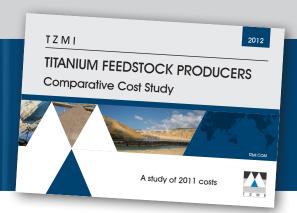


TITANIUM FEEDSTOCK PRODUCERS

Comparative Cost Study 2012

ALL NEW FORMAT AND CONTENT

The essential reference for comparative operating costs in the global titanium feedstock industry.



WHAT INFORMATION IS INCLUDED?

A persistent difficulty with cost studies is establishing an appropriate methodology to use for consistent comparisons of different producers. A successful methodology must take into account variations in the nature of resources, operations and products. During the past 10 years, TZMI has developed a methodology that is both suitable and highly regarded as the best in the industry.

This study provides:

- A detailed explanation of TZMI's methodology employed to maintain consistent comparisons of operating costs across the entire titanium feedstock industry.
- · Informed discussion about the parameters used for comparing relative competitiveness in the industry.
- · Updated cost data for the industry from information and research garnered during the previous year.
- · Commentary on the importance of co-product credits in the current market conditions (pig iron and zircon).
- · Discussion on increasing operating costs, specifically energy and mining costs.
- · An analysis of the effect of exchange rates on producer performance.
- · An updated titanium feedstock industry cost curve for 2011 – an invaluable tool for evaluating both existing operations and measuring the potential of new projects.

Titanium Feedstock Producers Comparative Cost Study

A\$17,500 excluding GST. For Australian subscribers, 10% GST will be added to the listed price.

WHAT DO YOU RECEIVE?

TZMI's Titanium Feedstock Producers Comparative Cost Study 2012 is now in its 11th edition and in a revamped electronic format. This edition continues to review cost versus revenue analysis for producers across the feedstock sector.

WHO SHOULD BUY THIS REPORT?

This is an essential resource for all industry participants. This report is suitable for anyone wanting to maintain an up to date perspective of all elements of the industry, including:

- · New and established mineral sands producers
- TiO₂ pigment producers
- · New entrants to the industry
- · Financial industry (fund managers, hedge funds, investors and potential investors)



TABLE OF CONTENTS

EXECUTIVE SUMMARY

METHODOLOGY

Introduction

Operations included in the study: 2011

TITANIUM FEEDSTOCK MARKET FUNDAMENTALS

Titanium feedstock demand: 2009-2011

Titanium feedstock supply overview: 2009-2011

Titanium feedstock pricing: 2005-2011

COST AND PROFITABILITY CURVES

Mineral production operations

Mineral production costs

Ilmenite beneficiation costs

Total cash cost oif production

INDUSTRY COMPETITIVENESS

R/C ratio curves 2011

Industry cash margin alaysis 2011

COST OF DEVELOPMENTS

Cost of mineral production

Ilmenite conversion costs for slag producers

FACTORS AFFECTING RESULTS

Factors affecting R/C ratio

Co-product revenue

Labour costs

Feedstock pricing development

Exchange rates

Energy prices

DEFINITIONS

Key principles

Definitions

TABLES

Operations included in 2011 comparative cost study

Proportion of global production (by product): 2011

Weighted average traded product prices: 2010 and 2011

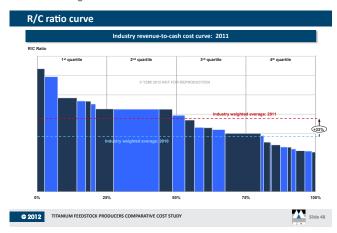
Top 10 titanium feedstock producers in 2011 (TiO₂ units)

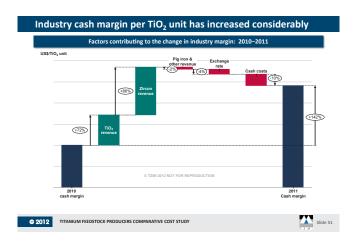
Ore production summary for 24 operations

Summary cash cost of mineral production by producer group: 2011

Summary cash cost for ilmenite beneficiation: 2011 Quartile for the R/C ratio curve: 2010 and 2011

Factors affecting R/C ratio





FIGURES

Titanium minerals and zircon production by region: 2011

Share of global production (in TiO, units)

Location of operations

Feedstock imports by region 2011

Feedstock demand by end-use: 2009-2011 Titanium feedstock production: 2009-2011 Global weighted price average: 2005-2011 Global weighted price average: 2010 versus 2011

