



**UHDENORA, your reliable technology and  
services partner in South America**

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UHDENORA S.p.A.**

# Summary

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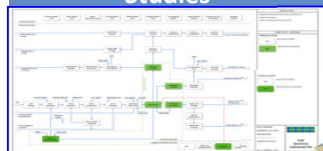
- Company updating
- Technology Expertise
- Product Portfolio
- After Sales Partnership

# UHDENORA: Flexibility to Satisfy Customer Needs Since 2001

## Concept development



## Feasibility Studies



## Basic/Detailed Engineering



Electrolyzers Room

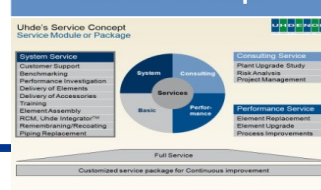


Skid-mounted plants

## Scope of Services

Design and construction of electrolysis plants, advanced membrane electrolysis based on Single Element technology.

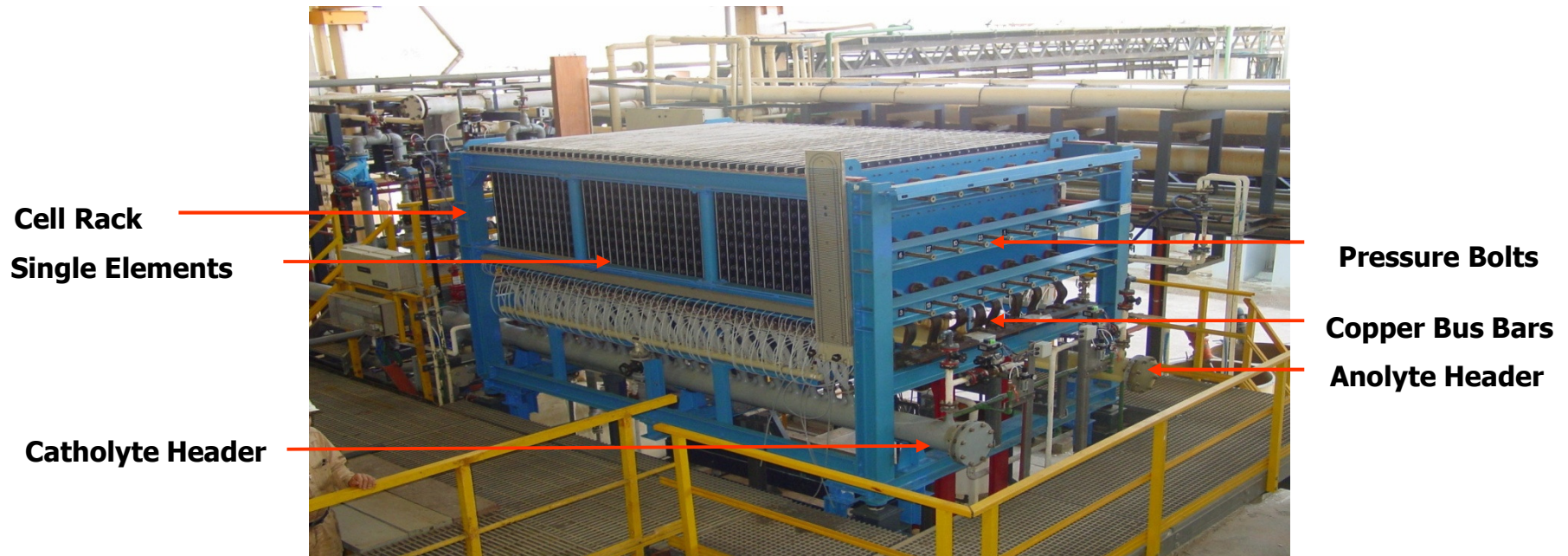
## Service Concept



## Large tailor-made plants

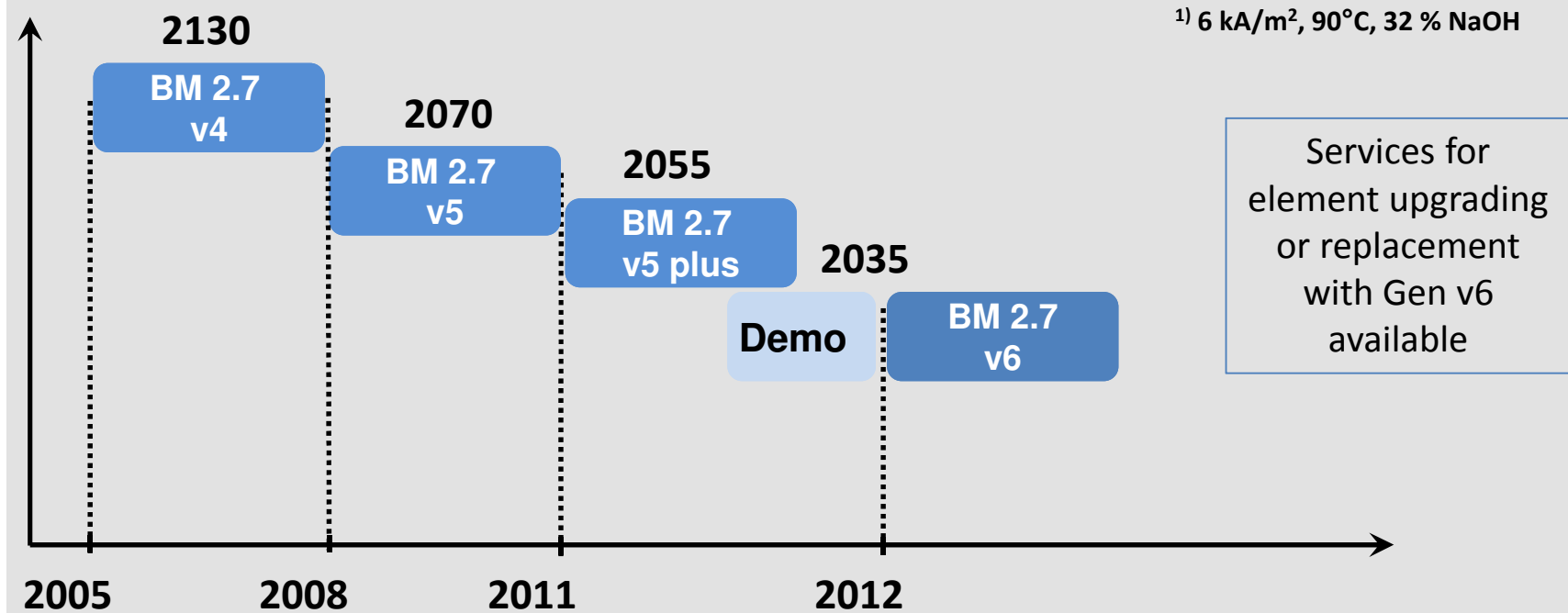


