



**TECHNOLOGY** 

**MANUFACTURI** NG

**PROJECTS** 

# rCE Powerpack Schematic operating principle

- Given the challenges of combined transport and traffic congestion, the goal must be to shift road transport to rails. (Shift2rail)
- The challenge on reducing CO2 emissions, on one hand, and reducing noise emission on the other, must be
  answered in a sustainable way through combined transport solutions.
- The challenge faced by railCare AG, Switzerland, the logistics specialist for the COOP Group in Switzerland, was to meet the challenge of transporting refrigerated goods by rail. This is how the rCE Powerpack for the needs of railCare was developed and deployed. rCE Powerpack is a trade mark and copyright protected by railCare.
- For the commercialization of the rCE Powerpack, the companies railCare AG and Molinari Rail AG agreed, that Molinari Rail AG is the international distributor of the rCE Powerpack, due to their experience in the railway industry and thanks to their engineering and manufacturing landscape. This includes the consulting during the introduction, the installation in Dessau or at sites of the customers, and the supply of spare parts during lifecycle.
- Based on the experience of the logistics concept of railCare AG, it is possible in addition to the rCE Powerpack, that Molinari Rail AG and the experts from railCare AG also support tailor made logistics concepts.

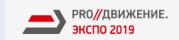




# rCE Powerpack Application area

To transport reefer container wagons in combined transport with power supply: It is necessary to ensure the energy supply of electrical power (400V) for reefer container during rail transport and shunting as well as during parking and marshalling.



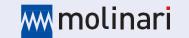




## rCE Powerpack Schematic operating principle







# rCE Powerpack Securing power for reefer container @ rail

Integration or securing the «energy requirement» for the reefer container during the entire intermodal transport process in the combined transport.

	Securing of the «Energy requirement»			
Loading equipment operation	Loading on ramp	Transport by Road (Outbound)	Transport by Rail	Transport by Road (Distribution)
Reefer containers with diesel-electric or pure electric cooling units	Operation over network terminal (Standard)  Standard-Technik (Anschluss)	Operation over the generator in the truck (Standard)  Standard-Technik (Generator)	Keine branchen- übliche Lösung	Operation over the generator in the truck (Standard)  Standard-Technik (Generator)





# rCE Powerpack Securing power for reefer container @ rail

The lack of power supply in the rail and on the freight cars (container wagon)

Existing system «Train line» (Zugsammelschiene) available only for passenger trains, not suitable for freight trains



### Needs / Requirements:

- An autonomous power supply per wagon for the electrical operation of up to 4 cooling units!
  - During train journey / trips
  - During the waiting times on mainline and in the event of catenary problems or change of power systems
  - During shunting, marshalling and loading for at least 3 to 4 hours.



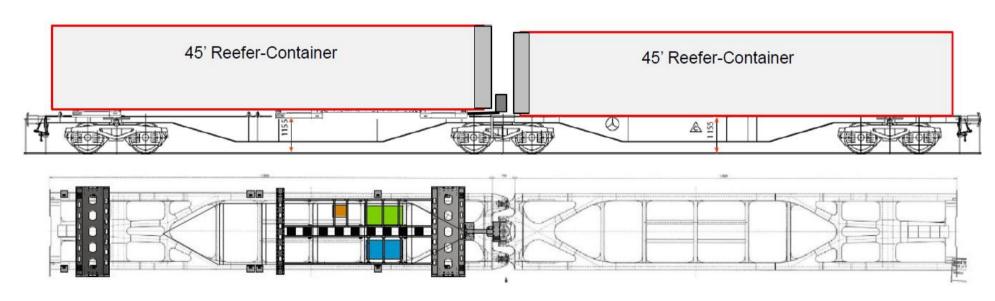


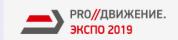
# rCE Powerpack Securing power for reefer container @ rail

### For international application

- Same concept, modular system
- Optimized system components
- Simplified execution

