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ANALYSIS OF THE POTENTIAL OF THE IRON ORE SMELTER INDUSTRY IN WEST SUMATRA IN THE DEVELOPMENT OF THE NATIONAL IRON INDUSTRY

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Abstract

Iron ore is one of the most sought-after mining materials because of its high economic value, the potential for primary iron ore (ironstone) in West Sumatra is quite large, does this potential have a large quantity of raw material and the quality of its metal content is of good quality and how is the impact of West Sumatra smelter production? for future consumption, production, and import of national iron ore. This research method uses a literature review of various iron ore mining companies, district and provincial mining and energy offices, government regulations, ministerial data, and others related to industrial smelter development planning. Analysis of the quantity and quality of ironstone resources (primary iron) in terms of the amount and content of metal content of ironstone mining minerals (primer iron), analysis of supporting factors for the smelter industry, and analysis of the impact of projected output from the smelter industry on the needs of consumption, import, and production of iron National, using Least Square linear regression. The research results show that the quantity of primary iron ore (ironstone) reserves in 32 iron ore mining companies in West Sumatra, has several raw material stocks: Tereka MT indicated MT, Measured MT, Estimated MT, and Proven MT with the amount of raw material stock. primary iron ore (ironstone) reserves are enormous. Meanwhile, the quality of primary iron ore (ironstone) reserves has an average content of iron (Fe) and good quality Fe203, above fifty percent. Energy resources and road and port infrastructure support smelter construction. The projected impact of West Sumatra smelter production in 2022-2030 has a significant impact on the consumption and import needs of iron in Indonesia.

Keywords: consumption, production, import, smelter, ironstone

INTRODUCTION

It cannot be denied that mining is a very important and strategic commodity in encouraging national economic growth. However, mineral resources in the Indonesian homeland lack economic benefit value and have added value if further processing has not been carried out. If mineral mining goods are carried out, processing operations will be able to provide many benefits, including multiplier effects, including regional, social and economic benefits. Regional and economic benefits are derived from the sale of

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mineral processing output and the creation of new infrastructure in the region as well as social benefits through community innovation and the creation of a workforce. The exploitation and management of mineral mining goods should receive serious attention because it has a multiplier effect in the future so that its use must be carried out in maximum planning. Mineral resources in the country do not have added value because the majority are exported in the form of raw materials. Like it or not, it is time to pay serious attention to increasing the added value of mineral mining goods in the Indonesian homeland because this will provide a significant multiplier effect and can increase the competitiveness of the National steel industry in the future.

The pursuit of added value for metal minerals and at the same time is a positive step in prohibiting the export of raw material for mineral mining goods in Indonesia, if they are not processed and refined first, at least into semi-finished goods. This is carried out to protect the natural resource wealth of mining goods, the utilization of added value will be able to provide benefits for all interested parties, among others, mining companies can increase the selling value of processed output; for manufacturing industrial companies, it is greatly assisted in obtaining raw material input which is cheaper and more secure and is no longer dependent on imports; the availability of job opportunities for the wider community as well as new business opportunities with the construction of domestic mining smelters, increasing state revenue and reducing national steel imports. This is related to the Regulation of the Minister of Energy and Mineral Resources No.1 of 2014 concerning Increasing Mineral Added Value through Domestic Purification and Processing Activities(KementerianESDM, 2014).

A smelter is a container for cleaning and purifying mineral minerals directly from a mining processing raw material into semi-finished goods and at the same time increasing the added value of these mineral mining goods, as well as adding new jobs(Nauly, 2019). The extraction of mineral goods in the form of primary iron (ironstone) is a strategic step in increasing the added value of the product through the transmission of refining minerals and cleaning mineral goods in the form of iron ore directly from a mine. It can be stated that iron is one of the important components and is the main raw material for the steel industry in the country and is a staple material for the manufacturing industry, infrastructure building, and construction, as well as domestic steel consumption every year, continues to increase its use, everywhere the need for national steel still very far behind developed countries, the average demand for steel in Indonesia is only forty kilograms per capita per year, while developed countries have reached six hundred kilograms per capita per year(KESDM, 2015).