## Uhde Single Element – BM 2.7 Electrolyzer

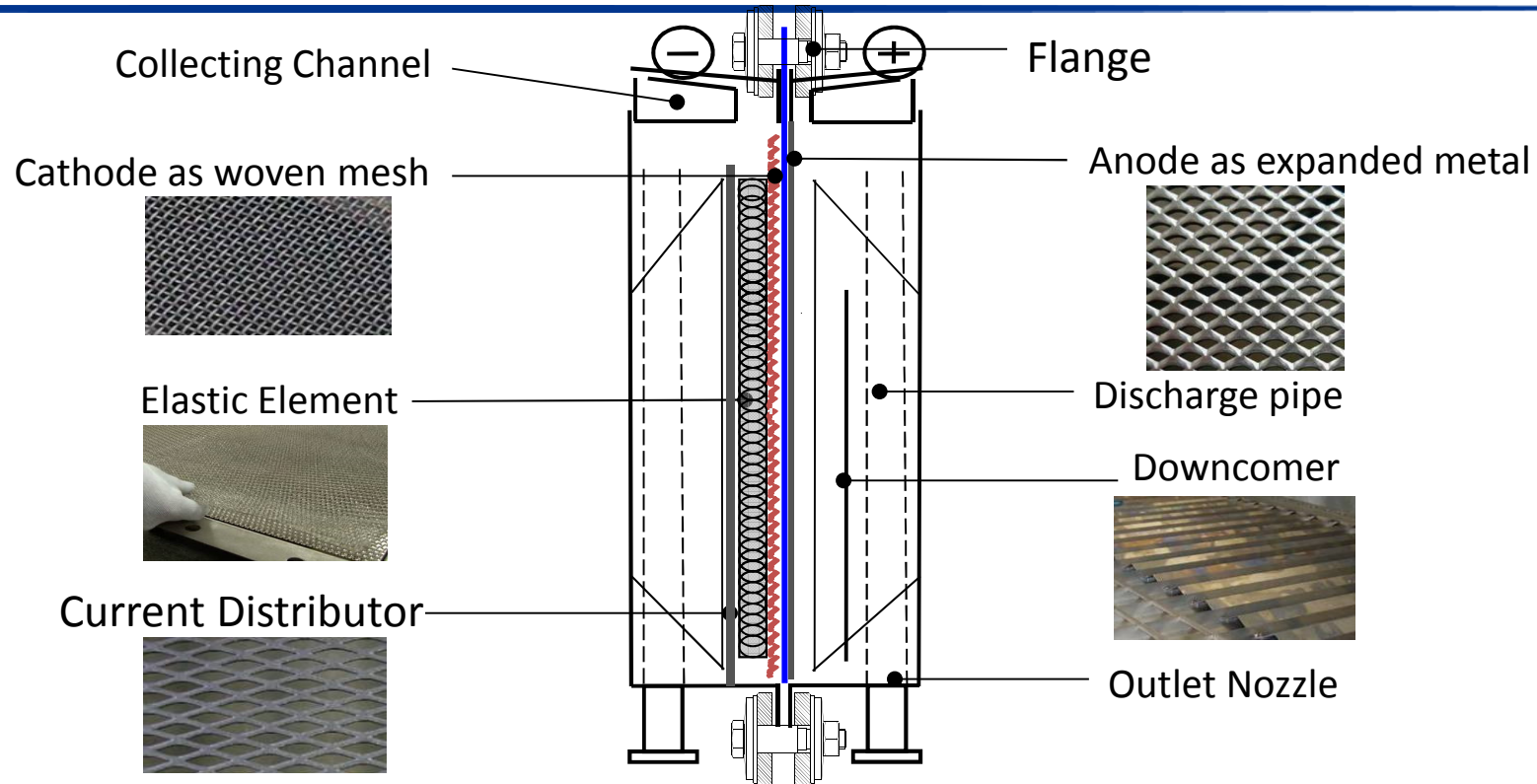


## Power Saving Evolution - BM 2.7 Single Element

Power Consumption in kWh/ t NaOH<sup>1)</sup>

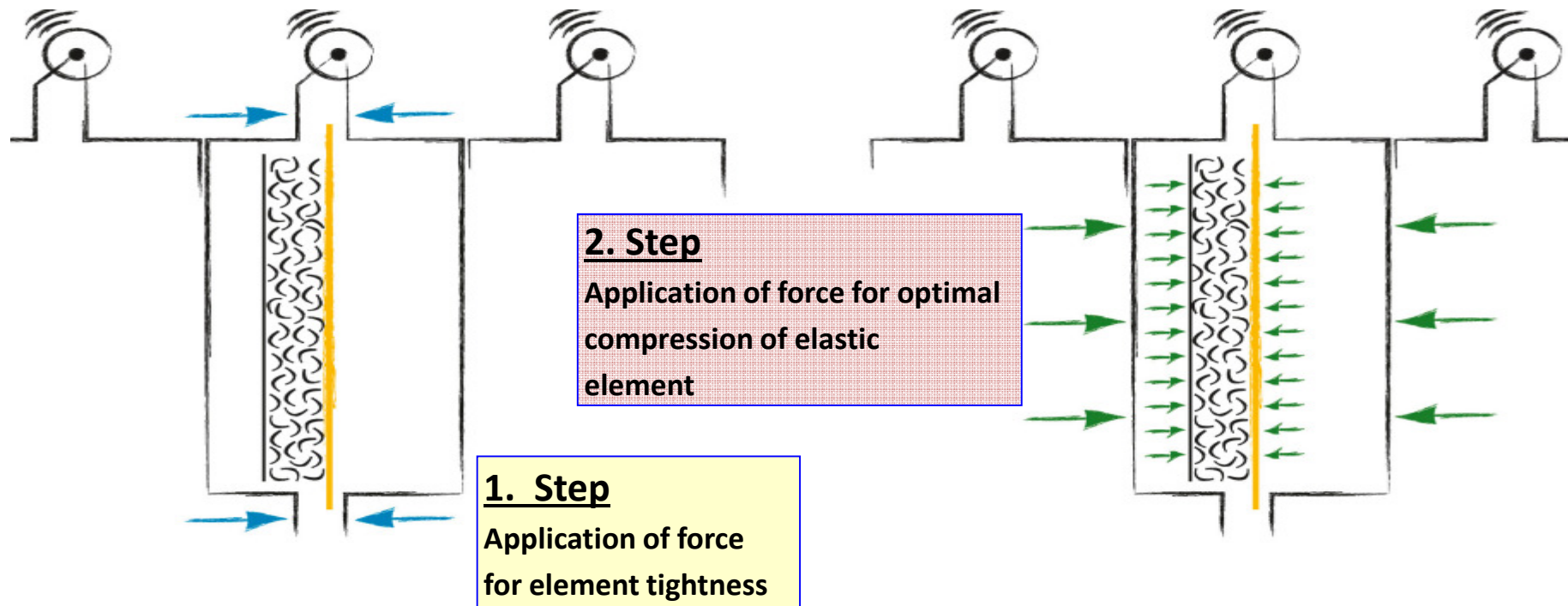


## Characteristics of new Generation 6





Application of forces for tightening and elastic element compression are separated in the Uhde Single Element



