

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

TSC Category	Decarbonisation					
TSC Title	Fuel Cells Technologies Application					
TSC Description	Manage the adoption of fuel cell systems to provide standby and distributed generation power					
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 fuel cell systems in standby and distributed generation power	Assess feasibility of fuel cell systems to provide standby and distributed generation power	Manage research and demonstration projects in adopting fuel cell systems to provide standby and distributed generation power
Knowledge				<ul style="list-style-type: none"> Hydrogen properties, uses and applications Hydrogen production and electrolyser principles and methods Energy storage systems Fuel cell technologies and systems, e.g. Proton-exchange membrane fuel cells (PEMFC) and solid oxide fuel cell (SOFC) Design and specifications of power system incorporating fuel cells and fuel supply Installation and maintenance for fuel cell system Hydrogen safety practices and procedures Relevant regulations, industry standards and codes of practice 	<ul style="list-style-type: none"> Energy security issues and concerns New and emerging hydrogen technologies Applications of fuel cell technologies in portable and stationary power supply Use cases on hydrogen production and storage Feasibility and applications of energy storage mechanisms Power-to-power and power-to-gas systems Fuel cell costs, financials and economics Challenges in fuel cell installation and maintenance Hydrogen safety practices and procedures Relevant regulations, industry standards, and codes of practice 	<ul style="list-style-type: none"> Local and global energy security issues and concerns Alternative energy sources policy options Demonstration projects and commercialisation of fuel cell technology Fuel cell research and development opportunities Concepts of integrated fuel cell and cogeneration systems Fuel cell costs, financials and economics Challenges in durability and costs of fuel cell, electrolyser and hydrogen energy storage High performance, nano-sized catalysts for fuel cell systems Relevant regulations, industry standards, codes of practice and safety procedures

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<p>Abilities</p>				<ul style="list-style-type: none"> • Identify applications of fuel cell systems • Explain the operating principles of fuel cells • Apply principles of hydrogen technologies including materials, catalysis, electro-chemistry, thermo-fluid and design • Supervise fuel cell installation and setup • Oversee maintenance tasks and frequency for fuel cells • Prescribe safety practices and procedures • Identify relevant regulations, industry standards, and codes of practice while working with fuel cell systems 	<ul style="list-style-type: none"> • Advise on application of fuel cells in portable and stationary power supply • Review application of fuel cells for power-to-power and power-to-gas systems • Assess feasibility of hydrogen energy storage mechanisms • Evaluate feasibility of fuel cell systems by assessing financials and economics • Develop installation, maintenance, and audit programmes for fuel cell systems • Provide technical advice on factors influencing the operation of fuel cells • Resolve issues in implementing and maintaining fuel cells • Review compliance with relevant regulations, industry standards, codes of practice and safety practices for fuel cells 	<ul style="list-style-type: none"> • Lead research and demonstration projects on specialty applications of fuel cells • Provide expert technical advice on use cases of fuel cells in portable and stationary power supply • Establish procedures to implement and maintain fuel cells • Approve installation, maintenance, and audit programmes for fuel cell systems • Establish procedures to drive compliance with relevant regulations, industry standards, codes of practice and safety practices for fuel cells • Advise on policy options fuel cell, electrolyser and hydrogen energy storage • Guide on issues on long-term durability and cost effectiveness of fuel cell systems • Provide technical advice on high performance, nano-sized catalysts for fuel cell systems • Recommend solutions to improve energy efficiency
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