



# TIN MARKET OUTLOOK

*Can tin  
weather the  
trade storm?*

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PREPARED FOR: Beer and Co Tin Conference, November 2018



# Presentation outline

1	2018 tin market in review
2	Consumption trends and prospects
3	Tin supply outlook
4	Conclusions

# Tin market in review

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Price,  
US\$/t

\$22,500

\$22,000

\$21,500

\$21,000

\$20,500

\$20,000

\$19,500

\$19,000

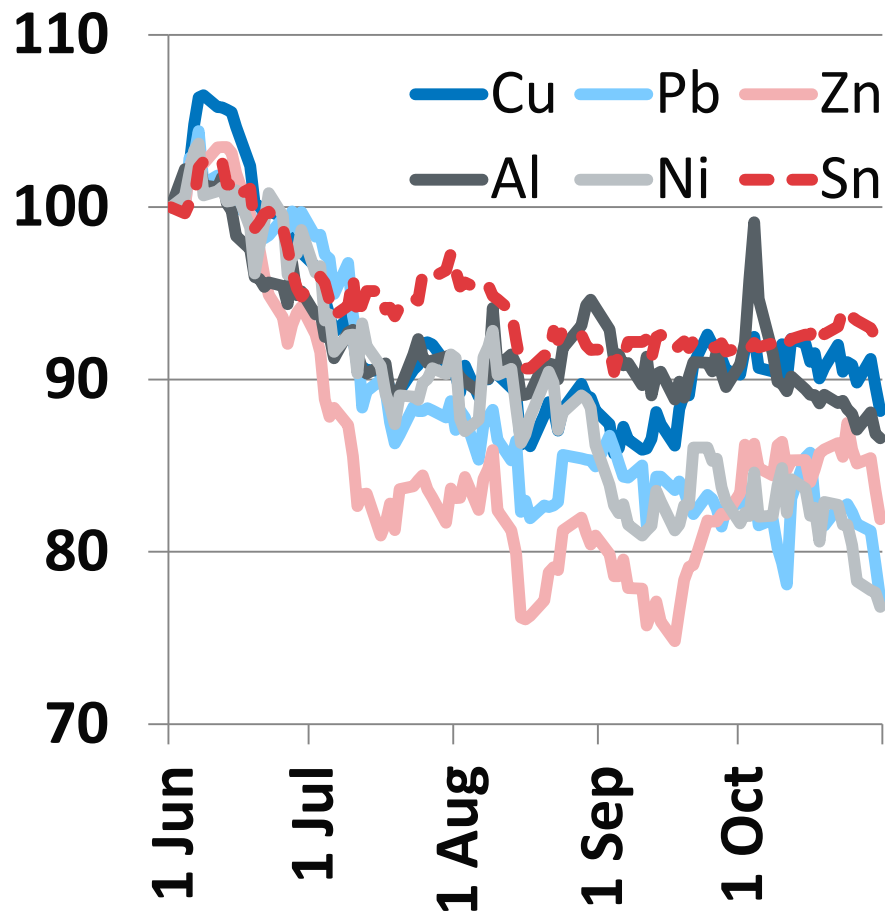
\$18,500



LME tin price developments in 2018

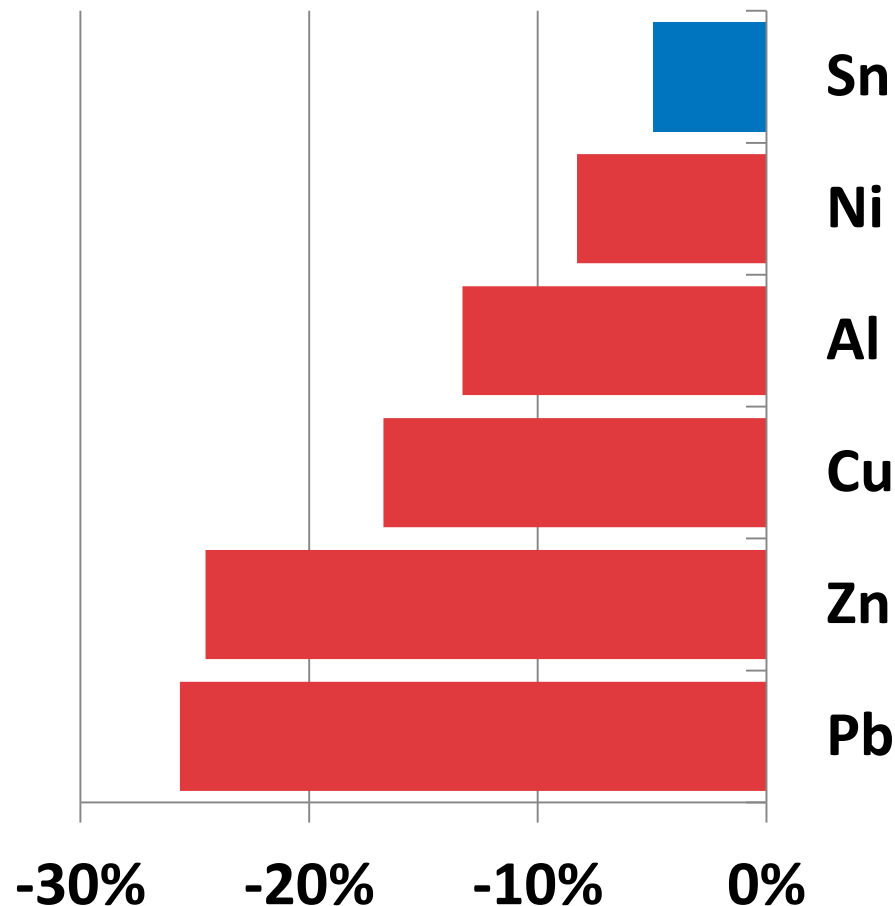
## Indexed LME 3-month price

Index base = 100



## LME price in the year to 31 October

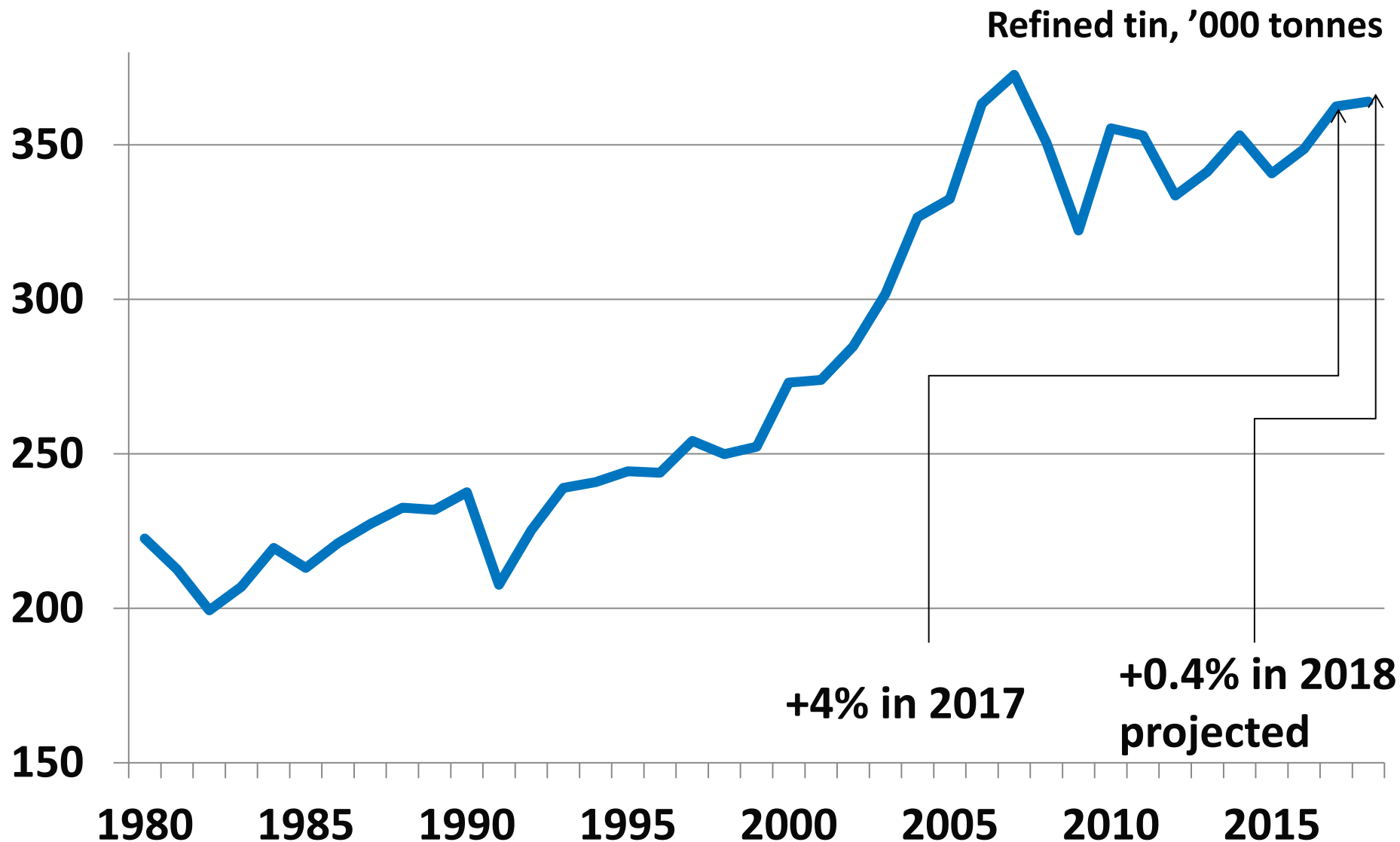
% change



Tin weaker but outperforming peers

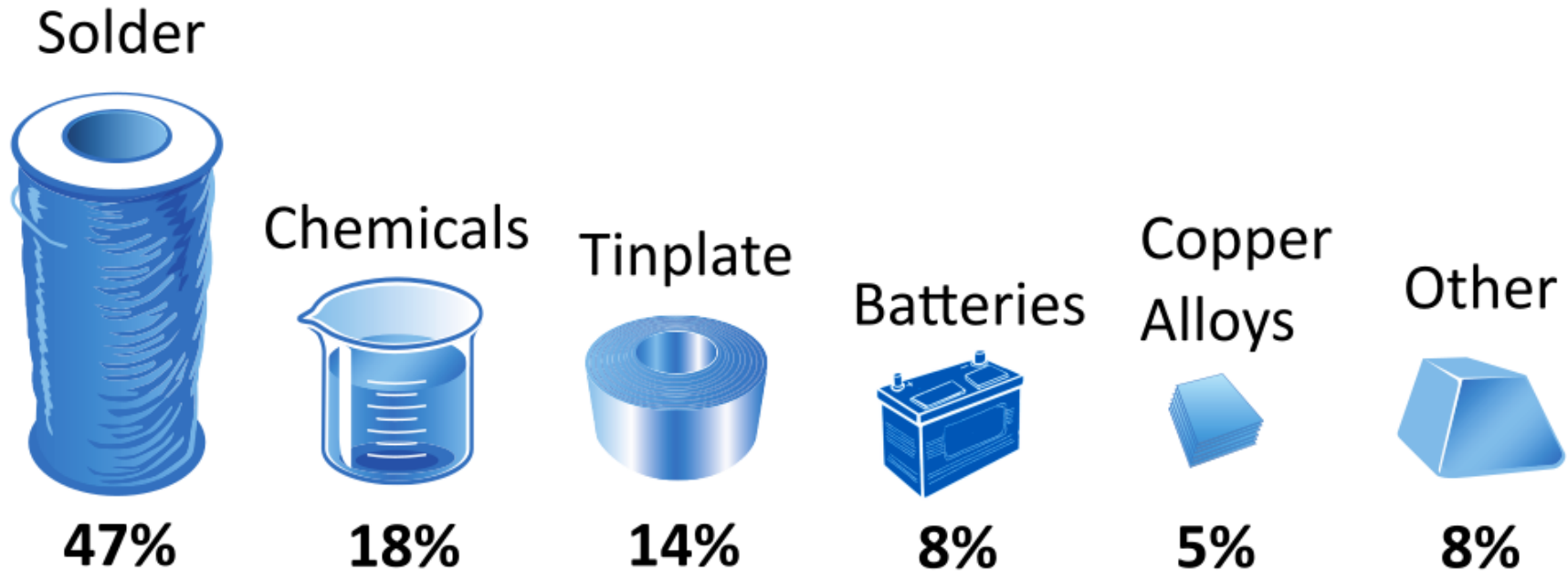
# Market presentation outline

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Tin use growth has stalled in 2018

