



Australian Government

UEEFS2009 Explore battery storage and vehicle-to-everything energy systems

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Modification History

Release	Comments
1	This unit of competency was first released in UEE Electrotechnology Training Package Release 10.0.

Unit outcomes

This unit introduces learners to home battery storage and Vehicle-to-Everything (V2X) energy systems, with a focus on how these technologies can be used in smart residential energy applications.

It supports the development of foundation and employability skills, preparing learners for further vocational training, apprenticeships, or employment in the energy sector.

On completion of this unit, learners will be able to demonstrate basic knowledge of how battery storage, solar energy and electric vehicle energy systems can be used in residential settings to generate, store, and supply energy during limited power availability or loss of mains supply, and the types of entry-level roles, emerging energy-related roles and career pathways in related energy sector industries. They will have the skills to interpret residential energy scenarios, develop and represent a conceptual residential energy system, and safely demonstrate energy storage and transfer using an ELV direct current (d.c.) model energy system.

Licensing/Regulatory Information

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Knowledge

On successful completion of this unit, learners will have:

- basic factual knowledge of:
 - how energy is generated, stored, and used in residential settings using battery storage, home solar, and electric vehicle energy systems
 - how these systems support household energy needs during limited power availability or loss of mains supply
 - entry-level occupations, emerging roles and career pathways in the energy sector related to battery storage and electric vehicle integration
- basic technical knowledge of:
 - industry standards for selection and installation of systems

- the components used in battery storage, home solar, and electric vehicle energy systems
- how energy flows from generation through storage to supply a load
- how battery storage, solar, and vehicle-to-everything (V2X) systems operate
- how monitoring, load management, and grid interaction are used in smart energy systems
- basic numerical concepts and faults relevant to battery storage and ELV d.c. model energy systems
- the use of digital tools where required to monitor, record, represent, or communicate project information
- conceptual understanding of:
 - safety considerations relevant to battery storage and electric vehicle energy systems.

Skills

On successful completion of this unit, learners will have:

- cognitive skills to:
 - access and interpret information from residential energy scenarios
 - design a conceptual residential energy system incorporating battery storage, solar energy, and/or electric vehicle integration
- technical and procedural skills to:
 - represent the conceptual system
 - select and check a limited range of tools, components, and materials
 - apply safety procedures
 - demonstrate energy storage and transfer using a basic ELV d.c. energy system
 - test model performance
 - make basic adjustments
 - record project actions and results
 - use digital tools where required to monitor, record, represent, or present project information
- communication skills to:
 - communicate technical information about the proposed residential energy system and how it supports residential energy needs
 - use appropriate energy sector terminology effectively
- collaboration skills to:
 - participate in project activities with others.

Application of Knowledge & Skills

Learners will apply their knowledge and skills in a structured learning environment. They will use autonomy and limited judgement to:

- plan and manage tasks to explore how energy is generated, stored and used in residential settings
- record and communicate information about the proposed residential energy system and how it supports residential energy needs using appropriate energy sector terminology
- interpret a residential energy scenario
- apply core principles of battery storage, solar and V2X energy systems to develop and represent a conceptual residential energy system that uses battery storage to support essential needs during a loss of mains supply
- replicate those principles using a basic ELV d.c. energy system with a single supply path from a storage device to a load, including small-scale generation for charging
- use digital tools where required to record, represent, or present project information.

Pre-requisite unit(s)

No pre-requisite units

Competency field(s)

Foundational Skills

Unit sector(s)

Electrotechnology

Range of conditions

N/A

Assessment Requirements for UEEFS2009 Explore battery storage and vehicle-to-everything energy systems

Performance Evidence

The individual must demonstrate the ability to:

