ÖBB INFRA

Pre-commercial procurement (PCP) Initiatives

Austrian Federal Railways

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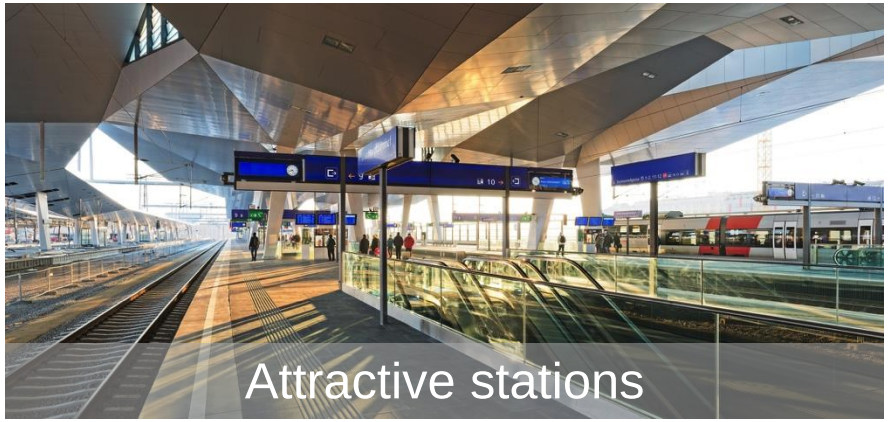
Pre-commercial procurement (PCP) Initiatives

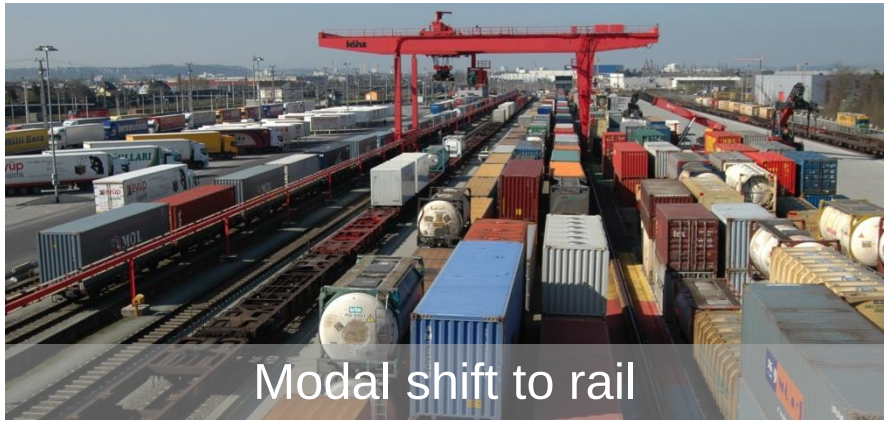
DRIVING INNOVATION TO ENSURE HIGH QUALITY PUBLIC SERVICES

ÖBB-Infrastruktur AG

We want to get as many people as possible excited about railway travel!

More trains, shorter travel times, more capacities for goods transport





We plan, build, operate and maintain railway infrastructure

17,700
employees
(of which 1,500 apprentices)

6,350 trains daily
145 million
train kilometres per year

235 million
passengers

Over 1,100
stations and stops

Climate protection:
Power from
10 hydroelectric power stations

4,865 kilometre
rail network

8 rail freight
terminals

31 railway companies
on the network

More than
2 billion Euro
investment each year

21 billion Euro
balance sheet total

3 billion Euro
total earnings

35 million Euro
earnings before tax (EBT)

Two PCP Initiatives of ÖBB

Detection of Natural Hazards

Starting 2012, till today

2014 to 2017

Hybrid shunting locomotive

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PCP Initiative: Detection Natural Hazards

Flexible Detection and Early-Warning-Systems monitoring the Impact of Natural Hazards on Rail-Infrastructure.

Reasons for this PCP project

Due to their short-term profitability for emergency action or temporary measures detection / early warning systems gain increasing attention for protection against natural hazards. But due to the rapid technological development of such systems public tender is hampered by island-solutions and the lack of technical standards.

Therefore based on system prototypes tender specifications should be created:

- Emphasis is set to flexible and stand-alone prototypes.
- They should enable a quick, simple but secure installation wayside remote railroad tracks.
- The focus is put on: debris and high-water flows, rock-fall and other hill-slope processes

PCP Phase 1 – Feasibility Study

Call Opening:

- **1. Mai 2012**

Call closing:

- **31. Oktober 2012**

We had 13 submissions!

