

EVA+ ENERGY



A DCS for Energy Efficiency Projects

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ON-BOARD ELECTRONICS

- /// Data recording
- /// Safety functions
- /// Rail data management solutions
- /// Odometry
- /// Cold Movement Detection
- /// Energy metering
- /// Mobile Gateway - GOCU
- /// HMI/DMI mobile visualization solutions
- /// Speed indicators
- /// Badge reader
- /// Video recording
- /// Vehicle Control Units (VCU)
- /// Remote I/O units
- /// Gateways
- /// Protection
- /// Sensors



WORLDWIDE PRESENCE

Close to you
in more than
40 countries
worldwide



HASLERRAIL RAILDATA CLOUD SOLUTION REFERENCES

GB Railfreight

INFRABEL

LINEAS

SISTEMA DE TRANSPORTE COLECTIVO

adif

Typer
Trasporto Passeggeri Emilia-Romagna

northern

greateranglia

c2c

TRAFNIDIAETH CYMRU
TRANSPORT FOR WALES

Operated by West Midlands Trains

STADLER

ALSTOM

Hitachi Rail STS

CAF

SIEMENS

中国中车
CRRC

banedanmark

BANE NOR

TRAFIKVERKET

DB BAHN

SBB CFF FFS

ouigo

v/line

Government of South Australia
Department of Planning, Transport and Infrastructure

QueenslandRail

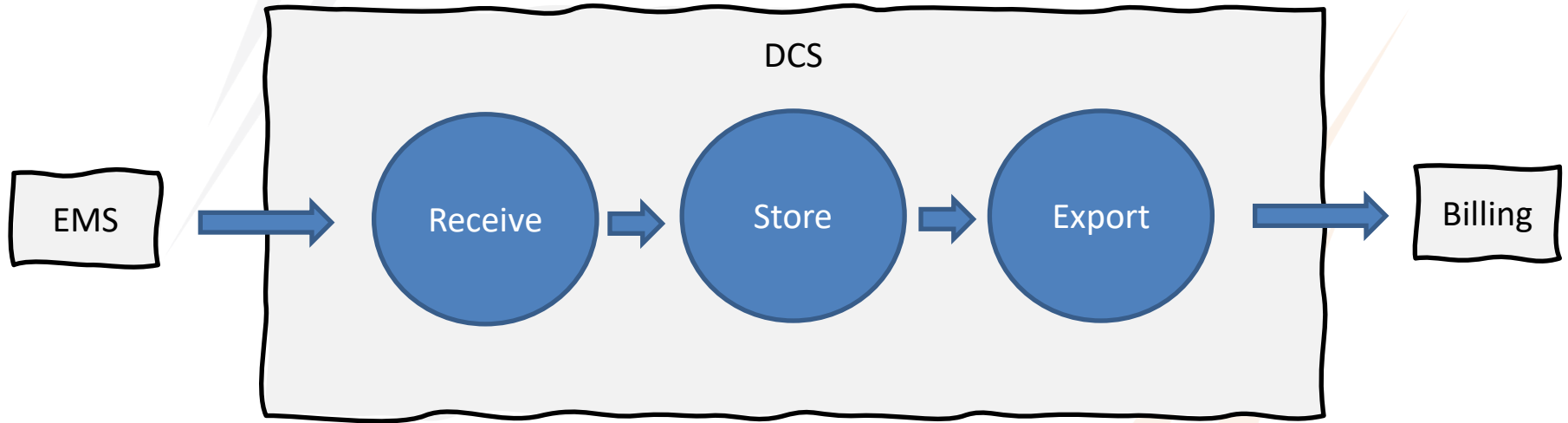
ST

eress

Globally, more than 120'000 TELOC Event/Data Recorders and REM102 Energy Meters in daily service

