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ECONOMIC CONSULTING

Impact of ceasing sand mining on North Stradbroke Island

Updated Report for Sibelco

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Key findings

Sibelco has requested Synergies Economic Consulting (Synergies) to update its November 2011 assessment of the contribution of mining to the North Stradbroke Island (NSI) economy and community. Data for this update was provided by Sibelco.

To assess the importance of mining activity on NSI to the local economy, this report examines the impact on NSI should all mining operations cease.

It is estimated that the economic impacts from the cessation of mining will:

- result in direct revenue losses of around $180.4 million per year of which approximately $114.05 million represents value added
- directly reduce the GRP of the island by between 29% and 32%. The total impact will be greater because of the high degree of integration of mining with the rest of the economy
- directly reduce employment by up to 14.6% (130 FTEs) and a further 17% from consequential flow-ons (151 FTEs) as well as additional direct job losses in South-East Queensland (61 FTEs).
- reduce royalties paid to governments by between $60-80million over the life of the mine.

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1 Introduction

Sibelco has requested Synergies Economic Consulting (Synergies) to update its November 2011 assessment of the contribution of mining to the North Stradbroke Island (NSI) economy and community. Data for this update was provided by Sibelco.

To assess the importance of mining activity on NSI to the local economy, this report examines the impact on NSI should all mining operations cease. It identifies the impacts on the value of production, incomes, employment and revenues received by governments. Impacts are estimated both for the direct impacts of a cessation in operations by Sibelco, and the flow-on or indirect impacts on other NSI industries. The indirect impacts are supported by an analysis of the relevant inter-industry linkages in the NSI economy as well as its links with the rest of South-East Queensland.

The report is structured as follows:

- section two updates local economic data
- section three describes the direct economic impacts of ceasing mining activity
- section four describes the indirect economic impacts
- section five outlines the conclusions of the analysis.

2 Background

2.1 Mining on NSI

In 2010-11 Sibelco produced 526,000 tonnes of heavy mineral sands and silica. The heavy sand and silica were used in domestic manufacturing and exported.

In our November 2011 study, we based the value of production on a 5 year average. In 2013 Sibelco has advised that it expects the annual value of output to be approximately $180.4 million and has requested that the impacts be reassessed at the higher value.

2.2 Updated regional economic data

2.2.1 Population

As at the 2011 census, the population of NSI was 2,032 persons, down from 2,121 persons in 2006. The main NSI population centres are Dunwich, Amity and Point Lookout.

2.2.2 Employment

Since the 2006 Census there has been some notable changes in the employment profile of NSI. The total labour force has dropped by 6% to 890. The share in the percentage of the population aged 15 years or more has dropped from 55.9%to 54.2%. The percentage of those employed full time has fallen to 51.6%. Unemployment has risen from 2.6% to 6.4%.

These changes in some ways reflect the general downturn in labour market conditions in Queensland in recent years but they are greater than the changes recorded for the Redlands district as a whole. The most likely cause of this is as a reaction to the uncertainty regarding the mining industry and the impact that has had on the economy of the region.

Table 1 Employment profile, persons aged 15 years and over, 2011

	North Stradbroke Island			Redland City Council	
	2011 (Number)	Per cent of Labour force	Per cent of Total pop. >15 years	Per cent of Labour force	Per cent of Total pop. >15 years
Full time	459	51.6		60	
Part Time	354	40.9		32.8	
Not stated	10	1.1		1.9	
Total Employed	823	93.6		94.6	
Total Unemployed	57	6.4		5.46	
Total in labour force	890	100	54.2	100	65
Total not in labour force	633		38.4		31.3
Not Stated	120		7.4		3.7
Total pop. (>15 years)	1,643		100		100

Source: ABS Census of Population and Housing 2011

2.2.3 Industry structure

Table 2 contains our current estimates of the industry of employment for NSI and compares these to the corresponding data for RCC and Queensland as a whole. Census results for 2011 are not available at the NSI level of disaggregation but they are for Queensland as a whole. To obtain the estimates for NSI shown in table 2, we assumed that the employment share ratios established between NSI, RCC and Queensland in our earlier report (Synergies (2011)) were maintained and used the small shifts in the Queensland proportions to adjust the NSI and RCC data .

While it is highly unlikely that much in the way of variation in these percentages would have taken place in the period between the reports it is necessary to note that the data in Table 2 for NSI are best estimates rather than verified ABS data. Our estimates underestimate the importance of mining employment to NSI.

Sibelco reported to us that post 2016[1] it will have between 120 and 140 employees on NSI significantly more than our estimate of 120 for 2011. Our impact analysis adjusts the size of the mining workforce in our input-output model to equal 130, the midpoint of the range provided by Sibelco.

[1] In late 2015 the Yarraman operation on NSI will cease reducing employment. It is expected that employment will fall a year later after decommissioning and rehabilitation work is completed.

