Trends and future challenges in the welding industry

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voestalpine Böhler Welding

www.voestalpine.com/welding

voestalpine
ONE STEP AHEAD.

voestalpine Böhler Welding

FY 2012/2013

voestalpine group

Steel

Premium steel strip, electrical steel strip, heavy plate, cast products

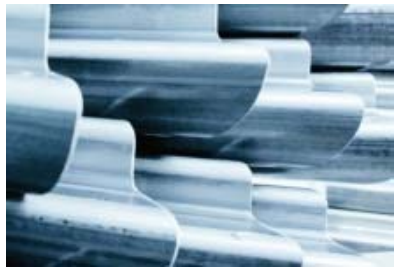
Special Steel

Tool steel and leading position for high-speed steel and special forged parts

Metal Engineering

Turnouts, rails, processed wire, seamless tubes and **welding consumables**

~ 530 Mio EUR
~ 2400 Employees
~ Global TOP 4

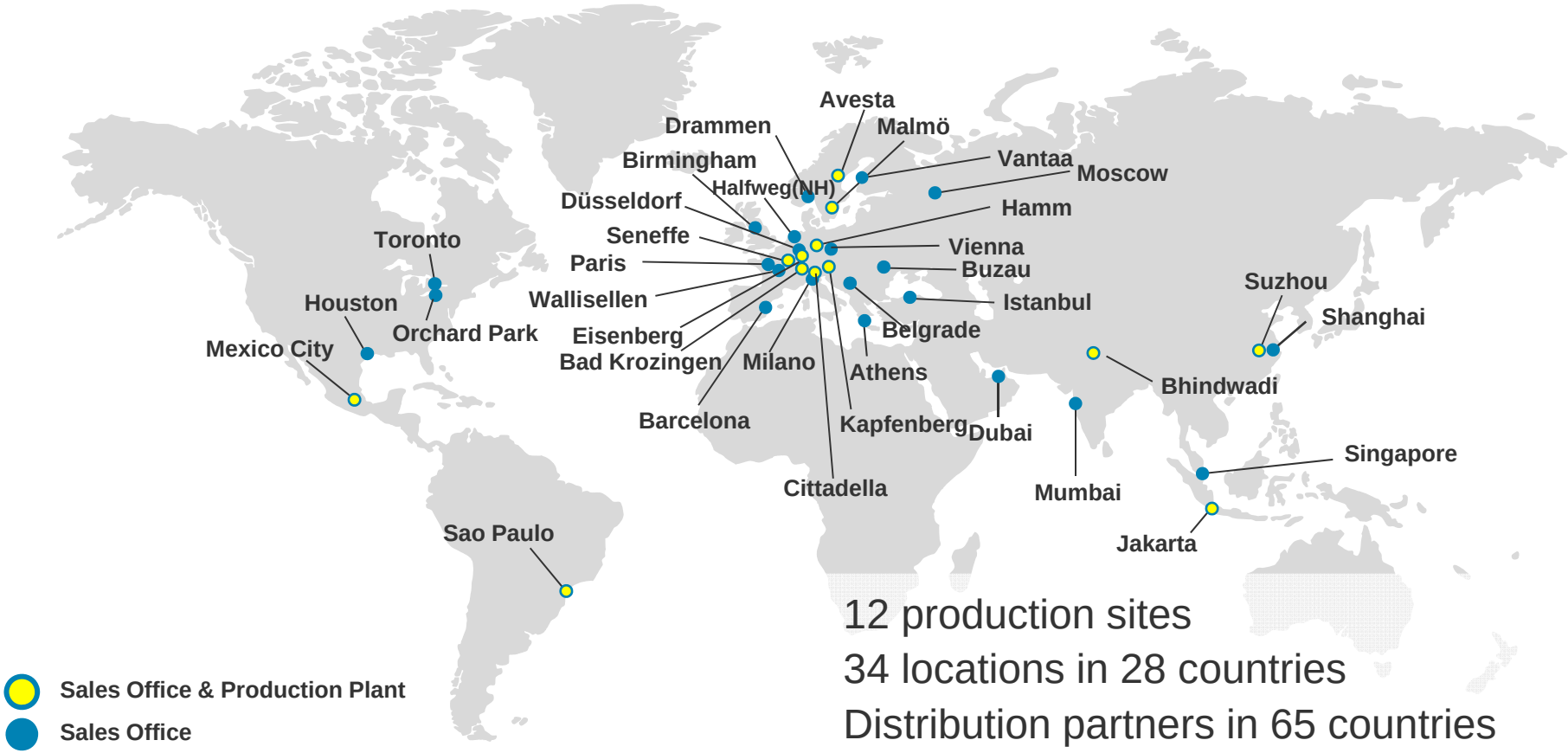


Metal Forming

High-quality metal processing solutions, precision steel strip and special components

voestalpine Böhler Welding

Our locations



12 production sites
34 locations in 28 countries
Distribution partners in 65 countries

Sales Office & Production Plant
Sales Office

Let Our Expertise Take You Further

We are 100% focused on filler metals

- Joint welding
- Overlay welding
- Cladding
- Brazing

Research & Development

- 5 Competence Centres in EU
- More than 40 industrial and scientific cooperations

