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Ship-Breaking in Pakistan
-an overview for industry potential & challenges

manzil PAKISTAN

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Introduction and Background

Ship breaking is the process of dismantling ships and selling their parts. Ships that have lived their operational lives and are not anymore economically viable are then sent for ship breaking. Ship breakers at ship breaking yards dismantle entire ship. After dismantling, the recovery is in the form of scrap, which has some monetary value. These recovered items and / or scrap are sold or reused in the domestic market or may also be exported. Major items obtained from ship breaking are metals (mainly iron and steel)[1], glass, wood, furnishings, and plumbing etc. Shipbreaking is considered as a very labour intensive yet an equally dangerous job. There are few international conventions that provide guidelines for safe shipbreaking and also there are many national and non-governmental institutes that keep an eye on shipbreaking industry for its human and environmental safety compliance.

Pakistan, India and Bangladesh are three Asian countries that together constitute 70% of world's shipbreaking industry. Previously China was also considered industry leader but slowly it has phased out itself from shipbreaking and now only in the business for country flag-ships and / or under Chinese ownership. On the other hand Turkey is developing itself to be competitive in the market and have seen increase in market share over the years. Generally, control of shipbreaking industry by Asian countries is attributed to their natural coastal belts and availability of cheap labour with negligible legal compliance.

Pakistan's shipbreaking yard at Gadani is the world's third largest ship breaking yard. The yard consists of 132 ship-breaking plots placed across a 10 km long beachfront at Gadani. In 80s, Gadani was the largest ship-breaking yard in the world, with greater than 30,000 direct employees. However, competition from newer facilities in Alang, India and Chittagong, Bangladesh resulted in an important reduction in output, with Gadani presently producing less than one fifth of the scrap it produced in the 1980s.[2]

As mentioned in media reports 18-20 percent of the country's iron needs is fulfilled by scrap re-rolling.[3] In FY18 higher ship imports reflected an uptick in demand for scraps from the steel industry, given the 22.2 percent YoY growth in domestic steel production in FY18. Also in FY18, ferrous scrap imports were roughly US$1.58 billion. [4]

This research document is purposely developed to assist policy makers in understanding the prospects of the industry as it plays an important role not only in terms of domestic economic activities, generating employment but also has potential to support in reducing the import burden of the country. The document also highlights the issues faced by the industry / sector and future challenges, which need to be incorporated in policy making for the industry / sector.

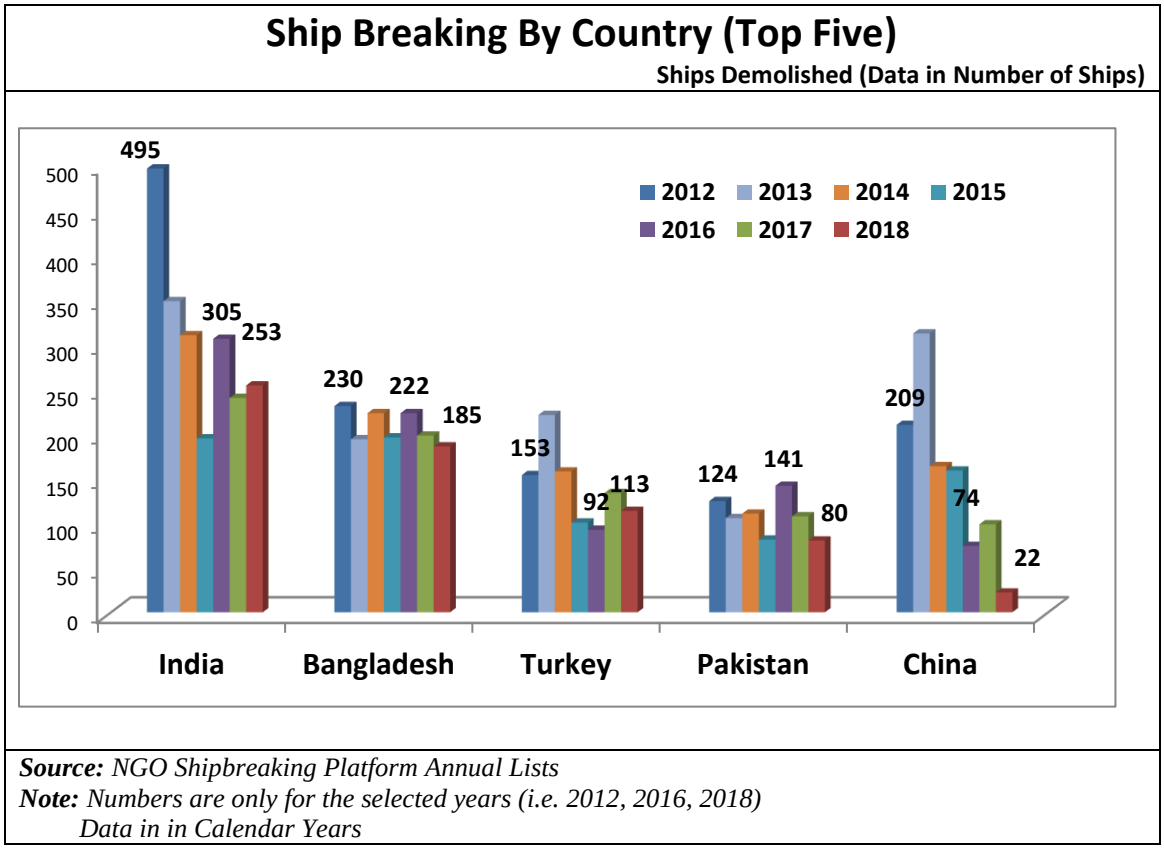
[1] Special Procedures for Ship Breaking Industry Rules, 1997 (Rule 8 sub-Rule (3))
[2] http://www.pakistaneconomist.com/2018/07/16/shipbreaking-review-pakistan-against-its-neighbors/
[3] https://fp.brecorder.com/2019/01/20190125442212/
[4] State Bank of Pakistan Annual Report 2017–18 (Page 84)