Ore mined: 2011

Cash cost per tonne HMC

Cash cost of HMC production by region: 2011
MSP cost per tonne of product: 2011
MSP cost by producer group: 2010-2011
Cash cost per tonne of product: 2011
Average cash cost per tonne of product: 2011

Average cash cost per idine of product: 2011 Average cash cost per ilmenite TiO₂ unit: 2011 Ilmenite conversion cash cost: 2011

Average conversion and beneficiation costs Comparison of ilmenite conversion costs

Cost of total operation: 2011
Proportion of transport costs: 2011

Total transport costs per TiO₂ unit: 2011

Average cash cost per TiO₂ unit in 2011 (all products)

Industry revenue-to-cash cost curve: 2011 R/C ratio curve by producer: 2011 R/C ratio curve: 2011-2011

Factors contributing to the change in industry margins: 2010-2011

Cash margin per TiO₂ unit: 2011 Cash margin by producer type

Change in slag producers cash margins: 2010-2011 Change in SR producers cash margins: 2010-2011

Change in chloride ilmenite producers cash margins: 2010-2011 Change in sulfate ilmenite producers cash margins: 2010-2011

Average cash cost per TiO₂ unit: 2009-2011 Ilmenite conversion cost: 2009-2011

Pig iron monthly import prices into China: 2007-2012

Bulk zircon export prices: 2007-2012

Monthly pig iron import prices into China: 2009-2011 Value per tonne or ore mined vs volume mined: 2011

Labour cost index for major feedstock producing countries: 2005-

2011

Titanium feedstock prices: 2007-2011

Exchange rates trends for selected currencies: 2004-2011

Electricity price indices for selected countries



ABOUT TZMI

TZ Minerals International (TZMI) is a global, independent consulting and publishing company with offices in Australia, the US, Europe, Africa and China. The strength of TZMI's consulting services stems from extensive practical experience in the mineral sands, titanium dioxide and coatings industries and from a comprehensive database, which has been built up over many years.

TZMI has proven expertise gained from our consultants having many years of direct operating experience in the industry at chief executive, senior operational, analytical and marketing roles. TZMI's publications and data services support the consulting activities and ensure up-to-date, high quality and comprehensive data, analysis and information across the mineral sands, zircon and TiO₂ pigment industries.

TZMI provides operational and technical expert advice on many areas including:

- · Mergers and acquisitions
- · Market assessments and industry analysis
- · Due diligence
- Pre-feasibility studies incl. preliminary capital and operating cost estimation
- · Competitive cost analysis and benchmarking
- · Technical reviews and audits
- · Resource assessments
- · Physical separation test work
- · Flowsheet development

Diners

Total Value \$

· Customised data analysis and reporting.

ORDER FORM

Email completed form to marketing@tzmi.com or fax to +61 8 9359 6050.

Visa

Mastercard

	Price excluding GST	Qty	Amount
Titanium Feedstock Producers Comparative Cost Study 2012: A study of 2011 costs	A\$17,500		\$
			\$
Australian subscribers: To apply 10% GST enter Qty purchased in section opposite	GST		\$
	Total		\$

Amex

PAYMENT OPTIONS

Credit Card

Credit Card (option available for all subscribers)

Expiry Date			Card	d No.																	Security Code				
Cardholders Name											Cardholders Signature														
All Subscribers							A	Australian Subscribers																	
Electronic Funds or Telegraphic Transfers: ANZ Bank International Services, Australia Account Name: TZ Minerals International Pty Ltd BSB: 016 498 Acc No: 2555 45838						Cheque: Payable to TZ Minerals International Pty Ltd Mail cheque and Order Form to: TZ Minerals International Pty Ltd PO Box 1252, Victoria Park East WA 6981																			
Swift: ANZBAU3M Ref No: Purchaser name and invoice number							Ir	International Subscribers																	
									Bank draft drawn on US Bank by airmail: TZ Minerals International Pty Ltd PO Box 1252 Victoria Park East WA 6981 Australia																
		_																							

CC	NIT	AC 1	DE	TA	1 9
CC	ו אנ	AC I		IA	LO

Name	
Position Con	mpany
Postal Address	
Telephone () Fax () Mobile/Cell ()
Email	Website