voestalpine Böhler Welding

Focus Industry Segments


Power Generation


Oil & Gas Upstream


Oil & Gas Downstream


Chemical Processing


Pipeline Industry


Iron and Steel Production


Sugar and Ethanol


Heavy Manufacturing


Rail Transportation and Manufacturing


Automotive

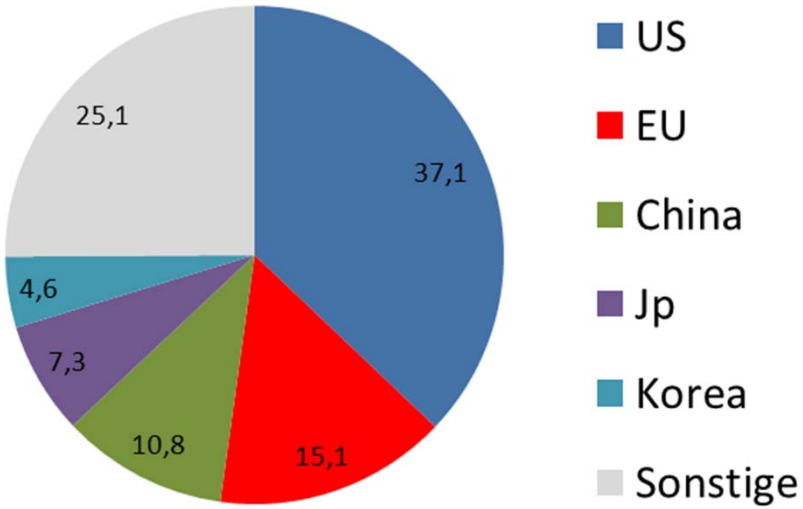

Marine Architecture & Shipbuilding


Structural Steel Works

Trends and future challenges

Market situation

