

**INDRIVETEC**  
Innovative Drive Technologies AG



**Indrivetec AG is located in Zürich Oerlikon, Switzerland. Production is carried out in Zürich and with external production partners in Switzerland and in Bulgaria.**

**The activities of Indrivetec Germany GmbH based in Hamburg are concentrated to business development of energy storage systems.**

**The whole team of Indrivetec is working since many years, some for more than 25 years, in the business and technology of power electronics.**



# **Your expert for linear motor drives and electrical energy storage**

**About Indrivetec:**

**25 Years experience in power electronics**

**515 Megawatt worldwide experience and installations**

**95 Members in Switzerland, Bulgaria and Germany**

**218 Projects confirms the international standards for quality**





Energy Storage Systems



Drive inverters



Linear Motor Drives



Special-purpose inverters





# Energy Storage Systems

**Modular and flexible electrical energy storage systems for a reliable power supply**

**Optimized asset performance by stabilizing frequency and voltage**

**Large range of applications**

**Increase of Self-Consumption**

**Back-up power for commercial and industrial application**



# Energy Storage Systems

**Multiple uses in the industrial, commercial and utility sector**

**Operation in highly developed and weak grids**

**Balancing of various energy various sources**

**Islanding and black start capability**

**Scalable up to the multi-MW-range**



# FlexConvert PCS

**Fully integrated unit including interface to BMS**

**Integrated On-grid and Off-grid operation modes**

**Compatible for various energy storage systems**

**Innovative cooling concept (compact and energy-efficient)**

**BDEW and ARN 4110 certification**



# FlexConvert PCS

## Power capability table

			Rated active power at cos phi: 0,9						
Nom. AC voltage VAC	Min. DC voltage VDC	Max. DC voltage VDC	FC250	FC320	FC500	FC750	FC1000	FC1500	FC2000
180	300	1100	100	120	200	300	400	600	800
330	540	1100	175	220	350	525	700	1050	1400
400	650	1100	200	270	450	675	900	1350	1800
<b>480</b>	<b>780</b>	<b>1100</b>	<b>250</b>	<b>320</b>	<b>500</b>	<b>750</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>
600	980	1100	300	400	650	950	1300	1950	2600
690	1100	1100	350	460	750	1075	1500	2250	3000





# FlexConvert PCS

**No power derating with high DC-voltages up to 1100 VDC**

**Smallest unit volume and lowest weight per kW**

**Optional cooling systems for operation without derating up to 55° C**

**Optional heating systems for operation down to – 40° C**

**Outdoor solutions IP55 – IP65**



# Drive inverters

**Inverters to optimize the start-up and speed behavior of AC motors**

**Inverters to optimize the start-up and speed behavior of DC motors**

**Inverters for speed and torque control**

**Inverters for pumping and ventilation systems and traction applications**



# Drive inverters

## Safe Torque Off Interface

### Parameters:

<b>Lifetime:</b>	<b>10 years</b>
<b>Power supply:</b>	<b>24 VDC <math>\pm</math> 5 %, 2 A</b>
<b>Operation temp:</b>	<b>-25°C to + 70°C</b>

## C E R T I F I C A T E

No. Z10 18 06 99402 001

Holder of Certificate: **INDRIVETEC AG**  
Hagenholzstrasse 71  
8050 Zürich  
SWITZERLAND

Factory(ies): 99398

Certification Mark:



Product: **Safety components**

Model(s): **STO PCB Control Interface**



# Linear Motor Drives

**Low voltage frequency inverters 0.5 MVA - 7.0 MVA to feed power to the motors via a central or decentral drive topology**

