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D2.2
Model for Skills Intelligence Skills Mapping

Occupations in the Smart grid workforce

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ISSO

Occupation:	Electrical engineer	EQF Level:	6	ULOS (Units of Learning Outcomes)		
Tasks and responsibilities:		**Level of competence:**		**Knowledge**	**Skills**	**Attitude**
(a) The electrical engineer **advises** on and **designs** power stations and systems which generate, transmit, **store** and distribute electrical power.		5		The electrical engineer **specifies system designs** for power stations that generate, transmit, store, and distribute electrical power under energy efficiency and reliability conditions.	The electrical engineer **designs power stations and systems** to support electrical power generation, transmission, storage, and distribution under operational and regulatory requirements.	The electrical engineer **proposes solutions** to optimize electrical power generation, transmission, storage and distribution.
(b) The electrical engineer supervises, controls, and monitors the operation of electrical generation, transmission, **energy storage** and distribution systems.		3		The electrical engineer **identifies and analyses the operation parameters** of electrical generation, transmission, energy storage, and distribution systems under standard and dynamic conditions.	The electrical engineer **supervises the operation** of electrical generation, transmission, storage, and distribution systems in real-time operational environments.	The electrical engineer **demonstrates commitment** to safe and effective operation of Smart Grid electrical systems under varying conditions.
(c) The electrical engineer design and **adjusts** systems for electrical motors, **propulsion units, drive trains, converters,** and other related equipment, including various **control systems for industrial distribution.**		**3**		The electrical engineer **specifies system configurations** for electrical motors, propulsion units, drive trains, converters, and industrial control systems in energy distribution settings.	The electrical engineer **configures and adjusts** electrical equipment systems such as motors, drive trains, and converters for functional and industrial performance.	The electrical engineer **advises on integrated solutions** for the adaptation and optimisation of electrical and control systems in industrial distribution.
(d) The electrical engineer specifies electrical installations and applications in industrial facilities, **commercial enterprises, SMEs** and other buildings and structures (objects).		3		The electrical engineer **analyses and specifies electrical installation requirements** for various industrial and commercial buildings and structures under relevant codes and regulations.	The electrical engineer **sketches installation plans** for electrical systems in industrial facilities, SMEs, and commercial enterprises.	The electrical engineer **respects safety and efficiency principles** when defining electrical applications in diverse building structures.
(e) The electrical engineer **applies** control standards and procedures to monitor performance and safety of electrical generating and distribution systems, motors, and equipment.		**4**		The electrical engineer **specifies control standards and procedures** to monitor performance and safety of electrical generating and distribution systems, motors, and equipment.	The electrical engineer **assesses system performance and safety** using established control standards and procedures in electrical environments.	The electrical engineer **explains safety implications** of control procedures applied to electrical systems and equipment.
f) The electrical engineer **identifies** repetitive or rule-based tasks suitable for **automation**, while retaining human oversight for high-complexity decisions and adaptive control.		**3**		The electrical engineer **differentiates automation-suitable tasks** from high-complexity decisions within Smart Grid systems.	The electrical engineer **guides automation implementation** for repetitive or rule-based electrical engineering tasks, ensuring human oversight remains.	The electrical engineer **accepts human responsibility** in adaptive control while promoting responsible task automation.
b) The electrical engineer **integrates** automation in grid systems for traditional tasks such as network calculations, real-time monitoring, and system diagnostics, improving efficiency and response time.		**4**		The electrical engineer **evaluates automation integration strategies** for network calculations, real-time monitoring, and diagnostics in Smart Grid systems.	The electrical engineer **adapts traditional grid tasks** for automation to improve efficiency and response time under dynamic conditions.	The electrical engineer **combines automation solutions** with existing operational routines to enhance Smart Grid task execution.
g) The electrical engineer **applies** analytics to perform predictive maintenance, detect anomalies in infrastructure, and ensure proactive intervention before system failures occur.		**2**		The electrical engineer **monitors analytics** in the context of predictive maintenance, anomaly detection in infrastructure, and proactive interventions.	The electrical engineer **implements analytics** for predictive maintenance and anomaly detection to ensure proactive system intervention before failures occur.	The electrical engineer **initiates proactive intervention** to prevent Smart Grid system failures by recognising and acting on anomalies.