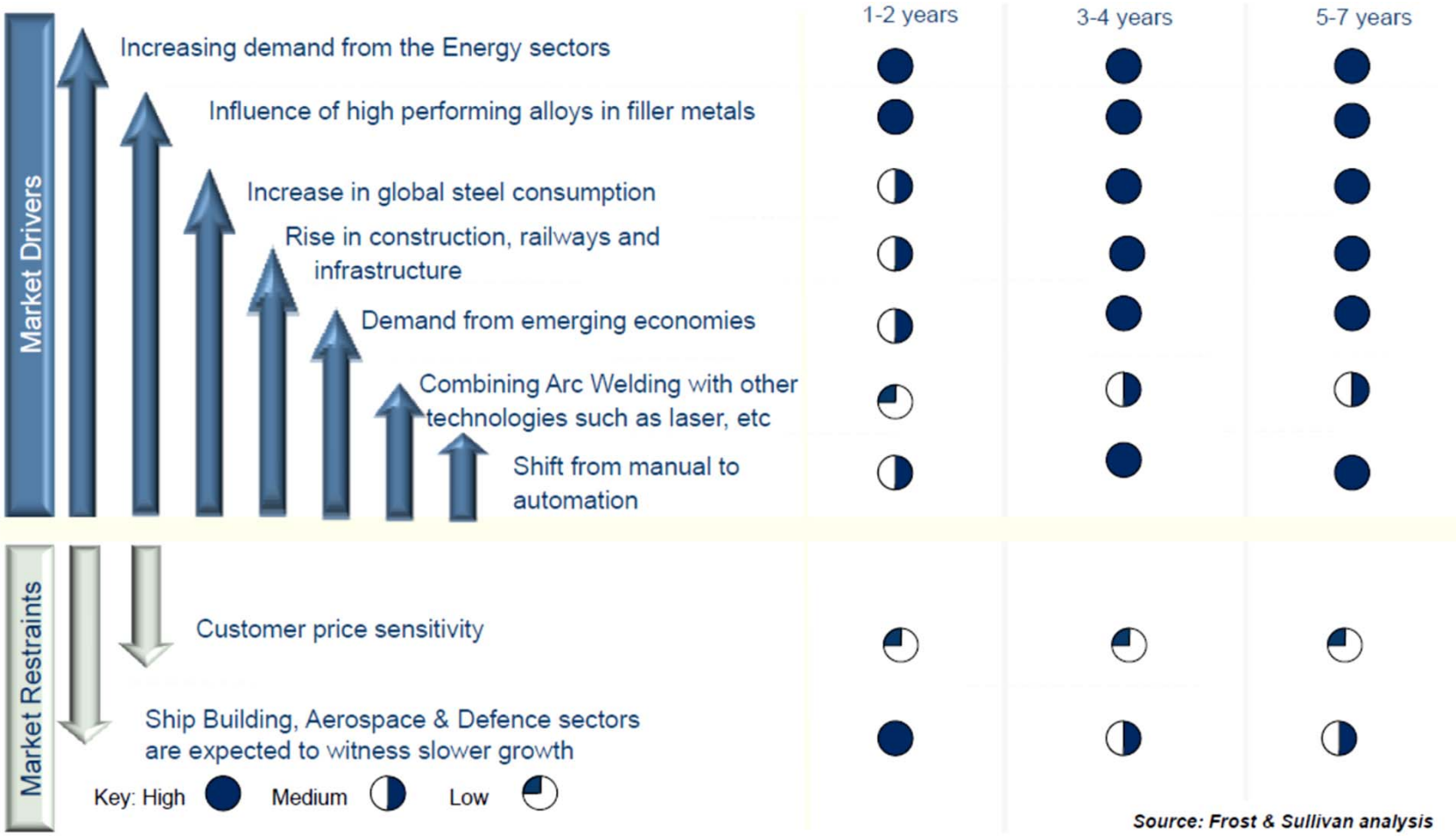
- **40% of the global welding industry** is driven by US based enterprises
- **Pressure on European** based companies increases, as **consolidation process** is still going on
- Necessity to strengthen **competitiveness** of European welding industry



Source: vaBW 2013

Trends and future challenges

Market drivers



Study: World Arc Welding Equipment and Filler Metals Market (2010)

