

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

TSC Category	Electrical and Power Engineering Fundamentals					
TSC Title	Electricity Network Planning					
TSC Description	Manage medium to long-term electricity network development plans to meet power generation and demand needs					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
		<Insert TSC Code>	<Insert TSC Code>	<Insert TSC Code>	<Insert TSC Code>	
		Analyse relevant information and conduct feasibility studies for electricity network planning	Develop or revise electricity network development plans to ensure that power generation and demand needs are met	Review and advise on electricity network development plans	Formulate targets and guidelines, and drive enhancements for optimal electricity network planning	
Knowledge		<ul style="list-style-type: none"> Fundamental understanding of Singapore Transmission Code and other relevant statutory and regulatory requirements on the electricity network and laying power cables on public roads Understanding of electricity network planning processes Types and components of electricity networks Annual electricity demand forecast of different regions in Singapore Power generation planting plans Map of existing and planned public roads in Singapore Benchmarks for construction and cable installation cost estimation Methods of planning and costing of electricity networks at different operating voltages Standard design and/or drawings and installation methods of power transmission cables Load flow study software 	<ul style="list-style-type: none"> Fundamental understanding of Singapore Transmission Code and other relevant statutory and regulatory requirements on the electricity network and laying power cables on public roads Electricity network planning and design considerations Project consultation process with other government agencies Power system studies and simulation methods Methods for performing quality checks on modelling data for power system studies and simulation Components of the electricity network development master plan Industry best practices and guidelines for planning of electricity networks 	<ul style="list-style-type: none"> Interpretation and application of relevant statutory and regulatory requirements Implications of public policies, acts and regulations on electricity network planning Power system studies and simulation methods Principles of power system operation Strategic and operational risks of electricity network operations and maintenance Implications and impact of electricity network planning issues to other business units within the organisation and external stakeholders Industry best practices on planning of electricity networks 	<ul style="list-style-type: none"> Components and processes for the development of network planning guidelines Implications of public policies, acts and regulations on electricity network planning Cost control measures and implications Techniques and implications of integrating old and new infrastructure and equipment Implications and impact of electricity network planning issues to other business units within the organisation and external stakeholders 	

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

<p>Abilities</p>		<ul style="list-style-type: none"> Analyse and extract electricity network related information from information systems on: <ul style="list-style-type: none"> New and existing substations Power generation plants assigned Annual electricity demand forecast of different regions in Singapore Analyse possible cable routes based on the map of existing and planned public roads in Singapore Conduct on-site surveys for cable route feasibility study in the planning of network Oversee load flow study simulation for the 10-year development plan Review site plans and drawings detailing possible cable routes with the locations of related new and/or existing substations and/or power generation plants assigned indicated Study proposed expansion and renewal plan assigned against internal guidelines and Codes of Practice Develop simple network reinforcement and/or expansion and renewal proposals Prepare proposals based on statutory requirements Verify the cost breakdowns of network development, reinforcement, expansion and renewal based on cost benchmarks Review and extract electricity network related information from 	<ul style="list-style-type: none"> Develop or update the rolling ten-year development plan to meet power generation and demand needs Maximise network utilisation and minimise network capital expenditures Assess adequacy of planned and existing electricity networks to cater for changes and developments within the supply zones in the next ten years based on load flow, power system study and forecast results Calibrate and validate electricity network models and analyse demand projections by authorities Work with relevant departments to assess stakeholders' requirements and interpret regulations relating to electricity network construction Establish project implementation schedules, operational requirements and necessary compliance related activities of proposed electricity networks Review site investigations, feasibility studies and proposals prepared by team members assigned to assess feasibility with internal and external stakeholders to confirm recommended route for laying new power cable Assess project cost estimates, incorporating costs of network development, reinforcement, expansion and renewal, where 	<ul style="list-style-type: none"> Review and provide advice on the updated ten-year rolling development plan and the capital expenditure plan Review the performance and adequacy of existing electricity networks at all supply zones based on demand forecasts, generation planting plans and simulation outcomes Identify gaps in policies and planning procedures and propose recommendations to meet future development requirements Work with relevant departments to update internal guidelines and Standard Operating Procedures (SOPs) to align the planning of proposed electricity network development projects with electricity demand forecasts across supply zones Conduct budget forecasting and prioritise development projects to optimise use of available funds Evaluate costing recommendations based on latest costing norms and estimation methods Review internal guidelines to address gaps and ensure standardisation across new electricity network system designs and costing recommendations Evaluate feasibility of proposed designs Recommend scheduling and sequencing of network reinforcements, expansions and renewal based on regional 	<ul style="list-style-type: none"> Set targets and deliverables to drive network design, costing and improvements in the ten-year electricity network development planning Develop and review internal guidelines for planning of electricity network development projects and forecasting of electricity demand Establish opportunities and drive integration of enhancements to improve planning of electricity networks Direct and influence policies and planning-related matters that may affect the adequacy and integrity of electricity network systems Advise on cost control measures and construction project timelines Collaborate with stakeholders to resolve internal or external conflicts in the planning and design of electricity network projects Identify opportunities and drive the integration of network enhancements by comparing the proposed network cable routes with those existing cable routes that are due for replacement Advise on cost control measures and construction project timelines Oversee long-term network reinforcement, expansion and/or renewal based on regional changes in existing and proposed power generation plants 	
-------------------------	--	--	--	---	--	--

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

		information systems as instructed	<p>applicable, and prepare project recommendation papers</p> <ul style="list-style-type: none"> • Schedule and develop plans to check cost information database for relevance and completeness • Review overall costing and planning for network reinforcements, expansion, renewal as well as assess feasibility of new customer connections 	changes in existing and proposed power generation plants to avoid potential network constraints	<ul style="list-style-type: none"> • Endorse the submission of rolling ten-year development plan with proposed annual capital expenditures for senior management and regulators' approval 	
--	--	-----------------------------------	---	---	--	--