

# Indium facility at the Auby smelter



20 September 2012



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> **Indium and its markets**

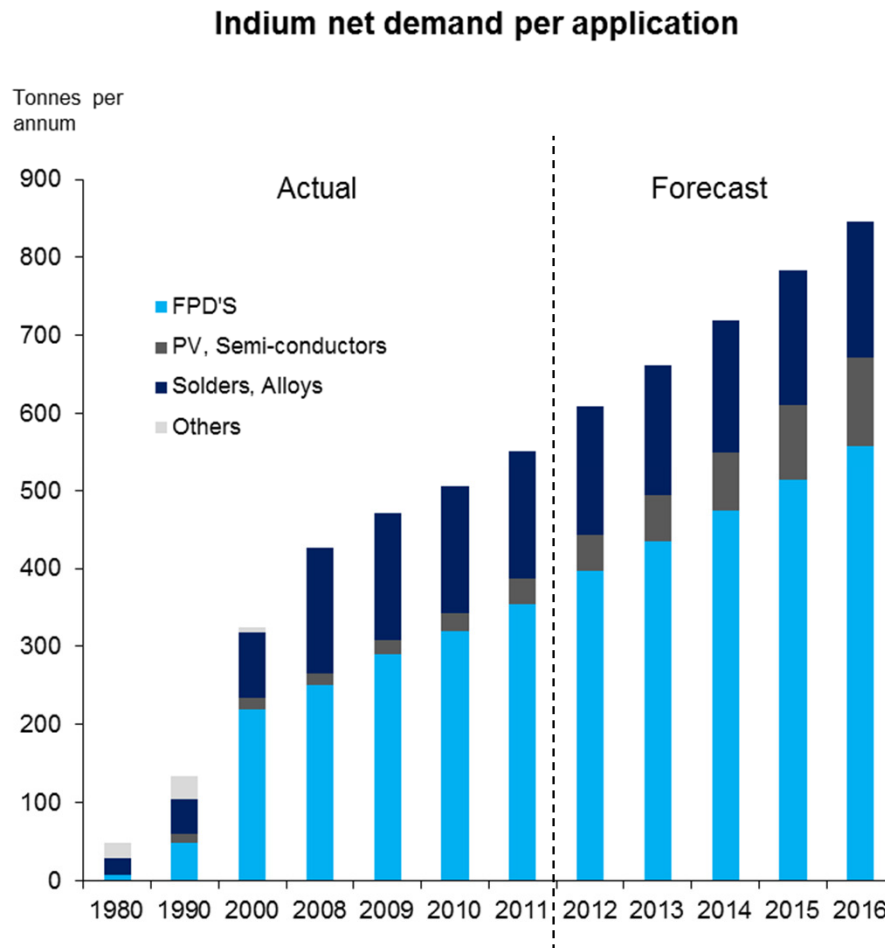
Alignment to strategy

Project execution

Process

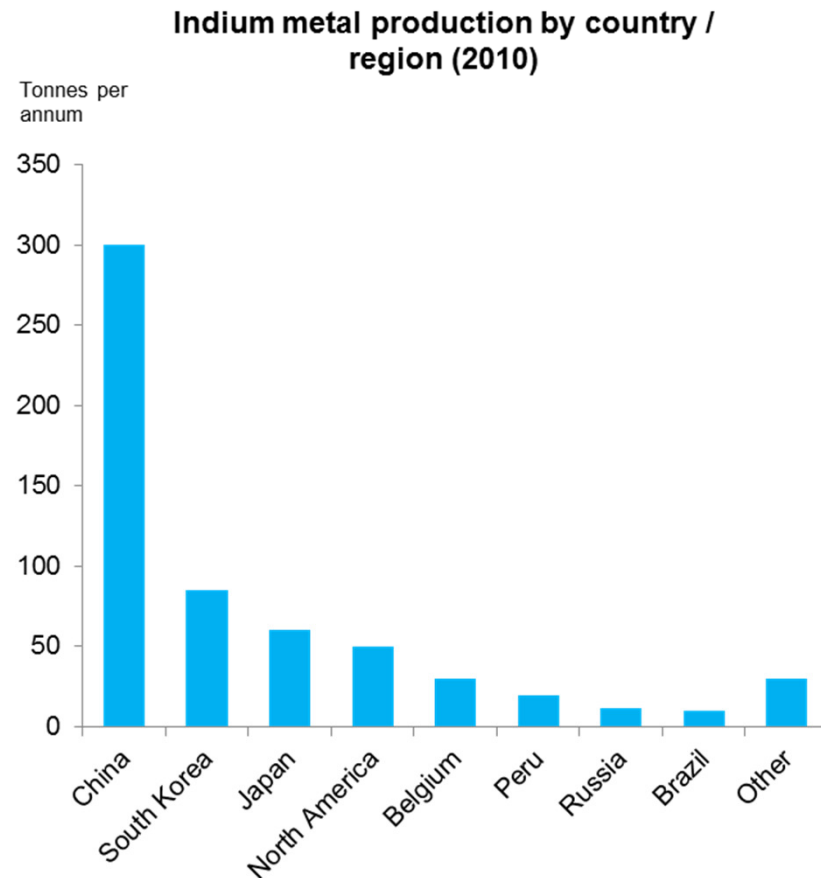


## Growing demand for indium and its industrial applications



- Indium is a rare, soft, silvery, metallic element
- Global demand for indium has increased substantially in recent years
- Driven by its main application, as indium tin oxide, for use in flat panel displays (FPDs)
- Photovoltaic cells are a growing application of indium, in the form of indium tin oxide (ITO) or CIGS material (copper, indium, gallium, selenide)
- Traditional market for solders and alloys remains stable.
- A substitute for indium in the medium term is not currently foreseen

## Sources of indium and indium metal production



- Indium is found in some tin and zinc concentrates
- Typical indium content in indium bearing zinc concentrates is between 100 and 800 parts per million (ppm)
- Some zinc refiners are capturing the value of indium from their raw material feed and historical residues