Our cloud solutions can ingest and blend data from these and other sources

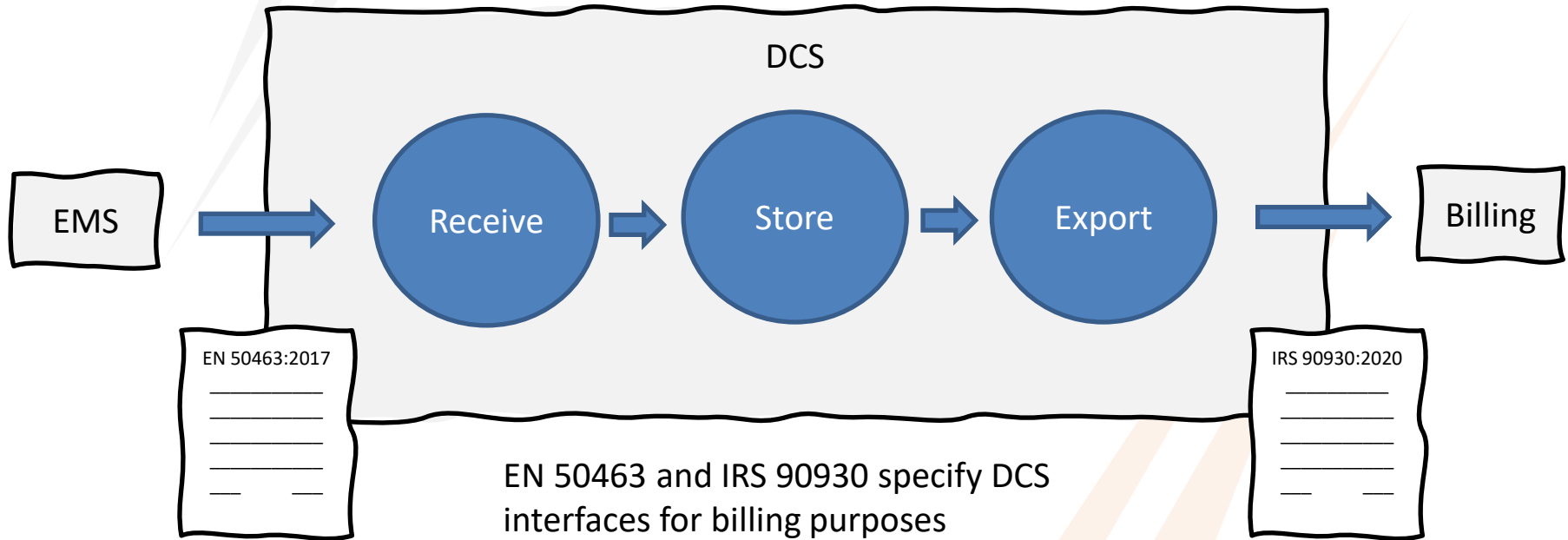
TSI ESTABLISHED DCS FOR BILLING PURPOSE



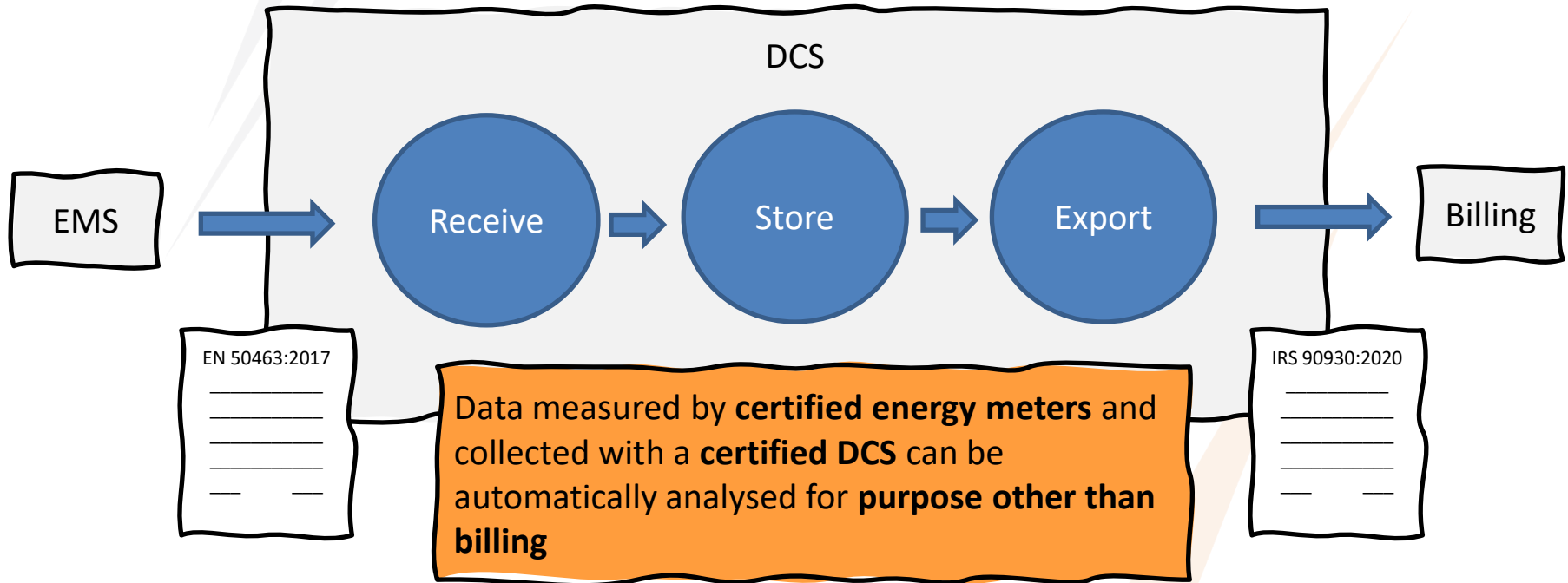
(2) The on-ground energy data collecting system (DCS) shall receive, store and export CEBD without corrupting it, in accordance with the requirements quoted in clause 4.12 of EN 50463-3:2017.