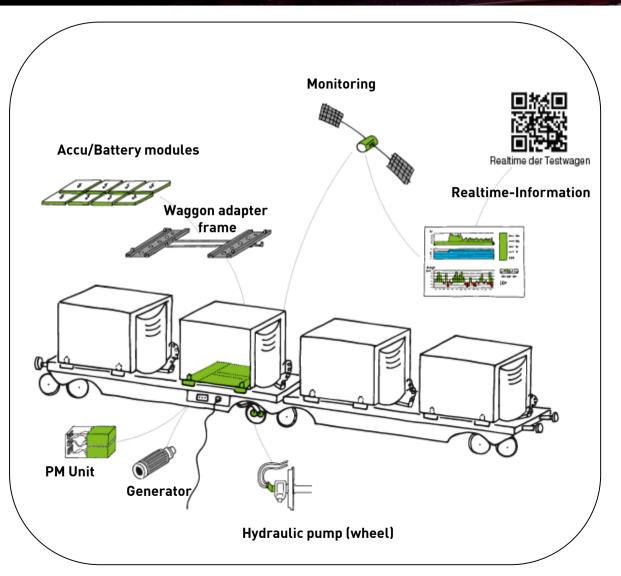




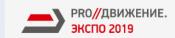


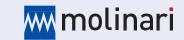


## rCE Powerpack System overview

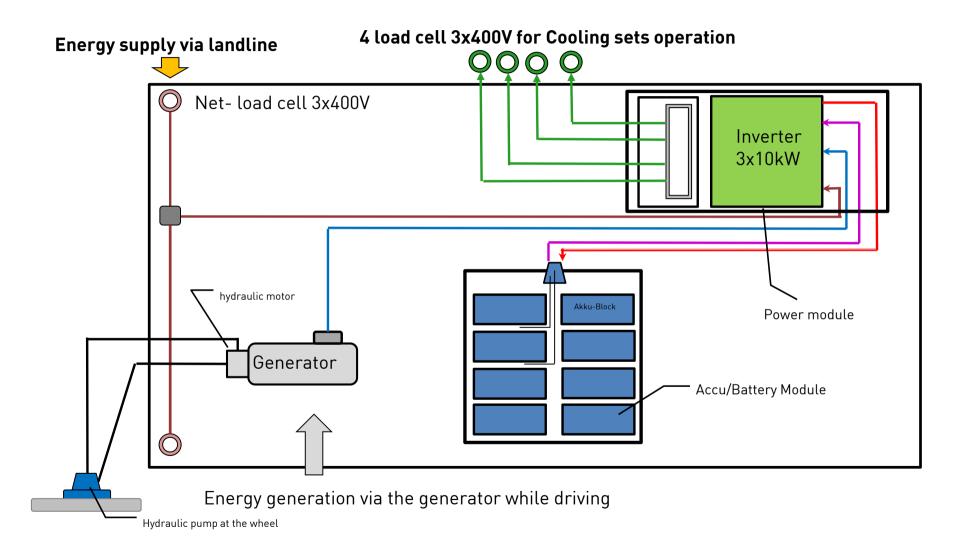


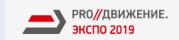
- Electricity generation through the use of kinetic energy
- Storage of energy in batteries
- Adaptable use for standard components
- Complete power supply system built into adapter frame (considered as charge)
- Satellite-controlled monitoring and control program
- Tailored release of saved energy





# rCE Powerpack Schematic operating principle







## rCE Powerpack System overview

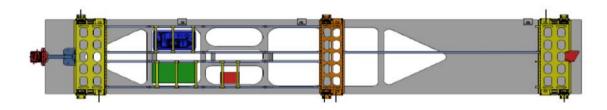
The rCE Powerpack is designed with 4 subsystems:

Subassembly 1 – rCE E Wagon-adapter frame

Subassembly 2 – rCE PM Unit (36 kW/h)
 optional: additional 27 kWh battery modules