- Typically, Nyrstar sources indium from two 'groups' of concentrates: South American and North American / European
- China produces approximately 50% of the world's primary indium, from approximately 15 different plants
- Recycling facilities are mostly installed in Asia, Japan and South Korea, close to the customers of indium tin oxides



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# Nyrstar2020 strategy clearly articulated into a vision and mission, with Strategy into Action providing a clear focus on consistently delivering performance



## Our 2020 vision

### What we want to be

To be the leading integrated mining and metals business

## Strategy into Action

Disciplined approach to taking the strategy into every part of the business, and engaging the entire workforce to achieve Nyrstar's vision of being the leading integrated mining and metals business

## Focus in 2012

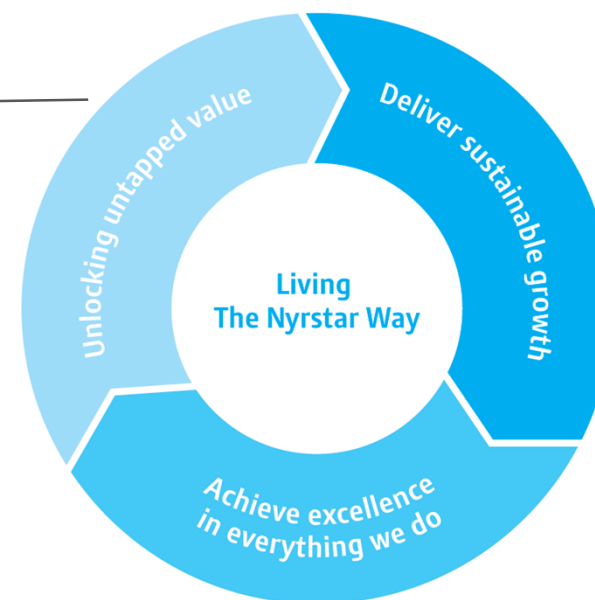
Putting our Strategy into Action with a clear focus on delivering performance from our existing assets and pursuing both internal and external growth opportunities