h) The electrical engineer **applies** data science principles **(EMS; Energy Management System)** to monitor, interpret, and optimize energy flows within Smart Grids **deployed in homes, neighbourhoods, and through internet-connected systems**, ensuring intelligent and data-driven operational strategies.	**2**	The electrical engineer **applies data science principles** in EMS to optimise energy flows in Smart Grids within connected home and neighbourhood systems.	The electrical engineer **runs EMS tools** to monitor and optimize energy flows in Smart Grids across residential and connected environments.	The electrical engineer **assists** the use of EMS strategies for energy flow optimisation within Smart Grids with a thoughtful and reliable attitude.
i) The electrical engineer **applies** and **uses** analytical models, **including temperature profiles** to forecast energy demand, detect anomalies in usage patterns, and support real-time decision-making under dynamic grid conditions.	**3**	The electrical engineer **examines analytical models and temperature profiles** to forecast energy demand and detect anomalies in usage patterns under grid dynamics.	The electrical engineer **conducts real-time forecasting** using analytical models and thermal profiles for decision-making under dynamic Smart Grid conditions.	The electrical engineer **justifies modelling decisions** made to support real-time operational insight in evolving energy systems.
j) The electrical engineer **supervises** robotic and automated systems used in **construction operation** maintenance and **removal (circular) construction**, grid operations, ensuring they function reliably, safely, and in accordance with technical standards.	**3**	The electrical engineer **specifies operational parameters** for robotic and automated systems in circular construction and grid operations under technical standards.	The electrical engineer **supervises robotic and automated systems** to ensure functional reliability, safety, and compliance during grid operations and construction operation maintenance.	The electrical engineer **promotes safety and standard compliance** when overseeing robotics in circular construction and Smart Grid environments.
k) The electrical engineer, **configures and refines** automated systems for Smart Grid operations, aligning physical component behaviour with digital control protocols to maintain system stability and safety.	**4**	The electrical engineer **refines automated systems** to align physical component behaviour with digital control protocols in Smart Grid systems.	The electrical engineer **configures automated systems** to support stable and safe Smart Grid operations under real-time conditions.	The electrical engineer **promotes control strategies** to ensure stability and safety across automated Smart Grid components.
l) The electrical engineer **designs** integrated **Electric Energy systems** that combine software, hardware, and communication technologies to support decentralized energy resource (DER) control, **such as battery and PV systems.**	**5**	The electrical engineer **specifies integrated Electric Energy systems** that combine software, hardware, and communication technologies to support DER control under decentralised energy conditions.	The electrical engineer **designs Electric Energy systems** integrating DERs such as battery and PV systems through communication-enabled control architectures.	The electrical engineer **verifies the configuration** of integrated energy systems to support decentralised DER coordination and responsiveness.
m) The electrical engineer **manages** integrated **Electric Energy systems** to ensure they operate efficiently, and reliably supporting the coordination and performance of **decentralized energy resources.**	**5**	The electrical engineer **structures management strategies** for integrated Electric Energy systems that ensure efficient and reliable support of decentralised energy resource performance.	The electrical engineer **designs operational routines** to manage integrated Electric Energy systems under efficiency, reliability, and DER coordination constraints.	The electrical engineer **self-evaluates management practices** to improve system coordination and performance of decentralised energy resources.
n) The electrical engineer **verifies** information support decision architectures that enable dynamic, data-driven control of distributed Smart Grid components.	**5**	The electrical engineer **revises information support structures** that guide **decision architectures** for dynamic control of distributed Smart Grid components.	The electrical engineer **develops information pathways** to enable real-time, data-driven control decisions for distributed Smart Grid components.	The electrical engineer **verifies information support** to ensure accurate and dynamic control of distributed Smart Grid systems.
o) The electrical engineer **applies** interoperability and cybersecurity across integrated Smart Grid systems, safeguarding data flows, communication protocols, and device coordination.	**2**	The electrical engineer **assures interoperability and cybersecurity** across integrated Smart Grid systems by safeguarding data flows and protocols.	The electrical engineer **handles and validates device coordination** in Smart Grids by applying cybersecurity and interoperability safeguards.	The electrical engineer **respects communication protocols** and promotes secure interoperability practices across Smart Grid systems.

