



Rob de Vogel / Steven Dorresteyn

# Quick charging network for electric cars Project “ELMO” in Estonia

Photo of the car: [www.elmo.ee](http://www.elmo.ee)

# A global leader in power and automation technologies

## Leading market positions in main businesses



- 130,000 employees in about 100 countries
- \$32 billion in revenue (2010)
- Formed in 1988 merger of Swedish (Asea) and Swiss engineering companies (Brown Boveri).
- Predecessors founded in 1883 (Asea) and 1891 (Brown Boveri)
- Publicly owned company with head office in Switzerland

# EV Charging Infrastructure

## Product Group in ABB



Headquarters, Rijswijk, the Netherlands



Software development center at high-tech campus, Eindhoven, the Netherlands

- The Product Group is located in Rijswijk (HQ) and Eindhoven (Software development center), the Netherlands
- The product group is part of the Discrete Automation and Motion division
- Epyon/ABB has 6 years of experience in DC fast charging and commercial products in the field since May 2010
- Epyon (80+ FTE) was an early leader in DC fast charging infrastructure



# ABB DC fast charge installations

## Proven technology in the field since early 2010

- **Actual:**

Germany, Norway, The Netherlands, UK, Ireland, Finland, Denmark, Sweden, Switzerland, Austria, France, Czech, Estonia, Turkey, Hungary, Italy, Hong Kong, Chili, China, USA, Taiwan, Slovenia, South Africa

- **Expected soon:**

Belgium, Bulgaria, Korea,



# EV Charging Infrastructure

## Product portfolio overview



### Terra DC fast chargers

Web connected intelligent  
DC fast charging systems

### Terra AC chargers & charge clusters

Turnkey solutions of web  
connected AC and DC  
charging systems

### Galaxy EV infrastructure management tools

Web-based management  
tools for site management,  
statistics and configuration

### Galaxy integration services

Professional back office  
integration interfaces  
(API's)

# Our Terra product line has been designed to cover a wide range of needs

Our Multi-Port Solution



Terra 100.2

All-in one stations



Terra 51



Terra 51 with AC

NEW

- Modular design
- Future Proof
- Software controlled
- Connected
- Intelligent

# Market segments in electric vehicle charging

• Different solutions for each segment



## Highway

- DC fast charging
- 15-30 minutes



## Commercial

- DC & AC charging
- 30-120 min.



## Office

- AC & DC charging
- 30-120 min.(fast)
- 8 hours(workday)



## Home

- AC & DC charging
- 8 hours (overnight)
- 2 hours (top-off)

Curious ??  
Want to know more ??



Curious?  
Attend the launch at  
Intertraffic Amsterdam or  
eCarTec Paris or watch  
your mailbox.

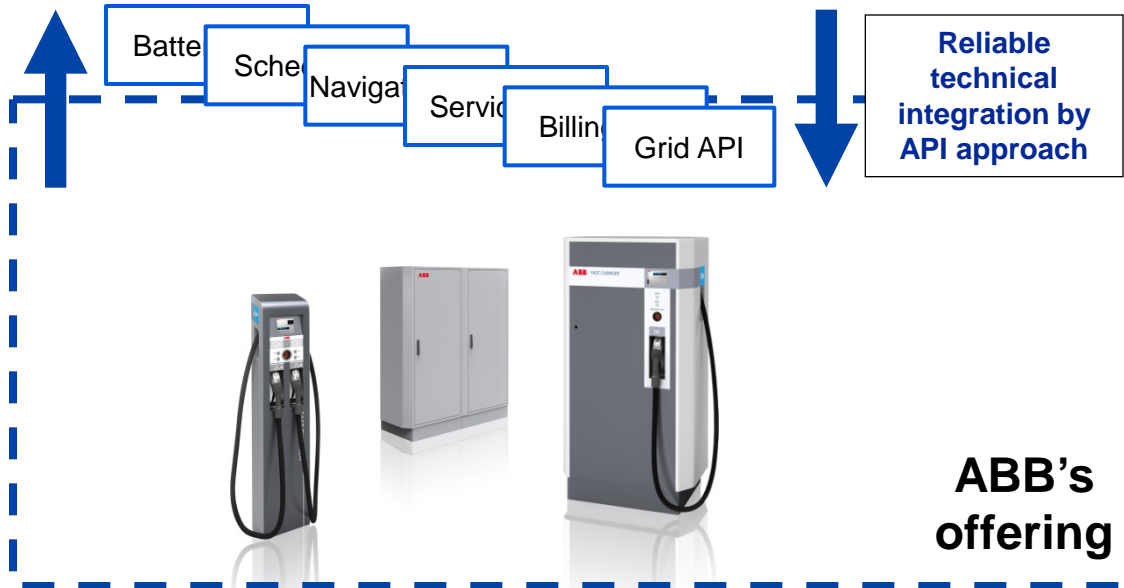
[www.abb.com/evcharging](http://www.abb.com/evcharging)

Power and productivity  
for a better world™ **ABB**



# ABB provides easy & flexible connectivity to enable your business model and back-office

## A connected charging infrastructure / Focus Area ABB-EVCI



- ABB charging solutions can communicate to other applications via an API interface layer
- This allows ABB to do remote monitoring for service and maintenance purposes
- This layer provides you the interfaces to your applications
- These applications can enable your
  - Grid load control
  - Point of sale services (e.g. billing and white list)
  - Status information (e.g. scheduling)
  - Etc.

