



Power conversion

2026

Current Booster technology

BESS / Solar / Drones / Home / EV / Defence



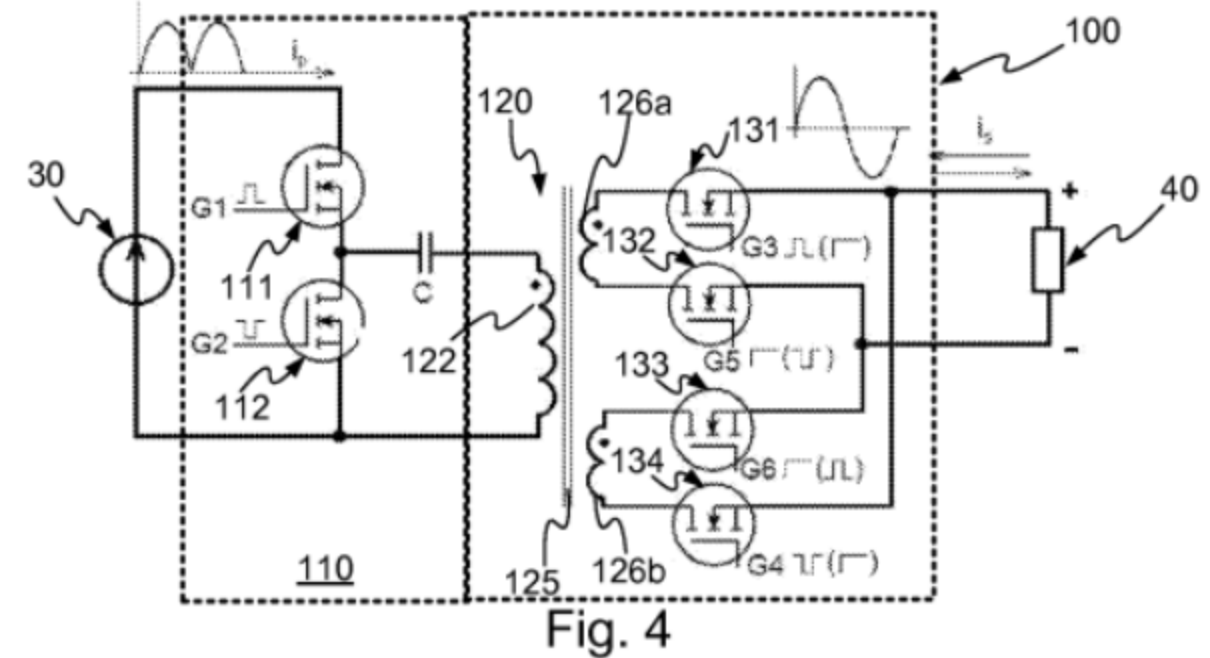
CONCEPT ENCLOSURE

Current Booster technology for connected energy systems

Controlled current conversion

A transformer and switched secondary circuits form the core of the patented current-booster architecture.

The NexVolt source describes modular, galvanically isolated AC/DC and DC/DC power-conversion ambitions.



SE544970 C2 · Figure 4 · source circuit

Less hardware More efficient energy conversion



Galvanic isolation

Electrical separation between input and secondary circuitry.



Fewer components

Consolidate selected conversion stages and connections.



Lower cost potential

Reduce hardware, cabling and assembly requirements.



Higher efficiency

Efficient switching with source-reported conversion figures.

Patent features and NexVolt commercial claims are distinguished in the following pages.

Galvanic isolation at the conversion core

Isolated input and output

Transfer energy through the transformer while separating the primary and secondary electrical circuits.

Safety-oriented architecture

A foundation for isolated interfaces to batteries, vehicles, loads and electrical test equipment.