Energy TSI

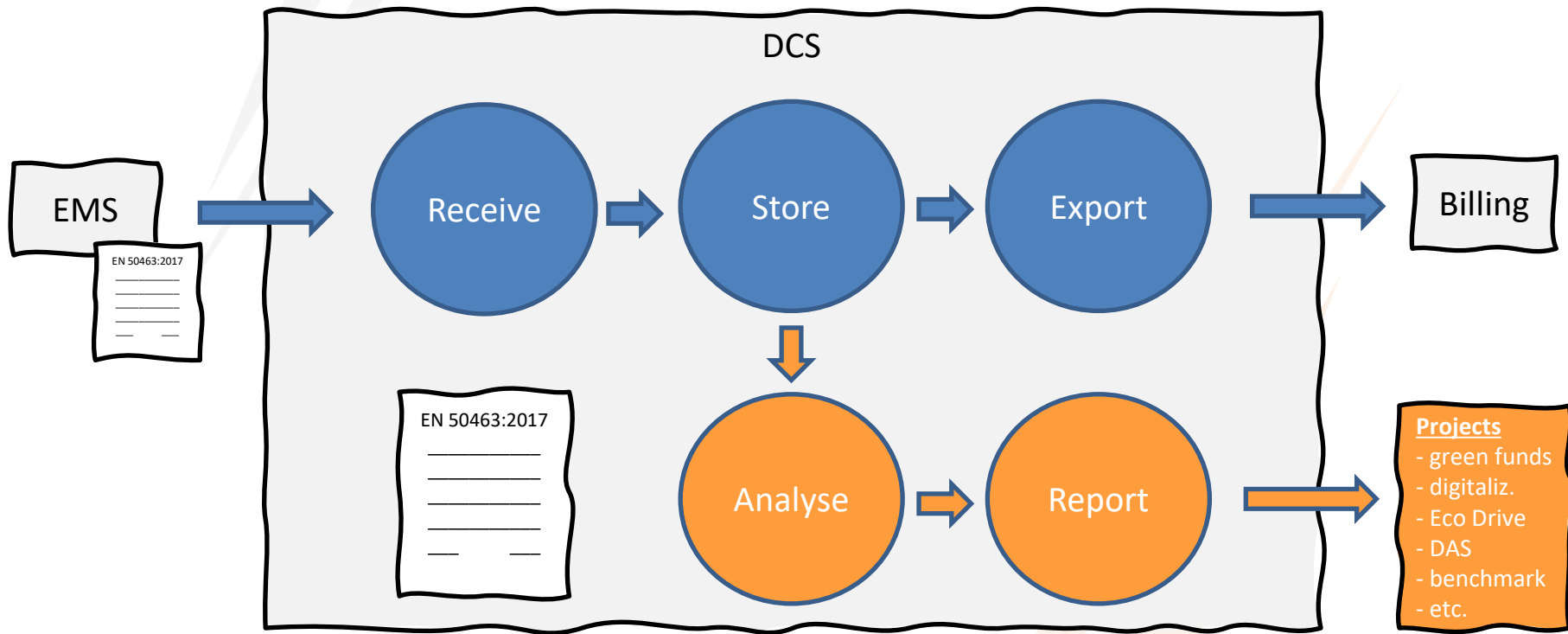
TSI DCS WAS DESIGNED MAINLY FOR BILLING PURPOSE