p) The electrical engineer **designs** complete Smart Grid systems, including control centres, smart meters, **metering**, and closed distribution systems, aligning with legal frameworks and energy optimization principles.	**5**	The electrical engineer **structures** complete Smart Grid systems under conditions requiring alignment with legal frameworks and energy optimization principles.	The electrical engineer **designs** Smart Grid control centres, smart meters, and distribution systems under scenarios involving full-system design requirements.	The electrical engineer **revises** design assumptions of Smart Grid systems under changing legal and optimization conditions with a thoughtful approach.
q) The electrical engineer **interprets and applies** evolving energy laws, data privacy rules, and distribution rights in the context of Smart Grids and closed distribution systems.	**2**	The electrical engineer **interprets** evolving energy laws, data privacy rules, and distribution rights relevant to Smart Grids and closed distribution systems.	The electrical engineer **complies** with energy laws and data privacy rules in the implementation of Smart Grid operations and distribution systems.	The electrical engineer **respects** regulatory frameworks governing energy laws and data privacy within Smart Grids and closed distribution systems.
r) The electrical engineer **handles** regulatory complexities associated with energy data usage and ensures compliance with national and international Smart Grid standards.	**2**	The electrical engineer **monitors regulatory frameworks** for energy data usage and Smart Grid standard compliance at national and international levels.	The electrical engineer **follows Smart Grid standards** and **updates** operational practices to handle complex regulatory compliance issues.	The electrical engineer **accepts responsibility** for regulatory compliance in energy data management and Smart Grid deployment.
s) The electrical engineer **validates** assumptions underlying Smart Grid design and operational decisions, and supports evidence-based improvements (if applicable).	**4**	The electrical engineer **validates design assumptions** that influence Smart Grid operational decisions using technical and contextual evidence.	The electrical engineer **assesses design inputs** to support evidence-based improvements in Smart Grid systems when conditions evolve.	The electrical engineer **proposes improvements** to Smart Grid operations by reflecting on validated assumptions and data insights.
t) The electrical engineer **applies** systems thinking to understand interdependencies between energy components, technologies, and human factors across Smart Grid infrastructure.	**2**	The electrical engineer **constructs an understanding of interdependencies** between energy technologies, components, and human factors using systems thinking.	The electrical engineer **employs systems thinking** to process interactions within Smart Grid infrastructure.	The electrical engineer **shares systems-level insights** to enhance collaboration across interdependent Smart Grid components.
u) The electrical engineer **oversees** a strategic, big-picture perspective of Smart Grid operations, aligning technical work with societal and environmental goals for sustainability and resilience.	**4**	The electrical engineer **oversees operational strategies** that align Smart Grid performance with sustainability and resilience goals.	The electrical engineer **leads and updates operational procedures** to reflect broader strategic objectives for sustainable and resilient Smart Grid development.	The electrical engineer **formulates sustainable goals** and aligns technical contributions with societal and environmental impacts.
v) The electrical engineer **collaborates** across disciplines—including IT, AI, legal, and mechanical engineering—to co-develop integrated and innovative Smart Grid solutions.	**4**	The electrical engineer **elaborates interdisciplinary principles** needed to co-develop integrated Smart Grid solutions with IT, AI, legal, and mechanical experts.	The electrical engineer **leads co-development efforts** across disciplines to build innovative Smart Grid systems and components.	The electrical engineer **collaborates with professionals** from diverse domains to ensure system integration and innovation in Smart Grid projects.
w) The electrical engineer **translates and explains** technical knowledge into accessible insights for stakeholders, facilitating shared understanding and collaborative decision-making in multidisciplinary teams.	**4**	The electrical engineer **summarizes technical knowledge** for use in stakeholder communication and cross-disciplinary understanding.	The electrical engineer **ensures translation of system insights** into accessible language for collaborative decision-making among stakeholders.	The electrical engineer **explains system insights** in a clear and inclusive manner to facilitate collaboration and joint action.
