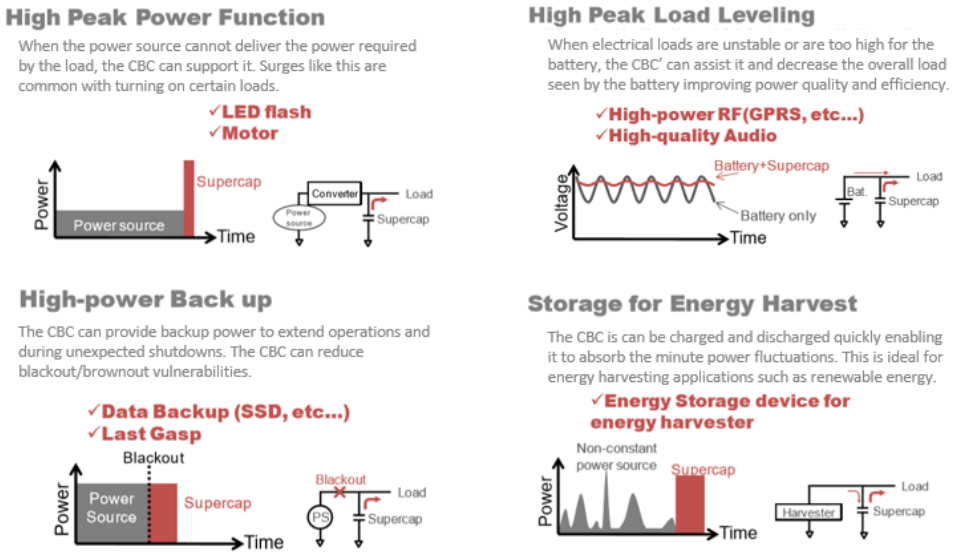
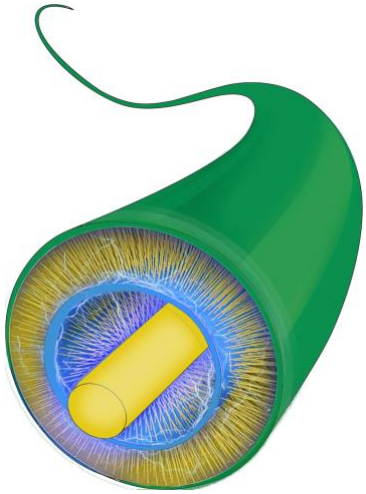
Cable-Based Capacitors

The Cable-Based Capacitor (CBC) is Capacitech's proprietary **wire-shaped supercapacitor optimized for space to miniaturize electronics and complement batteries.** The CBC's unique form factor offers aesthetic and space saving advantages compared to existing supercapacitors on the market. The CBC is ideal for applications such as Internet of Things (IoT), wearables, emergency lighting, renewable energy systems, uninterruptible backup power supplies and energy harvesting. **The CBC's form factor allows it to be used where no supercapacitor has gone before, off the printed circuit board (PCB) and integrated into other parts of a product or system, such as inside a wiring harness.** The CBC can also be installed on a PCB and routed through areas where space is available or bent to fit inside a small enclosure. The CBC's high-power density can complement existing energy storage products and energy harvesting modules by providing peak-power support.





The CBC is ideal for high power bursts, filtering, and storage.

This kind of power behavior is common in applications such as those listed below:

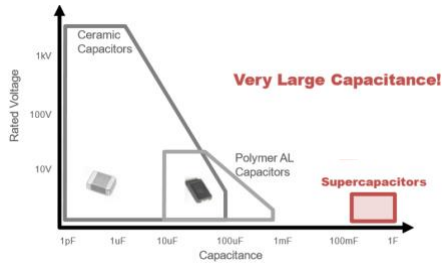
- Electronics & IT
  - Internet of Things
  - Energy harvesting
  - Wearables
  - Backup power & UPS systems
  - Last gasp energy storage
  - Smart home devices, wireless alarms
  - LED flash systems
  - High power, long range RF communication
  - High quality audio
  - Sensors, remote metering
  - Power electronics
  - Emergency lighting
- Renewable energy applications
  - Solar power systems
  - RF Energy Harvesting
- Automotive
  - Electric vehicles
  - Regenerative braking systems
  - Switching power supplies
  - Connectivity features
- Aerospace
  - Drones
  - EMF/EMI suppression

Many of the applications listed, such as solar power systems, include complementing batteries.

Each CBC cell is rated to 1.6V (surge of 2V) and a capacitance of 3F. Individual units of the CBC can be connected in parallel or series to meet voltage and power requirements. **While traditional supercapacitors are rigid and restricted to use on a PCB, the CBC is leveraging its flexible and wire-like form factor to build a discrete and distributed network of energy storage throughout the world's infrastructure; inside of wiring harnesses, power cords, shoes and other wearables, electronics enclosures and more.** The CBC technology gives design engineers more space, opportunity to add new features, and design flexibility to meet their customers' needs by offsetting supercapacitors from the PCB or adding additional energy storage capability in parts of a product or system that was previously impossible.

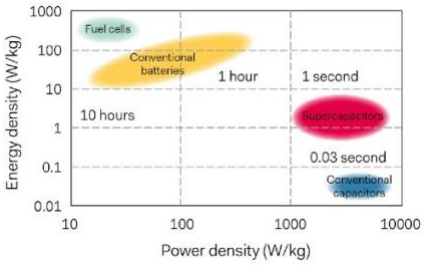
Performance & Design

The Cable-Based Capacitor (CBC) has supercapacitor performance. This means that the CBC stores more energy than a traditional capacitor would and can deliver it quicker than a battery. The ability to deliver energy quickly speaks to CBC's high-power density.



High energy density compared to capacitors

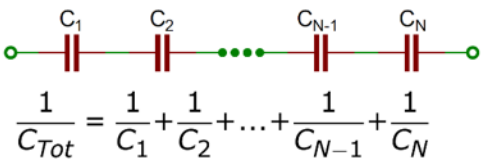
Supercapacitors have significantly higher capacitance ratings and energy storage capabilities than traditional capacitors.



High power density compared to batteries

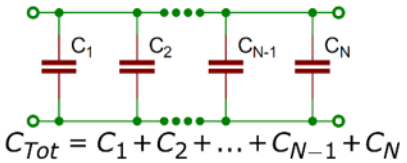
Batteries are designed to energy for long periods of time. Supercapacitors are designed to deliver a lot of energy quickly. Therefore, an ideal energy storage system will feature both batteries and supercapacitors.

Using the equations below, CBC cells can be connected in series and parallel to meet a required specification:



$$\frac{1}{C_{Tot}} = \frac{1}{C_1} + \frac{1}{C_2} + \ldots + \frac{1}{C_{N-1}} + \frac{1}{C_N}$$

$$V_{Tot} = V_1 + V_2 + \ldots + V_{N-1} + V_N$$



$$C_{Tot} = C_1 + C_2 + \ldots + C_{N-1} + C_N$$

$$V_{Tot} = V_1 = V_2 = \ldots = V_{N-1} = V_N$$