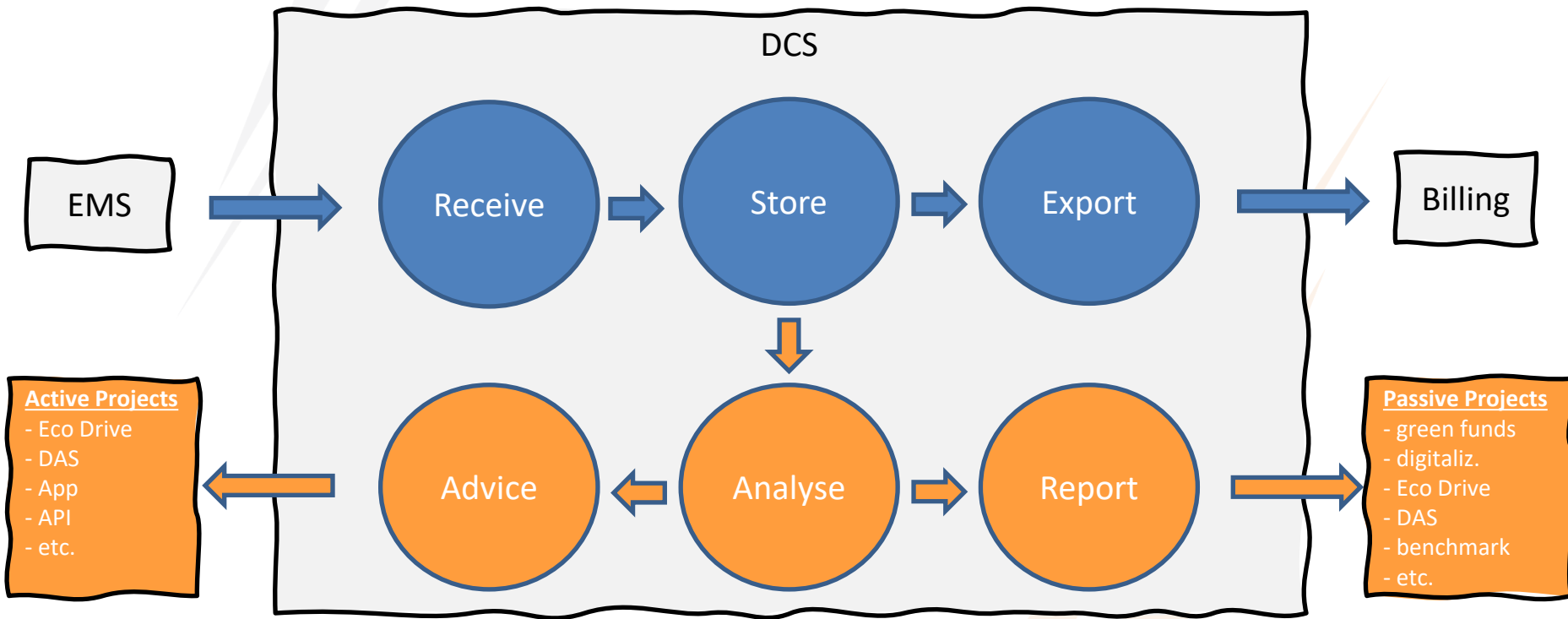
A DCS MAY BE USED FOR PURPOSE OTHER THAN BILLING



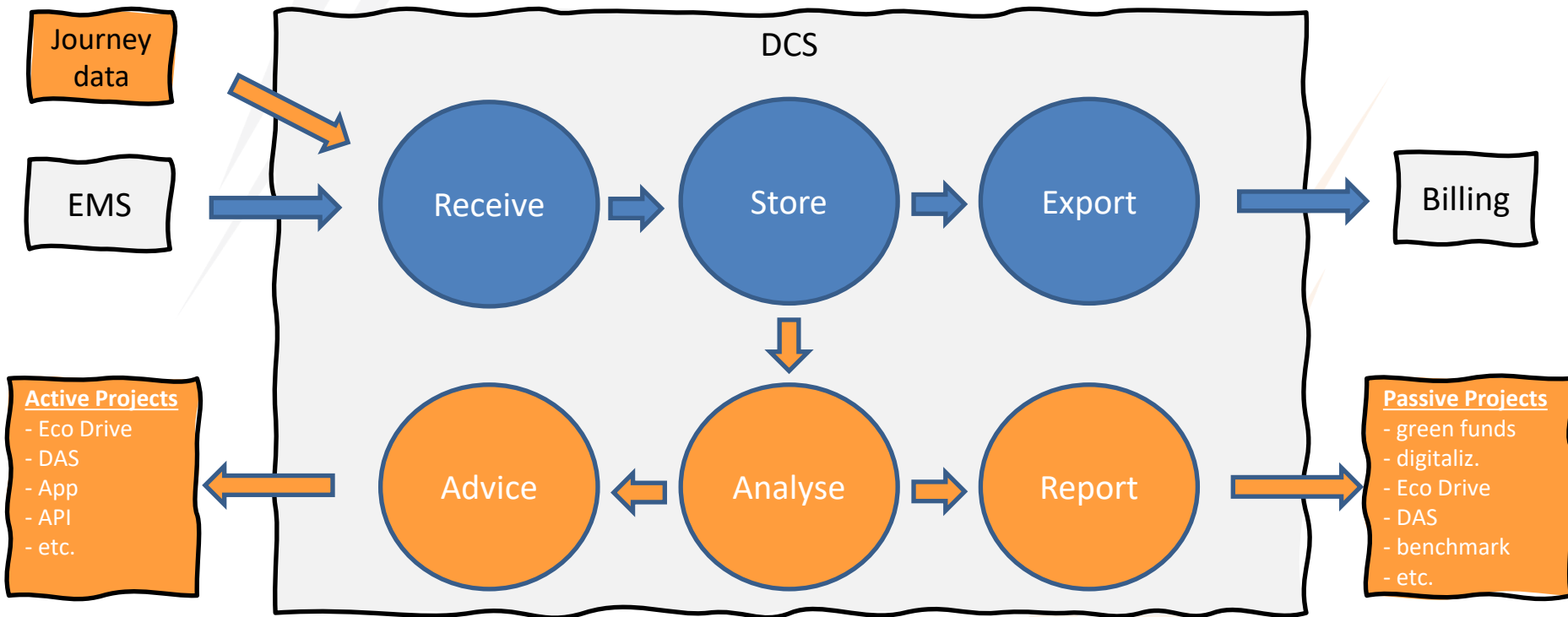
EXAMPLE – ASSESSING “PASSIVE” EFFICIENCY PROJECTS