# The ELMO Project – Offer by ABB

- Offer by ABB to Kredex included
  - Supply of 200 chargers (50 kW DC and 22kW AC)
  - Installation and commissioning at prepared sites  
(Foundation and connection to grid form a separate tender - excluded here)
  - “Administration System”, consisting of
    - (a) network management system for installed base of fast chargers
    - (b) back-office system for customer-related services, such as subscriber management, tariffing, billing
  - Five years of warranty for the above
  - Managed operations for a period of five years
    - Helpdesk (24/24)
    - Services hosting platform
    - First-line Support
    - End-user support and training
  - Partnership with *NOW! Innovation* and *G4S* for complete system & services

# KredEx

KredEx was founded by the Ministry of Economic Affairs and Communications in 2001 to

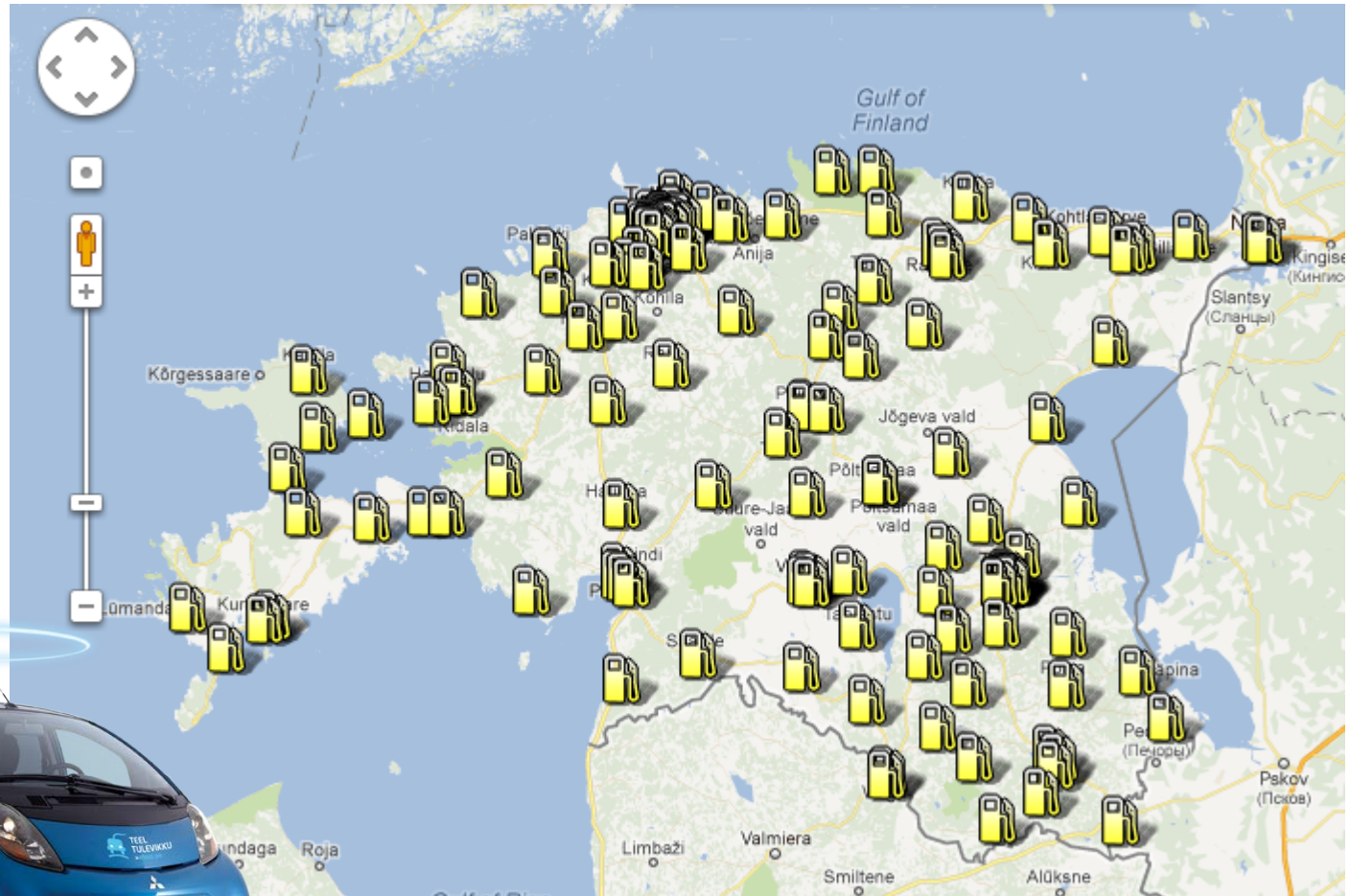
- facilitate the increase of competitive strength of Estonian companies by improving the availability of financing and managing credit risks,
- to improve the housing conditions of Estonian inhabitants, by expanding financing possibilities and offering financing solutions aimed at energy efficiency.