# Tin use by application

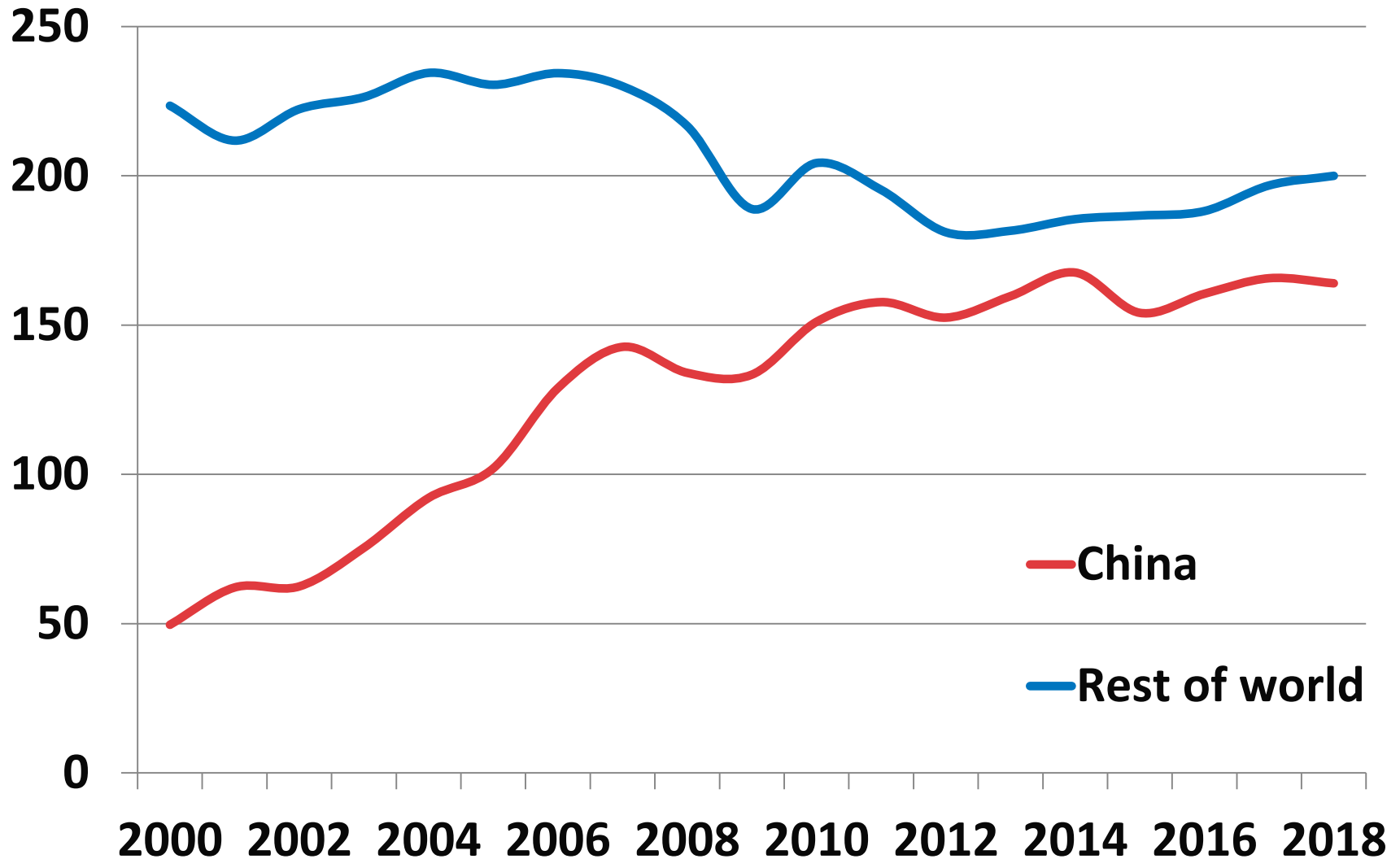


**Total refined tin use in 2017:  
362,500 tonnes**

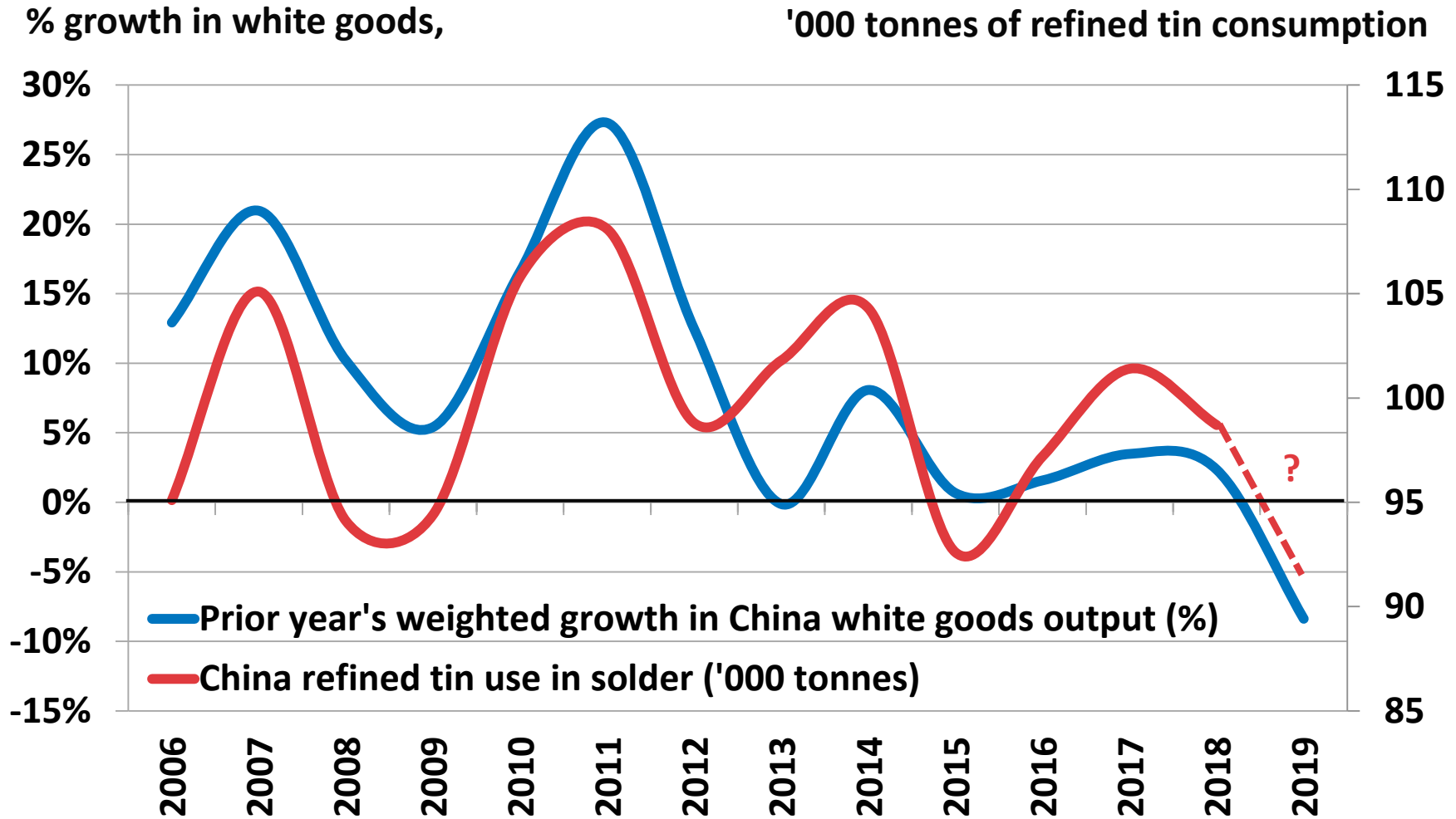


# ROW tin use picks up as China growth stalls

Refined tin, '000 tonnes

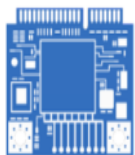


## Solder demand lags electronic white goods output in China



China solder demand to weaken?

## Solder



Electronics and solar panel growth



Ongoing conversion to lead-free solders

## Chemicals

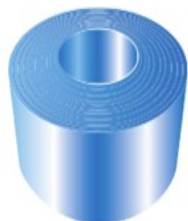


Rising construction demand



New glass coating applications

## Tinplate



Growing demand in emerging economies

## Lead-acid batteries



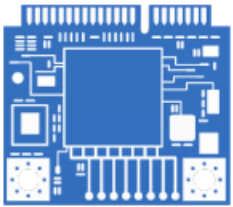
Growing stationary battery demand



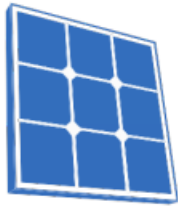
Higher-performance batteries using more tin