Number of participants:

- **5 consortia**

riskCAST

Mobile monitoring/warning kit focusing on hill-slope processes

Project idea:

Mobile measurement cubicle enabling quick system set-up. Combines state-of-the-art
sensors as well as data management facilities.

Result – selected for phase 2:

Good performance of sensors, data analysis, data transmission and storage devices during pre-tests. Good detection results.

Natural Hazards Radar

Real-time detection of mass movements

Project idea:

Short-time warning to real-time detection of quick mass or water movements by means of high-frequency radio beam up to 1km.

Result – selected for phase 2:

Good operational performance for snow flows and promising tests for small-scale hill slope processes.

SART

Early Warning System against hazardous Rock-Fall Processes

Project idea:

Combined detection design by real-time surveillance of rock-fall protection fences in combination with source detection by borehole based sensors.

Result – selected for phase 2:

Good performance of fence sensoring, data management and alerting matrix. Promising source detection concept.

DESME

Early warning system focusing on rock-fall and debris flows

Project idea:

Combination of ground sensors at the source area and detection fenc surveillance system nearby the railroad tracks.

Results – not selected for phase 2:

Pre-tests showed inhomogeneous results and too high energy consumption – still at scientific development level.

IDSF

Real-time warning system against hazardous rock-fall processes

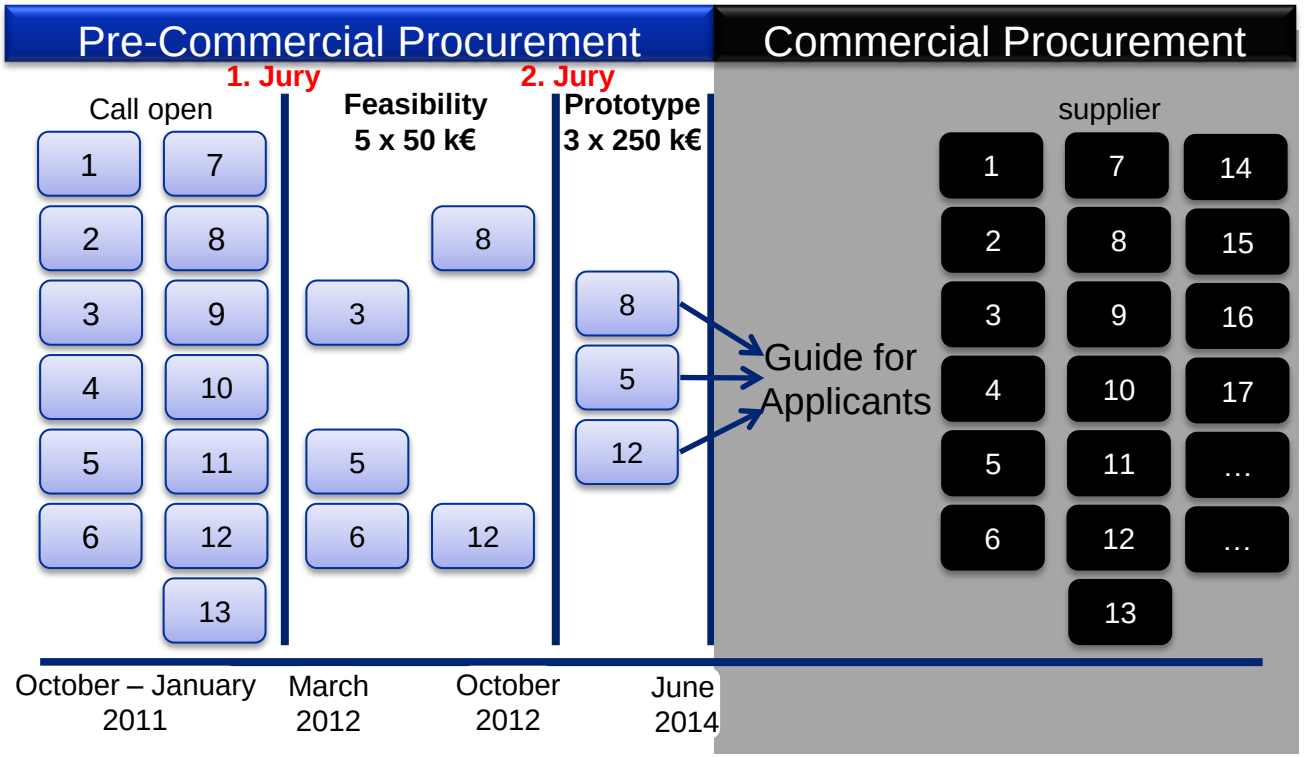
Project idea:

Real-time surveillance of railroad tracks based on punctual or linearly aligned sensors (Geophones, LWL) along the track.