## Our mission

### What we need to do to get there

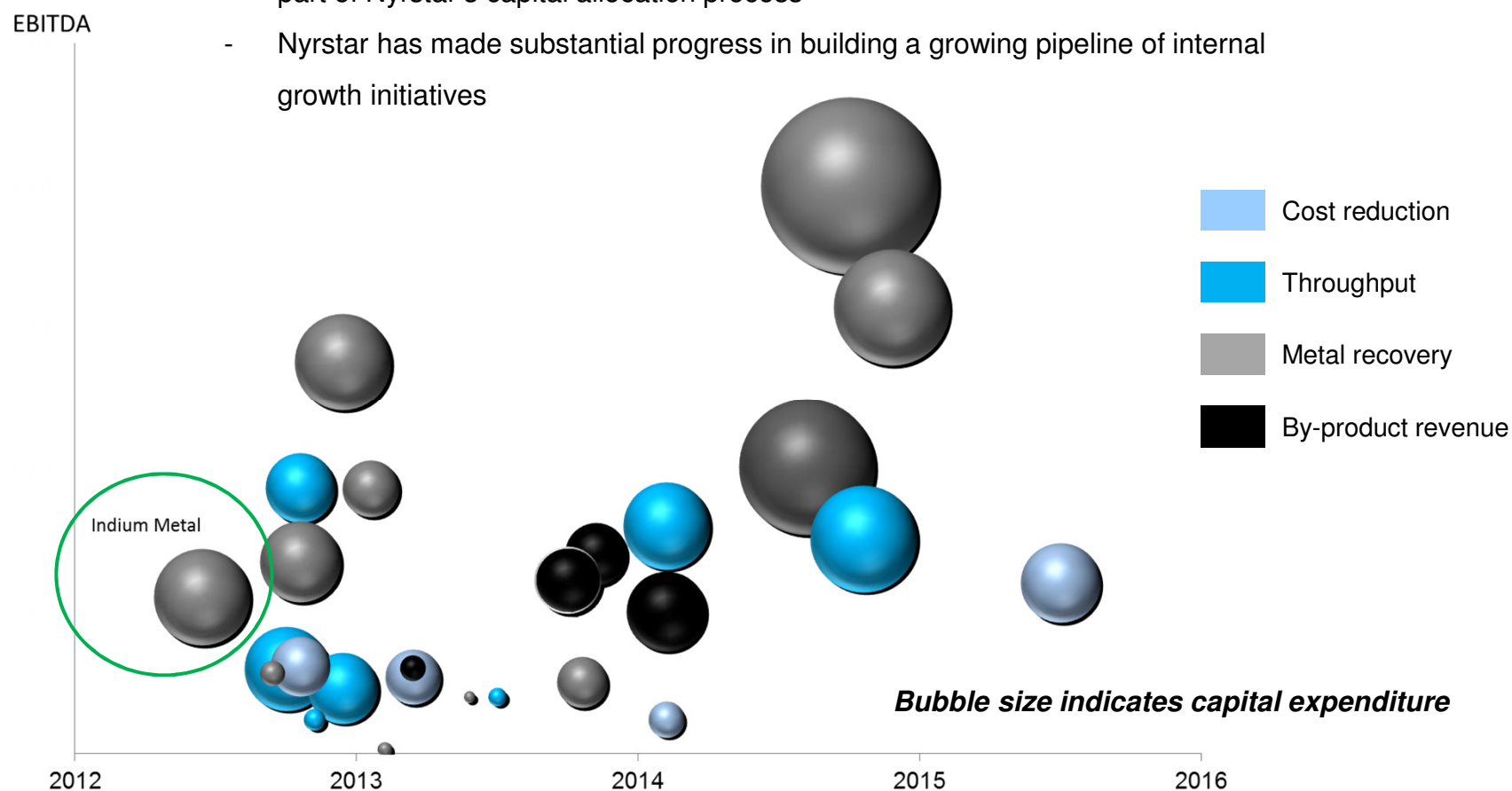
To capture the maximum value inherent in mineral resources through deep market insight and unique processing capabilities, generating superior returns for our shareholders