## 507 iMievs to social workers

- Estonian government bought 507 Mitsubishi iMievs
- The purchase is financed by selling AAU (carbon credits) to Mitsubishi Corporation
- The cars will remain in the ownership of the Ministry of Social Affairs of Estonia, but they are handed over to local municipalities all around Estonia
- The cars are distributed for free
- Social workers: public administrators responsible for providing public social services
- The cars will be equipped with GPS/GPRS enabled data loggers for future R&D of usage of electric cars

# The ELMO Landscape - Fast DC charging network with full nation-wide coverage



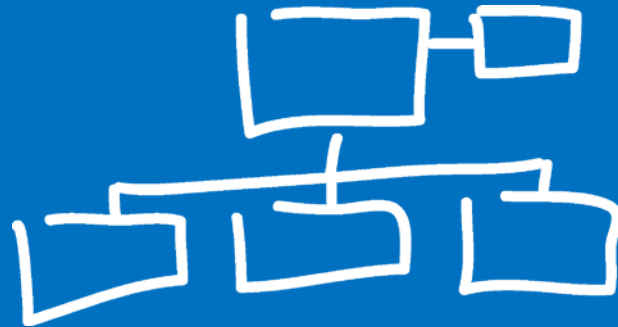


# Example video ELMO



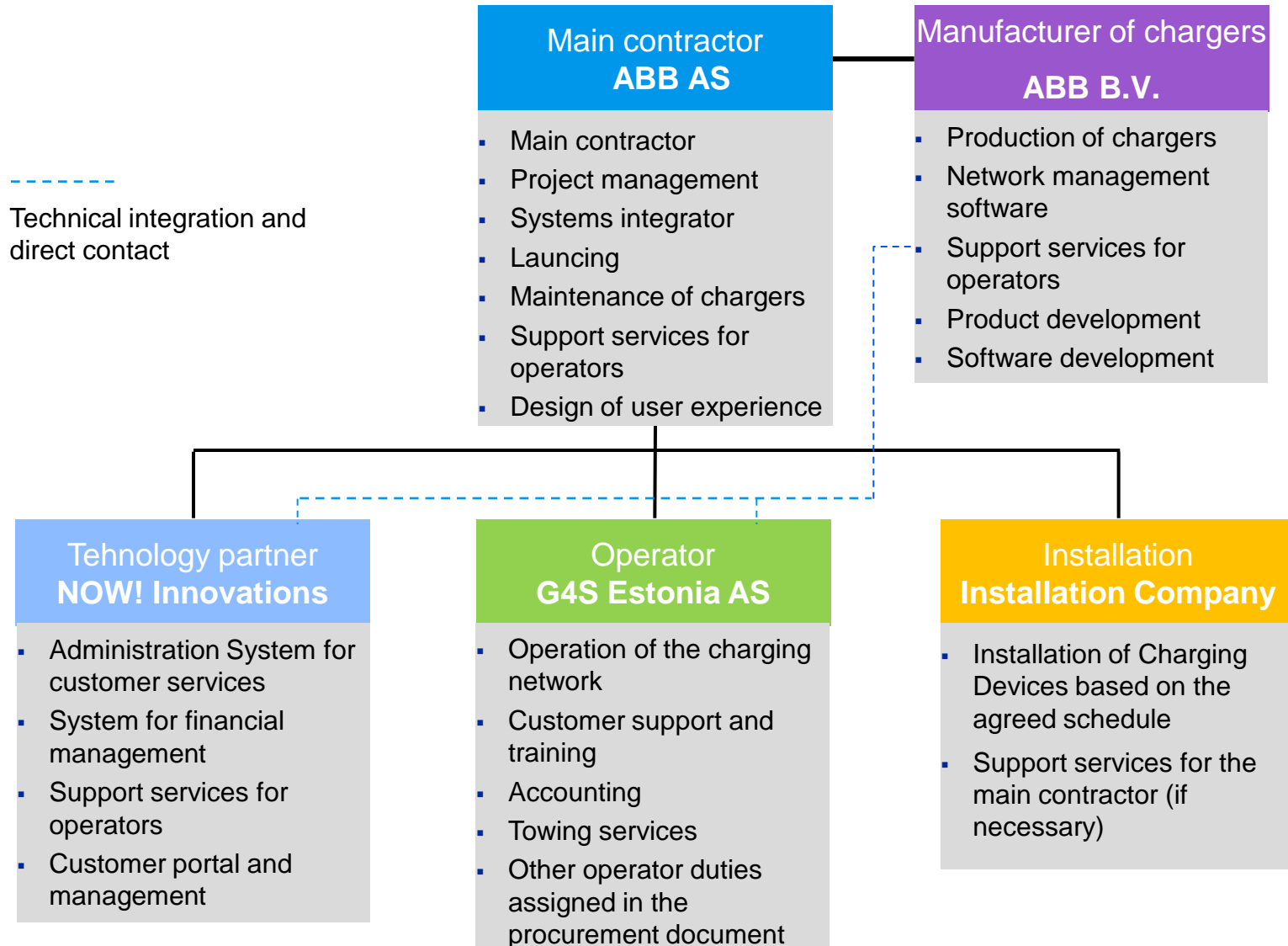
<http://www.youtube.com/watch?v=P9kC47iuqXE>





# 1. ORGANISATION

# Structure of the organisation



# Main contractor ABB AS



Bo Henriksson  
Manager of ABB  
Baltics

**ABB**



## Facts

- Locations: Tallinn, Keila, Jüri, Maardu, Kunda, Jõhvi, Tartu
- 1101 employees as at 30th of September 2011
- ABB AS has invested over 70 million euros in Estonia

## 4 factories

- Engine and generator factory (Jüri). Global.
- Low voltage actuator factory (Jüri). Global.
- Low voltage systems factory (Keila). Regional.
- Compact substation factory (Maardu). Regional.