Performance of Ship Breaking Sector vis-à-vis World[5]

Shipbreaking industry over the years is mainly concentrated in Asia and particularly in South-Asia where around 87.8% (in 2018) of world's ships are demolished. Since 2012 there is significant decrease in number of ships dismantled (from 1243 in 2012 to 744 in 2018) yet share of top 5 ship-breaking countries is nearly the same. Data-trends show that India is always leading the chart for number of ships demolished.

Ship Breaking By Country (Top Five) Ships Demolished (Data in Number of Ships)								
Calendar Years / Country	Bangladesh	China	India	Pakistan	Turkey	Total Top 5	Total World	Top 5 Share
2012	230	209	495	124	153	***1211***	**1243**	*97.40%*
2013	193	311	347	105	220	***1176***	**1209**	*97.30%*
2014	222	163	309	110	157	***961***	**1023**	*93.90%*
2015	195	158	194	81	100	***728***	**761**	*95.70%*
2016	222	74	305	141	92	***834***	**859**	*97.10%*
2017	197	98	239	107	133	***774***	**831**	*93.10%*
2018	185	22	253	80	113	***653***	**744**	*87.80%*

Table 1 Top-5 Shipbreaking Countries (Number of Ships)



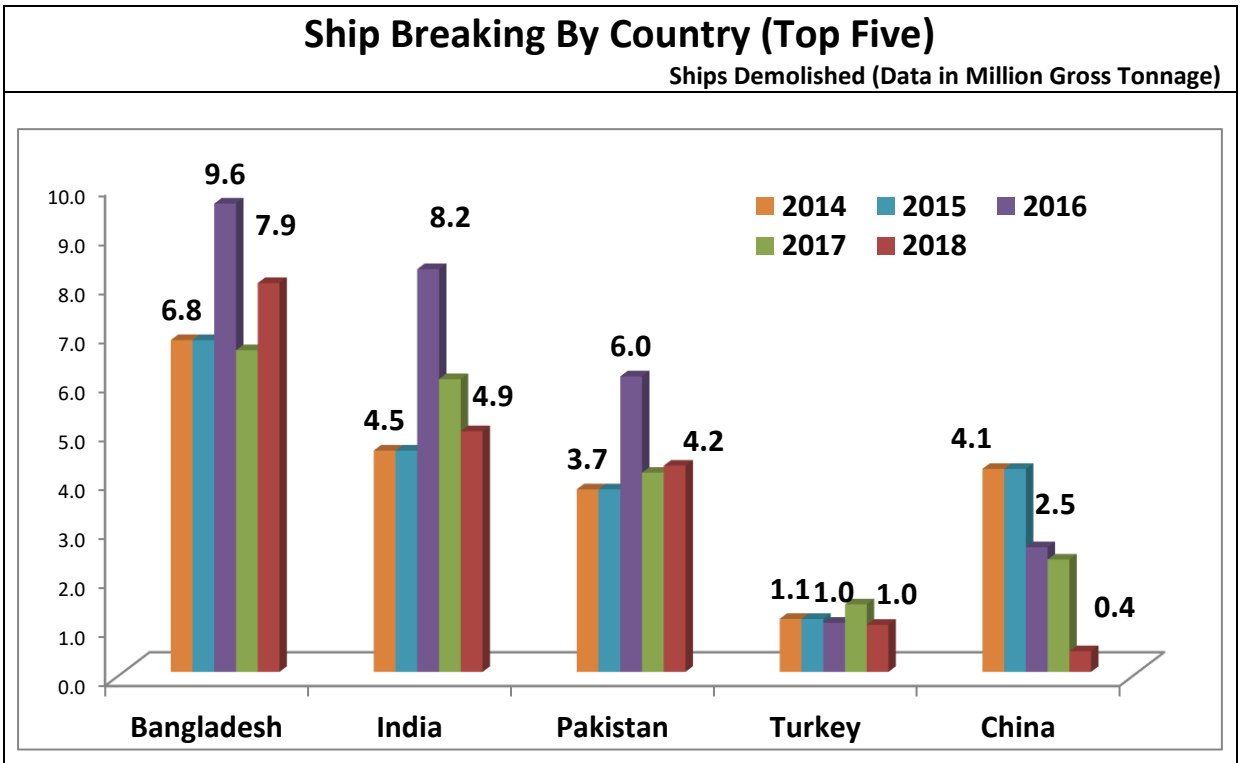
Source: *NGO Shipbreaking Platform Annual Lists*