The national iron ore mining production is around 12.5 million tons, mining companies can no longer operate and are no longer allowed to export because they must be processed and refined domestically into semi-finished goods as a result of Government Regulation No.1 of 2014 and the Ministry of Energy and Resources Regulation Mineral

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No. 1/2014 concerning increasing the added value of mineral mining goods through refining and processing activities in the country. The effort to build a smelter is a challenge and at the same time an opportunity to increase the added value of a national iron ore mine, of course with the hope that smelter construction will be able to grow and can substitute imports of pellets/sponge iron/pig iron and scrap as industrial inputs. National steel. In this decade, the majority of domestic iron needs are met from imports, while efforts to refine and process iron ore mines in the country are still facing problems, especially having the characteristics of metal content and varying volume of mining products as the main requirement and still a lot. Again, other problems include the legal aspects of the company so that the upstream-downstream industrial chain is cut off (Suherman, 2015).

The main supplier of world steel production is China, which contributes 50% of the world's product, followed by Japan, the USA, and India. Indonesian steel company Krakatau Steel (KS) Posco started production with a capacity of 3 million tons of crude steel in 2015 and an increase in production capacity of 1 million tons of crude steel, thus increasing domestic production capacity to 10.84 million tons. In 2020 an additional capacity of 4 million tons from the expansion of PT. Krakatau Posco phase II (3 million tons) and processing of products produced by PT. Jogja Magasa Iron (1 million tons), as well as increasing the volume of domestic steel production. In 2025, the national steel demand projection is targeted at 20 million tons, so the production capacity must be increased by 6 million tons for that year. To meet the target in 2025, investment is needed to build a steel industry smelter facility with a total capacity of 14 million tons of USD ± 14 billion or equivalent to IDR 140 trillion and a total of 1,174 MW of energy is needed until 2025 and it is estimated that at least it must require materials. Raw iron ore of 250 million tons and iron sand of 110 million tons from within the country. From this, it is necessary to classify the need for the number of raw material reserves for iron ore mining goods with good metal content quality for raw materials smelter constructions.

Kementerian Perindustrian (2013) explained that the government estimates that the need for a mineral smelter factory, including iron ore, is up to 20 smelters. Jero Wacik, Minister of Energy and Mineral Resources said that since the enactment of the Minister of Energy and Mineral Resources Regulation No. 7/2012 on Increasing Mineral Added Value through Mineral Processing and Refining Activities (smelters). Data from the Ministry of Energy and Mineral Resources shows that currently, only 7 smelters are operating. Furthermore, it is in urgent need of further construction of the construction of a new smelter.

Natural resources of iron ore mining goods in the country are distributed in various regions, especially the majority of which are in the provinces of Aceh, West Sumatra, Lampung, Bangka-Belitung, Java, West Kalimantan, South Kalimantan, Southeast Sulawesi, East Nusa Tenggara, North Maluku, West Papua, and Papua. The natural

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resources of iron ore mining products have various characteristics, both in terms of quality and types of iron minerals contained therein. Problems in the construction of the Smelter industry with domestic staple raw materials, the quality of domestic iron ore raw materials has different characteristics, in addition to the quality of natural resources of domestic iron ore mining products, which are relatively low in Fe content, although in some places there are contents above. 70% Fe. The average metal content of ore mining in Indonesia is: average Fe content for primary iron is 47.144%, iron sand has an average Fe content of 47.08% and laterite iron has an average Fe content of 30.26%. Reference to the criteria for the metal content of the average iron content of ironstone raw materials (Primary Iron) for the import of the smelter industry ranges from 30% to 68% of its Fe content. Focus group discussion (FGD) 2014.

West Sumatra Province has the potential for natural resources of primary iron ore (stoneiron), where the volume of primary iron reserves is quite large and the mineral content is quite good. The results of the primary iron ore processing test came from the West Sumatra province by a focus group discussion (FGD) conducted by BPPT in March 2014, it turned out that the metal content was good, while stating that the laterite iron ore deposits in South Kalimantan were quite good, but requires higher processing costs than the type of primary iron (ironstone) in the West Sumatra region in meeting the raw material input needs of the iron ore mining industry smelter(Rusnoviandi, 2016). When referring to the total iron (Fe) content, the quality of available iron ore varies considerably for the input of raw materials for the smelter industry. This can be seen from the different total Fe content for each type of sediment. For iron sand, the content ranges from 37.8% to 61.5% Fe, and for primary iron reserves (iron rock), the total Fe content varies from 30.63% to 68.7%. Whereas for the type of a type of laterite iron ore deposit, the Fe content ranges from 9.9% to 60%;

The natural resources of iron ore mining products in West Sumatra are very potential for the development of processing and refining of these mining goods (smelters). West Sumatra Province, there are 32 iron ore mining companies with 36 mining locations spread across 7 districts, 18 sub-districts, 25 villages/Nagari with iron ore mining areas in several districts, namely: Solok Regency mining area 1,641.16 ha; Dharmasraya 538 ha; South Solok 9,817.23 ha, Pasaman 10,068.54 ha; West Pasaman 3,980.0 ha; Agam 582 hectares; Sijunjung 163.30 ha and Pesisir Selatan Regency 612.0 ha with a total mining area of 27,402.23 ha(Anonimous, 2019).