Result – Not selected for phase 2:

Weak point sensor design. High energy consumption and high maintenance expenditure.

innovation needs time vs. problems need quick solutions



Conclusions

- **Initial feasibility studies require a lot of effort on the client side, which was underestimated.**
- **Only project ideas close to implementation have a good chance to be realized within project-time. Practically, operational systems which only need limited adjustments to match the project targets had the best scores.**
- **Many good ideas showed a too high degree of innovation, so that a successful prototype implementation was doubtful and the project therefore had to be eliminated.**
- **The development of standards is difficult to enforce.**
- **The functional tests of two projects are still running, because we are waiting for such extreme weather conditions. This is an individually "problem" for this Austrian PCP project!**

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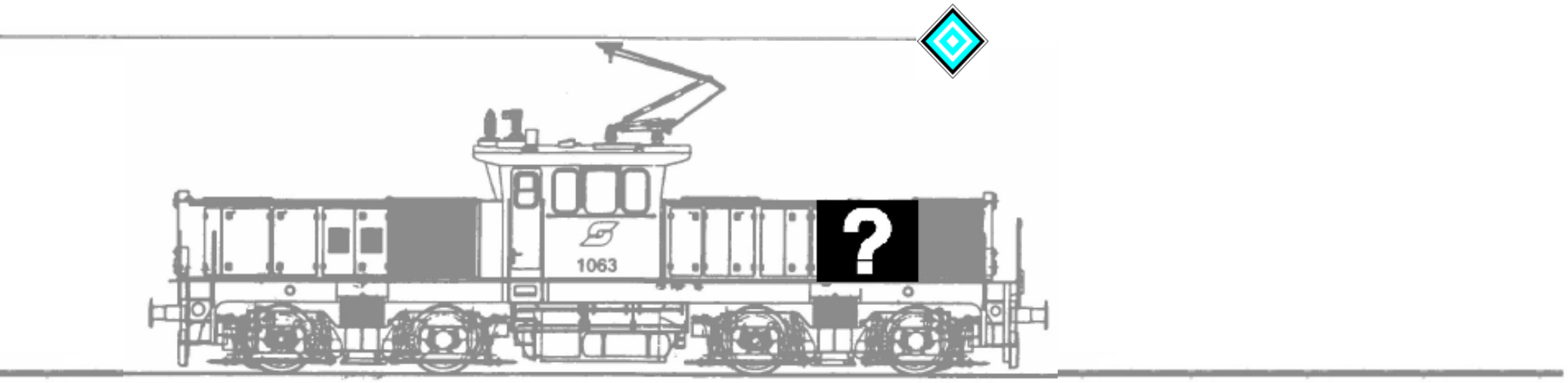
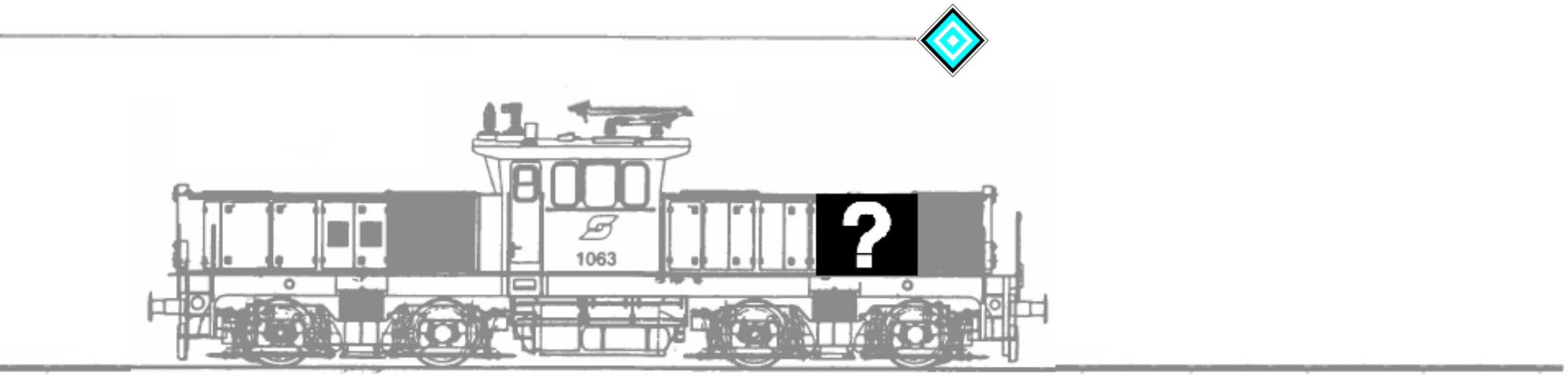
PCP Initiative: eHybrid shunting locomotive