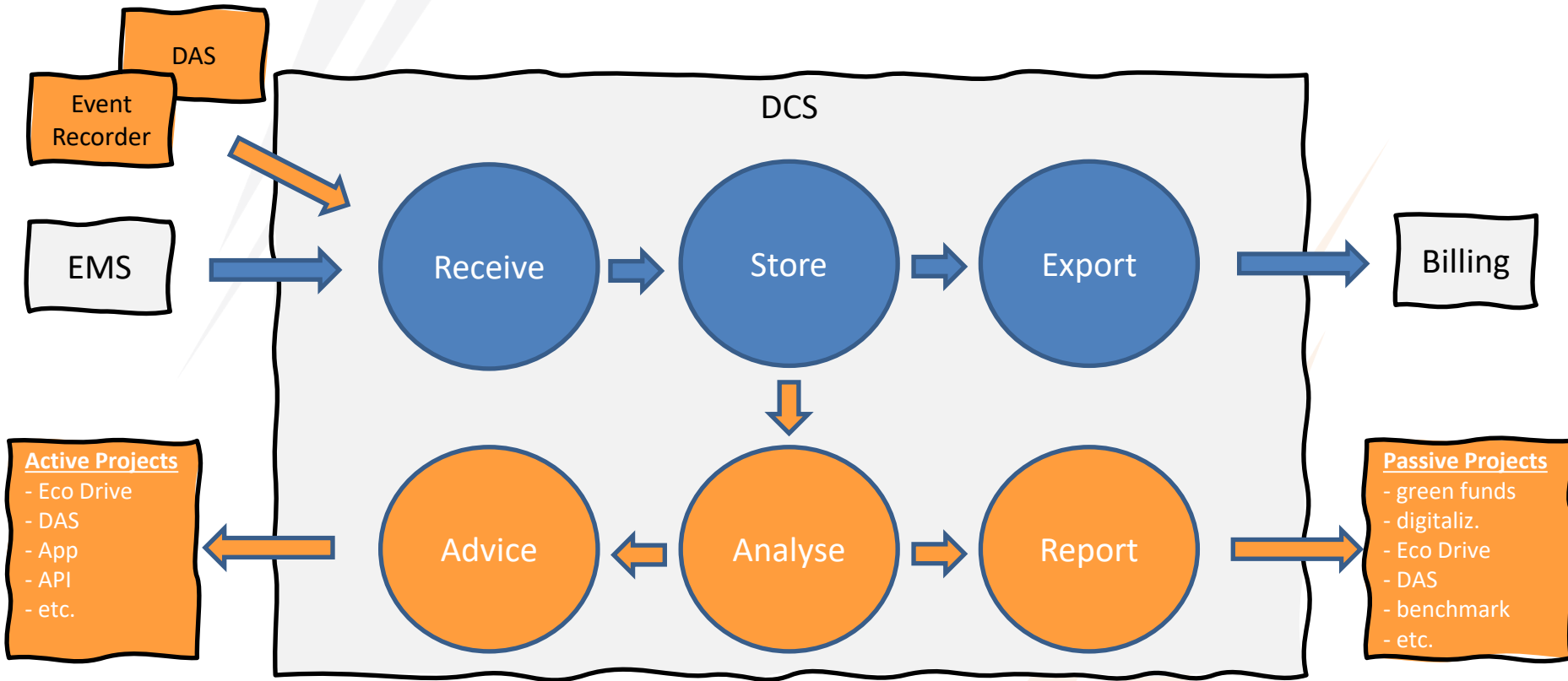
EXAMPLE – FEEDING “ACTIVE” EFFICIENCY PROJECTS