Based on the natural resource potential of primary iron ore (ironstone) mining goods in West Sumatra Province, both from a large mining area and the quality of its metal content is quite good. So from this, whether the iron ore mining product has the volume of raw material, metal content and support for energy resources and supporting infrastructure for the development of the iron ore processing industry (smelter), and what is the impact of the output of the primary iron smelter (ironstone) industry on

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National iron requirement. So the research objective is to determine the feasibility of building a smelter industry in West Sumatra Province in terms of metal content, reserves, support of resources, and supporting infrastructure as well as the impact of smelter products on future consumption, production, and import needs of National iron ore.

REVIEW OF LITERATURE

The regional development planning concept of an export base model that focuses on the strategic economic base sector, one of the base sectors in an area is the mining sector where the metal mineral mining commodity is a strategic economic sector in an area. Processing and refining of iron ore metal mining products that can add value to the product, then the area will be able to develop rapidly, can increase the per capita income of the community and encourage the growth rate of the area and create new jobs(Adisasmita, 2006).

The mandate of Law no. 4 of 2009 Indonesia is strengthened by Regulation of the Minister of Energy and Mineral Resources Number eight of 2015, that raw mineral mining goods must be processed first before being exported to make intermediate goods or finished goods, supporting industrial structures, creating new jobs and being able to increase State income. On the other hand, the added value output of iron ore into pig iron and the like can be used as raw material for the national steel industry which can have a multiplier effect on other economic sectors. The government can encourage mining and steel industry companies, research and development agencies, and other stakeholders to work together to accelerate the implementation of increasing the added value of iron ore minerals and strengthen the national steel industry(Suherman, 2015).

The challenge of developing the crude / semi-finished steel industry relies heavily on imported sponge iron as raw material if this can be resolved by the mandate of the Law on Minerals and Coal (Minerba) NO. 4 2009 which was officially in effect since January 12, 2014. If investment in the smelter industry development can be realized, it will create an increase in total economic value and can absorb labour, so that in the next turn it will contribute to boosting the growth of Gross Domestic Product (Kementerian Perindustrian, 2013).

Coordinator of the Metal Mineral Investigation Group of the Geological Resources Centre-Geological Agency to import iron ore for smelter construction. The quality of primary iron reserves (ironstone) for smelter input refers to the theory of total iron (Fe) content, the total Fe content varies from 30.63% to 68.7%. Whereas for the type of laterite iron ore deposit, the Fe content ranges from 9.9% to 60%; and for iron sand, the

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Fe metal content ranges from 37.8% to 61.5%. In this regard, the direction of investigation can be focused on the types of iron deposits available. The role of researchers and local governments in the short, medium, and long term can carry out investigations of mineral mining goods and can convey information on resources/reserves to the existing Iron Ore Mining Business License (IUP) through SIGNAS and the Research Agency can help compile complete and up to date National balance data. Date for the construction of the Indonesian mining industry smelter(Tampubolon, 2015).

Geophysical Exploration Methods for mineral goods(Gocht et al., 1988). The research conducts preliminary investigations on mining which aims to determine the potential for minerals or minerals in an area. Exploration will result in the characteristics of mining materials, mineral distribution, or the number of mineral reserves. Meanwhile, geophysical exploration uses geoelectric, magnetic, gravity, and seismic methods. The geoelectric method is used to determine magnetically. Geoelectric, magnetic, gravity, and seismic methods can be applied in the exploration of minerals such as iron rock (primary iron) and manganese.

The search for deposits of valuable minerals that are economically valuable is mining activity, both mechanically and manually under the surface of the earth's crust and below the surface of the water. Mining will produce minerals in the form of ironstone, iron sand, tin ore, bauxite ore, oil and natural gas, coal, nickel ore, copper ore, gold ore, silver, and manganese ore(BPS, 2020). The steps for mining operations start from prospecting and research, mining preparation, exploitation, and processing/refining/refining. Prospection is the activity of investigating and searching for mineral or mineral deposits. Exploration is a follow-up activity of prospecting in knowing the deposits of minerals or minerals that have been obtained, then grading/refining/refining to find out the size, shape, position, average grade, and size of reserves.