**Linear Synchronous PM Motors (Magnet-Runners and Stators)**

**Speed and position sensor system**

**Energy-storage based on SuperCaps**





# Linear Motor Drives

**Powerful, maintenance free launch system**

**High system productivity**

**High forces**

**High dynamic response**

**Wide variety of use**



# Special-purpose inverters

**Mining Converters**

**DC-DC converters**

**Water Treatment Converters**

**H-bridge circuits**

**Compensation units**





# Special-purpose inverters

**Customized solution**

**Prototyping**

**Multi functional converters**

**Power quality solution**

**Specially designs**



# Development

**More than 25 years of experience**

**In house developed DSP control unit and power electronics**

**Prototype design assembling**

**Hardware in the loop design and testing**

**Manufacture-independent supply chain resources**





# Production

**ISO 9001 certified production in Bulgaria and Switzerland**

**Serial production for high volume orders**

**Prototype assembling**

**Functional and type testing**

**Customer acceptance / FAT**



# Test infrastructure

**3.0 MW test bay for active power testing**

**6 MVA test bay for reactive power testing**

**High voltage testing**

**Heat chamber up to 60° C**

**Customized testing**



# Service program

Servicelevel	Basic Legal warranty	Basic + Extended warranty	Comfort	Premium
Inspection	-	inclusive	inclusive	inclusive
Maintenance	-	-	inclusive	inclusive
Spare parts	-	-	-	inclusive
Transport cost	-	-	-	inclusive
Availibility on site	in consultation	in consultation	< 168 hours	< 72 hours
24 / 7 Hotline	-	-	inclusive	inclusive
Yearly status report	-	-	inclusive	inclusive
Life-Cycle Management	-	-	-	inclusive



# Training program

**Level 1 – “basic knowledge”**

**Safety functions of PCS**

**Coolant system**

**Visual checks**

**Maintenance**





# Training program

## Level 2 - “Commissioning”

Cold commissioning (IDT protocol)

Hot commissioning (IDT protocol)

Maintenance (IDT protocol)

Troubleshooting with IDT support hotline



# References







## References



# WEMAG (DE)

## 15 MW

10 x Solo S (battery inverter)

8 x FC750 (battery inverter)

Primary control reserve





# Rosecote (UK)

## 49 MW

63 x FC750 (battery inverter)