Successful  
commissioning of  
indium plant, in  
line with guidance



## Deliver sustainable growth and unlock untapped value through internal growth opportunities, such as the indium metal project at Auby

- All internal growth opportunities are continually prioritised based on strict criteria as part of Nyrstar's capital allocation process
- Nyrstar has made substantial progress in building a growing pipeline of internal growth initiatives

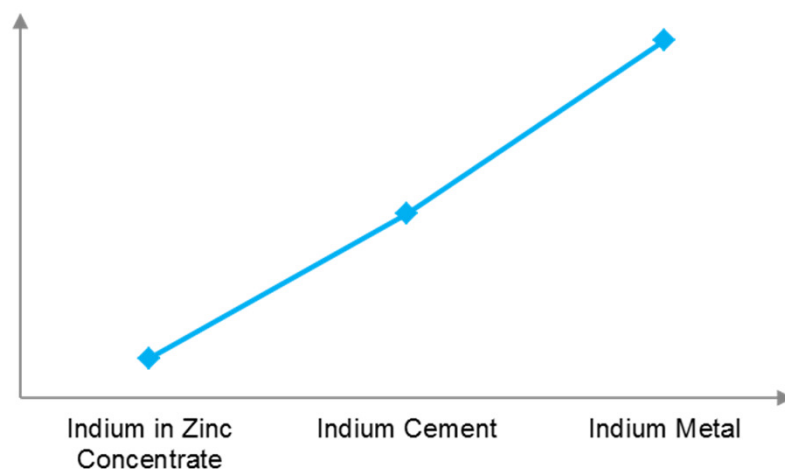


Source: Nyrstar internal growth pipeline (Q2 2012)