The transmission of exploitation activities is a task of extracting mining goods, taking raw material for valuable mineral deposits, and processing/washing(Nalle, 2012). Processing/washing is a job to purify/increase the content of minerals by distinguishing useful and useless minerals, then isolating these useless minerals (chemically processed): (1) Feasible or not worthy of exploration work and output; (2) The validity of the quality and distribution of reserves based on the relationship between all exploration data; (3) Certainty of reserve limits, such as Cut of Grade, Strip-ping Ratio, maximum mining depth, minimum thickness and so on, to obtain information on geological conditions and distribution of subsurface mineral goods. Furthermore, it is analyzed to obtain a conclusion on the total row material reserves of minerals and (4) The exploration results will reveal inferred, indicated, measured, and estimated and proven reserves.

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The steps in the analysis determine the percentage of metal content contained in mineral resources such as primary iron (ironstone), iron ore, and other metal goods(Istiyanti, 2012), namely: (1) Taking sufficient rock samples in the location area mining, provided that the sampling is evenly distributed, which means that the sample taken can represent the existing population; (2) Testing of samples of ironstone (primary iron) in the calculating laboratory and (3) The results of laboratory testing of ironstone (primary iron) obtained the percentage of Fe2O3, Fe, A12O3, SiO2, TiO2, Na2O, K2O, CaO, P, MgO, S, and Moisture.

Other related studies carried out include (1)Suherman (2015), Techno-economic Analysis of the Development of an Iron Ore Smelting Plant in the Framework of Strengthening the Steel Industry in Indonesia; (2)Suherman & Saleh (2018), Analysis of the Iron Steel Value Chain in Indonesia. Center for Research and Development of Mineral and Coal Technology Bandung; (3)Isnugroho & Birawidh (2016), Utilization of Crushing Plant Waste for Making Pig Iron Using Hot Blast Cupola Injected With Wood Charcoal Powder. Technical implementation Unit. Lampung Mineral Processing Center, Indonesian Institute of Sciences; (4) Kementerian Perindustrian (2013), Iron Ore Absorption in Small Countries, Ministry of Industry of the Republic of Indonesia Indonesia Finance Today; (5)Contesa et al., (2018), Smelter: Policy Inconsistencies, Constraints and Damages in Indonesia and (6)Zulhan (2017) in his study of technological and economic aspects of the construction of iron ore processing plants into steel products in Indonesia. Meta-lurgi Engineering-Faculty of Mining and Petroleum Engineering, Bandung Institute of Technology.
Infrastructure support in the construction of processing and refining (smelter) for mining excavation must be properly available, such as Availability of roads according to road class and weight, availability of shipping ports and installed capacity, and availability of electrical resources, all of these are the main support for the smelter industry. The availability of electricity, in the electricity industry, is the main staple so that factories continue to produce. In the smelter industrial mining area, it is hoped that PLN will build a PLTA or PLTU power plant to provide adequate sources of electrical energy in the area of the Smelter industry development(Jati, 2014).

Theory of Consumption (needs) on Production and Imports(Sukirno, 2016). Indonesia's iron consumption needs are influenced by domestic iron production and iron imports from abroad. Furthermore, the concept of consumption, production, and import in international economics is a form of identity equation where:

Ct = Yt + Mt or Yt = Ct - Mt
Where
Ct = Iron consumption (requirement) in year t
Yt = Iron production in year t
Mt = Iron imports in year t

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To determine the prediction of future iron consumption using multiple linear regression(Komariah & Subagyo, 2014).

Multiple linear regression General equation:

$Y = \beta 0 + \beta 1\ x1 + \beta 2\ x2 + \ldots\ldots\ldots + \beta r\ xr$

Y = Need / Consumption

X_1 = Production

X_2 = Import

β0, β1, β2, ……, βr are parameters X_1 and X_2

METHODOLOGY

The method used in this research is to use literature reviews from various iron ore mining companies, mining and energy services, government regulations, ministry data, and other data related to the smelter activity. Several analytical tools are used, including analysis of the quantity and quality of ironstone resources (primary iron) related to raw material reserves and metal content of ironstone mining minerals (primary iron), analysis of supporting factors for the smelter industry, and impact analysis. Projections of smelter industry output on consumption, import, and national iron production needs, using the Least Square linear regression.