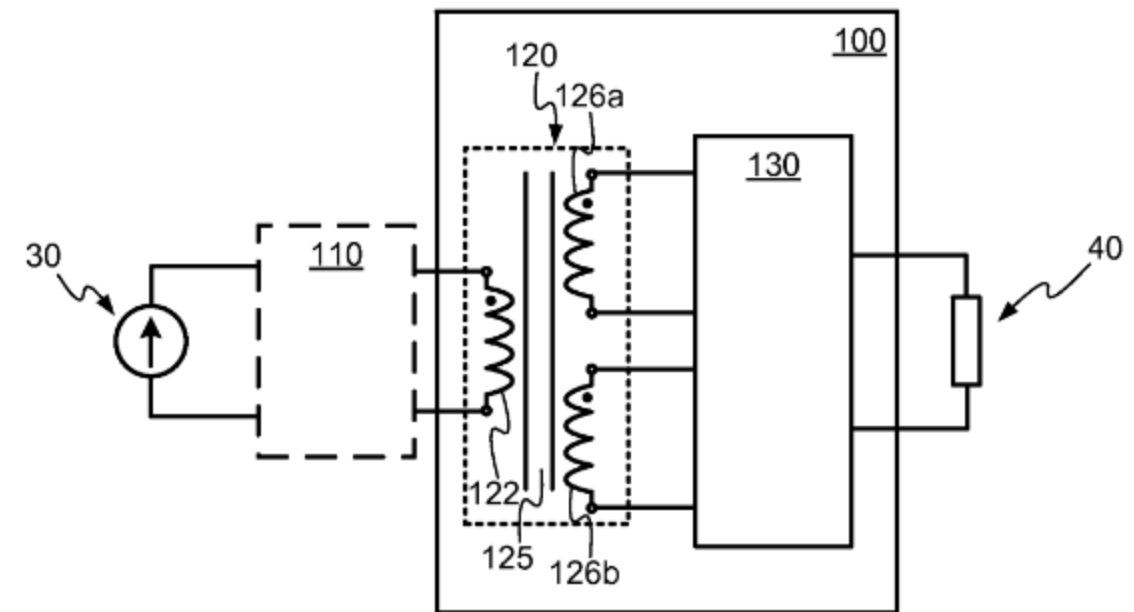


Fig. 9

SE544970 C2 · claim 4 · Figure 9

Fewer components

A route to lower system cost

Consolidate conversion stages

An integrated conversion interface can reduce separate power blocks, connections and assembly operations where the topology permits.

8 → 4

High-power HV cables

5 → 3

Low-power twin-core HV cables

Reduce cost drivers

Less hardware and cabling; a route to lower BOM, packaging and assembly costs.

Illustrative NexVolt EV architecture · 2023 source

Higher efficiency Less energy lost in conversion

96%+

Power conversion

Reported application-dependent conversion efficiency.

96–98%

Battery-string balancing

Reported efficiency for the string-balancing application.

≈ 90%
→ > 96%

EV circuit illustration

Source comparison of separate blocks and integrated conversion.

Compact magnetics

Less size and weight



High-frequency operation

30 kHz+; preferred 50 / 100 kHz+. A route to smaller transformers.



Windings within the PCB

Internal secondary windings improve coupling and reduce parasitic effects.



Shared transformer core

Stacked boards share a core for a compact, lightweight assembly.

Ferrite-core and PCB routing options support the compact conversion architecture.

Precise current control across both polarities



Current & waveform control

Switch the secondary connections to control positive and negative current.



Synchronized switching

Coordinate primary and secondary operation for efficient energy transfer.



Adaptable input stages

Half-bridge or full-bridge options balance switch count and control.



Fast FET switching

Low-resistance semiconductor switches support responsive control.

Primary-to-secondary turns: $\geq 5:1$; $\geq 10:1$ preferred · supports current boost.

Modular conversion for simpler system assembly



Scalable assemblies

Series primary connections with parallel secondary outputs.



Shared circuits

A common primary stage and control module across boards.



Socketed modules

Carrier connections support a structured module assembly.



Illustrative module construction
Patent objective: lightweight, portable testing equipment

Bidirectional conversion

Flexible battery control



AC/DC & DC/DC interfaces

Bidirectional conversion described in the original NexVolt platform material.