Battery storage facilities

# WEMAG WBS (DE)

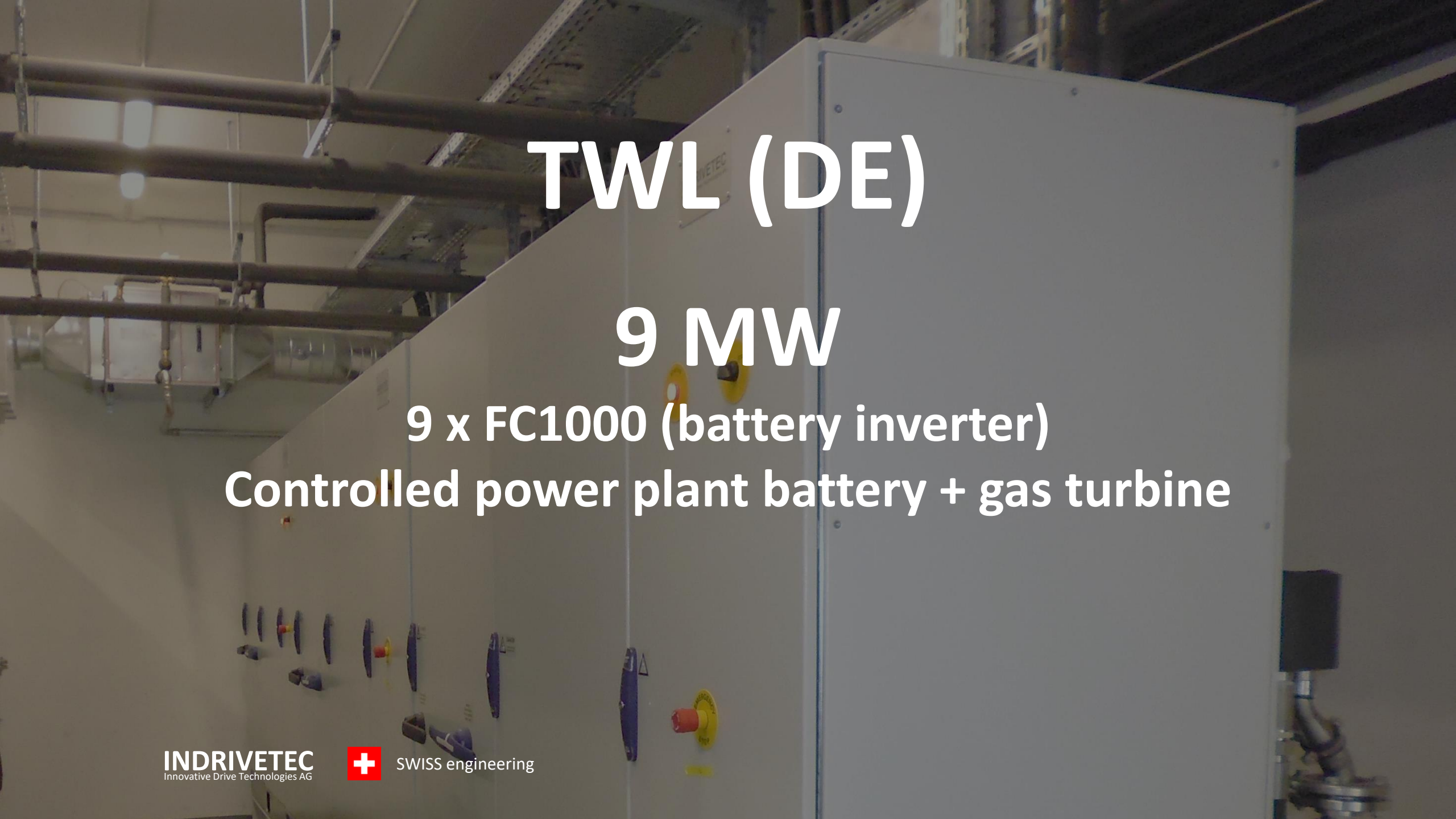
3 MW

3 x FC750 (battery inverter)

3 x FC250 (battery inverter)

Ancillary services and island operation





# TWL (DE)

## 9 MW

9 x FC1000 (battery inverter)

Controlled power plant battery + gas turbine



# Tilos (GR)

## 800 kW

2 x FC750 (battery inverter)

Island operation

# Drogenbos (BE)

12 x 250 kW

12 x FC250 (battery inverter)

Frequency regulation service



# Peterhead (UK)

## 1000 kW

4 x FC250 (battery inverter)