NSI industries with significantly higher employment shares than the RCC and Queensland are Mining, Wholesale Trade, and Accommodation and Food Services (Table 2). NSI industries with a significantly lower industry share are Manufacturing and Retail Trade.

Table 2 Comparative industry structure by employment, 2011 Census

	NSI	Industry share of employed (Per cent)		
	Employed (Number)	NSI	RCC	Queensland
Agriculture, Forestry and Fishing	26	3	0.9	2.7
Mining [a]	120	13.5	0.7	2.6
Manufacturing	18	2	9.4	8.4
Electricity, Gas, Water & Waste Services	3	0.3	0.6	1.2
Construction	86	9.6	8.1	9.0
Wholesale Trade	87	9.8	4.6	3.6
Retail Trade	8	1	17.2	10.7
Accommodation and Food Services	139	15.6	7.7	7.0
Transport, Postal and Warehousing	34	3.8	3.2	5.3
Information Media & Telecommunications	6	0.6	1.3	1.2
Financial and Insurance Services	8	1	2.1	2.7
Rental, Hiring and Real Estate Services	18	2	2.7	1.8
Professional, Scientific & Technical Services	27	3	4.6	6.5
Administrative and Support Services	41	4.7	3.0	3.2
Public Administration and Safety	54	6	4.7	6.5
Education and Training	73	8.2	9.8	7.9
Health Care and Social Assistance	87	9.8	11.9	11.9
Arts and Recreation Services	17	1.9	1.1	1.4
Other Services	19	2.1	4.5	3.9
Inadequately described or Not stated	19	2.1	1.2	2.4
Total	**890**	**100.0**	**100.0**	**100.0**

Source: ABS Census of Population and Housing 2011 and Synergies estimates..

A Sibelco reports that its resident workforce is now 145, almost 15% greater than reported in the 2011 census.

Note: 'Employed, worked full-time' is defined as having worked 35 hours or more in all jobs during the week prior to Census Night.

2.2.4 Occupational profile

NSI's occupational profile does not appear to be dramatically different to the profile for RCC (Table 3). Occupations with a notably higher share in NSI are Technicians & trade workers, Intermediate production & transport workers, and Labourers & related workers. Intermediate clerical, sales & service workers make up a significantly smaller

share of the NSI labour market, consistent with the employment data showing that the retail sales industry accounted for a significantly smaller share of industry economic activity on NSI.

Table 3 Occupational profile, 2011 NSI

	NSI	Occupational share (%)	
Occupation	**persons employed (Number)**	**NSI**	**RCC**
Managers	126	14.2	12.3
Professionals	117	13.1	16.2
Technicians & trades workers	126	14.2	16.4
Community & personal services workers	111	12.5	9.6
Clerical & administrative workers	92	10.3	17.3
, sales & service workers	53	6.0	10.6
Machinery operators and drivers	89	10.0	6.2
Labourers & related workers	126	14.2	9.0
Inadequately described/not stated	50	5.6	1.6
Total	**890**	100.0	**100.0**

Source: ABS Census of Population and Housing 2011 adjusted to fit in labour market totals.

3 Direct impacts

3.1 Value of production and Value adding

A full year of lost production is expected to forgo $180.4 million in revenue of which approximately $114.05 million represents direct value added.[2]

The NSI Non-linear model estimates the total net value of economic production on NSI at between $357 million and $400 million.[3] Ceasing sand mining would reduce the value of economic production by between 29% and 32%.

However, the impact of any closure of the sand mining operations is magnified due to by the integration of mining with the rest of the economy. These indirect effects are presented later in this report.

3.2 Employment

The workforce in sand mining is split between those employed on the island 130 and those employed on the mainland 32.[4] The industry accounts for approximately 14% of total employment on NSI but a smaller percentage of total employment on the mainland.

3.3 Public finances

Sibelco has recently advised the Queensland Government the Enterprise Mine on NSI could yield from $60 to $80 million in royalty payments over the period 2014-2035. The exact revenue yield cannot be precisely stated because it is varied with the market price

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[2] This represents the value of output net of raw materials and operating costs. It is akin to GDP in a National Economy.

[3] This level of value adding corresponds to a value of output in the range $516-693 million per annum. This is a fairly wide range and allows for estimation error. Estimation error is likely because the only industry for which solid data are available for updating the table from the previous study is the mineral sands mining. It would be impractical and potentially misleading to attempt a RAS adjustment on the whole NSI table basis of changes in one industry. Therefore the adjustments from our earlier estimates of GRP are based on a known increase in Mineral Sands and projected indirect increases in value adding based upon the relationships established in the first North Stradbroke non-linear table. This procedure has two problems as a means of estimating the total value of the economy. First, it is not clear what proportion of the increase in the value of mineral sands is driven by price effects or by production effects such as increased production or increased productivity. Second, we also have no specific data on any significant changes (or revaluations) in the other sectors of the economy. For these reasons the estimates of the total size of the North Stradbroke economy should be seen in the light of the simplifying assumptions made and used only as a guide.