Battery-string balancing

Polarity adjustment and efficient transfer for storage-system integration.



Flexible power management

Tailor conversion and power output for solar, batteries, charging and microgrids.

Source-described capabilities · complete application interfaces and protection required

One conversion foundation. Six application domains.



BESS

Storage and
controlled energy
exchange



Solar

Buildings, vehicles
and remote
devices



Home

Solar, home
battery and a
compatible EV



EV & grid

Charging, backup
and grid
participation



Drones

Solar-backed
charging and
remote docks



Defence

Power for bases
and field
infrastructure



01 / BESS

Energy stored. Power controlled.

A modular conversion interface
between battery storage, solar
generation and site demand.

Utility, commercial and industrial
battery energy storage concepts



CONCEPT RENDER

Storage that works with site demand



More use of solar generation

Store surplus generation within the battery's operating limits.



Power when the site needs it

Coordinate dispatch and import peaks through the site EMS.



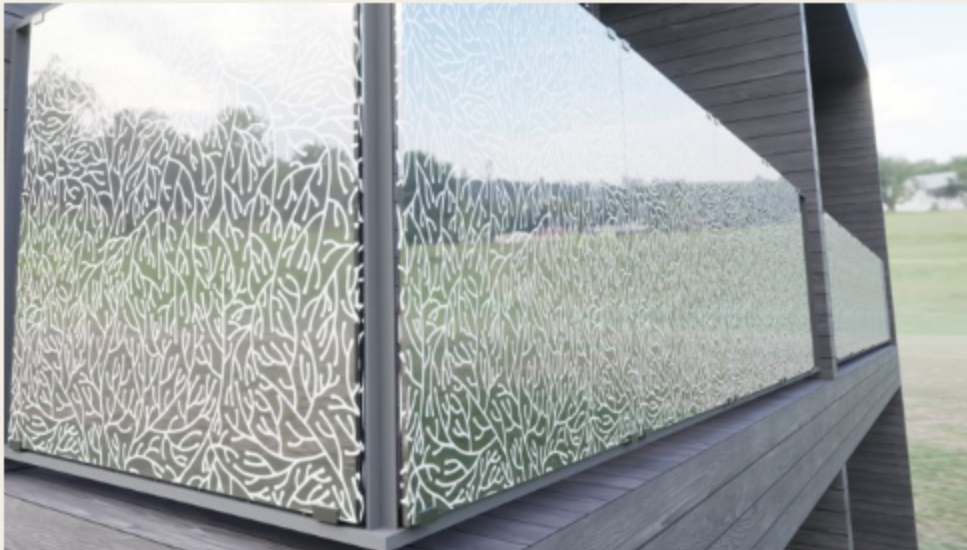
Control across battery strings

Explore independent string management alongside the battery BMS.

Power (kW) and stored energy (kWh) are separate design decisions.

Solar integrated into buildings

Façades. Balconies.
Designed surfaces.



Interface variable PV output with storage and building loads through a purpose-designed power stage.



Savcor / Valoe application references

Integrated vehicle solar

Integrated solar for light urban mobility

Route roof-generated power to the battery
or auxiliary loads through a compact
conversion interface.

Solar contribution depends on area,
sunlight and the vehicle's energy demand.



Toyota FT-Me concept · Savcor source image

Solar for remote and specialist systems



Solar-powered drones

Explore lightweight conversion for solar UAVs with application-specific flight energy budgets.



Remote devices

Sensors, cameras and monitoring nodes with intermittent harvest and storage.

Drones powered by solar and storage

Solar-backed drone docks

Connect local solar and battery storage to drone docks and battery charging at remote sites.



A conversion platform for inspection, remote monitoring and field support.



Savcor solar UAV concept illustration
Proposed NexVolt integration

Power where drone operations need it

	Solar farm inspection	Supply drone docks from site solar and storage for repeat inspection workflows.
	Remote drone docks	Coordinate charging demand, dock equipment and a battery reserve at isolated sites.
	Mobile field charging	Combine portable solar and battery storage for drone battery service in the field.