## Generation 6 - Reference Installations

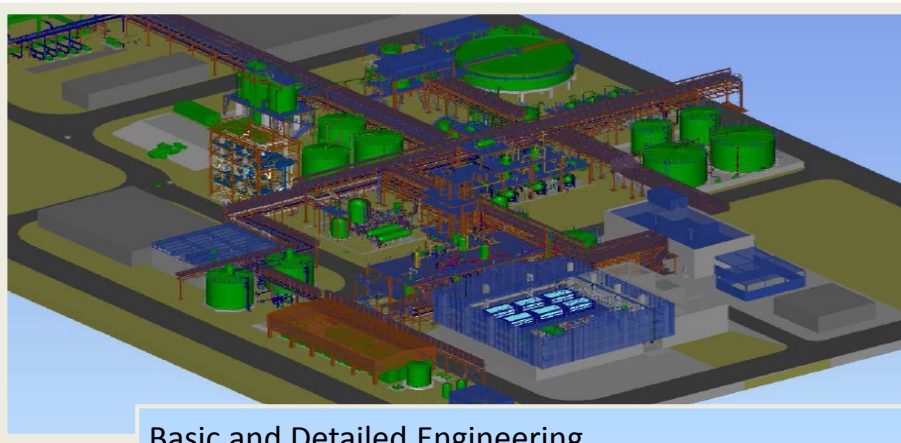


Customer:	BEFAR
Location:	P.R. China
Capacity:	159.700 t/year of Cl <sub>2</sub>
Process:	BM Technology
Licences:	Uhdenora
Commissioning:	2014



## References Membrane electrolysis

<b>Customer:</b>	Quimpac
<b>Location:</b>	Peru
<b>Capacity:</b>	64.000 ECU
<b>Process:</b>	UHDENORA
<b>Commissioning:</b>	2014
<b>Scope:</b>	E,P + Supervision

