

**POWER ENGINEERING COMPETENCY FRAMEWORK FOR POWER ENGINEERING PROFESSIONALS IN PUBLIC SERVICE
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT**

TSC Category	Decentralisation					
TSC Title	Solid-State Power System Apparatus Implementation					
TSC Description	Manage the migration of power system apparatus from conventional technologies to power electronic-based technologies such as solid-state power system switchgear, transformers and compensators					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
				<Insert TSC Code>	<Insert TSC Code>	<Insert TSC Code>
				Apply knowledge of solid-state power system apparatus in the migration of power system apparatus from conventional to power electronic-based technologies	Review the quality, performance and reliability of solid-state power system apparatus when migrating from conventional technologies	Establish procedures to migrate power system apparatus from conventional technologies to solid-state electronics technologies
Knowledge				<ul style="list-style-type: none"> Power transmission and distribution technologies Power semiconductor devices and conversion Operating principles and configuration of solid-state power system switchgear, transformers, and compensators Advantages of solid-state apparatus over conventional electro-mechanical and electro-magnetic apparatus Fault detection, and maintenance in solid state power apparatus Power system communication and control Concepts of smart grid Relevant regulations, industry standards, codes of practice and safety practices 	<ul style="list-style-type: none"> Power electronics technologies and their applications Power system integration, interfacing and interoperating Advanced configurations and topologies for solid-state power apparatus Factors affecting the quality, performance and reliability of solid-state power apparatus Condition monitoring and asset management for solid-state power systems Advanced power system communication and control Operating principles of smart grids Relevant regulations, industry standards, codes of practice and safety practices 	<ul style="list-style-type: none"> National and regional power grid Energy security and efficiency issues Power electronics technologies and their applications Challenges in power system integration, interfacing and migration Use cases and best practices for application of solid-state power apparatus Advanced power system controls using sensor and Internet of Things (IoT) technologies Feasibility and practicability considerations Whole-of-government energy security and efficiency principles Relevant regulations, industry standards, codes of practice and safety practices

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Abilities				<ul style="list-style-type: none"> • Apply knowledge of power transmission and distribution in Singapore context • Undertake projects involving adoption of solid-state power apparatus • Review design configurations of power systems with solid-state power apparatus • Witness testing and commissioning of solid-state power apparatus • Oversee operations of solid-state power system communication and control • Review design maintenance programs for solid-state power apparatus • Identify relevant regulations, industry standards, codes of practice and safety practices 	<ul style="list-style-type: none"> • Decision-making informed by factors influencing the operation of solid-state power apparatus • Manage projects involving adoption of solid-state power apparatus • Evaluate the quality, performance and reliability of solid-state power apparatus • Establish communication and control for solid-state power system • Plan condition monitoring and asset management program for power systems with mix of conventional and solid-state technologies • Resolve issues in migrating power system apparatus from conventional to solid-state technologies • Review compliance with relevant regulations, industry standards, codes of practice and safety practices 	<ul style="list-style-type: none"> • Support high level planning on transformation of power infrastructure • Manage development programs on applications of solid-state power apparatus • Establish procedures to migrate power system apparatus from conventional to solid-state technologies • Manage issues on long-term performance and reliability of solid-state power apparatus • Approve conventional and IoT-based power system communication and control circuitry • Establish procedures to drive compliance with relevant regulations, standards, codes of practice and safety practices