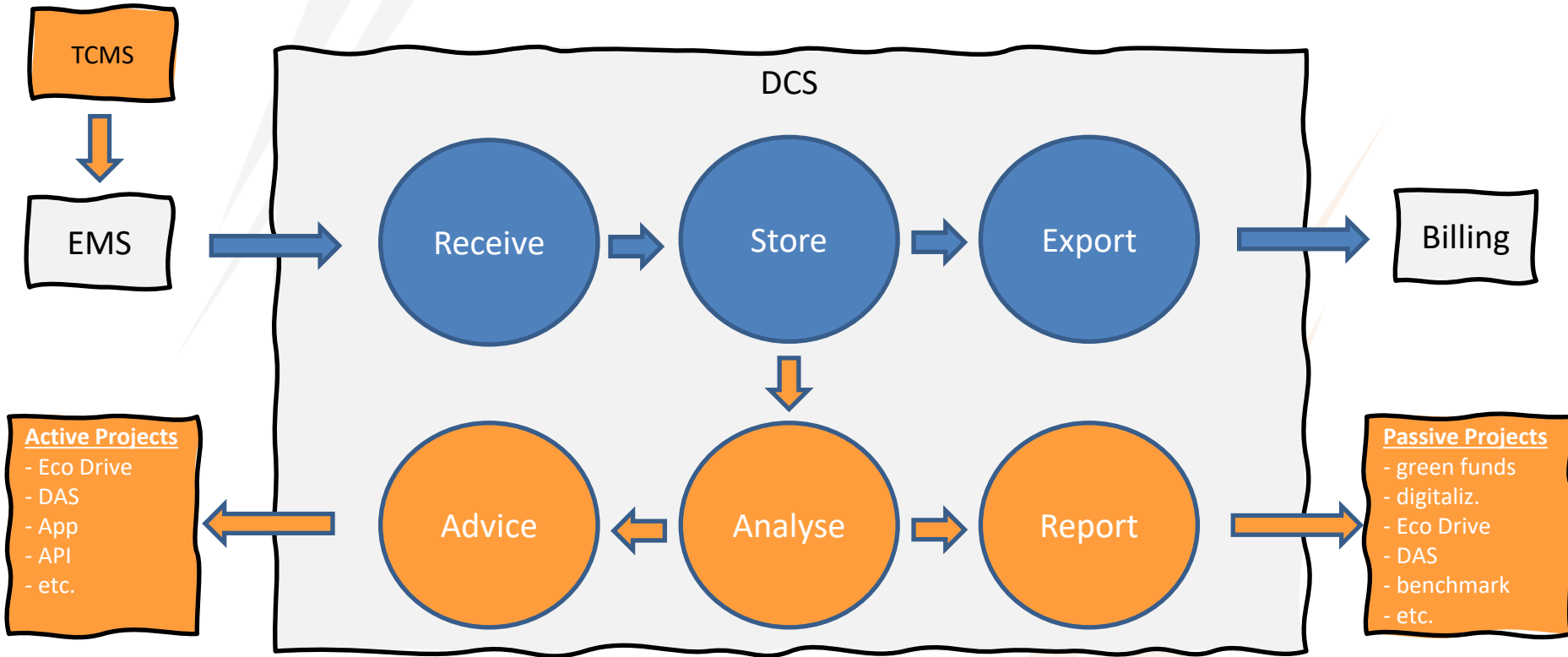
MISSING DATA CAN BE COLLECTING FROM OTHER SOURCES