[4] Sibelco provided a range for mainland employment of .30 -35. We adopted a midpoint of 32 in our analysis.

of mineral sand and the Australian US dollar exchange rate. This estimate is lower than our previous update which reflects reduced production levels.

4 Flow-on impacts

4.1 Direct and flow-on impacts

The revenue from annual production ($180.4 million) was used as the exogenous shock to the NSI nonlinear model to estimate the total economic impacts.

The key results are:

- a reduction in gross output/turnover of $333.7 million annually;
- a reduction in Gross Regional Product (GRP) of $212 million annually;
- reduced factor incomes of $161 million annually;
- a potential loss of 281 jobs from the NSI economy; and
- additional job losses of 61 FTE in South-East Queensland.[5]

The table below reports the direct, flow-on and total impacts. The impacts on suppliers to Sibelco are shown as flow-on industry effects. Finally the reduced activity also impacts households who have reduced income and therefore reduced total consumption. This is shown as the flow-on consumption effect. The sum of the industry and consumption effects is the indirect economic impacts.

Table 4 Total economic impacts $ million per annum[6]

Indicator	Direct impact	Flow-on Industry Effects	Flow-on Consumption Effects	Total
Gross Output	180.4	65.7	87.6	333.7
Value Added	114.6	41.7	55.7	212.0
Factor income	90.6	18.3	52.1	161.0
Employment(Stradbroke)[7]	130	54	97	281

[5] The additional job losses were estimated outside the model with an appropriate employment multiplier, based on the mainland employment reductions likely for Sibelco if sand mining were to cease on NSI.

[6] In comparison to the results in our earlier study, the impacts across the categories of turnover, value added, factor income and employment have all increased to reflect the increased value of mineral sands production, however there has been a greater than proportional increase in turnover and value added flow on and a less than proportional increase in factor income and employment. This is a typical (and realistic) feature of non-linear models and in this case reflects the assumption of constant direct employment. This means that most gains flow turnover (output) and non-wage value adding

Indicator	Direct impact	Flow-on Industry Effects	Flow-on Consumption Effects	Total
Employment (S. E Qld)	32	11	18	61

Source: Estimated from NSI Non-linear Model (2013)

These losses are permanent unless another activity can replace the economic value created by sand mining. The economy's heavy dependence on sand mining is evident from its high proportionate share of GRP, which in the short run, will be taken out of the local economy.

In terms of GRP (value added), the loss will be between 53% and 59% of current levels. Job losses will also be heavy with total employment on the Island potentially reducing by approximately 31.5%, and approximately 61 job losses elsewhere in South-East Queensland.[8]

Structural change in economies is a naturally occurring event in which new industries replace existing ones. The crucial factor however in initiating successful structural change is to integrate the reduction in the importance of one industry with the emergence of replacement activity.[9]

Table 5 shows the distribution of indirect employment and value-adding impacts across other industries (for the whole of Queensland).

Table 5 Percentage distribution of indirect employment losses from cessation of sand mining by sector

Sector	Employment (per cent)	Value added (per cent)
Agriculture	1.5	1.5
Manufacturing	16.5	13.5
Utilities	10.5	10
Construction	14	14
Trade	15.5	14.5
Transport &Communications	14	13.5
Tourism	2.5	3
Finance& Business Services	9.0	7.5
Education & Training	5	6.5
Health & Social Services	4	5.5

7 Based on midpoint of expected workforce

8 Post 2016

9 We refer to our previous report which assessed that there was no likelihood of a replacement industry emerging (or an existing industry expanding) to offset these losses.

Sector	Employment (per cent)	Value added (per cent)
Arts & Recreation Services	2	3
Personnel Services	2	3
Other	4	4.5
Total	*100*	*100*

Source: Derived from NSI non-linear model (2013)

Almost all indirect employment and value-added losses occur in manufacturing, trade, construction, transport and communications and utilities as a direct result the linkages between these sectors and the sand mining industry or their suppliers.

5 Conclusions

This report has revised our 2011 estimate of the potential economic impact of ceasing sand mining on NSI.

The population of NSI is highly dependent on sand mining for employment and income. Sibelco is the major employer on NSI. Direct employment in mining accounts for a much larger share of total employment than it does in Redland City Council or Queensland as a whole.

It is estimated that the economic impacts from the cessation of mining will:

- result in direct revenue losses of around $180.4 million per year of which approximately $114.05 million represents value added
- directly reduce the GRP of the island by between 29% and 32%. The total impact will be greater because of the high degree of integration of mining with the rest of the economy
- directly reduce employment by up to 14.6% (130 FTEs) and a further 17% from consequential flow-ons (151 FTEs) as well as with additional direct job losses in South-East Queensland (61 FTEs).
- reduce royalties paid to governments by between $60-80 million over the life of the mine.

Overall, reductions in GRP on NSI are estimated to range from 53% to 59% of current levels. Job losses on NSI would also be heavy with total employment potentially reducing by 31.5%. These are continuing losses until other activity moves into to take the place of sand mining.