X) The electrical engineer **demonstrates** strong stakeholder engagement skills, clearly communicating system states, risks, and operational options to regulators, consumers, and utility partners.	**3**	The electrical engineer **identifies communication strategies** for conveying system states, risks, and operational options to Smart Grid stakeholders.	The electrical engineer **communicates system information** effectively to regulators, consumers, and utility partners under various operational conditions.	The electrical engineer **shares system states and risks** in a transparent and timely manner to build trust and engagement among stakeholders.

Occupation:	Electrical engineering technician	EQF Level:	4	ULOS (Units of Learning Outcomes)		
Tasks and responsibilities:		**Level of competence:**		**Knowledge**	**Skills**	**Attitude**
a)The electrical engineering technician **provides technical assistance** in research on and development of electrical equipment and facilities or tests prototypes		1		The electrical engineering technician **describes electrical equipment and facilities** in the context of research and development activities.	The electrical engineering technician **identifies electrical equipment and prototypes** when supporting testing activities.	The electrical engineering technician **follows procedures** during prototype testing or equipment development.
b)The electrical engineering technician **prepares detailed estimates of quantities and costs of materials** and labour required for manufacture and installation, according to the specifications given		3		The electrical engineering technician **calculates material, labour quantities and costs** based on manufacturing and installation specifications.	The electrical engineering technician **specifies detailed cost and quantity data** to support estimation processes for manufacture and installation tasks following engineering specifications.	The electrical engineering technician **completes cost estimations** in alignment with technical specifications and procedural expectations.
c)The electrical engineering technician **plans installation methods, checks completed installations** for safety and controls, or undertakes the initial running of new electrical equipment or systems		5		The electrical engineering technician **plans installation methods and safety checks** for new electrical equipment and systems before commissioning.	The electrical engineering technician **designs system start-up routines** to support the initial running of electrical installations after safety and control checks.	The electrical engineering technician **verifies safety and control compliance** before initiating the operation of newly installed equipment.
d)The electrical engineering technician **assembles, installs, tests, calibrates, modifies, and repairs electrical equipment** and installations to conform with regulations and safety requirements		3		The electrical engineering technician **specifies functional requirements of electrical equipment and installations** to ensure regulatory and safety compliance.	The electrical engineering technician **calibrates and installs electrical equipment** to meet applicable safety protocols and regulations.	The electrical engineering technician **demonstrates responsibility** in applying safety measures during electrical equipment work.
f) The technician **assists the implementation of automation for repetitive or rule-based tasks- for grid calculations, monitoring, and diagnostics-** by following configurations defined by electrical engineers.		2		The technician **prepares** systems for automation of repetitive or rule-based tasks for grid calculations, monitoring, and diagnostics under engineer guidance.	The technician **follows** predefined configurations to assist in the implementation of automation for grid calculations, monitoring, and diagnostics.	The technician **assists** engineers by reliably applying automation instructions with attention, accuracy and procedural integrity.
g) The technician **identifies and prepares** datasets from sensors and equipment logs to support automation-based predictive maintenance and anomaly detection systems.		2		The technician **identifies** relevant datasets from sensors and equipment logs **to support** automated-based predictive maintenance and anomaly detection systems.	The technician **processes** datasets from sensors and equipment logs **to prepare** automated-based predictive maintenance and anomaly detection systems.	The technician **proactively applies** datasets from sensors and equipment logs **to support** automation-based predictive maintenance and anomaly detection.
h) The technician **configures and tests** automation-enabled tools for field diagnostics, ensuring proper data inputs and functionalities per engineering instructions.		4		The technician **explains** automation-enabled tools for field diagnostics, to ensure proper data inputs and functionalities according to engineering instructions.	The technician **configures and tests** automation-enabled tools for field diagnostics, ensuring proper data inputs and functionalities according to engineering instructions.	The technician **effectively completes** configuration and testing of automation-enabled tools for field diagnostics according to engineering instructions.