- develop a conceptual residential battery storage energy system solution by:
 - interpreting a scenario involving a loss of mains supply or limited grid access to identify residential energy needs
 - proposing a conceptual energy system that produces electrical energy, charges a battery, and supplies a household alternating current (a.c.) load by integrating battery storage, solar generation, or V2X functionality
 - representing the proposed system using labelled diagrams or digital simulations to show how the system works
 - communicating information about the proposed system while participating in project activities with others, using appropriate energy sector terminology to explain how the system supports residential energy needs
- assemble and operate a basic ELV d.c. energy system to replicate residential battery storage functions by:
 - interpreting a project brief to identify the requirements and plan a basic ELV d.c. energy model that replicates residential battery storage functions to show how energy can be stored and transferred to meet basic energy needs during a simulated loss of power supply or limited grid access
 - selecting and checking ELV components, tools, and materials for correct function and safe condition
 - applying safety procedures, including shut-down and isolation procedures, before working on the system
 - assembling and operating a basic ELV d.c. energy system with a single supply path from a storage device to a load, including small-scale generation for charging
 - testing the model to identify basic faults or performance issues
 - making a basic adjustment to improve model performance
 - recording actions and results clearly using written notes, labelled diagrams or digital tools.

Knowledge Evidence

The individual must demonstrate knowledge of:

- entry-level occupations, emerging roles and career pathways in the energy sector related to battery storage, solar energy, and electric vehicle integration work

- awareness and conceptual understanding of how energy is generated, stored, and used in residential settings using battery storage, home solar, and electric vehicle systems, including:
 - the concept of grid interaction and the role of the electricity network operator (entity) in setting requirements for systems that supply power to, or draw power from the grid
 - the role of inverters in converting d.c. electricity from battery storage, solar panels, or electric vehicles to a.c. for household use
- the concept of V2X, and how electric vehicles can be used to supply energy to homes or appliances
- the components used in battery storage and V2X energy systems, including:
 - solar panels
 - isolators
 - battery types
 - charge controllers
 - inverters
 - household loads
- awareness of relevant industry standards to which the selection, installation and control equipment of each type of system must comply
- the basic purpose and function of smart energy system monitoring, including:
 - using digital displays or apps to check how much energy is being generated, stored, or used
 - identifying when battery levels are low or when solar panels are producing less energy
 - tracking household energy use to help manage consumption
- the basic purpose and function of smart energy system load management, including:
 - using timers or smart switches to run appliances when solar energy is available
 - automatically reducing power to non-essential appliances when battery levels drop
 - prioritising essential loads (e.g. lighting, refrigeration) during limited power availability
- the basic purpose and function of smart energy system grid interaction, including:
 - sending excess solar energy back to the grid
 - charging or discharging a battery depending on electricity demand or tariffs
 - disconnecting from the grid during an outage (islanding) and switching to stored battery power

- how energy flows through basic battery storage energy systems from generation, through storage, to supply a load
- awareness and conceptual understanding of safety considerations related to real-life residential battery storage, solar, and electric vehicle energy systems, including:
 - hazardous chemical leakage from batteries
 - risks of arc flash from short circuits
 - electric shock associated with interconnected battery banks, and a.c. and d.c. rated parts/components present in real-world energy systems
 - fire and explosion from flammable gas emission and excessive temperatures
- how energy flow can be replicated or represented in an ELV d.c. model with a single supply path from a storage device to a load, including a small-scale generation source for charging
- safety principles when working with ELV d.c. model energy systems relating to battery storage and V2X project work.
- basic numerical concepts relevant to battery storage and ELV d.c. energy systems, such as interpreting voltage or current readings, estimating battery charge or discharge times, and comparing energy use of different loads in a model system
- faults or problems that might affect small battery storage and V2X energy ELV demonstrations or models, and simple solutions to improve performance.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

All practical activities and projects involving electrical components must be limited to ELV d.c. systems as defined by relevant jurisdictional standards, to ensure they can be safely delivered and undertaken by individuals who do not require an electrical licence.

Mandatory Workplace Requirements

There are no mandatory workplace requirements for assessment. Assessment of performance evidence may be in a structured learning environment.

Unit Mapping Information

Previous Code and Title	Equivalence	Comments
	Newly created	This unit has been created to address a skill or task required by industry that is not covered by an existing unit of competency

Links

Companion volumes, including implementation guides, are found on the national training register - <https://training.gov.au/training/details/UEE>.