## Investment rationale for commissioning an indium metal facility

Indium value captured at the different stages of production

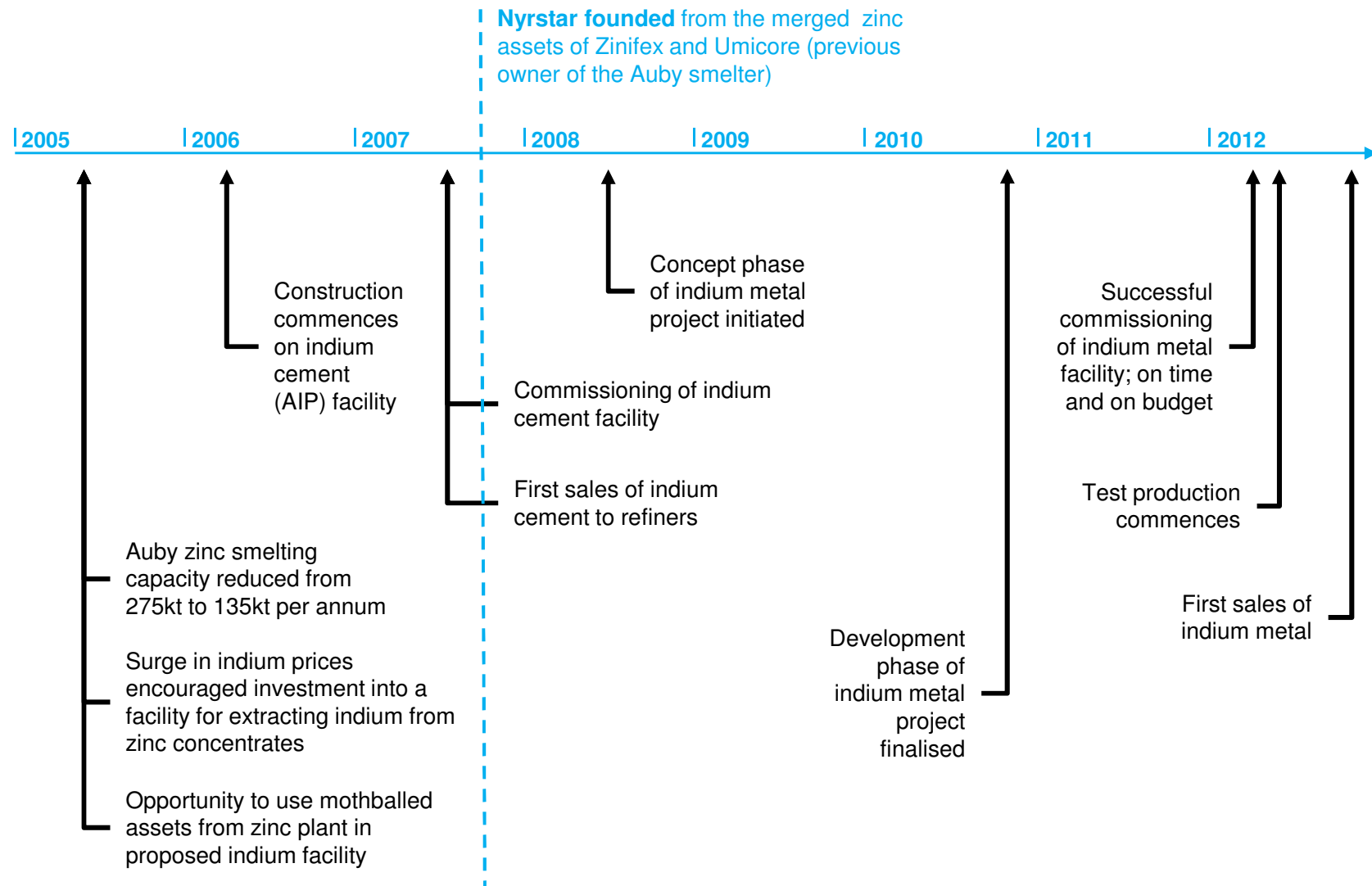


- The indium metal project is an example of unlocking further untapped value from the raw material feed received by Nyrstar's smelters
- Since 2007, the Auby smelter produced an intermediate indium cement product (AIP) which captured some of the value of indium
- With the ability to produce refined indium metal, Nyrstar can capture a higher amount of the value of indium
- Given conversion costs (people, energy and other costs) of converting indium in concentrate to indium metal, Nyrstar would expect to make a high margin on indium metal