## Maintenance service

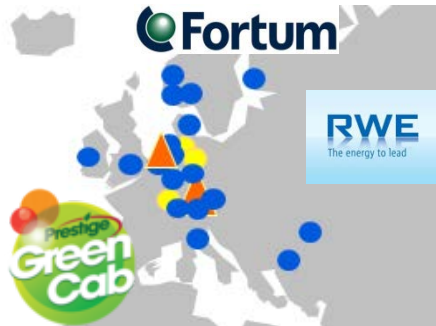
- Full maintenance service
- Maintenance of engines and generators
- Maintenance of turbo-compressors

## Project and sales units

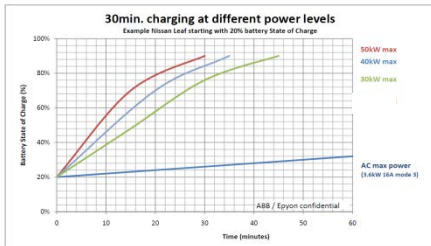
- Industrial engineering projects
- Planning and construction of transmission substations
- Component sales departments

# In summer 2011 ABB strengthened its position in the electric mobility market by buying Epyon B.V., and establishing a new product group «EV Charging Infrastructure»

## Epyon



- Big customer base in Europe, very good products
- Fast and flexible supply chain
- Hardware controlled with software
- Connected chargers and software services and tools
- Experience with Li-ion batteries and involved in standardisation



## ABB



- Global sales and maintenance network
- Global supply chain and production
- Strong and trustworthy trademark
- Competencies in power electronics platforms, and electric mobility



# Technology partner NOW! Innovations



- **NOW!** is a software development company which specialises in **issuing mobile licences and tickets for mobile payments**. The company is one of **the top 5 leading companies in the field of mobile parking**.
- Platform designed by **NOW!** facilitates **mobile payments for different services**, from mobile parking and motorway charges to consumer payments in cafes, different events or for services on trains, buses and boats.
- Platform of **NOW!** has been implemented in **4 countries: USA, Belgium, Macedonia and the Ukraine**. Biggest client on USA's market is Montgomery County, with 14,000 parking places, making it the second biggest mobile parking application in USA. Previously mobile parking has been successfully launched in **14 towns in Belgium**.
- **Business development and pilot testing are active in Spain, Mexico, Portugal, Argentina, Singapore, Russia** and elsewhere, with the main focus on mobile parking and mobile payments.



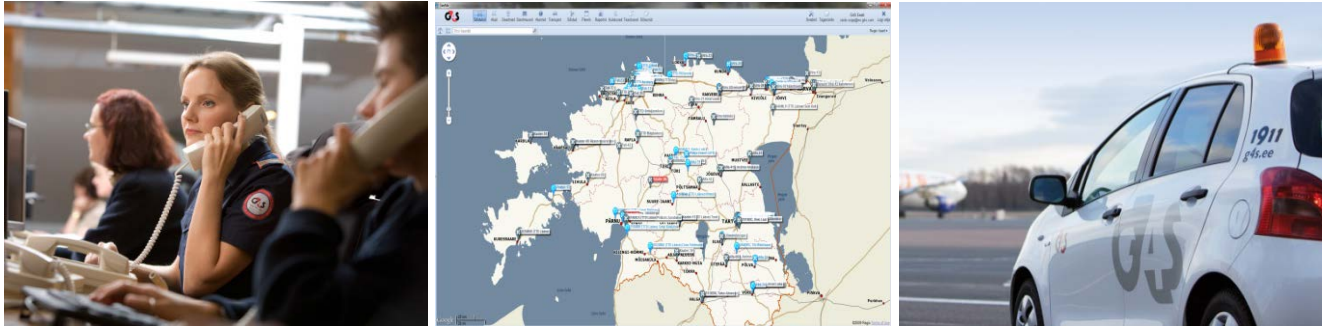


# Operator G4S Estonia AS



- G4S has had professional experience in **providing operator services** since 1991
- Operator service is provided through the **Control Center of G4S**, which is **licenced by the Police and Border Guard Board**
- The task of the Control Center of G4S is to **guide users and to help them use Charging Devices safely**
- G4S has enjoyed **long co-operation with OÜ Falck Autoabi**, who give operational help with customers' vehicles
- The Control Center of G4S manages **80 patrol cars and 15 duty technicians, and mans at least 300 guarded objects** every day
- G4S organizes regular **survival drills in co-operation with Rescue Board**