World's first battery for offshore wind



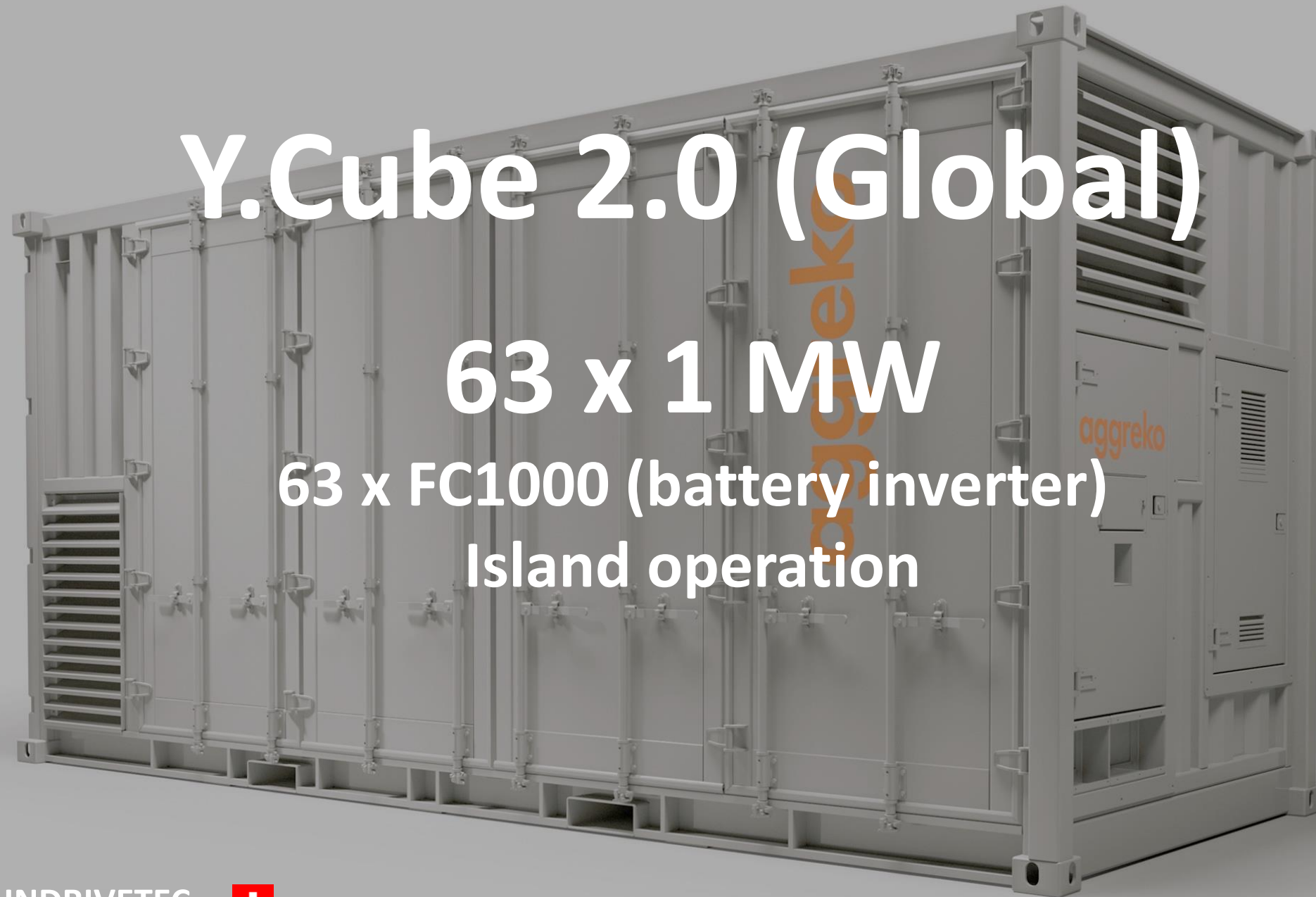
# Terna (IT)

## 2 x 1000 kW

### 4 x Solo S (battery inverter)

### Island operation





# Y.Cube 2.0 (Global)

63 x 1 MW

63 x FC1000 (battery inverter)

Island operation

# FC-PCSU-2000 (CH)

2000 kW

1 x FC2000 (battery inverter)+ MV-transformer

Island operation

**INDRIVETEC**





FC320 (CH)

220 kW

FC320 (battery inverter)

Reduction of the facility's electricity  
consumption



# FC-PCSU-1000 (BE)

INDRIVETEC  
www.indrivetec.com

## 950 kW

5.8 MWh NAS<sup>®</sup> battery storage system

Long-term energy storage use cases



Phantasia  
LAND

# Phantasialand

## TARON

LSM Multi Launch Coaster, breaking 4 records  
worldwide



# Ferrari World Abu Dhabi Turbo Track

is a shuttle coaster with a twisted vertical spike which passes through the roof of Ferrari World Abu Dhabi.



# Linnanmäki TAIGA

the fastest LSM DOUBLE LAUNCH COASTER on the  
northern hemisphere respectively in Scandinavia



# Guangzhou Sunac Land

## DUELING DRAGONS

two dragon themed trains, one suspended and one sit-down, are dueling each other with a number of thrilling near-miss elements



# Europe Ferrari Land

## Red Force

the tallest and fastest vertical acceleration in Europe  
Port Aventura Park



# Rock Mining Mill

## SER 6 MW

SER drive assures in combination with a liquid resistance the redundant and process-optimised operation





INDRIVETEC

Indrivetec is proud member of following organisations:

BVES



iBAT Association



electro suisse





INDRIVETEC

**Thank you for your attention!**

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