# Opportunities in existing applications

# The imminent technology 'supercycle'



Computing and  
robotics



Energy  
generation



Autonomous and  
electric vehicles

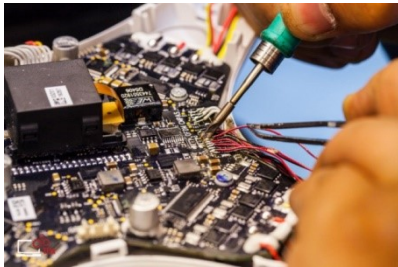
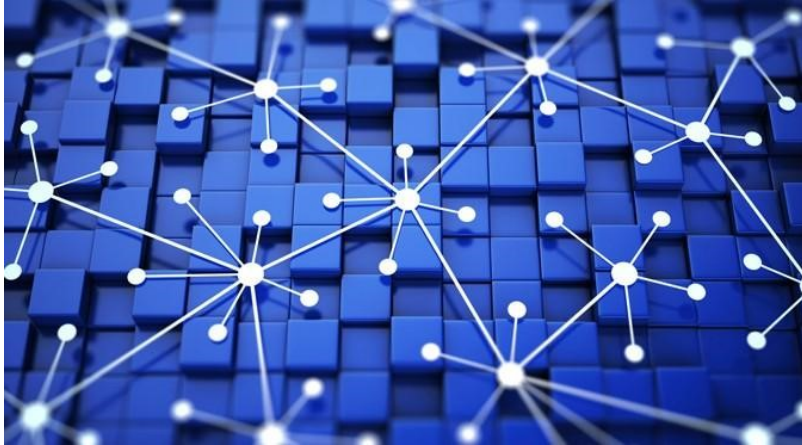


Energy  
Storage



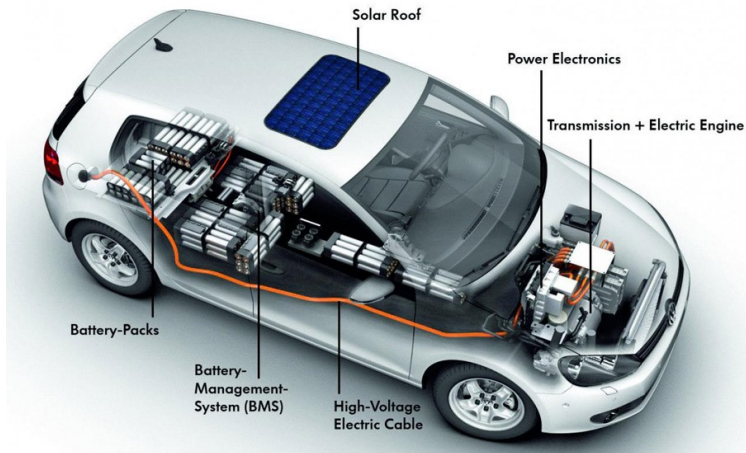
Energy  
Infrastructure

**Energy and technology to drive tin demand  
significantly from 2025**



- ▲ **Increased electronics**
  - Electric vehicles
  - Energy infrastructures
  - Drones \ IoT
  - Robotics
  - Computing \ 5G
- ▲ **Solar cell solders**
- ▲ **Tinned wire & cable**
- ▲ **Tinned connectors**

**Tin connects everything together**



## Zero-emission targets

Transport

Renewable energy

## Tin technologies

Advanced Lead-acid

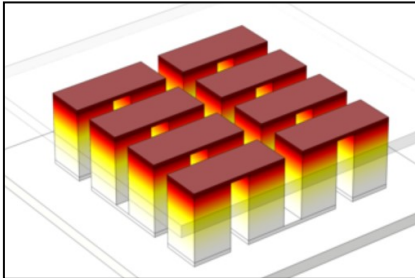
Lithium-ion

Sodium-ion ++

Liquid metal ++

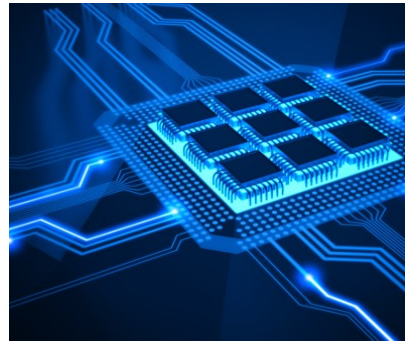
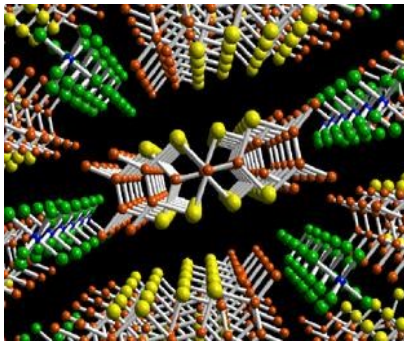
# Energy storage





- ▲ **Solar cell materials**
  - Copper Zinc Tin Sulphide
  - Tin Perovskites
- ▲ **Heat harvesting**
  - Solar heat transfer
  - Thermoelectric materials
- ▲ **Hydrogen tech**
  - Water splitting
  - Fuel cell catalysts
- ▲ **Carbon capture**
  - Tin catalysts

# Energy generation



## ▲ **Conductive films**

Display screens

Solar cells

## ▲ **Semiconductors**

Transparent components

Superconductive

Lasers

Opto-electronics

Sensors

# Electronic materials



# Tin supply outlook

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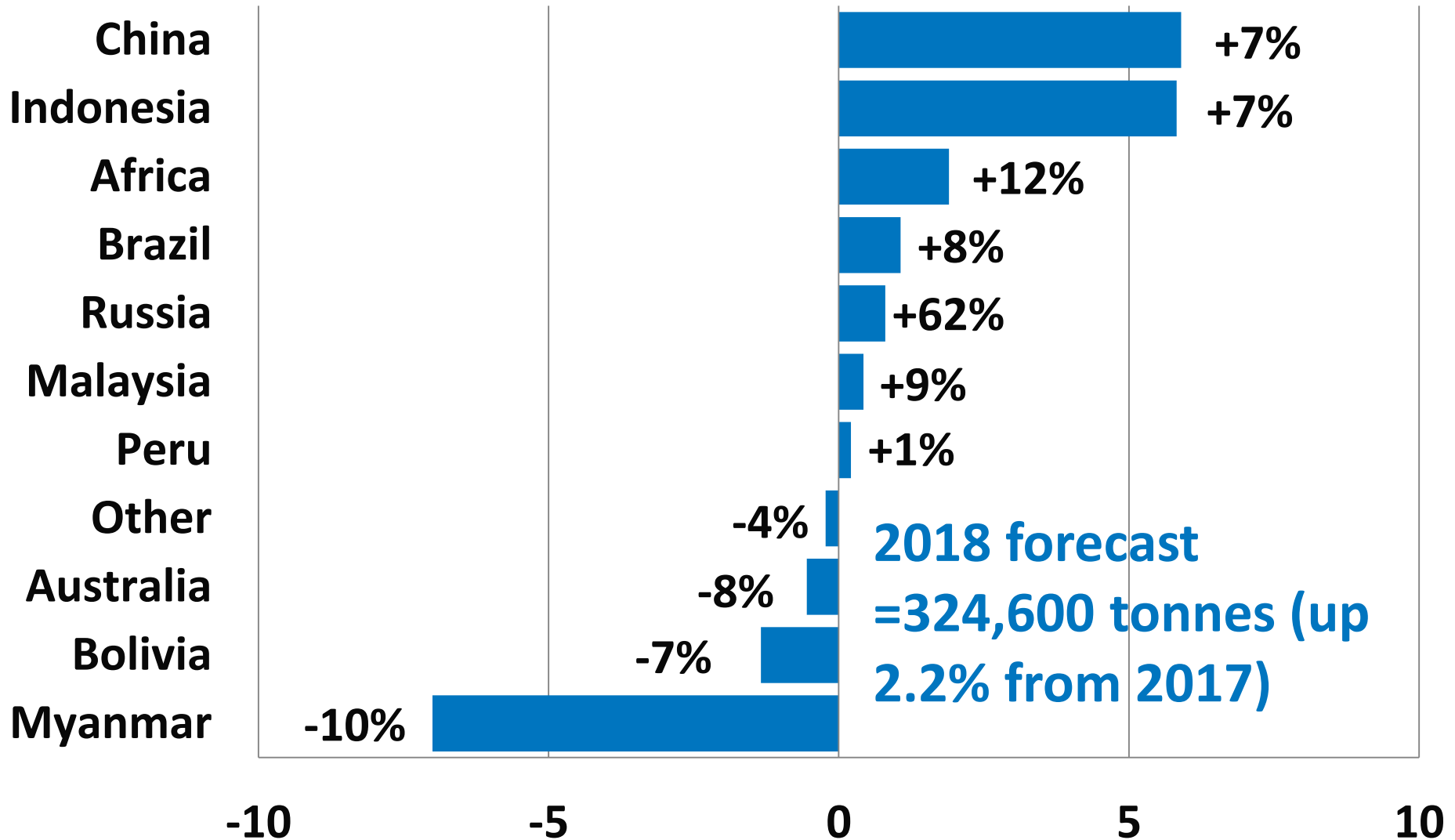
# Where was tin mined in 2017?