i) The technician **collects, organizes, and checks energy data from Smart Grid sensors** and devices to support analytical model development by engineers.		2		The technician **collects and organises energy data** from Smart Grid sensors and devices to support analytical model development.	The technician **runs energy data checks** from Smart Grid sensors and devices to verify usability in analytical models.	The technician **proactively reports** data inconsistencies found during energy data checks from Smart Grid sensors and devices to engineers.
j) The technician **applies pre-defined analytical dashboards and tools to monitor** energy flow indicators and report anomalies or inefficiencies to engineers.		2		The technician **applies pre-defined analytical dashboards and tools** to monitor energy flows and report anomalies to engineers.	The technician **monitors** energy flow indicators **using pre-defined analytical dashboards** and tools to identify anomalies or inefficiencies to engineers.	The technician **reports** detected anomalies or inefficiencies through analytical dashboards to engineers in a timely and reliable manner.

k) The technician **supports** data visualization efforts by preparing graphical summaries and performance charts for review in operational meetings.	4	The technician **summarizes performance data** to prepare graphical summaries and charts for use in operational meetings.	The technician **elaborates graphical summaries and performance charts** by explaining them to ensure clarity and accuracy in operational contexts.	The technician **supports engineers and decision-maker**s by contributing accurate and well-prepared visualisations in a timely and collaborative manner.
l) The technician **performs** test runs and routine inspections of robotic systems used in grid maintenance to verify adherence to safety and functional standards.	2	The technician **identifies** safety and functional standards that apply to robotic systems to verify compliance with **operational and safety standards.**	The technician **executes test runs and routine inspections** of robotic systems to verify compliance with operational and safety standards.	The technician **reports** deviations or faults found during inspections of robotic systems in a timely and responsible manner.
m) The technician **adjusts** operational parameters of automated systems (e.g., sensor thresholds, actuator responses) based on test data and engineer recommendations.	3	The technician **distinguish operational parameters** of automated systems to understand their influence on system performance.	The technician **adjusts operational parameters** such as sensor thresholds and actuator responses based on test data and engineer recommendations.	The technician **follows** engineer recommendations **to effectively modify operational parameters of automated systems**.
n) The technician **documents** performance issues or irregularities in robotic maintenance tools and communicates findings to engineering teams for resolution.	1	The technician **identifies** common **performance issues and/or irregularities** in robotic maintenance tools during operational conditions.	The technician **documents observed irregularities** in robotic maintenance tools for communication with engineering teams.	The technician **relates performance irregularities** to engineering teams in a clear and proactive manner to support issue resolution.
o) The technician **supports** the installation and assembly of integrated Smart Grid components (e.g., sensors, controllers, communication modules) according to design drawings.	4	The technician **oversees the function and interconnection of Smart Grid components** based on design drawings.	The technician **ensures proper installation and assembly of Smart Grid** components in accordance with technical documentation.	The technician **supports** installation and assembly of Smart Grids **with careful adherence to design requirements.**
p) The technician **ensures** proper wiring and connection of Smart Grid devices in alignment with information architecture specifications and electrical diagrams.	4	The technician **identifies wiring requirements and connection** standards as specified in electrical and information architecture diagrams.	The technician **configures proper wiring and connection** of Smart Grid devices according to electrical and architecture diagrams.	The technician **ensures wiring quality** by following technical standards and with diligence and responsibility.
q) The technician **assists** in **testing system interoperability** and **documents** any data or signal transmission issues across connected devices.	2	The technician **reports** data or signal transmission issues during testing **system interoperability** across connected devices.	The technician **tests system interoperability** across connected devices.	The technician **handles communication irregularities** by supporting testing system interoperability with diligence and timely documentation.
r) The technician **builds and tests production prototypes of Smart Grid devices** (e.g., smart meters, modular control units) under engineering supervision.	3	The technician **specifies** functional requirements of **Smart Grid device prototypes** based on design plans and test objectives.	The technician **builds and tests production prototypes of Smart Grid devices** such as smart meters or modular control units, under engineering supervision.	The technician **undertake and completes prototype development tasks** in collaboration with engineers and project teams.