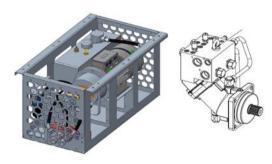
Subassembly 3 - rCE axle generator

Subassembly 4 - rCE remote monitoring

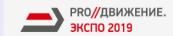


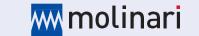






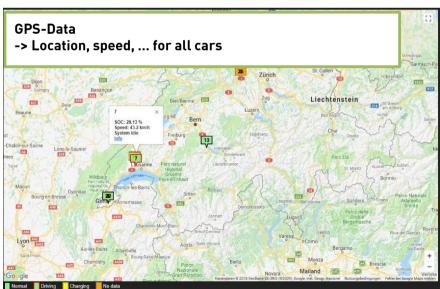






## rCE Powerpack Real time monitoring





- The rCE PowerPack has remote monitoring with GSM router and integrated multi-string battery management with SDRMS via WLAN. GSM sim card to be provided by operator.
- All operational information is available in real time via an online database.
- The access is not complicated and it can connect with any device which is connected to the Internet. The authorization system ensures that only authorized persons have access to the data.
- So that all parties can access the data, it can be called up over the Internet with a web browser. Depending on the requirements, different data (detail levels) are displayed, it also depends on the authorizations of the users. The application is an independent platform and can also be used by mobile devices.
- Information is available real time on:
  - the wagon-position
  - the actual velocity
  - the charging and discharging power
  - temperature and oil pressure
  - statistical values





## rCE Powerpack Real time monitoring

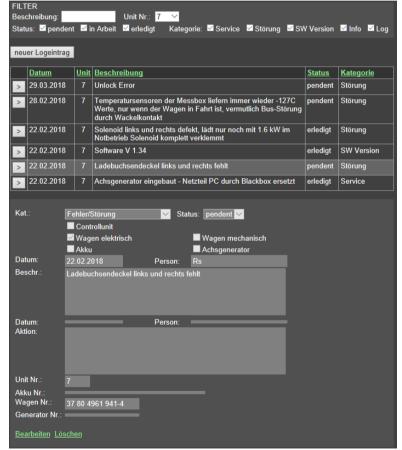
### Operation and performance date

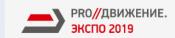
-> per single wagon

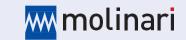


### History / Log book

-> Incidents/ Intervention per single wagon







#### railCare AG - Fleet

Total 84 wagons





### **Prototypes**

- 2 wagons with 8 parking spaces
  - ☑ Completed and in operation

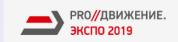


- 23 wagons for City Cargo Geneva
  - ☑ Battery module installed
  - Development of axle generator defenetly completed
  - ✓ Installation and commissioning completed and in operation

#### Tranche 2

- 59 wagons
  - ✓ Planning for the modernization
  - ✓ Material lists are created
  - ✓ Installation and commissioning started end of 2018 and will be completed by the end of 2020











### Projection «City Cargo Genève»

Saving on route Aclens to La Praille per year

430'00 liters Diesel or around 1'250 tons of CO<sub>2</sub>



### Potential at 100% use on all 84 wagons with rCE Powerpack

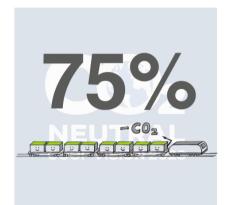
Savings when used on all existing train connections

1.78 Mio. liters Diesel or around 5'200 tons of CO<sub>2</sub>







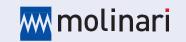


With the use of the **rCE Powerpack**, the CO2 emissions of temperature-controlled transports in the combined traffic, are reduced by up to 75%



The exclusive electrical operation of the refrigerators reduces noise emissions by 30-35%









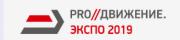










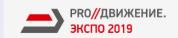




# rCE Powerpack Thank you for your attention!













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