*Size of circles proportional to 2017 tin mine output*

# Change in tin mine output, 2018f vs 2017

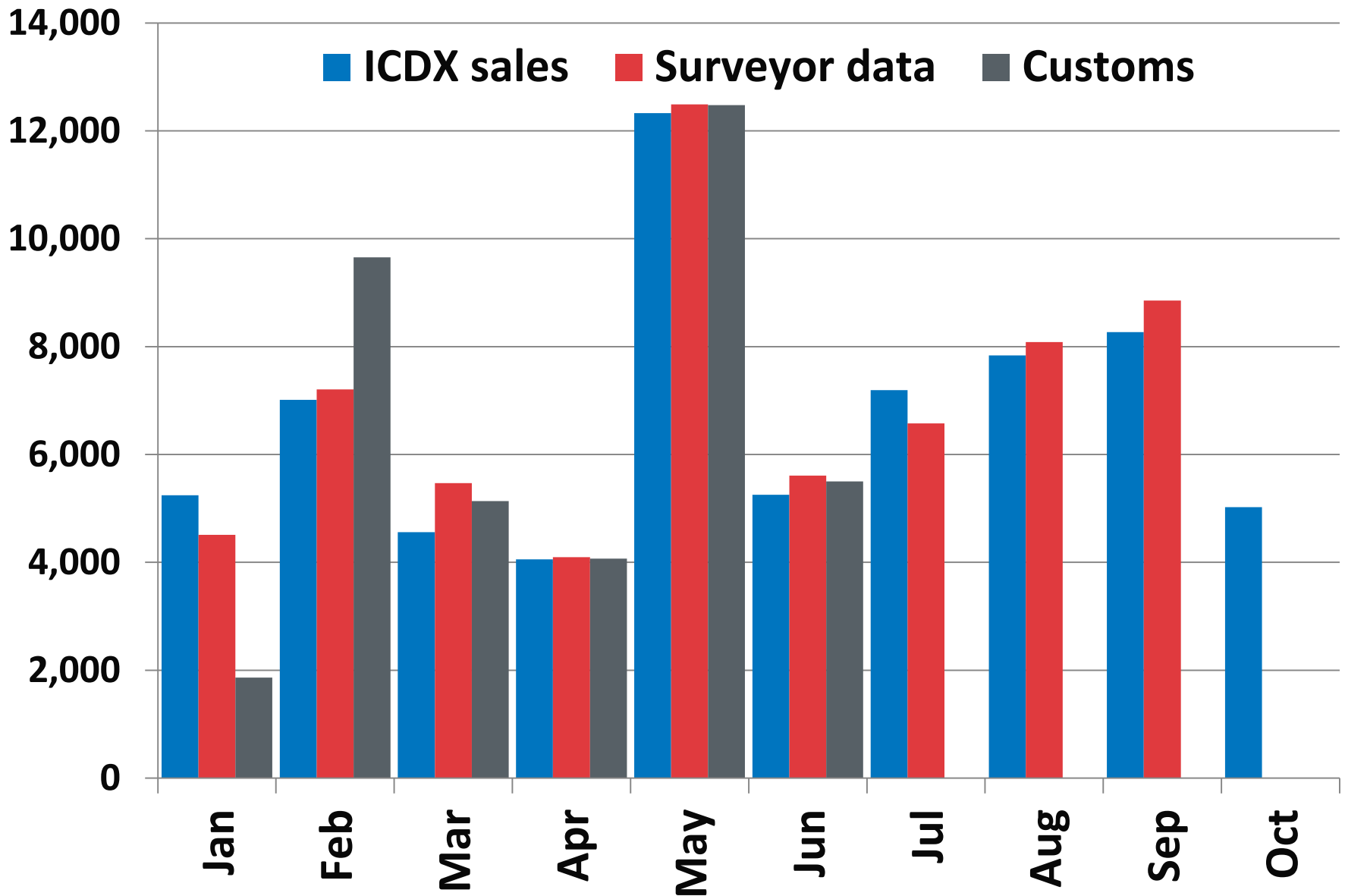
Contained tin, '000 tonnes



**2018 forecast  
=324,600 tonnes (up  
2.2% from 2017)**

# 2018 Indonesian export indicators

Refined tin, tonnes



# Risks for future Indonesian supply



**Regulation and enforcement**



**Currency fluctuation**



**Oil prices**

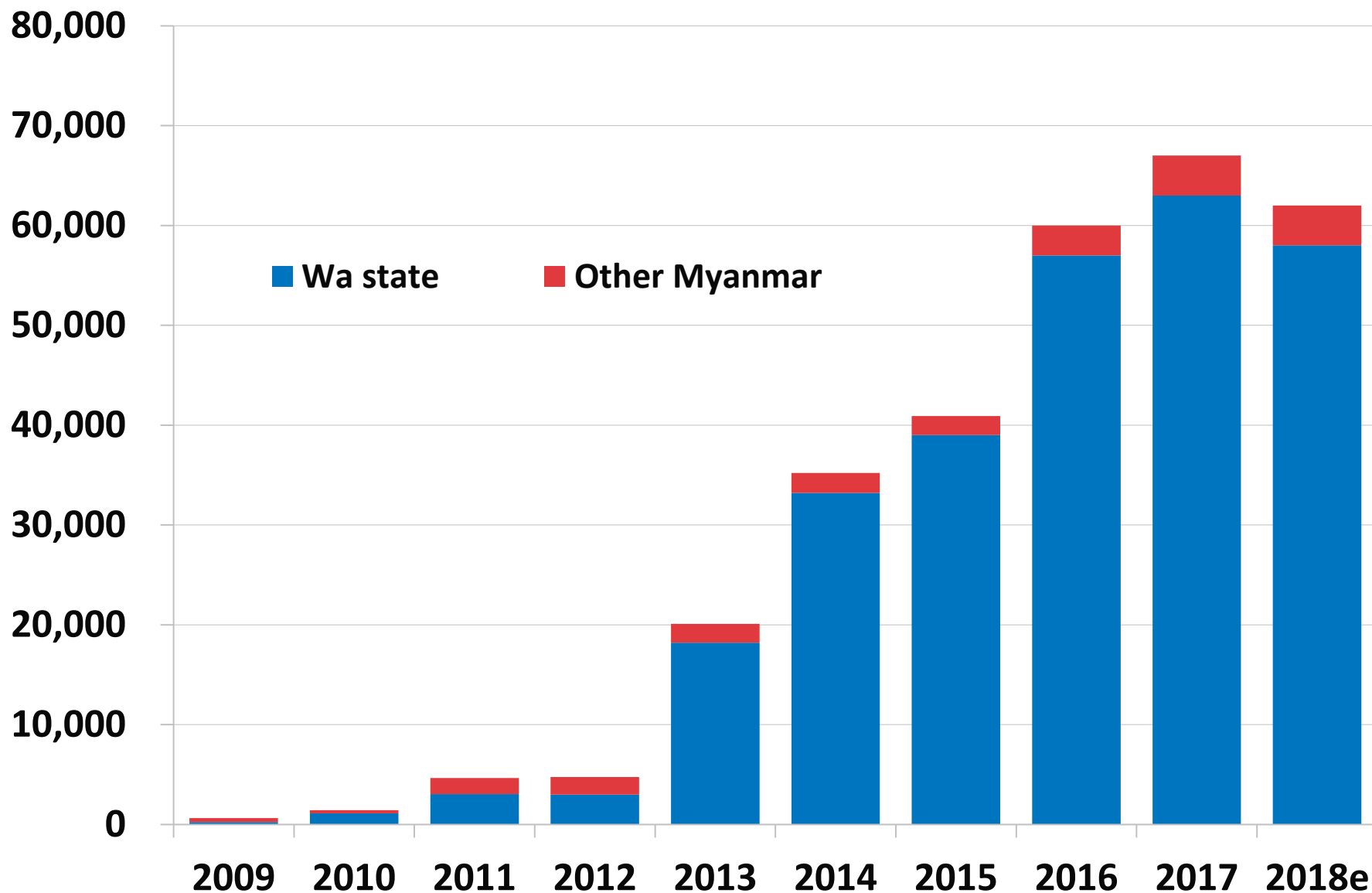


**Resource depletion**

**High-cost marginal tin producers particularly vulnerable**

# Myanmar tin mine output appears to have peaked

Tin content of ore and concentrate, tonnes



# Investments in supply

## Major known new tin projects under construction

(Those > 2,500 tpa)