Note: *Numbers are only for the selected years (i.e. 2012, 2016, 2018)*
Data in in Calendar Years

[5] Data used in this section is compiled using annual lists of demolished ships published by NGO Shipbreaking Platform. https://www.shipbreakingplatform.org/resources/annual-lists/ (Accessed on Feb 07, 2019)

In terms of Gross Tonnage (GT) same top-5 countries have hold on nearly whole of the market, with Bangladesh having majority share (approx. 42% in 2018). Also it can be observed through trends that China is slowly moving out of ship breaking industry where in 2018 it only dismantled 22 ships for total of 0.4 mGT of scrap.

Ship Breaking by Country (Top Five) Ships Demolished (Data in Million Gross Tonnage)								
Calendar Years / Country	Bangladesh	China	India	Pakistan	Turkey	Total Top 5	Total World	Top 5 Share
2014	6.8	4.1	4.5	3.7	1.1	*20.3*	20.4	*99.50%*
2015	6.8	4.1	4.5	3.7	1.1	*20.3*	20.4	*99.50%*
2016	9.6	2.5	8.2	6	1	*27.4*	27.4	*99.80%*
2017	6.6	2.3	6	4.1	1.4	*20.3*	20.7	*98.10%*
2018	7.9	0.4	4.9	4.2	1	*18.5*	18.9	*97.70%*

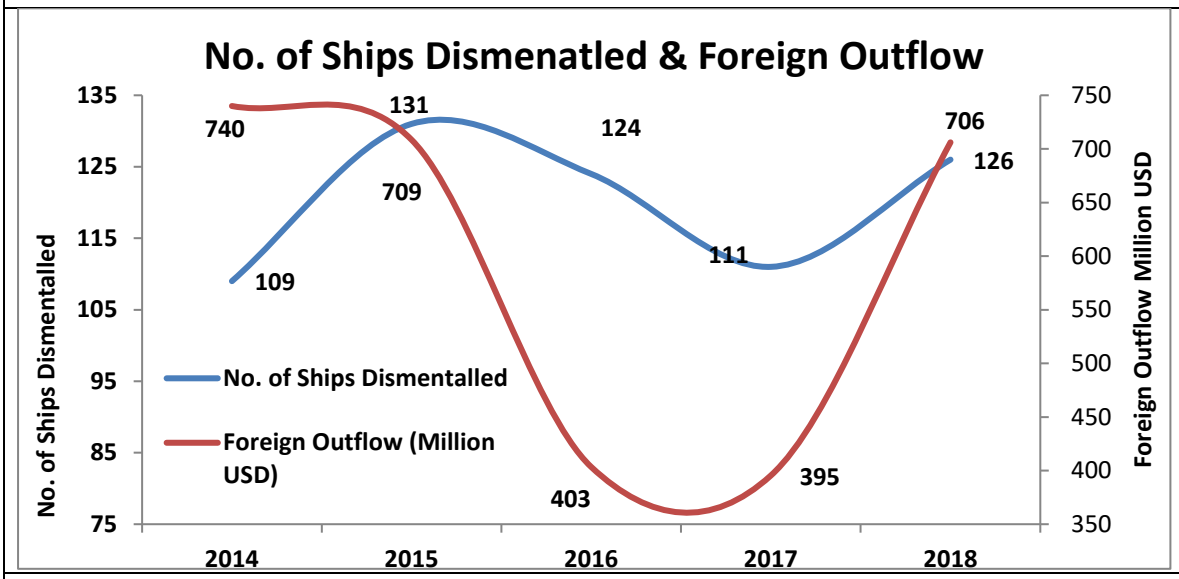
Table 2 Top-5 Shipbreaking Countries (Gross Tonnage)