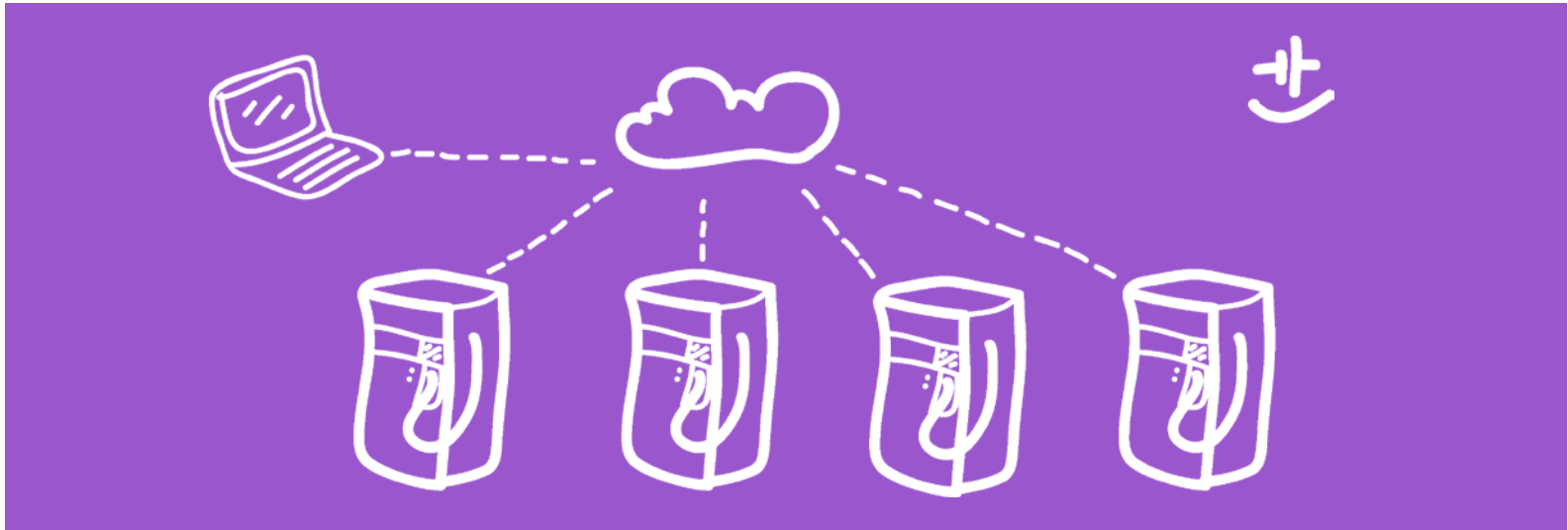
# Operator G4S Estonia AS



**Operator service of charging devices, customer support and other necessary services for the procurement contract are provided by:**

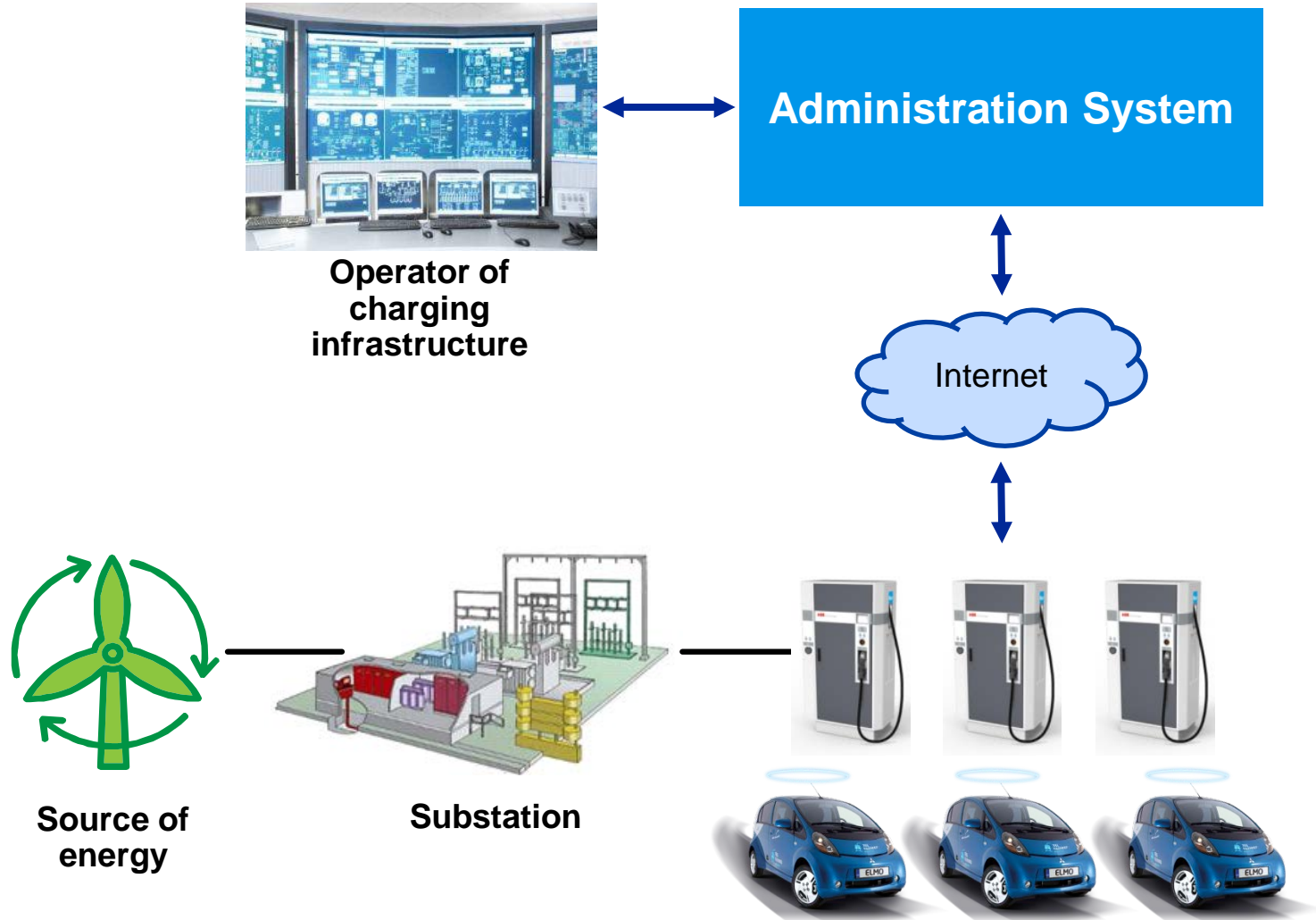
- 132 employees of the Control Center (customer support)
- 32 employees dealing with customer management
- 150 employees dealing with maintenance of devices