Electric locomotives with additional alternative energy supply for temporary shunting without catenary as a replacement for currently used diesel locomotives.

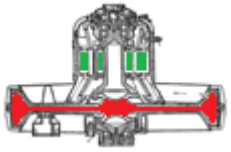
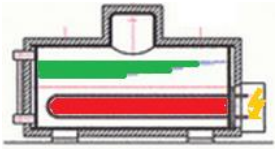
Approach: eHybrid shunting locomotive



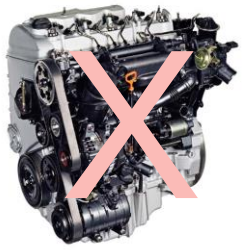
Approach: eHybrid shunting locomotive



Technology Variations

- flywheel mass  kinetic energy
- accumulator  chemical / electrical energy
- steam boiler  compressed air / thermal energy

or any other technology 

but only 1 non-target: combustion engine 

Results

	End of May 2014	Tender opening
	Mid of November 2016	6 concepts have been submitted Solution: variants of batteries and hydrogen
Step 1	Beginning of January 2015	4 feasibility studies 2 batteries and 2 hydrogen based
	July/August 2015	Evaluation of the results of the feasibility study
Step 2	Beginning of October 2015	Start of prototype development 1 battery and 1 hydrogen prototype
	End of December 2016	End of prototype development
	Beginn 2017	Possible procurement

Approach: eHybrid shunting locomotive

Partner	Bmvit	ÖBB	Gesamt
Budget	100.000,- €	100.000,- €	200.000,- €

Step 1:
Feasibility study

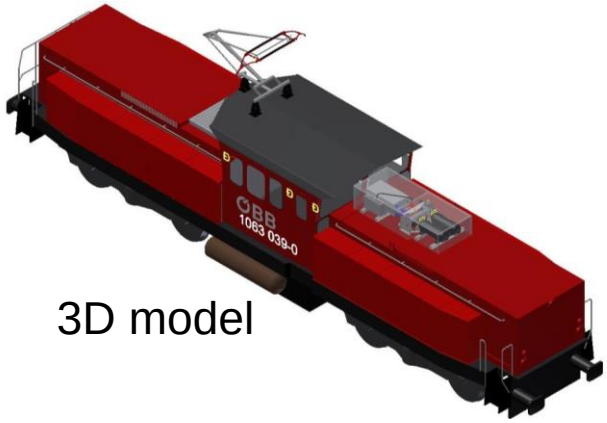
Partner	Bmvit	ÖBB	Gesamt
Budget	450.000,- €	100.000,- €	550.000,- €
Sachleistungen		350.000,- €	

Step 2:
Prototype

Finanzierungsschlüssel	ÖBB	bmvit
Kosten F&E Auftrage	50%	50%
Kosten Abwicklung		100%

Financing key

Wining projects after feasibility study



3D model

Hybridlocomotive based on H2-fuel cell

(the fuel cell works as range extender)