s) The technician **assists** in **aligning physical components with digital design** specifications using assembly drawings and standard blueprints.	2	The technician **reads assembly drawings and blueprints** to find the alignment requirements between physical and digital components.	The technician **assembles physical components** to match digital design specifications by using assembly drawings and standard blueprints.	The technician **complies** with alignment standards by **assisting carefully in matching components** to design expectations.
t) The technician **ensures** Smart Grid equipment is **assembled in compliance** with energy optimization protocols and legal standards.	4	The technician **explains energy optimization protocols and legal requirements** related to Smart Grid equipment assembly.	The technician **ensures assembly of Smart Grid equipment** in line with compliance energy optimization protocols and legal standards.	The technician **ensures adherence to protocols and standards** by checking compliance and taking corrective action when needed.
u) The technician **ensures** that all materials and components used in Smart Grid systems comply with banned materials regulations and safety standards.	4	The technician **identifies** banned materials and restricted components based on safety regulations and materials lists.	The technician **evaluates materials and components** to verify compliance with Smart Grid safety and legal standards.	The technician **protects Smart Grid system integrity** by ensuring use of approved and compliant materials at all stages of installation.

v) The technician **assists** in preparing compliance documentation for inspection and audits related to energy laws and data privacy requirements.	2	The technician **prepares** compliance documentation for audits related to energy laws and data privacy.	The technician **assists inspections and audits** related to energy laws and data privacy.	The technician **presents** documentation in alignment with audits and compliance expectations to meet legal requirements.
w) The technician **identifies** any observed non-compliant practices or equipment irregularities to engineering and compliance officers.	3	The technician **examines** non-compliant practices and equipment irregularities to ensure alignment with regulatory requirements.	The technician **diagnoses** equipment irregularities and report them to engineering and compliance officers.	The technician actively **reports** observed non-compliant practices to engineering and compliance officers.
x) The technician **documents** technical assumptions or field observations during prototype testing that may impact system-wide performance.	1	The technician **documents technical assumptions** or field observations during prototype testing procedures.	The technician **differentiates field observations** that may impact system-wide performance during prototype testing.	The technician **identifies the importance of documenting assumptions and observations** in the context of system-wide performance assessment.
y) The technician **identifies** component interdependencies (e.g., voltage ripple across devices, communication lags) that may affect operational stability.	3	The technician **analyses** component interdependencies such as voltage ripple and communication lags that impact operational stability.	The technician **conducts** evaluations of component interdependencies to assess effects on operational stability.	The technician **explains** the impact of interdependencies on operational stability to support informed decision-making.
z) The technician **supports** efforts to align Smart Grid functionality with energy sustainability goals by reporting efficiency trends and waste points.	4	The technician **explains** energy sustainability goals as they relate to Smart Grid efficiency trends and operational waste.	The technician **summarizes** efficiency data and observed waste points to support sustainable Smart Grid functions.	The technician **supports** sustainability efforts by consistently reporting trends that impact energy performance in a responsible manner.
aa) The technician **collaborates** with IT teams by supplying system measurements and hardware feedback relevant for software calibration.	4	The technician **describes** the role of system measurements and hardware feedback in Smart Grid software calibration processes.	The technician **provides** relevant feedback and data to IT teams for use in Smart Grid system tuning and calibration.	The technician **collaborates with technical teams** by offering timely and accurate feedback to support interdisciplinary coordination.
ab) The technician **prepares simplified summaries of complex technical issues** to assist cross-functional teams and stakeholders in understanding operational risks.	3	The technician **analyses and selects relevant complex technical issues** to include in simplified summaries for stakeholder use.	The technician **prepares and shares** clear summaries of relevant complex technical issues to support understanding of operational risks among cross-functional teams and stakeholders.	The technician clearly **communicates complex technical issues** to support cross-functional teams and stakeholders.
ac) The technician **participates** in stakeholder meetings to present test findings and clarify the technical implications of Smart Grid performance data.	3	The technician **reflects on test findings to clarify its technical implications** of Smart Grid performance during stakeholder meetings.	The technician **presents test findings and explains implications** of Smart Grid performance data, during stakeholder meetings.	The technician **actively take part** in discussions to clarify test results and Smart Grid performance data.