**In total 314 employees**



## 2. PRODUCTS AND SYSTEMS

# Architecture Overview



# Charging Device Terra 51+AC



Number of  
customer  
support  
**1911**  
and a visual  
manual

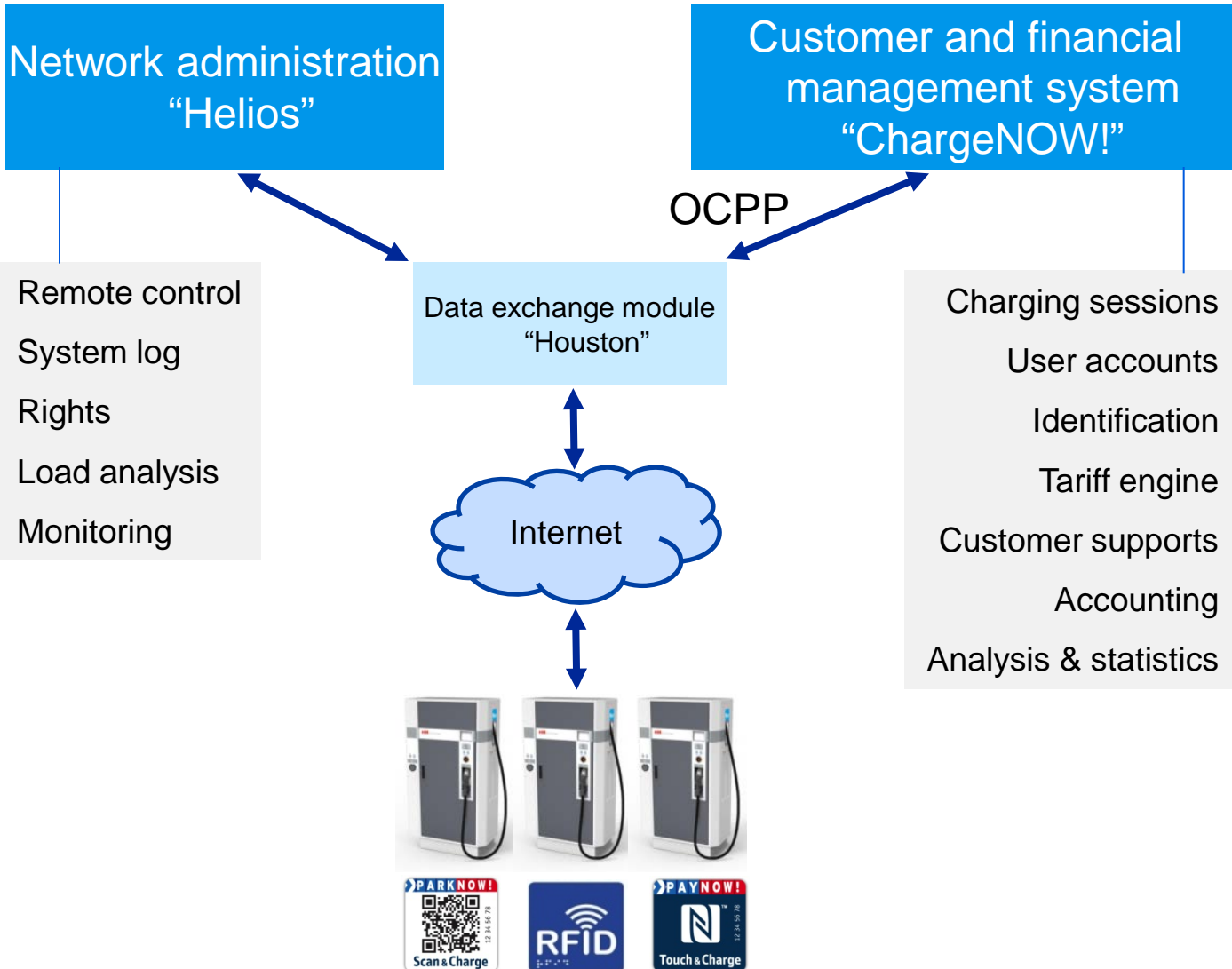
Name		Terra 51+AC - Type SL01 / SL02	
Input voltage	3Φ, 400 VAC ± 10%		
Frequency	50/60 Hz		
Main circuit breaker	3 x 100A		
Nominal input current	80A		
Maximum output power		50kW	3,7 / 22 kW
Output voltage	DC	50-500 V	AC 230 / 400 V
Maximum charging current		125A	1x16 / 3x32A
Efficiency	> 92%		
Power factor	> 0,98		
Conformity and certificates	CE / ISO9001 / ISO14001 / CHAdeMO / IEC61851 / IEC62196 / JEVS G105		
RFID system	13,56MHz, ISO 14443A		
Compatibility	CDMA / 3G / wired Ethernet		
Protection class of housing	IP54		
Operating temperature	-30 ... +40 °C		
Relative humidity	20-95%		
Software maintenance	Remote update / download		
Graphic user interface	Color LCD screen, Start/Stop & Emergency buttons		