Trends and future challenges

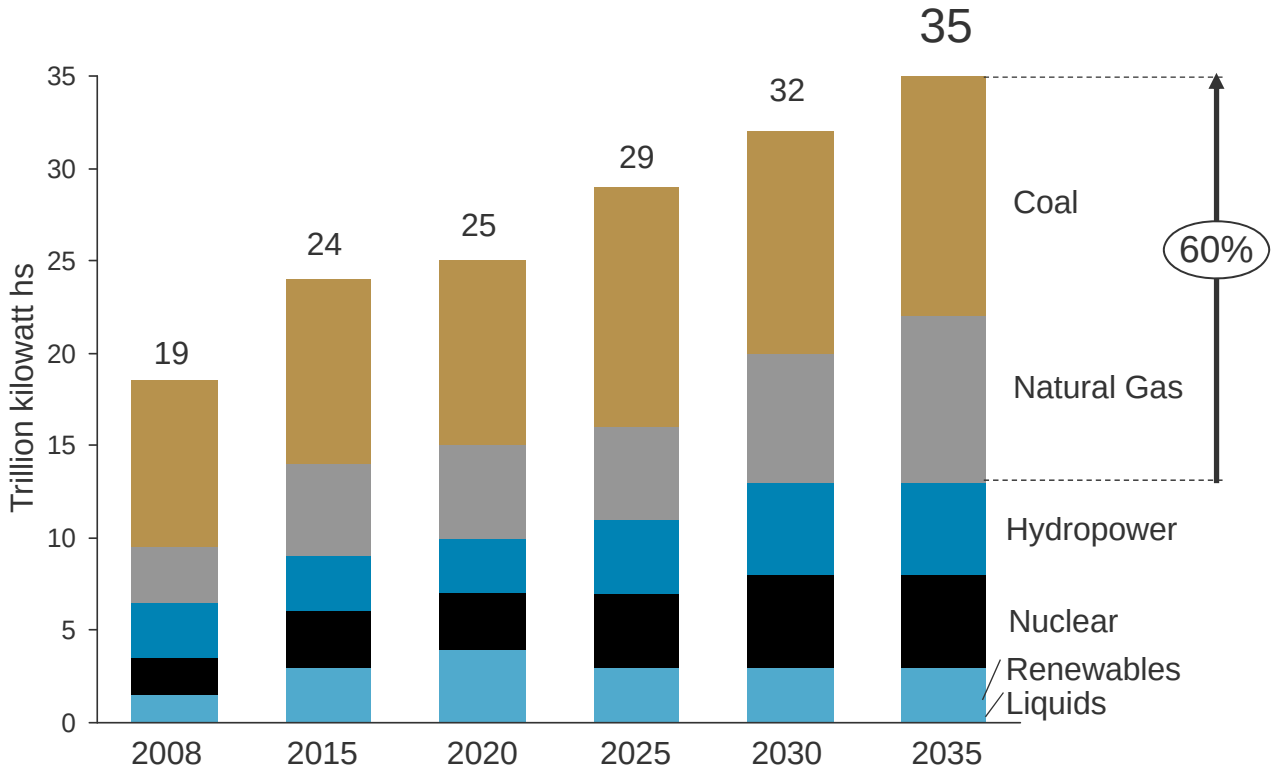
Market needs & requirements

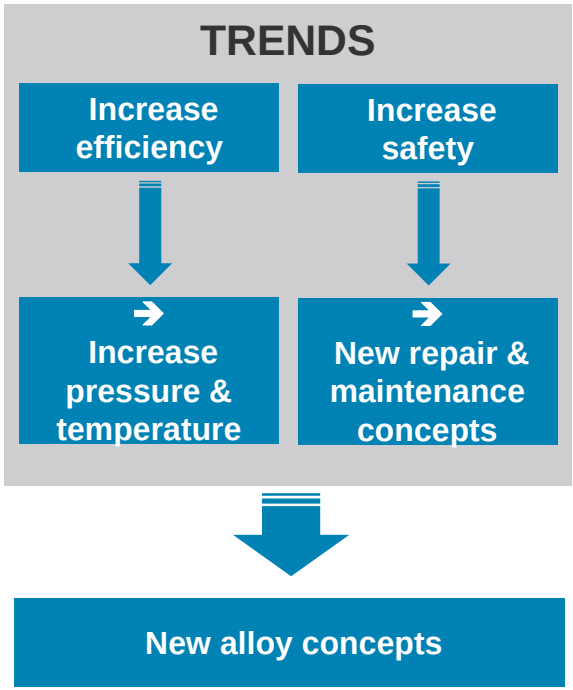
Higher Efficiency
Automatization, efficient welding processes, easy product handling