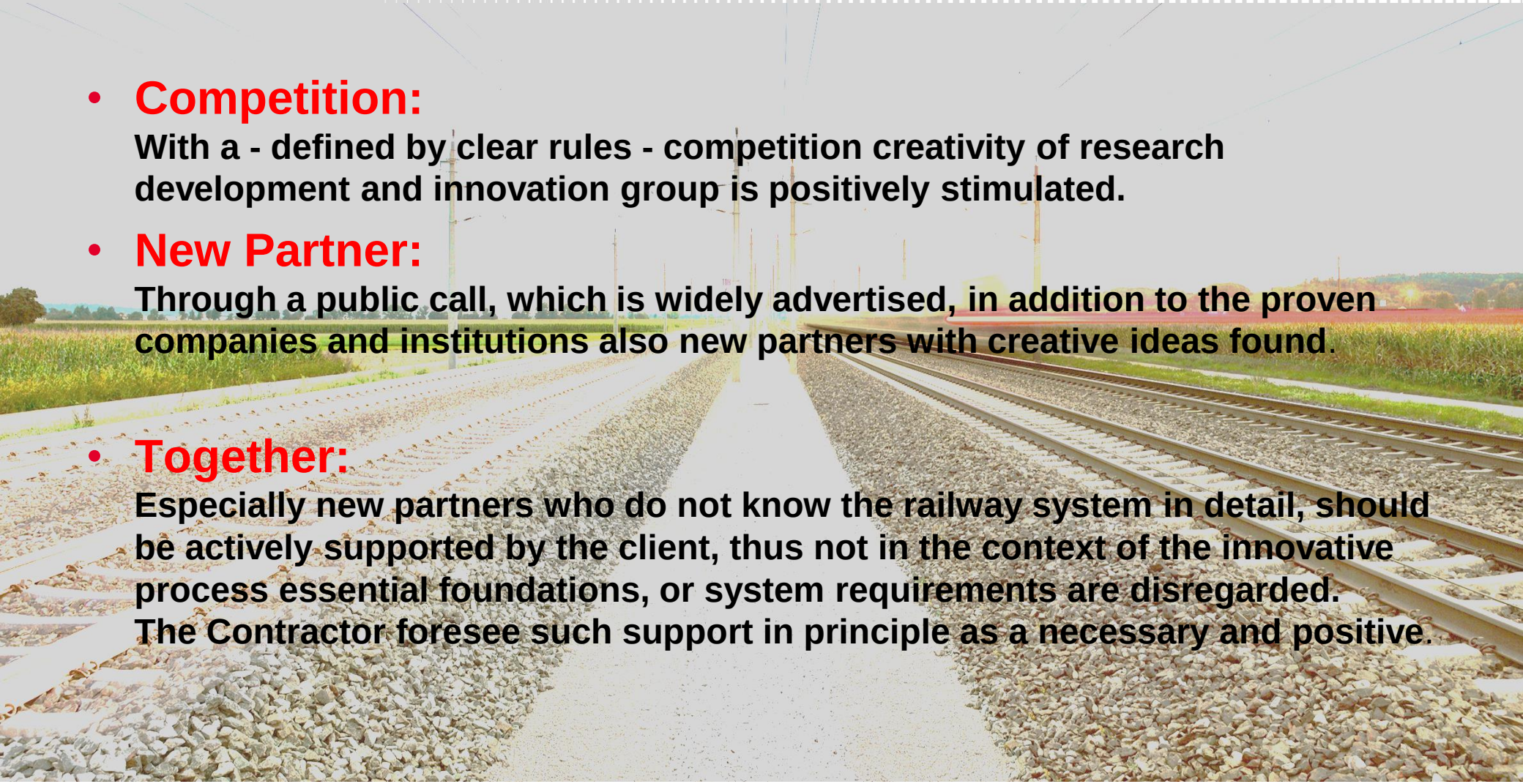
Batterie energie storage (LiFePo4) with supercaps for shunting operations without catenary and charging during catenary operation

Fuel cell Prototype

(currently under construction)

Batterie energy storage (LiFePo4)

supercaps prototype at heavy haul test run



- **Competition:**
  With a - defined by clear rules - competition creativity of research development and innovation group is positively stimulated.
- **New Partner:**
  Through a public call, which is widely advertised, in addition to the proven companies and institutions also new partners with creative ideas found.
- **Together:**
  Especially new partners who do not know the railway system in detail, should be actively supported by the client, thus not in the context of the innovative process essential foundations, or system requirements are disregarded.
  The Contractor foresee such support in principle as a necessary and positive.

- **Realization time:**
  This instrument results can only be expected at the earliest after three years. To ensure that only basic R & D tasks with this tool can be implemented.
- **Procurement Law (Perhaps only valid for Austria?):**
  To apply successfully PCP must be assured in law that those consortia that have realized together with the client a prototype that will not just automatically excluded from the commercial procurement.

We are sure that PCP is an excellent, new, efficient tool

- to provide innovative solutions,
- also with new partners,
- for not time-critical task,
- economically
- through interactive buyer-providers-learning.

PCP gives the economy new impulses and support public procurers.

Transparent expiry of the procurement by clear PCP rules.


Thank you for your attention

You need more information?

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