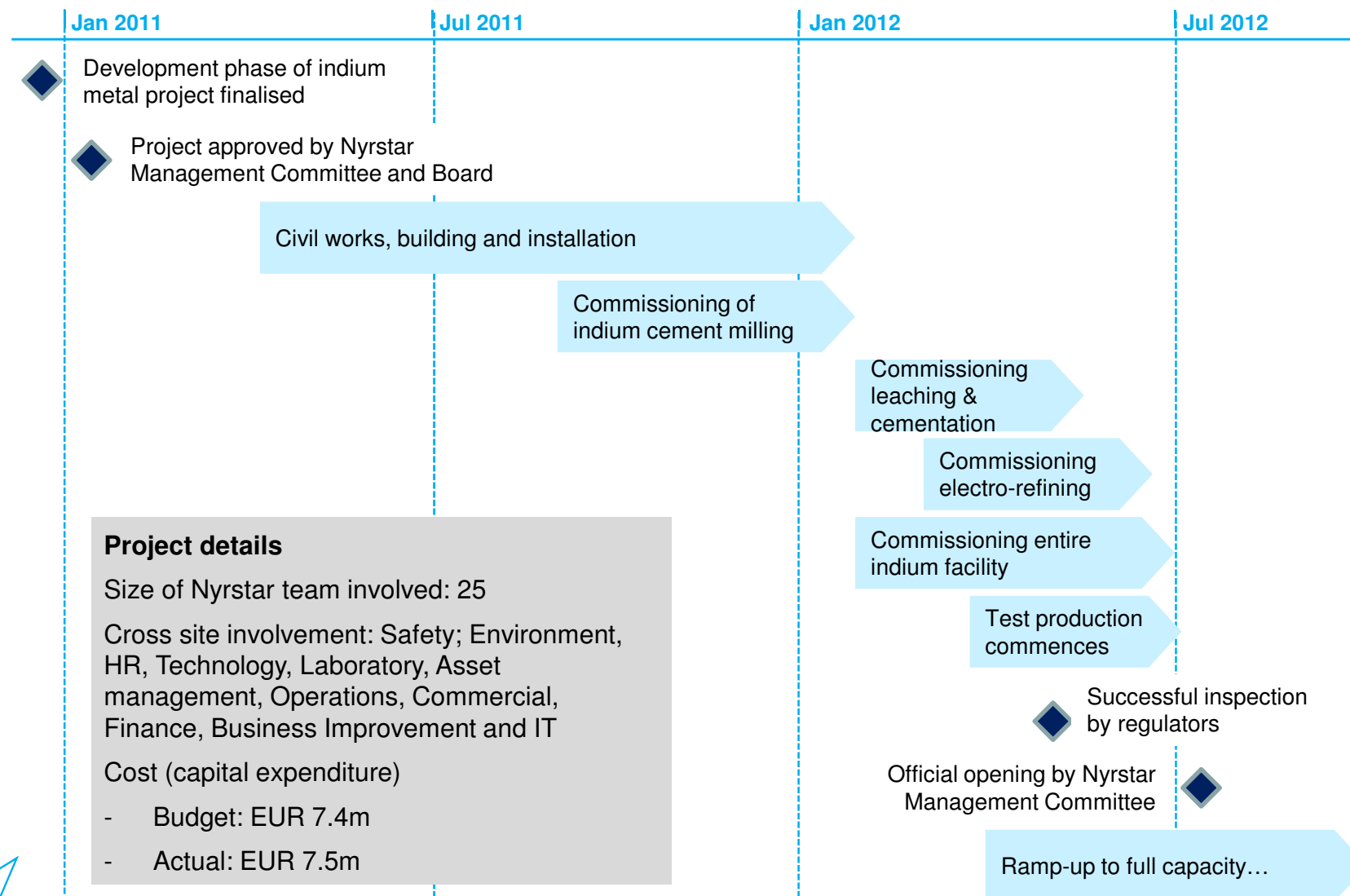


Indium and its markets  
Alignment to strategy  
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Process