**Name:** Bisie

**Location:** DR Congo

**Company:** Alphamin

**Projected capacity:** 10,750tpa

**Targeted start date:** mid-2019



**Name:** B2 tailings

**Location:** Peru

**Company:** Minsur

**Projected capacity:** 4,750tpa

**Targeted start date:** late-2019



**Name:** Weilasituo

**Company:** Weilasituo mining

**Location:** Inner Mongolia, China

**Projected output:** 3,000tpa

**Targeted start date:** 2020

**Potential additional 18,500 tonnes of tin mine output per year by 2020 from these projects**





## Current operations

- ▲ San Rafael (Peru) **2016**
- ▲ Renison (Australia) **2018**

## Projects (known examples)

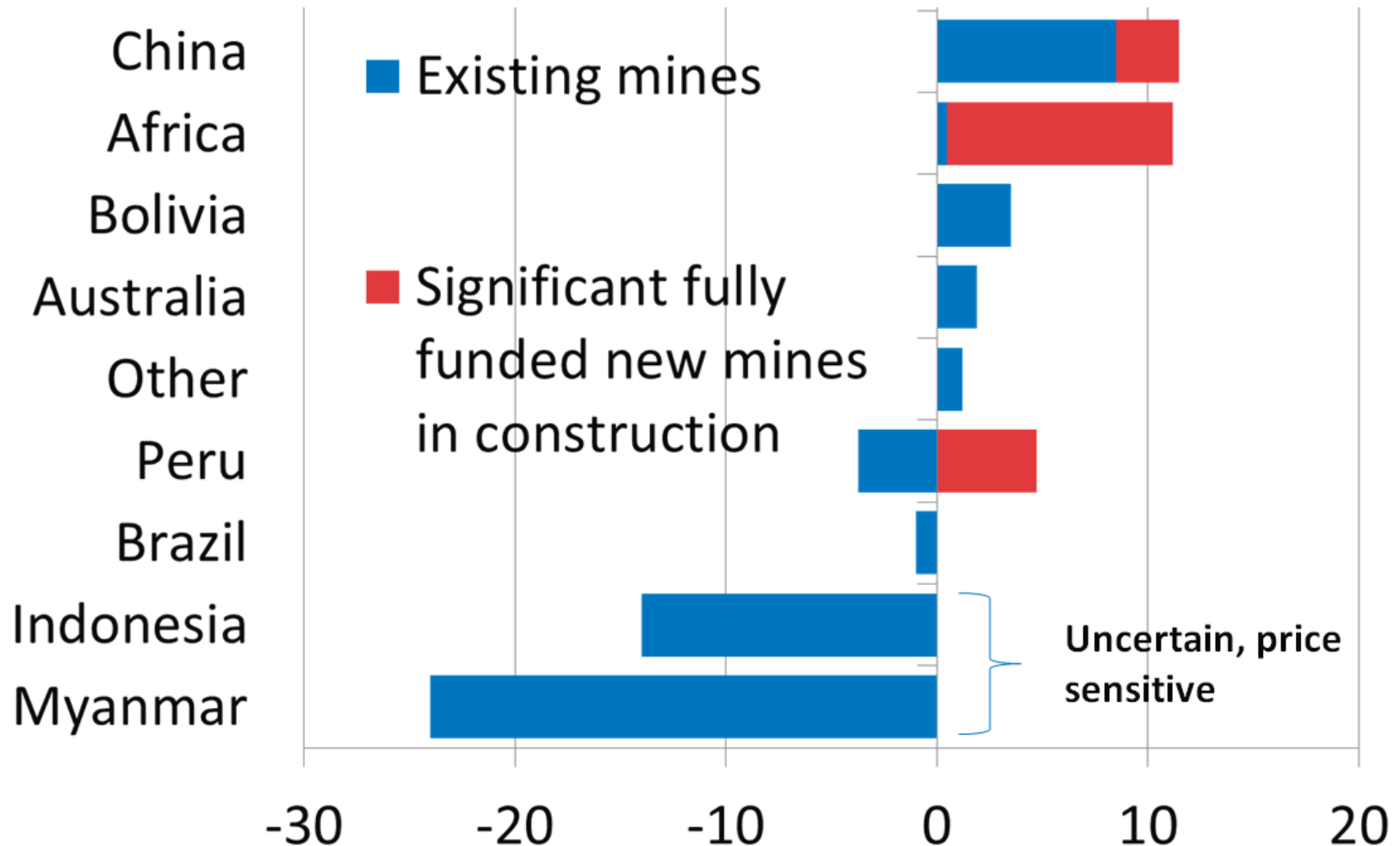
- ▲ Achmmach, Morocco
- ▲ Taronga, Australia
- ▲ East Kemptville, Canada