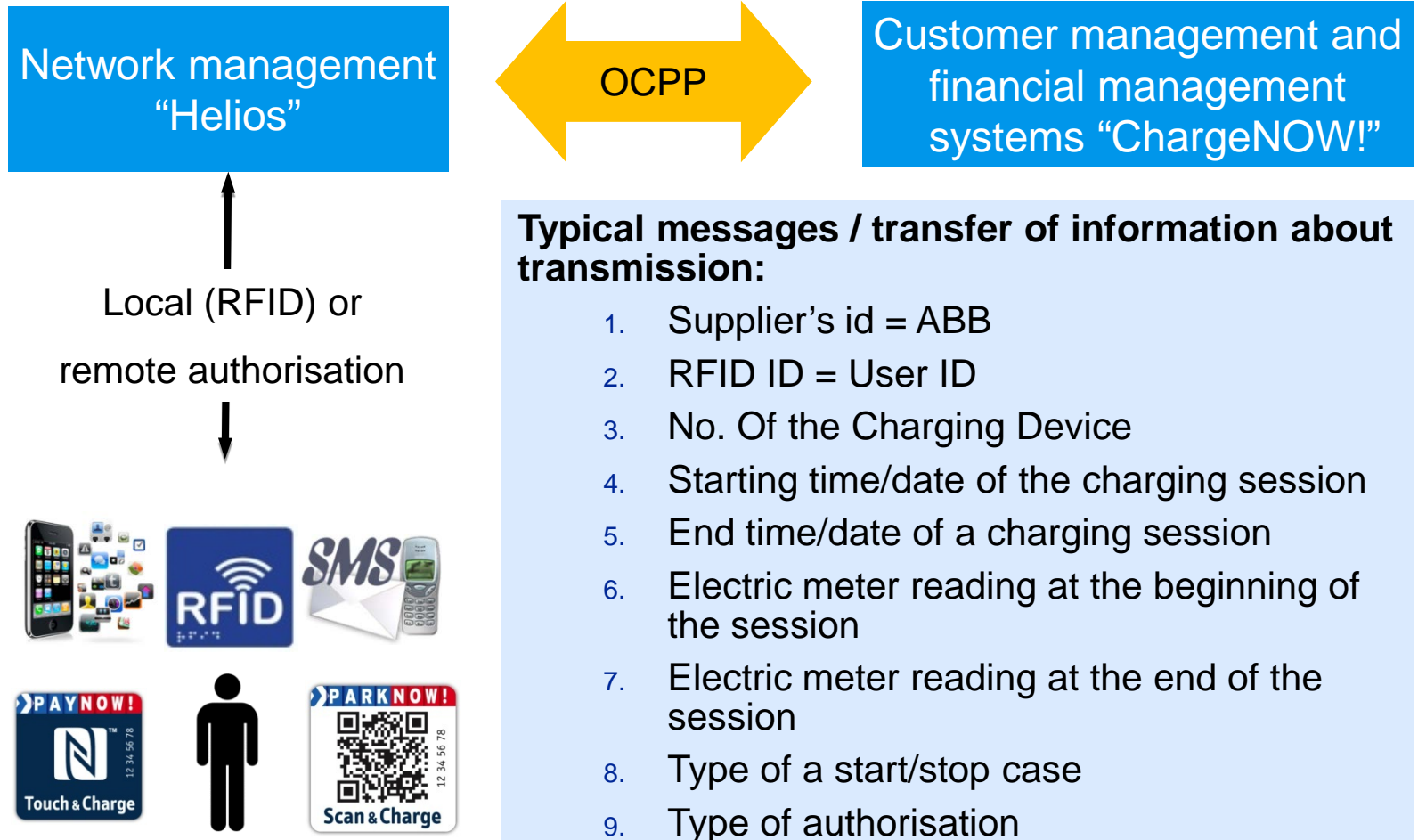
# Administration System Architecture

**ABB**

**NOW!**  
INNOVATIONS




# Administration System Software integration




# Administration System

## Integration with external systems (if necessary)

### Payment systems

- 
- An icon consisting of several grey puzzle pieces arranged in a square, with one orange puzzle piece missing from the bottom-left corner.
- Links to banks (Swedbank, SEB, SAMPO, Nordea, etc.)
  - Credit card payment
  - Import of bank files