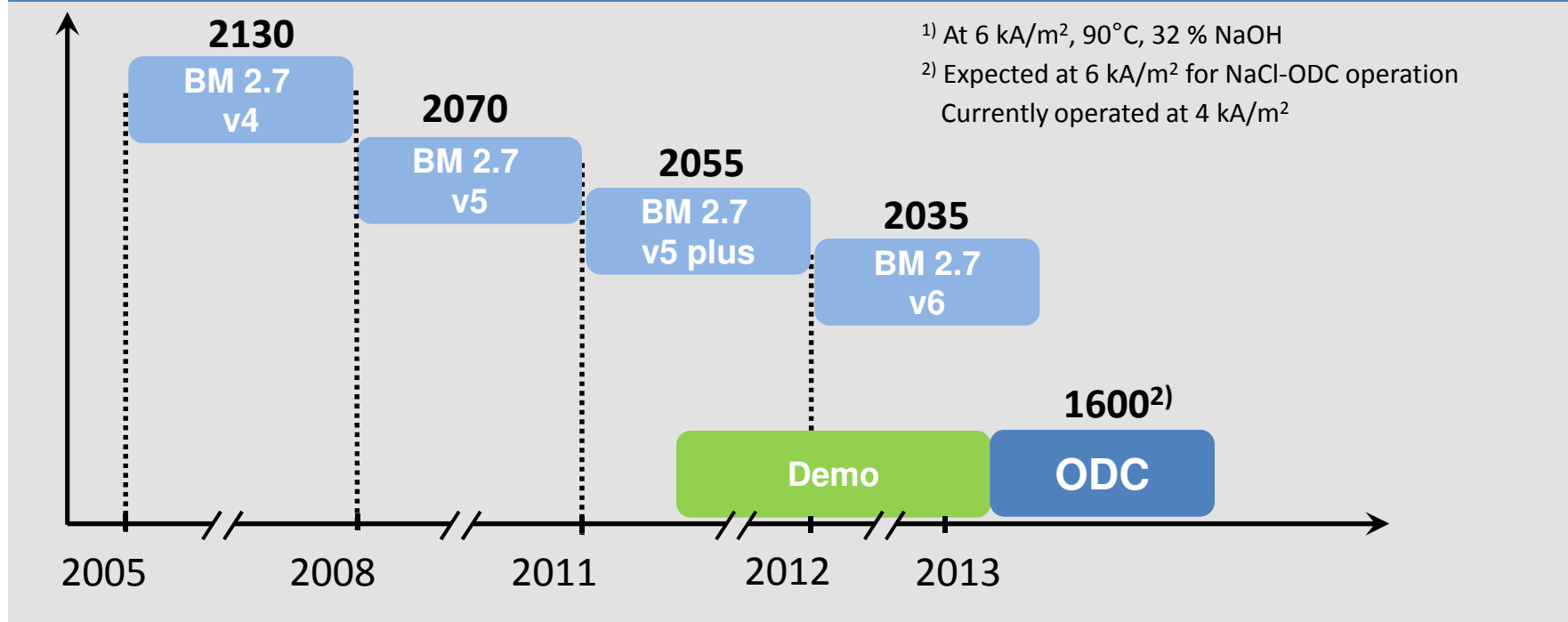


Basic and Detailed Engineering  
Process equipment  
Electrical Distribution  
Instrumentation  
Supervision to Erection, Start Up and Commissioning



## NaCl-ODC was released in 2013

Power Consumption in kWh/ t NaOH<sup>1)</sup>



## NaCl-ODC Is Commercial since June 2013

### NaCl-ODC Highlights

- ODC (Bayer Material Science) combined with Uhde BM2.7 design
- 1<sup>st</sup> demo electrolyzer with 20,000 mtpy  $\text{Cl}_2$  for BMS, Uerdingen  
time online: **> 42 months**
- Current density: 4-5 kA/m<sup>2</sup>
- Total elect. power consumption reduction by 25%
- **Commercial order** for 40.000 ktpy  $\text{Cl}_2$  + 40.000 tpy  $\text{Cl}_2$  awarded in China (under installation)

