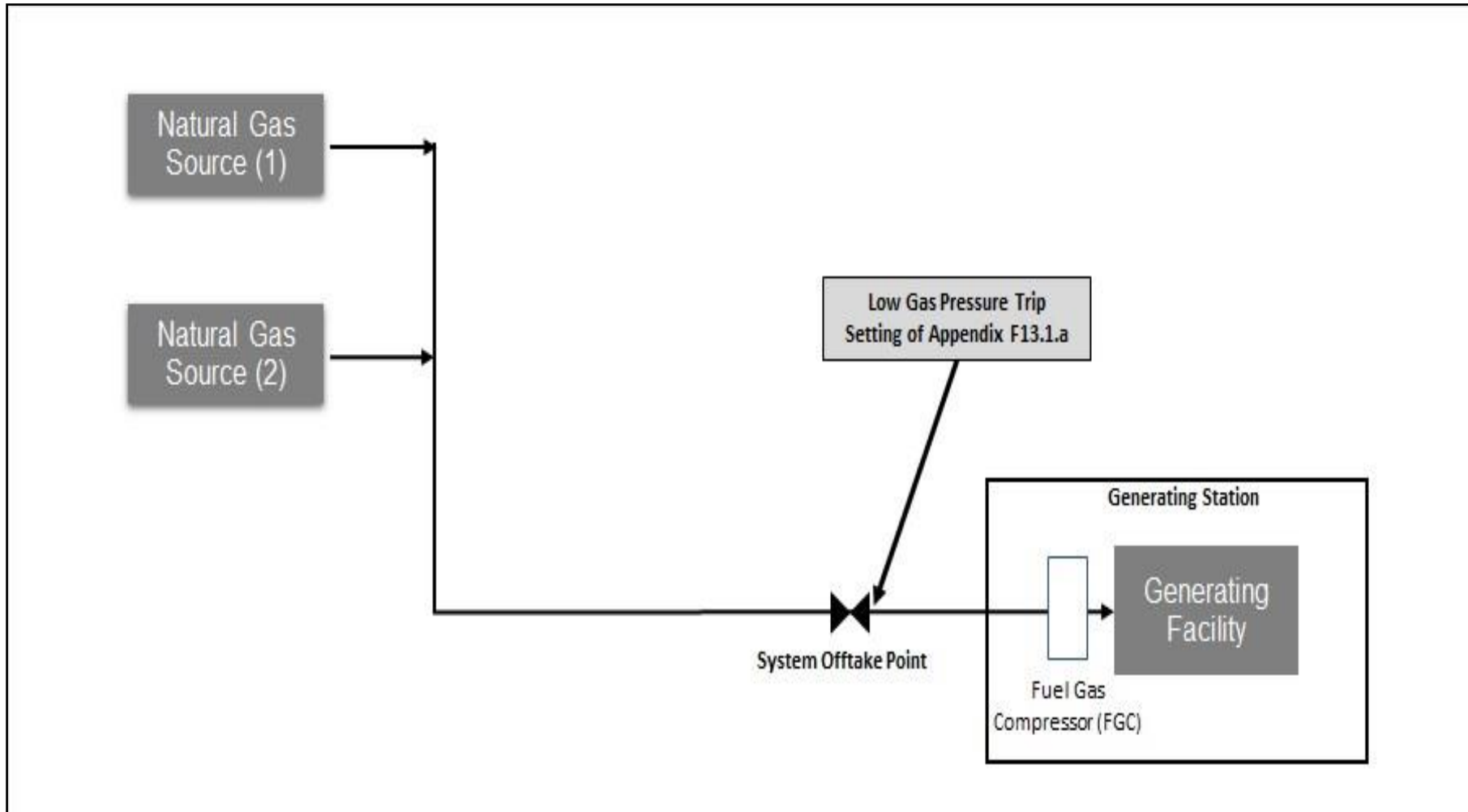
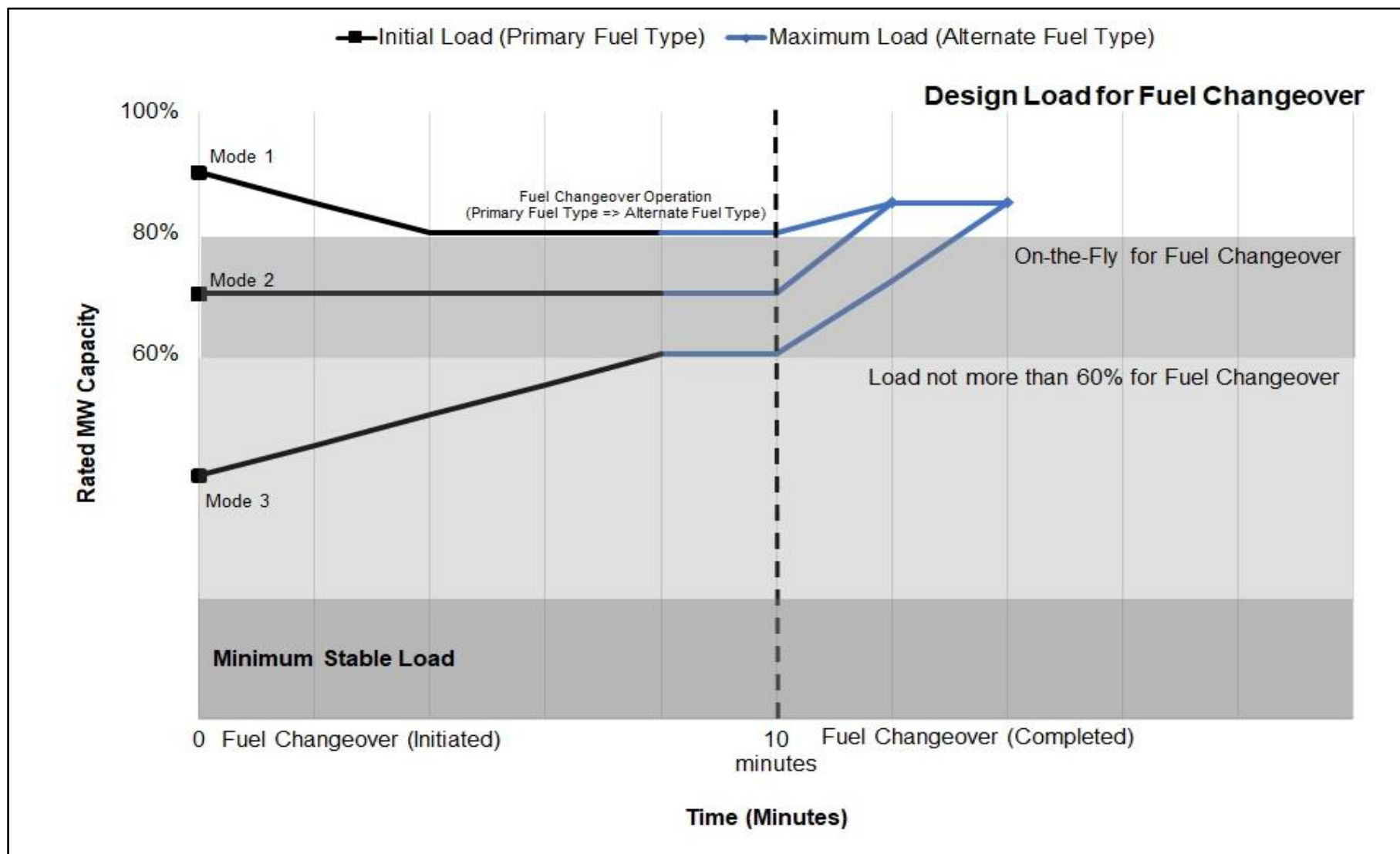


Figure F13.1.b – Design Load for Fuel Changeover over different modes of MW loading



**Representations on the Proposed Modifications to the Transmission Code**

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Company: \_\_\_\_\_

Email: \_\_\_\_\_

Role (Generation Licensee/ Retailer/ Consumer):

\_\_\_\_\_

Submission Date: \_\_\_\_\_ (dd/mm/yy)

<b>Modification Ref. No.</b>	<b>Section*</b>	<b>Comments</b>

\_\_\_\_\_

\* Reference to the section of the Transmission Code where change has been made in the version dated on Nov 2017 as published on the EMA website.