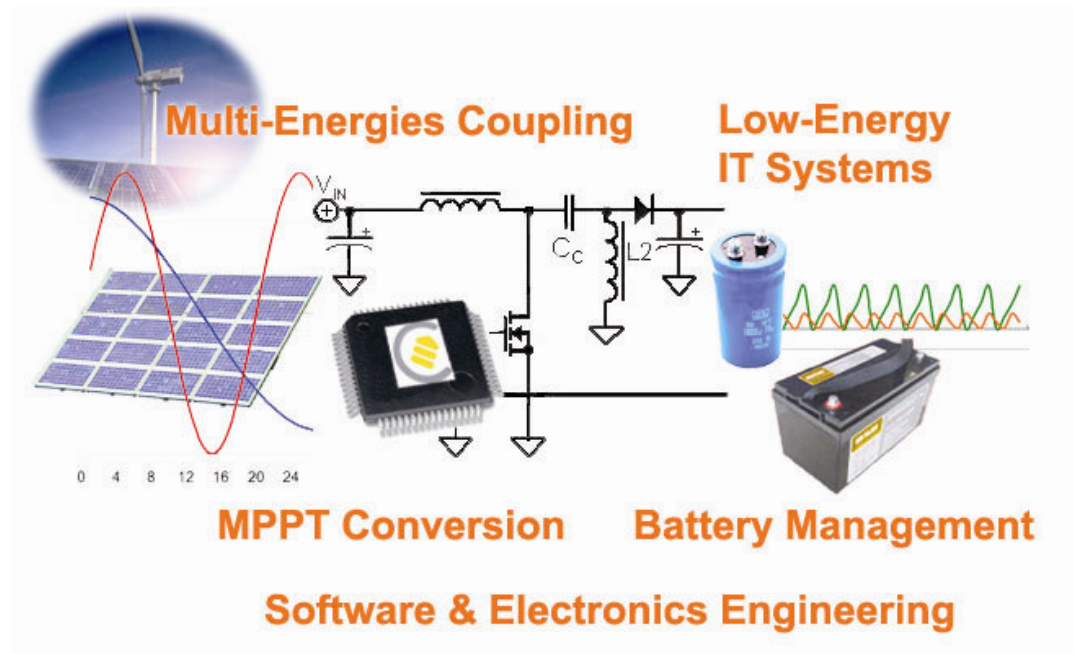


## TUNECHARGER, Innovation, Expertise, Engineering

TUNECHARGER implements an innovating and patented process to charge batteries.



### To optimize systems' autonomy

- High efficiency energy conversion
- Efficient battery management
- Complex energy source management
- Coupling of independent sources

### To reduce maintenance costs

- Stationary Equipments powered by renewable energy
- Electric vehicles
- Smart power management
- Rationalization of batteries
- Increased battery duty cycles

### A team of experimented engineers in integration

- Real time software and micro-controllers
- Bus and communication protocols
- Model-Driven Engineering
- IT Systems architecture

## The Tunecharger process

The process supplies batteries by controlling the discharges of capacitors. This simple principle brings up greatest advantages to convert and manage energy within embedded systems.

The process yields outstanding charge efficiency because it prevents the double layer that considerably contributes to heat losses when batteries are charged with DC current.

⇒ **1<sup>st</sup> advantage: charge time and efficiency are significantly enhanced.**

The strength of discharge is controlled as so to produce VHP<sup>®</sup> (Very High Pulse) phases in order to regenerate batteries, as scientifically evidenced.

⇒ **2<sup>nd</sup> advantage: battery duty cycles are increased.**

Every discharge allows measuring the profile of battery reaction as so to assess its state of health.

⇒ **3<sup>rd</sup> advantage: battery ageing is monitored and system reliability is strengthened.**

The decoupling by capacitor between energy sources and batteries helps integrate several available sources.

⇒ **4<sup>th</sup> advantage: systems may be powered by every available sources of energy.**

The TUNECHARGER process requires an accurate real-time management of conversion, thus implying to drive sources of renewable energy at their best efficiency (MPPT).

⇒ **5<sup>th</sup> advantage: systems exploit the maximum of the available energy.**

## Electronics and Software Engineering

Our skill in **metrology**, **energy conversion** and **battery management** is dedicated to the design of modules that best fit the most demanding embedded systems. Our experience in software and communication buses allows the implementation of smart functions: battery management systems (BMS), energy monitoring, statistics of supply, anomaly detection, etc.

Our know-how in systems industrialization spans the full engineering of product life cycle:

- ⇒ Software and electronics design
- ⇒ Price optimisation
- ⇒ Software quality
- ⇒ Software architectures.

## Contact Data

**TUNECHARGER** is member of the competitive cluster SYSTEM@TIC.

**TUNECHARGER** follows up a R&D program in battery regeneration with the IFP / hybrid vehicles

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