## History of indium production at Auby



## Project implementation of the indium metal facility



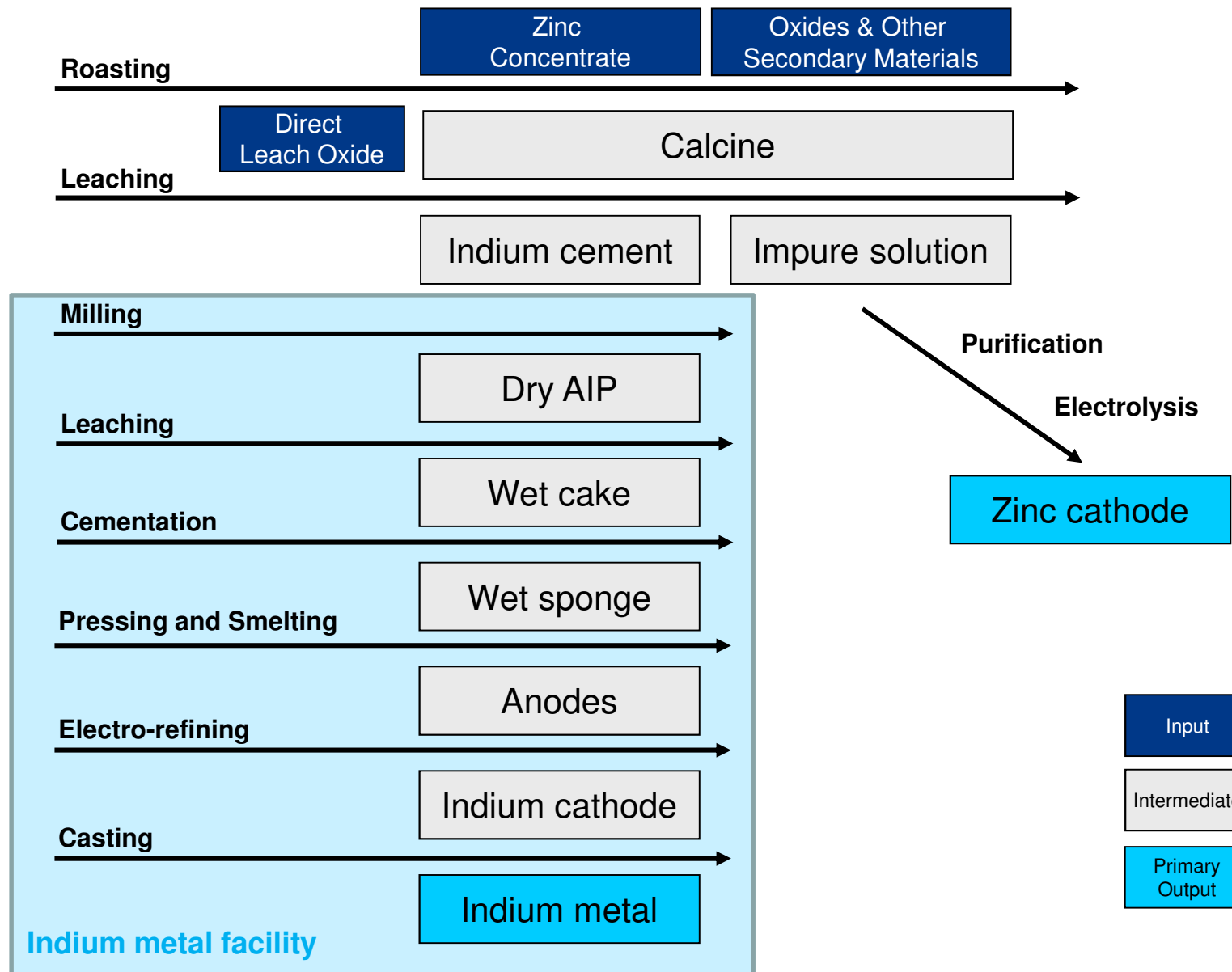




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## Process overview



## The product

### Pre-casting



### Cast ingot



- The indium metal produced at Nyrstar Auby is available in 4N8 grade (99.998% purity)
- ITO grade, can be used in flat panel displays (FPDs)

Chemical specification	Composition (%)
Indium (In)	99.998
Lead (Pb)	0.005
Tin (Sn)	0.005
Copper (Cu)	0.002
Nickel (Ni)	0.005
Iron (Fe)	0.001
Cadmium (Cd)	0.001
Thallium (Tl)	0.002
Zinc (Zn)	0.002
Aluminium (Al)	0.002

Physical property	Unit	Value	Solid (at 20°C)
Density	kg/dm <sup>3</sup>	7.310	
Melting point	°C	156.6	

Shape / package	Normal weight	Value
Ingot 1kg	1.0 ± 0.1	150 x 40 x 25
Ingot 5kg	5.0 ± 0.5	252 x 92 x 32