Analysis of Reserve Resources and Percentage of Metal Content

Analysis of reserve mineral resources and the percentage of primary iron (ironstone) content was carried out at 32 mining companies with 36 mining locations for primary iron ore (ironstone) minerals in West Sumatra, by conducting a research library study on all iron ore mining companies there is such. From the research study, it is obtained reserve resources and the percentage of primary iron metal content (ironstone), both in quantity and quality. Quantitatively, it can determine the Tere-ka resources; Designated; Measured and know the Estimated and Proven reserves of the existing iron ore mine. Qualitatively, a percentage of the metal content of mining materials will be obtained, such as Fe2O3, Fe, A12O3, SiO2, TiO2, Na2O, K2O, CaO, P, MgO, S, and Moisture(Istiyanti, 2012). To analyze and determine the effect of West Sumatra iron ore smelter production projections on future national iron consumption, production, and import needs, it is carried out using quantitative methods and descriptive analysis methods using linear regression analysis program.

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Analysis of Support for Energy Resources and Infrastructure

Analysis of infrastructure support for electricity resources, roads, and ports, is a component that must be available for the primary iron mining smelter industry (ironstone). Analysis of the availability of the installed capacity of electricity resources, road infrastructure, and transport port infrastructure is carried out using the inductive identification method(BPS, 2015).

Analysis of the Impact of Production Projection on National Iron Ore Consumption and Import Needs

To analyze and determine the impact of West Sumatra iron ore smelter production on domestic iron needs and imports, it was carried out using quantitative methods and descriptive analysis methods, namely research that focuses on solving problems that exist in the present and the actual using the ANA program. - regression analysis. The type of data used in this study is time-series data, which is data from year to year by the availability of data for each year under study.

To determine the prediction of demand/consumption, import, and production of iron, it is done by: Trend analysis. Trend analysis is a statistical analysis method that is intended to perform periodic data modeling and is used for an estimate or prediction in the future(Alatas, 2015). One of the models that can be used for trend analysis or often called time series is:

Linear regression model: $Y = a + b X$

Where:

Y: the dependent variable

X: independent variable

a: intercept

b: coefficient

To determine the significance of the factors that influence the need/consumption of national iron, a Least Square linear regression model is used with the following equation:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Information:

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Y = Need / consumption of iron)

X_1 = iron production

X_2 = Import of iron

α = Constanta,

β_1, β_2 = The regression coefficient of X_1 and X_2, respectively

ε = Random Error

RESULT AND DISCUSSION

Research Results Total resources and reserves of primary iron metal (ironstone) in West Sumatra

From the research result of primary iron ore (ironstone) mining in West Sumatra, it was found that the resources and reserves of primary iron metal (ironstone) were; Inferred 2,305,322,377 MT; The indicated amount is 4,377,387,010 MT and the measured amount is 966,483,562 MT. Meanwhile, reserves of primary iron metal (iron rock) are estimated at 987,470,017 MT and proven to be 1,840,865,138 MT, with a total mining area of 27,402.23 Ha. As below.

Table 1. Total resources and reserves of primary iron metal (ironstone) of 32 companies in West Sumatra

Regency Location	The Company Number	Area (Ha)	Resources (MT)			Reserve (MT)	
			Inferred	Designated	Measurable	Estimated	Proven
Solok	12	1,641.16	97,718,000	225,654,000	69,168,120	101,135,200	73,875,001
Solok Selatan	8	9,817.23	1,525,898,000	3,185,287,000	510,685,000	400,445,000	1,298,156,937
Dharmasraya	2	538.00	12,101,256	98,000	10,258,000	8,445,000	6,262,567
Sijunjung	1	163.30	8,820,619.0	1,221,297.0	1,820,000.0	566,000.0	560,649.0
Pesisir Selatan	1	612.0	1,762,000	10,875,071	1,962,000	3,020,853	3,020,853
Agam	2	582.0	61,974	101,974	61,974	44,747	40,421
Pasaman	3	10,068.54	657,692,000	953,656,000	372,014,800	472,990,568	458,160,094
Pasaman Barat	3	3,980.0	1,068,528	493,668	513,668	822,649	788,616
Jumlah	**32**	**27,402.23**	**2,305,322,377**	**4,377,387,010**	**966,483,562**	**987,470,017**	**1,840,865,138**

Source: Research Results 2019

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With a large number of mineral reserves available, primary iron (ironstone) mineral reserves, both from the total mining area (27,402, 23 Ha) and from the total raw material reserves of primary iron mineral goods (ironstone)(966,483.56 MT) and proven reserves (1,840,865,138 MT), so the availability of resources and reserves of metal mineral raw material for primary iron mining goods (iron rock) is feasible as input for the construction of the smelter industry in West Sumatra Province.