Source: *NGO Shipbreaking Platform Annual Lists*
Note: *Numbers are only for the selected years (i.e. 2014, 2016, 2018)*
Data in in Calendar Years

Pakistan Shipbreaking Industry at a glance

Pakistan has been importing ships for the purpose of breaking and dismantling since many decades. During the last five years, the dismantling of ships in number registered over 100, on average dismantling or breaking stood at 120 ships per year. While the foreign outflow for importing ships for shipbreaking ranges from USD 395 million to USD 740 million. The figure below exhibits the number of ships imported for ship breaking and their values in terms of Million USD.

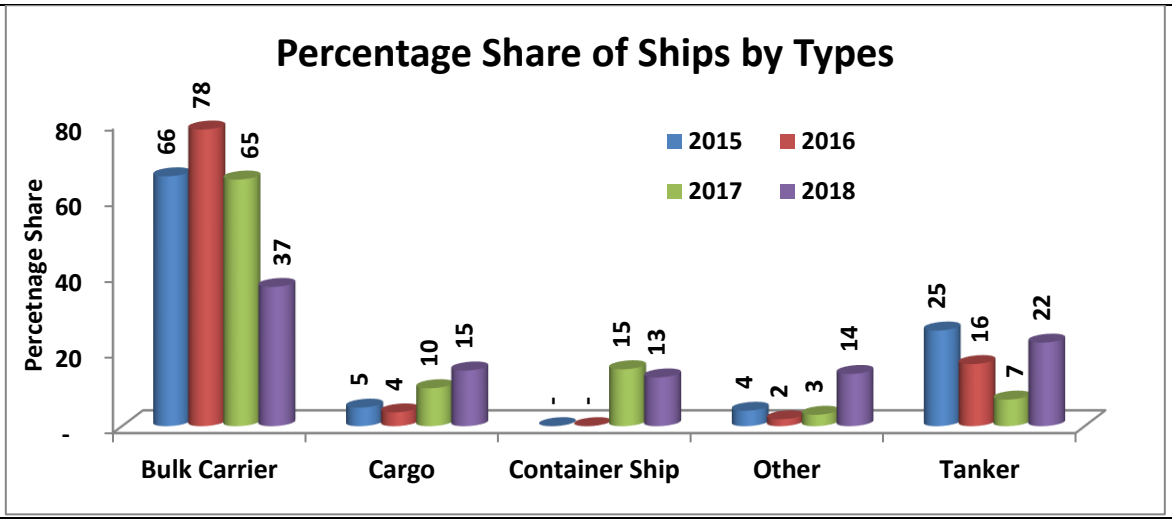


Data Source: *State Bank of Pakistan (Fiscal Years)*

As per the data of NGOs shipbreaking platform[6], there are some variations in number of ships imported vis-à-vis data reported by State Bank of Pakistan. Database maintained by NGO Shipbreaking Platform also provides gross tonnage of ships that were dismantled by Pakistan; this information is not available in State Bank of Pakistan (SBP)'s data. Also NGOs ship breaking provides the data by type of ships, which is also not provided by any domestic data sources and statistical bureau. Conversely, SBP's data set provides USD valuation of import commodity which is not available in NGO's platform data. The other limitation in NGOs platform data is the uniformity of database which is changed from the year 2013, so the useful data is from 2015 onwards for any analysis and estimation.