**Optical ore sorting proliferates**



# Potential changes in mine production – 2022 vs 2018

Change in annual tin mine production, '000 tpy





## Benchmarks and initiatives for responsible tin sourcing due diligence:

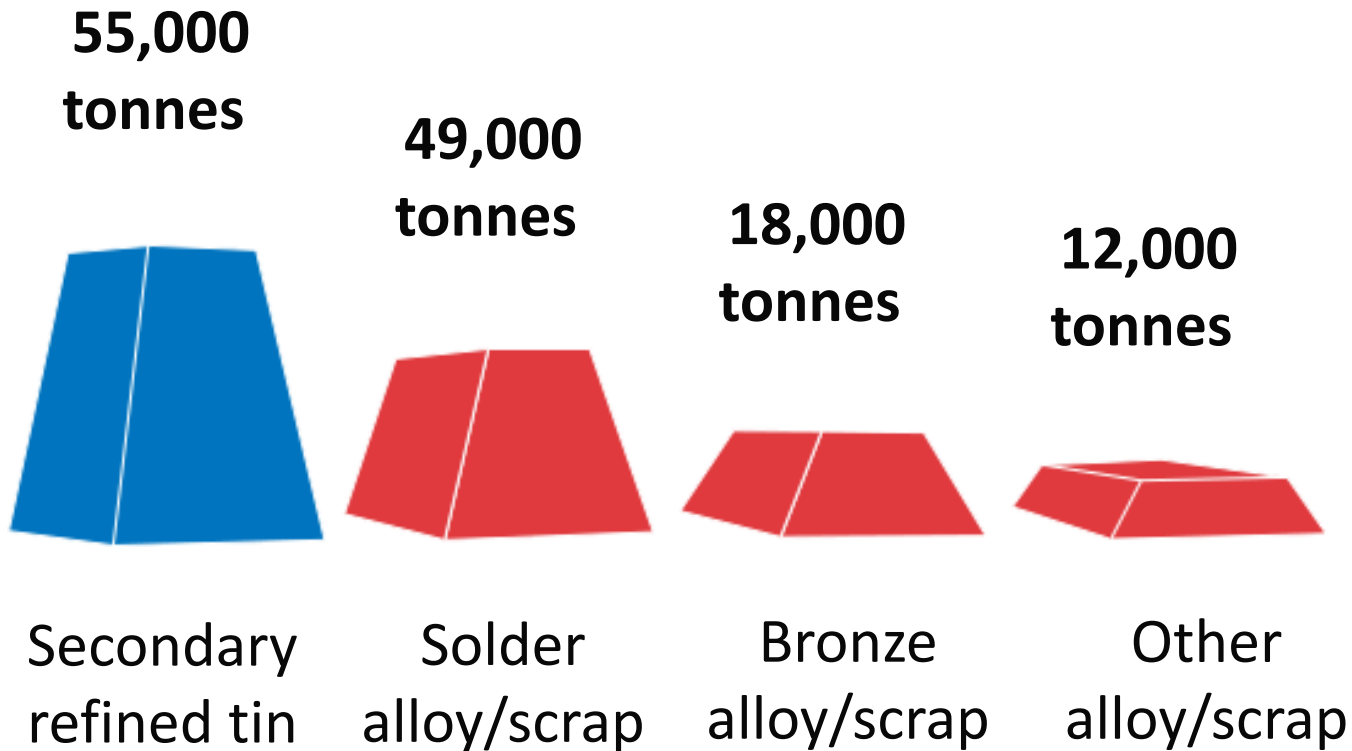


Consumers demanding responsible tin



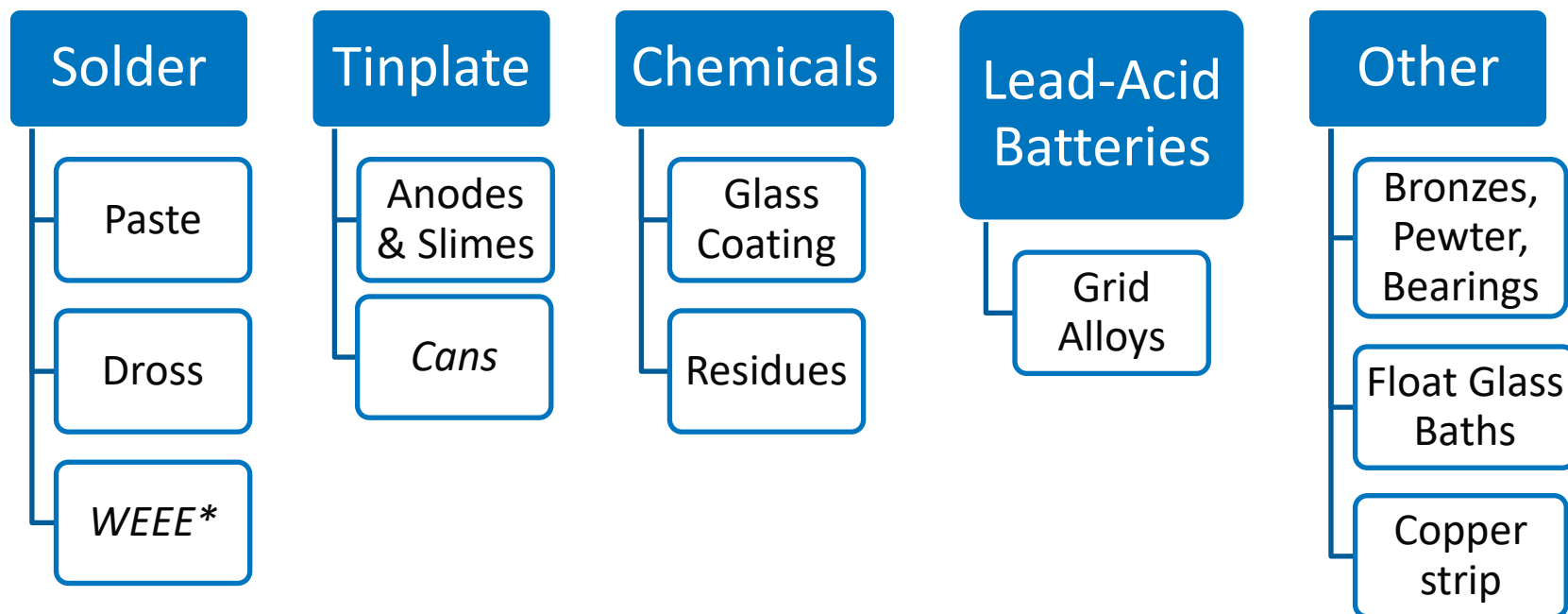
# Tin recycling

**A third of all tin used is from recycled sources:**



2018 estimates for **2017**

# Sources of tin waste for recycling

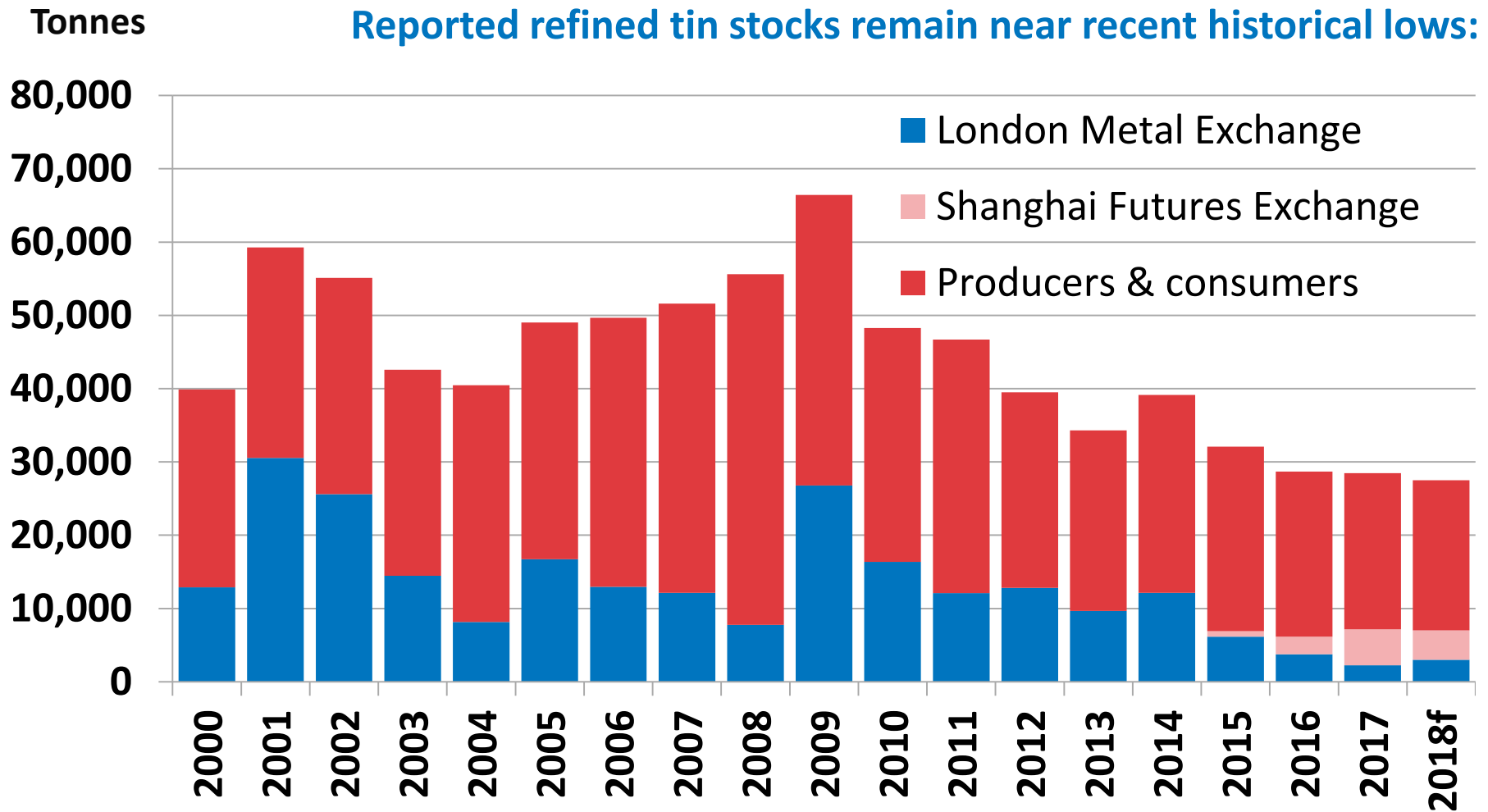


**Downstream manufacturers producing less midstream waste**

\*Waste Electrical and Electronic Equipment

**Tin recycled mainly from production waste**

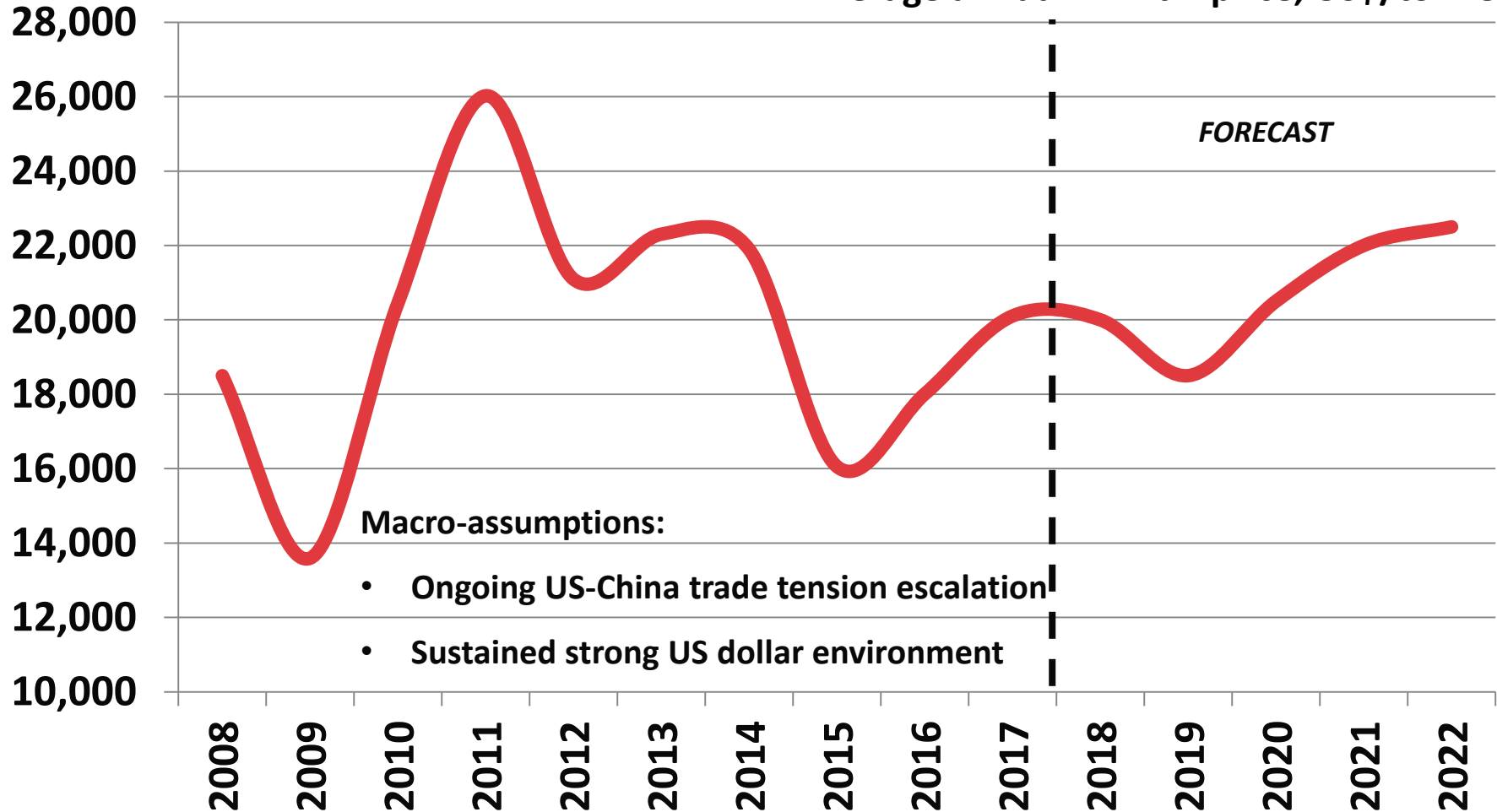
# Reported tin stocks



**Unreported stocks create some uncertainty**

## Medium-term price outlook

Average annual LME tin price, US\$/tonne



Medium-term outlook positive

# Conclusions

1. **Macro-economic developments dragging on tin market**
2. **New investments made in tin supply but risks remain**
3. **Consumers demanding responsible mineral origins**
4. **Consumption slowing in China but stronger elsewhere**
5. **Energy and tech uses to drive future tin demand**
6. **Price outlook weaker in 2019 but positive in medium-term**



## **Uncertainties remain:**

- **Macroeconomics**
- **Invisible stock levels**
- **Myanmar, Africa, Indonesia supply**



2 minutes

**A bright future ahead for tin?**



# Thank You

We believe that global co-operation on markets, technology, sustainability and regulatory issues is the most cost effective route to achieve long-term success for the industry. If we work together effectively then the outlook for tin is very positive.

Global co-operation for long-term success

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