4.2. Results of Research on Primary Iron Metal Content (Iron Rock) in West Sumatra.

The metal content of the primary iron mine (ironstone) in Sumatra Barta, the average iron content (Fe) was 53.9877% and Fe203 metal was 81.8621%. The highest percentage of metal content was found in the Fe sijunjung area of 65.5%, followed by Dharmasraya 61.75%, Solok Selatan 57.75%, and Solok 57.385%, as shown in the table below.

Table 2. Primary iron (ironstone) content of 32 mining companies in West Sumatra

Regency Location	Average Metal Content											
	Fe2O3	**Fe**	**Al2O3**	**SiO2**	**TiO2**	**Na2O**	**K2O**	**CaO**	**P**	**MgO**	**S**	**Moisture**
	%	%	%	%	%	%	%	%	%	%	%	%
Solok	86.6017	57.385	1.1808	4.1958	0.0812	0.056	0.175	0.2317	0.021	0.203	0.0605	1.126
Solok Selatan	79.0725	57.750	0.21	1.28	0.02	0.7125	0.2475	0.08	0.09	0.07	0.03	0.2
Dharmasraya	82.120	61.750	0.9325	14.5	1.57	0.26	0.7	1.12	0.09	1.35	2.2	0.6
Sijunjung	93.000	65.500	1.715	-	-	-	-	0,19	-	0.115	-	-
Pesisir Selatan	81.000	51.500	0.325	5.5	0.01	0.02	0.16	0.04	0.02	0.03	0.02	0.4
Agam	79.250	45.500	0.4	1.12	0.17	0.2	0.8	0.09	0.2	1.3	2.6	-
Pasaman	77.637	45.017	2.3	1.65	0.155	0.2	1	0.09	0.5	1.75	2.55	-
Pasaman Barat	76.217	47.500	2.3	1.29	0.155	0.2	1	0.09	0.5	3.1666	2.95	-
Average	**81.862**	**53.987**	**1.170**	**4.219**	**0.308**	**0.235**	**0.583**	**0.241463**	**0.203**	**0.998075**	**1.4872**	**0.5815**

Source: Research Results 2019

From the results of primary iron mineral content (ironstone) both in terms of iron content (Fe) (53.9877%) and Fe203 metal content (81.8621%), then the results of the metal mineral content of the goods Primary iron mine (ironstone), both in terms of iron content (Fe) and Fe203 metal content, is suitable as input for the construction of the smelter industry in West Sumatra Province.

Results of Support for Energy Resources and Infrastructure for Smelter Development in West Sumatra

The results of inductive identification and analysis of the Support of Energy Resources and Infrastructure for Smelter Development in West Sumatra, where the volume of

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electrical energy resources is available to support energy needs for the construction of the Smelter industry in West Sumatra with the installed capacity of current electrical energy resources, Per December 2018 the total electricity supply reached 703 MW, with a peak load of only 593 MW. The road infrastructure supports the needs of primary iron ore mining smelters in West Sumatra, the road conditions support and support, especially the road to the Teluk Bayur seaport. Teluk Bayur Port as support for sea transportation facilities is already good, it has been digitized with the ITOS-NBS (New Billing System) system for loading and unloading activities more real-time and connected to the control center(Anonymous, 2019). From the installed position of electric energy, the support for the road infrastructure and the port of Teluk Bayur as supporting infrastructure is very adequate in the development of the Smelter industry in West Sumatra Province.

Analysis of the Impact of Smelter Development in West Sumatra.

From the results of the research, the number of resources and reserves of primary iron metal (ironstone), the content of primary iron metal content (ironstone), and the support of energy resources and infrastructure for smelter development in West Sumatra fulfills both in terms of raw material input, content. Metal raw material input and supporting support for the development of the stone iron smelter industry (primary iron) can be fulfilled. From the total area of ironstone mining (primary iron) of 27,402.23 Ha with proven reserve resources of 1,840,865,138 MT, based on the availability of these areas and reserves, it is predicted that the production results of the primary iron mining smelter industry in West Sumatra will be able to produce in the amount of 2,000. MT every year, this is based on the availability of the mining area and the availability of the required raw material inputs, as shown in the above research.