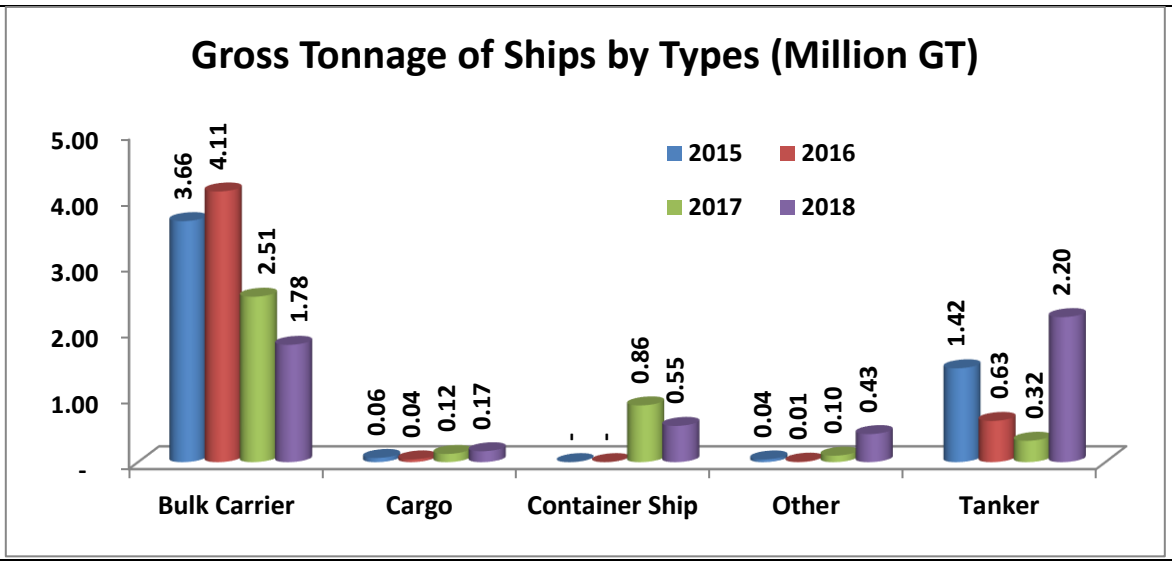
[6] The NGO Shipbreaking Platform is a global coalition of organisations working to reverse the environmental harm and human rights abuses caused by current shipbreaking practices and to ensure the safe and environmentally sound dismantling of end-of-life ships worldwide.

Over the reported years by NGOs platform database, Pakistan largely dismantled bulk carrier ships accounting for more than two-third of the total ships dismantled during the period from 2015-2017, whereas during 2018 this share has reduced to almost one-third. Share of tanker ship in ship breaking accounted for 22 percent, followed by cargo ships (15 percent), containerships (13 percent) and other type of ships (14 percent). Following graph exhibits the share (percentage term) of different types of ships dismantled during the last four years.



Data Source: *NGOs Shipbreaking Platform (Fiscal Years)*

NGOs platform database is also used to analyse the gross tonnage of ships dismantled in Pakistan's shipbreaking yard. The following graphs exhibit the gross tonnage of ships by their types.



Data Source: *NGOs Shipbreaking Platform (Conversion in Fiscal Years)*

Economic Contribution of Ship-Breaking

As explained earlier, shipbreaking industry across the globe contributes to economy in terms of generating employment and increase domestic economic activities. The latter also contributes to provide input material to domestic industries. There are several items / product / reusable material acquired during the process of dismantling / breaking of ships.

As discussed earlier, scrap steel is major output and reusable material acquired during the process of ship dismantling / breaking having significant economic value. The scrap steel acquired from the ship breaking industry is used as major raw material for the steel re-rolling mills of the country. The steel re-rolling mills source their raw material from the domestic markets and also import the same due to shortage in the domestic market. Thus the scrap steel from the shipbreaking not only serves domestic re-rolling steel mills, but also indirectly and invisibly regulates import of other scraps and raw materials. Thus, the sector has important contributions in terms of saving foreign exchange. Given the relative impact of shipbreaking on scrap imports it is important to realise the opportunity and need for it to be incorporated in public policy as an attempt to decrease import bill.

Import Substitution &/or Foreign Exchange Net-inflow

Thus, the following analysis is made to understand the potential contribution for saving foreign exchange by the shipbreaking industry. Attempt is made to assess value of steel scrap acquired from ship-breaking.

The document estimates the foreign value of steel scrap acquired during the dismantling / shipbreaking process and the contribution in terms of import substitution of steel scrap. Steel scrap import is measured in terms of Metric Tonnes (MT), so it is important to estimate and quantify the steel scrap acquired during the dismantling / shipbreaking process in terms of MT. Unfortunately, no such statistical institution records the amount of steel scrap derived from dismantling / ship-breaking.