### Authentication

- 
- An icon showing a set of silver keys with a blue keychain.
- User name / password
  - Bank link
  - ID card
  - Mobile ID

### Print & Post services

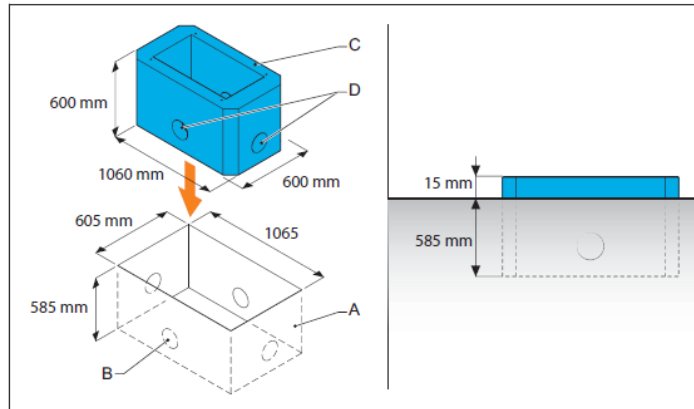
- Printing and posting bills and reminders



# 3. LAUNCHING

# Installation

ABB

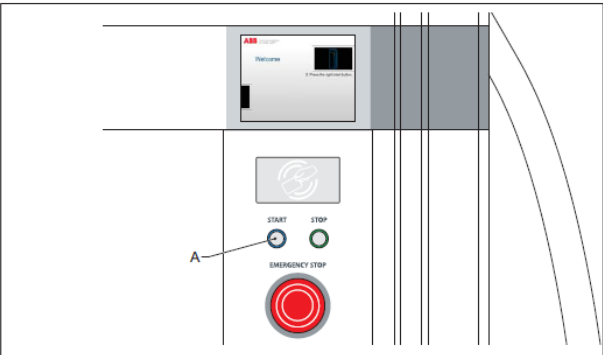
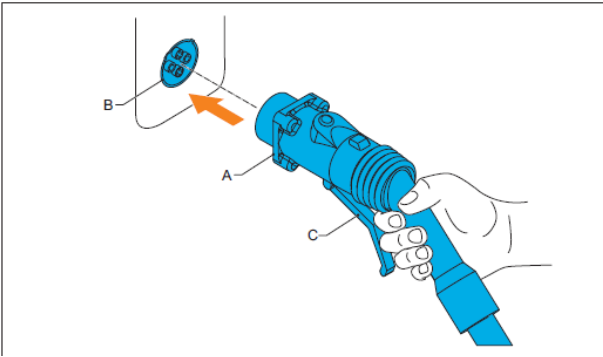


*Works described in grey boxes are in the case of ELMO prepared by the Supplier*

Installation and launching Order of works	
<b>Preparation</b>	Inspection of location
	Licences
	Checking of the network
	Electrical planning
<b>Construction</b>	Foundation
	Cabling
	Internet connection
<b>Installation</b>	Unpacking
	Setting in place
	Fixing to the foundation
	Installation of side covers
<b>Connection</b>	Electric cable
	Internet cable or modem
<b>Launching</b>	Launching
	<b>Test on commissioning</b>
	Execution document
	Conformity certification of the electrical installation



# Preparing the operator Training



## ABB & NOW! trains employees of the Control Center of G4S

- Using the Administration System, including activating or deactivating outputs
- Training of a Training Provider: using Charging Devices and identifying customer problems through guiding questions

## ABB trains patrol employees of the Control Center of G4S

- What to do in case of different Charging Device malfunctions

AS G4S Estonia guides and helps ABB in compiling descriptive manuals for different Charging Devices and Charging sites



Training of a Training Provider

Training of endusers





## 4. USER EXPERIENCE

# User friendly manuals



- User experience material must give answers to questions and give users the confidence to use a Charging Device for their electric vehicles
  1. How can I charge?
  2. How can I find a free charger?
  3. How can I pay?
  4. What can I do in case of a problem? etc...
- ELMO's home page will include a frequently asked questions page with answers updated according to fresh experience

**The Tenderer plans to create user experience manuals for the ELMO programme (video, graphic pages, animations, etc.) according to business processes agreed with the Supplier**

# Example video

## How to use RFID card for charging with CHAdeMO charger?



- Practical and visual manual, like learning videos should be, so as to make it easy for users to charge their electric cars
- In case of malfunctions / misunderstandings, the user is able to better understand the nature of malfunctions and describe this to the customer support
- Users can watch videos repeatedly at a convenient time

Power and productivity  
for a better world™





# Contact information



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