The data on national iron consumption, production, and import needs from 2002 to 2018, is shown in table 3 below(Adharsyah, 2019), a projection of the need for consumption, production, and import of National iron and the impact of output/production of the primary iron mining smelter industry in West Sumatra from 2022 to 2030 is obtained. Estimation using Least Square linear regression with the help of SPSS software, the trend equation is as follows:

The trend of iron demand and import equations linear interpolation $Y = 554.61x + 3025.1$ …….. (1)

Equation trend Iron production processed Linear interpolation $Y = 161.61x + 2399.7$ …….. (2)

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From equations (1) and (2) above, an estimate of the role of iron ore production in primary iron ore mining smelters (ironstone) on the demand for and imports of iron ore in 2022-2030, which in 2022 contributes to a reduction in imports by 21.6%. , and 18.5% in 2026 and 2030 at 16.1%. Furthermore, the West Sumatra smelter iron ore production estimates for the National iron production in 2022. 2026 and 2030 are: 33.6%, 30.5% and 27.6%. As well as the estimation of West Sumatera smelter production can contribute to 2022, 2026, and 2030 by: 13.1%, 11.5%, and 10.2% of the national iron demand, as shown in the table below.

Table 3. Demand for, production, and import of Indonesian iron ore in the period 2002 to 2030

Needs x 1000 T								Production and Importx 1000 T							
2002	2006	2010	2014	2018	2022	2026	2030	2002	2006	2010	2014	2018	2022	2026	2030
4.859	6.245	8.017	9.203	13.500	15.227	17.444	19.663	2.462	3.759	4.003	4.501	5.309	5.955	6.602	7.248
Import								724	2.462	3.055	4.639	7.669	9.272	10.842	12.415
Production of Iron Ore Smelter in West Sumatra													2.000	2.000	2.000
The Role of West Sumatra Iron Ore Smelter Production Against National Iron Production													33,6 %	30,3 %	27,6 %
The Role of West Sumatra Iron Ore Smelter Production Against National Iron Imports													21,6 %	18,5 %	16,1 %
The Role of West Sumatra Iron Ore Smelter Production Against National Iron Needs													13,1 %	11,5 %	10,2 %

Source: Research Results 2019

Factors that affect the need/consumption of national iron, where the production and imports of iron have a significant effect on the need/consumption of national iron.

C = 12,579 + 1,321 Q + 0.791 I.

Where.

C = National iron consumption

Q = Iron production

I = Iron Import

The regression coefficient value for National iron production is 1.321 means that every increase in production is 1 unit, it will increase Indonesia's iron demand by 1.321, and

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the regression coefficient value for National iron imports is 0.791, meaning that every increase in production is 1 unit, it will reduce the need Indonesian iron of 0.791 units

CONCLUSION

The quantity of primary iron ore metal reserves resources (ironstone) in 32 primary iron ore mining companies in West Sumatra, where the mining area is very large with the amount of raw material stock: Tereka MT, Indicated MT, Measured MT, Estimated MT, and Proven MT with a very large amount of raw material stock of primary iron ore (ironstone) stock. Quality of primary iron ore (ironstone) reserves found in 32 primary iron ore mining companies in West Sumatra, where the content of primary iron metal (ironstone) has an average iron content (Fe).) and good quality Fe203 metal above 50%.

Support for the needs of energy resources and infrastructure for roads and transport ports in planning the construction of an iron ore smelter industry in West Sumatra, where the infrastructure of the highway is already wide, the floor is reinforced with concrete, and the infrastructure for Teluk Bayur is already with the ITOS-NBS system (New Billing System), loading and unloading activities are organized at sea transport ports and electrical energy resources with an installed capacity of very large available electrical energy resources in West Sumatra. The impact of West Sumatra smelter production on future national iron ore consumption, production, and import needs. Where the estimated production of primary iron ore mining smelter (ironstone) against the need for National iron ore in 2022-2030, its production can contribute to reducing imports and national iron consumption, where the iron bee production of the West Sumatra smelter industry has a significant effect on Indonesia's iron consumption and import needs. From the above conclusion, West Sumatra Province is feasible for the construction of a smelter industry.

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