### ODC Demo Electrolyzer, Uerdingen

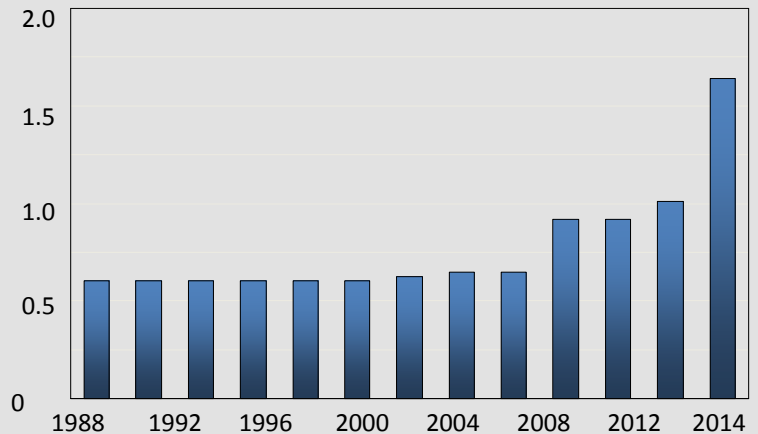


# Growing HCl-ODC market due to growing isocyanate business



Customer:	Yantai Juli
Location:	Laiyang, China
Capacity:	100,000 t/year of $\text{Cl}_2$
Process:	ODC Technology
Licence:	UHDENORA/Bayer
Commissioning:	1 <sup>st</sup> quarter 2012

TK EL/UHDN accumulated contract awards  
HCl Capacity [Mio. tpy  $\text{Cl}_2$  100 %]





# Skid Mounted Chlorine Plants: a Joint Development Cooperation



EXPERIENCE  
AND KNOW  
HOW

- Feedback from Over 220 chlorine plants
- Process Expertise for all Sections
- Technology Licensor
- EP and EPC Experience
- Operational Excellence

## Results

Standardized – Pre Assembled – Automated 45 TPD  $\text{Cl}_2$  Plant

New standard 15 TPD  $\text{Cl}_2$  skid mounted plants

## On demand

Customized skid units for higher capacities



135 TDP Skid mounted  
 $\text{Cl}_2$  Drying Tower



## Skid units from workshop to site



pre-assembled in workshop



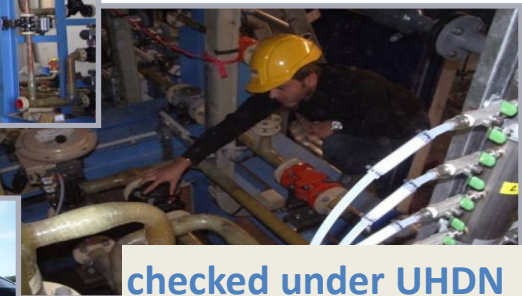
connected together in the final field configuration



combined with other elements to complete process unit



transported to site



checked under UHDN supervision

## Shipment of Skid Units



1

2



3

4





## From construction to installation: - Waste Gas Dechlorination



from workshop to site

- waste gas dechlorination tower
- hypo cooling and circulation



at site

## Leuna Harze Plant (Germany)

Contractor:	ThyssenKrupp Uhde GmbH
Location:	Leuna, Germany
Capacity:	15,000 t/year of $\text{Cl}_2$
Process:	Chlor-Alkali
License:	UHDENORA S.p.A.
Skid supplier:	UHDENORA S.p.A.
Commissioning:	2012



## Produquímica Industria & Comercio S.A. (Brazil)



Contractor:	Produquímica S.A.
Location:	Brazil
Capacity:	15,000 t/year of $\text{Cl}_2$
Process:	Chlor-Alkali
License:	UHDENORA S.p.A.
Skid supplier:	UHDENORA S.p.A.
Commissioning:	2014



## After Sales Partnership UHDENORA Expertise Is More Than Electrolyzers

Cell room



Salt



Evaporation



### ○ Performance Improvement

- Technical Exchange
- Benchmarking
- Performance Investigation
- Plant Upgrade
- Process Improvements
- Element Upgrade
- Element Replacement