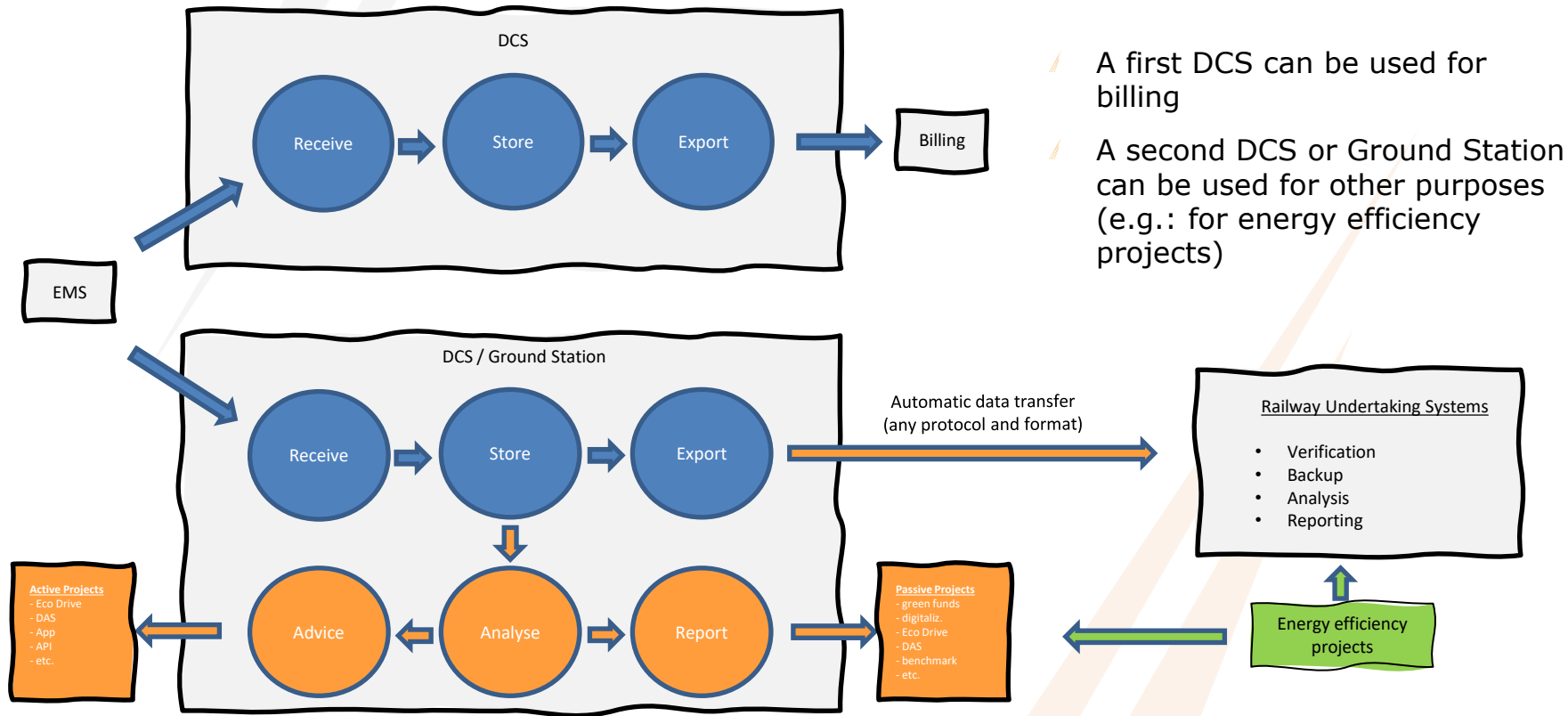
EXTRA DATA CAN BE COLLECTED FROM ON-BOARD DEVICES



EXTRA DATA CAN BE COLLECTED FROM TCMS



A FLEXIBLE ARCHITECTURE



- ⚡ A first DCS can be used for billing
- ⚡ A second DCS or Ground Station can be used for other purposes (e.g.: for energy efficiency projects)

STANDARD EXTENSIONS

- What can an **EN50463:2017 standard EMS** offer to energy efficiency projects?
 - CEBDBlocks, ReadingBlocks, AssetData, State, EventSet, Heartbeat
 - Interoperable communications to one or more Ground Stations
 - This is an extraordinary tool-set for an energy project designer

Example: ReadingBlocks

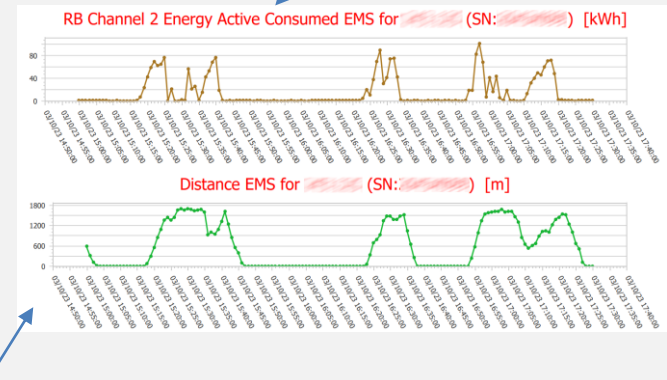
Table 24 — Definition of ReadingType elements (ReadingBlock)

Element	M/O/C	XSD Type	Description
ReadingID	M	NumericID (see Table 128)	Sequential number to identify each Reading.
TimeStamp	M	ZuluDateTimeType (see Table 128)	Date and time at the end of the time period. In this section 'time period' refers to the time period for which Reading is produced.
TimeStampQuality	O	TimeQualityCodeType (see Table 128)	Quality of the TimeStamp value.
Channel	O	ChannelType (see Table 25)	Channel in which the measurement is placed.
Location	O	EnhancedLocationType (see Table 32)	Location at the end of the time period.
AssociatedCEBD	O	NumericID (see Table 128)	The Reading could be associated to a CEBD (the value is the CEBDID of the associated CEBD)
Speed	O	SpeedType (see Table 33)	Train speed data in the time period.
IndoorTemperature	O	TemperatureType (see Table 34)	Indoor train temperature at the end of time period.
OutdoorTemperature	O	TemperatureType (see Table 34)	Outdoor train temperature at the end of time period.
InternalLoad	O	InternalLoadType (see Table 35)	Energy consumed by internal loads of the train during the time period.
any	O	other	Used to allow custom extensions.

