GLOBAL TRENDS IN INDUSTRIAL MARKETS

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TITANIUM IN THE INDUSTRY

Segment 1
POWERGEN
- Nuclear Power Plant
- Thermal Power Plant

Segment 2
DESALINATION
- Thermal MSF/MED

Segment 3
PROCESS
- Chemical
- Oil & Gas
- Pool Heater
- LNG
- PTA
- District Cooling

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Segment 1: TI USE IN POWER GENERATION MARKET

- **NUCLEAR**
  - Ti tubes kg/MW: 0.162

- **COAL**
  - Ti tubes kg/MW: 0.051

- **COMBINED CYCLE**
  - Ti tubes kg/MW: 0.036

- **SINGLE CYCLE HYDRO, WIND, SOLAR**
  - Ti tubes kg/MW: 0
Segment 1: ENERGY DEMAND OUTLOOK

Energy Demand Forecast – New connections to the grid

- Nuclear
- Coal
- Combined Cycle
- Single Cycle
- Hydro
- Solar
- Biomass & Waste
- Wind
- Other Renew
- Titanium Consumption

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Segment 1: NUCLEAR ENERGY

160+ nuclear reactors planned

60+ nuclear reactors under construction

Corresponding to over 40,000MT of Ti tubes over the coming 20 years
MARKET TREND

- Thinner tubes generating feasibility and cost questions
- No growing sustainable volume for Ti MSF design
- Potential not to be neglected: China & Retubing
Segment 3: PROCESS

Huge range of sizes depending on applications and projects

- Up to 180 MT
- Up to 150 MT
- Up to 60 MT
- 5 to 40 MT
- 1 to 10 MT

MARKET TREND

- Ti still has to be promoted as a Material of Reference with variations comparable to Ni or Cu
- Room for added value products with improved heat exchange, mechanical or corrosion resistance
Industrial applications are high-risk applications

In the industry, the main driver has always been
  - Improving durability of materials
  - Increasing efficiency

The recent tendency of the industry towards decontenting is dangerous

We do believe **high quality products** are essential to the industry
THANK YOU

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