### ○ Maintenance and Repair

- Training
- Plant Safety Review
- Element Assembly
- Remembraning/Recoating

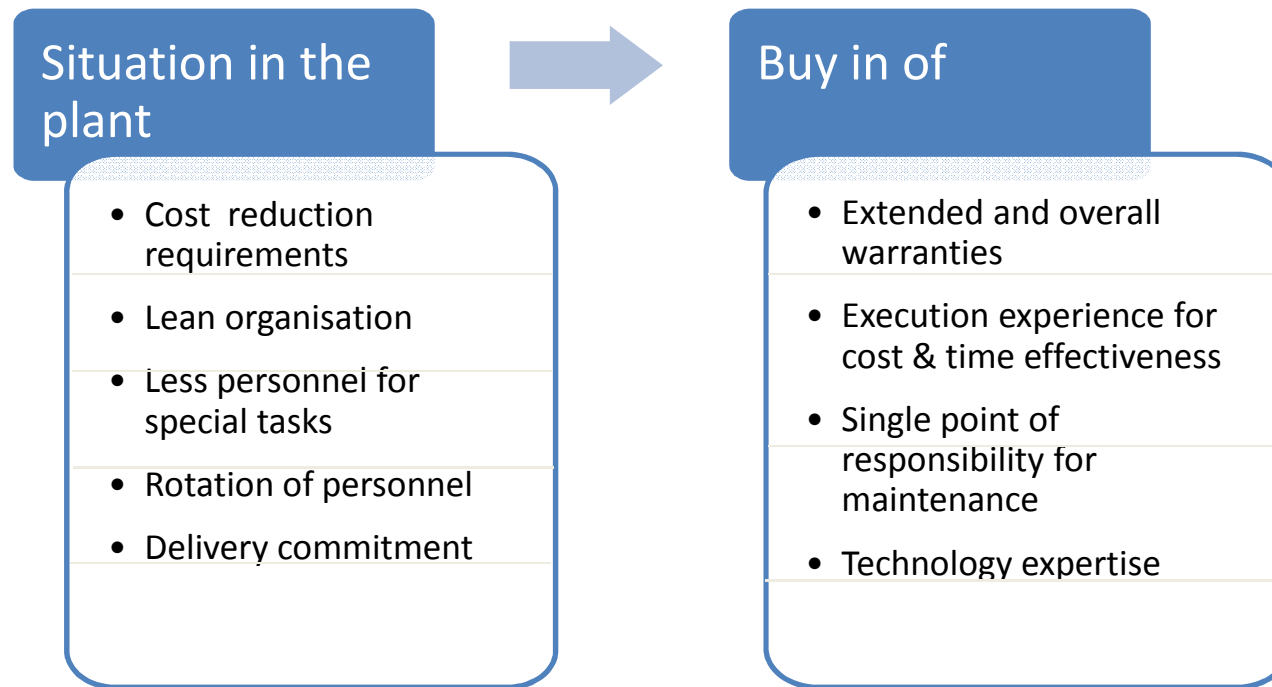
### ○ Delivery of Spare Parts

- Elements
- Accessories

## After Sales Partnership

There are good reasons to deploy a *Full Service* for cell house maintenance

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## After Sales Partnership

UHDENORA offers various *Full Service* packages for maintenance work

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### *Full Service* packages for

- Element Upgrade
- Remembraning
- Recoating
- PipeTech™ – Upgrade / Replacement of existing plastic piping



## Why UHDENORA ?

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- **Experience and References:** over 220 chlorine plants in operation (TK Electrolysis and UHDENORA)
- The only **single source** supplier
- Two **strong shareholders** with over 60 years of electrolysis experience each (part of ThyssenKrupp Uhde global network)
- **Extensive knowledge** and experience in all sections of a Chlor-Alkali plant (not only cell room)
- Dedicated and **experienced after sales services**
- **International reputation** for full service support through all plant lifetime
- **Quality**-certified systems and standards
- **Safety and environmental** considerations



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**Thank You For Your  
Attention**