ReadingBlocks can be easily extended:

```
<hr:LocationDistance>  
<hr:Value>  
<hr:Value>154</hr:Value>  
<hr:Unit>m</hr:Unit>  
</hr:Value>  
</hr:LocationDistance>
```

Consumption from basic ReadingBlock



Distance from extended ReadingBlock

FURTHER EXTENSIONS

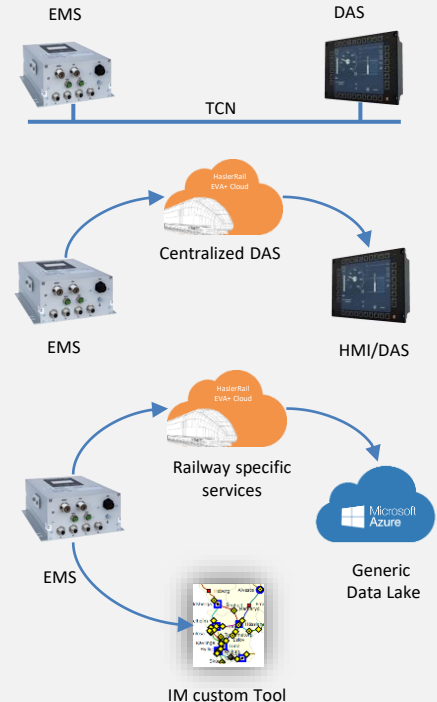
What else can an **EMS** offer to energy efficiency projects?

- any fieldbus data
- high-resolution data
- this is a further tool-set for the energy project designer

Examples (*):

- EMS can provide on-board devices (e.g.: DAS) with immediate feedbacks on real energy consumptions, if they are connected on the train network (any available fieldbus and protocols: MVB, TRDP, etc.)
- EMS can send high-resolution data to the ground, to feed on-ground DAS (UDP, MQTT, HTTP; carrying CSV, JSON, XML)
- EMS can send high-resolution data to the ground, to feed catenary analysis tools, including balancing with energy substation (example: UDP high-resolution data transfer from EMS to IM server or from EMS to DCS to IM data lake)

(*) based on HaslerRail REM102 features and real use-cases



A STANDARD ARCHITECTURE FOR ENERGY PROJECTS

- An **EN50463:2017 standard EMS** can be bound to more than one Ground Station
- This can be used to solve cross-borders energy settlement problems, until the exchange network is finished
- It can be used for energy efficiency project or for diagnostics and maintenance purposes, by sending CEBD data to a country specific DCS for billing and other data to a **service Ground Station** for purpose other than billing
- The standard tool to implement this architecture is the **User On Ground**
- Activating a second User On Ground has **no impact** on the Consumption Point homologation



- Exchange
- Energy Use Settlement
- Invoicing

User On Ground 1

User On Ground 2

CEBD

Readings
EventSet



EN 50463:2017
Standard EMS



- Energy projects
- Diagnostics
- Maintenance
- CP Assessment
- Commissioning
- Technical support
- Data integration

A POWERFUL ARCHITECTURE FOR ENERGY PROJECTS

Country specific DCS

- Exchange
- Energy Use Settlement
- Invocing

User On Ground 1

CEBD

User On Ground 2

Readings
EventSet
+
Hi-Res data

HaslerRail
EVA+ Cloud

Events



- Energy projects
- Diagnostics
- Maintenance
- CP Assessment
- Commissioning
- Technical support
- Data integration
- Hi-Res Event analytics
- Fleet management
- Driver performance
- Journey analytics
- Cybersecurity
- Artificial Intelligence



HaslerRail REM 102
EMS



HaslerRail TELOC 4000
Event Recorder

- ✦ Railway digitalization is a great opportunity for energy managers
- ✦ With the right tools and the right architecture, energy managers can finally develop *efficient projects*

CONCLUSIONS

- ⚡ A certified DCS can be used to **evaluate** energy efficiency projects
- ⚡ HaslerRail DCS is part of a **cloud solutions family** that is available to energy managers in SaaS mode to build powerful and reliable projects
- ⚡ We are ready to support the transition from data collecting for **billing** to data collecting for **energy efficiency**





THANK YOU FOR YOUR ATTENTION

HASLERRail

 **PIXY**

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