Current Booster opportunity: isolated supply and current control within the complete charger.

Size storage for weather and duty cycle. Match charger and battery limits.



03 / HOME ENERGY

The bidirectional home energy hub.

Bring rooftop solar, stationary storage, EV charging and household demand into one coordinated energy system.

Proposed home device and control concept
Compatible vehicle and power stages required



CONCEPT RENDER

One hub for solar, storage and the EV

-  Use solar power
-  Store the surplus
-  Charge the EV
-  Power the home from the EV
-  Participate in grid services



Compatible EV, complete power stages and approved controls required. Concept illustration.

The EV as a power source



Power for the home

Support household loads from the vehicle battery. Backup requires safe grid isolation and a suitable local power supply.



Services for the grid

Export or absorb energy through an approved grid programme, with vehicle reserve, metering and dispatch control.

Preserve the owner's minimum charge and departure requirements in both modes.



04 / GRID PARTICIPATION

Balance energy where it is used.

Coordinate solar, stationary
batteries and compatible vehicles
to absorb surplus energy and
respond to site or grid demand.

Peak management · controlled dispatch
Qualified grid services where permitted



CONCEPT RENDER



VEHICLE / CHARGING INFRASTRUCTURE

Solar-powered charging sites.

Combine solar canopies, battery storage and managed charging for workplaces, residential communities and fleet depots.

Buffer charging peaks with storage.
Explore bidirectional fleet services.



CONCEPT RENDER



05 / DEFENCE INFRASTRUCTURE

Resilient power for critical sites.

Support the energy systems behind
defence operations: fixed bases,
deployable shelters and remote
support facilities.

Proposed applications
Solar + battery + generator microgrids



CONCEPT RENDER

Power for defence support systems

	Radar & communications	Regulated supply for sensors, radios and communications shelters.
	Field medical facilities	Battery-backed power for clinical equipment and cold storage.
	Drone & robotic support	Solar-backed drone charging, remote docks and auxiliary supply for support vehicles.

Solar and storage can support remote drone docks, field charging and maintenance hubs.

Industrial testing and support infrastructure



Test & maintenance

Controlled current injection for relay, switchgear and contact-resistance testing — the use case closest to the supplied patent.



Site power & charging

Battery service stations, drone charging, motor-production benches and backup power for hangars and workshops.

Qualification must match the duty cycle, electrical environment and operating conditions.

Designed around the complete energy system.



Power conversion

Select topology, voltage range, isolation and thermal design.



Control & compatibility

Coordinate BMS, EMS, PV control and vehicle communication.



Protection & connection

Provide metering, switchgear, fault protection and grid compliance.

Consolidate selected conversion stages where the architecture supports it.

Performance qualification for the target application

	Electrical performance	Efficiency across load and voltage; transient and fault response.
	Thermal & environment	Cooling, enclosure, vibration and operating temperature.
	Safety & grid operation	Isolation, EMC, protection and application-specific compliance.

Application ratings and certification remain to be established.



Power conversion for your next energy system



OEM INTEGRATION / 2026 PRODUCT VISION

Application design begins with the voltage range, power level and operating requirements.

CONCEPT ENCLOSURE

Technology and application references

NexVolt technology reference	2023 source: efficiency, fewer components, cable reductions, lower cost, bidirectional conversion and battery-balancing claims.
Swedish patent SE544970 C2	Claims 1–19: current control, isolation, switching, PCB windings and modular assemblies. No assertion of current ownership or legal status.
Savcor solar reference	Integrated PV for façades, vehicles, aircraft and remote devices. Source imagery is an application reference, not a NexVolt partnership.
Front Ventures defence reference	Support infrastructure, sensors, robotics and manufacturing context. Proposed energy applications; no NexVolt deployment is implied.

Technical context: DOE, NREL, US Army, Skydio, DJI and Airbus. References in slide notes.