Increased Safety
Reliable manufacturability, reproducible properties

Lower costs / investments
Less usage of materials, automatization

Thermal Power
Technological Trends





1) Source: US Energy Information Administration / IEO 2011

Oil & Gas Upstream
Technological Trends

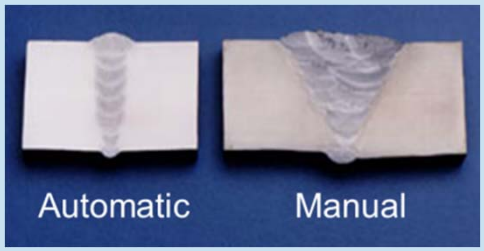
Higher efficiency Lower costs	Higher efficiency, Lower costs
▪ Corrosion resistant Nickel Alloy Cladding ▪ Higher Strength (X65/X70) pipe materials ▪ Joining of clad pipelines	▪ 690 MPa yield strength materials, low hydrogen ▪ Increased usage of cored wires for productivity gains

Pipeline
Technological Trends

	Rohrstahl-bezeichnung nach API 5L X	Festigkeits-anforderung (mind) Rp / Rm [N/mm²]
1990	X100	690 / 760
1980	X80	550 / 620
1970	X70	482 / 565
	X60	413 / 537
1960	X60	— " —
	X56	386 / 517
	X56	— " —

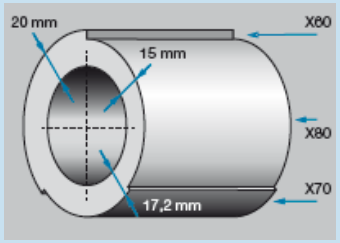
Increase efficiency

- Usage of solid and cored wires will grow for the disadvantage of stick electrodes.
- Mechanized narrow gap welding will reduce overall consumable demand.



Lower costs

- Reduction of wall thickness – high tensile strength materials, e.g. X80/X100 vs. X60/X70
- Increase of demand of CRA pipes type 625/825.



Automotive
Technological Trends

Increase efficiency & safety

- Increased operating temperatures; ferritic → austenitic materials

Lower costs

- Lightweight concepts, joining of steel together with aluminium
- Reduction of error rates, increase of welding speed, increased output

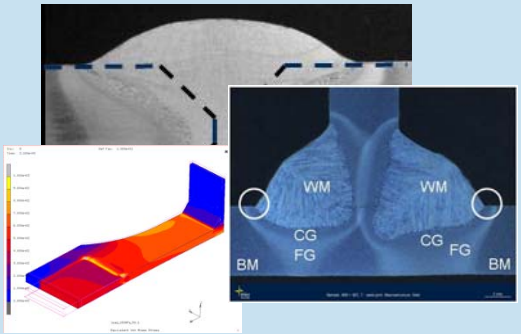
Heavy Manufacturing
Technological Trends

Lower Costs

- High yield strength materials
- Reduce overall weight and costs – new lightweight concepts and/or higher load capacity

Higher safety

- Metallurgy of filler metal to achieve best performance in joints at highest strength levels
- Simulation of fatigue behaviour



Trends and future challenges

Summary

- **Market needs & requirements**
  - Higher efficiency
  - Increased safety
  - Lower costs
- **Technological trends**
  - New alloy concepts – for joint & repair welding
  - Joining of dissimilar metals
  - Shift from manual welding to automation
  - Arc welding processes stay dominant
  - Advanced simulation and testing tools required
- **Strengthen competitiveness of European welding industry**
  - Welding as the core technology of a sustainable production