The first step is count the type of reusable material (see Table 12 in Annexure for different types of reusable materials) that can be acquired during the process of dismantling / ship breaking. As already discussed earlier, scrap steel is the major component accounting for more than 90 percent of the reusable materials acquired during the process. Before proceeding to apply the share of steel scrap component, the first step is to understand reusable 'Material Factor' by type of ships. Material Factor provides a percentage range in which reusable material can be acquired from a ship. This reusable material factor can be helpful for both

	Reusable Material Factor (%)	
Type of Ship	Min.	Max.
Cargo	0.67	0.78
Bulk Carrier	0.94	0.98
Tanker	0.95	0.97
Container	0.8	0.87
Other	0.25	0.8

Table 3 Reusable material factor[7]

[7] Khandakar A H. Calculation of Yearly Output of Reusable Materials of Ship Recycling Industry in Bangladesh. Recent Adv Petrochem

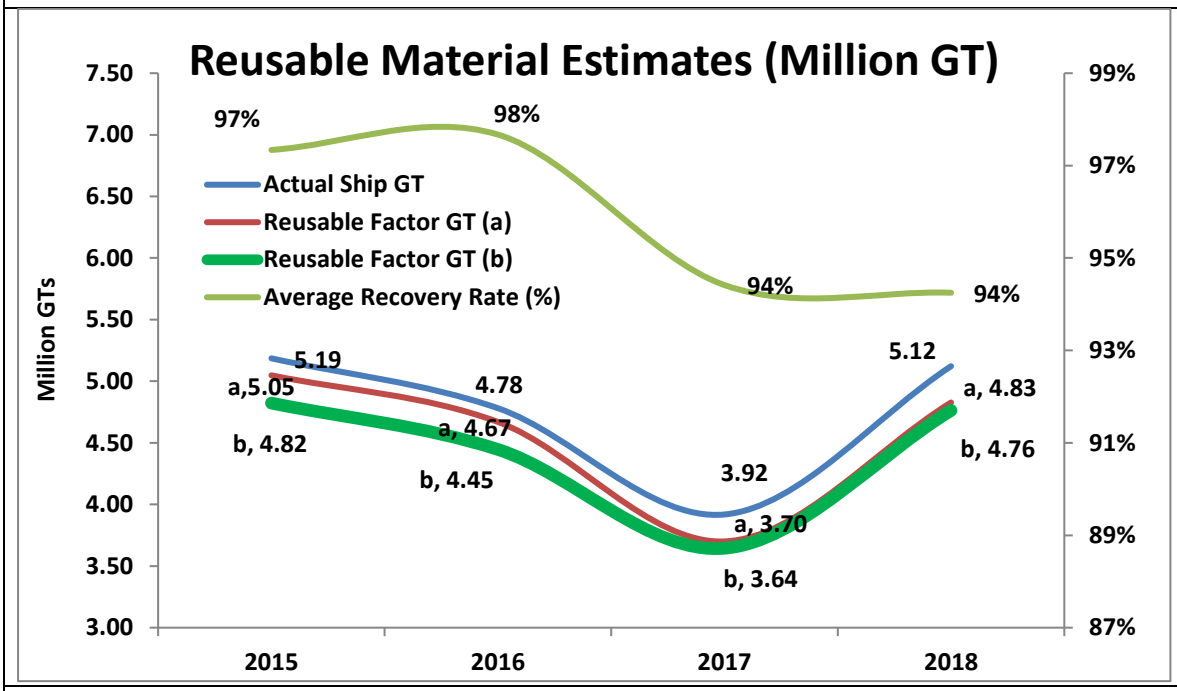
policy makers and stake holders who want to assess the actual output of local ship breaking yards. Material Factor % for different types of ships is given in Table 3.

Using quantity of ship from Table 2 and Material Factor from Table 3, we calculated approximate reusable quantity per type of ship (see annex Table 8). Based on the reusable material factor (a)[8] estimated on average around 96 percent during the period from 2015-2018. However, in the latter two years, there is decline in reusable material extraction to 94 percent vis-à-vis 97 and 98 percent in 2015 and 2016, respectively. The decline is largely attributed to reduction in shipbreaking of bulk carrier which is has high recovery reusable factor.

Another assumption of reusable factor (b)[9] is mentioned in a country's document 'Special Procedures for Ship Breaking Industry Rules, 1997 (Rule 8 sub-Rule (3)) as below

(3) Subject to the maximum aggregated wastage upto seven per cent,[……..]

Based on the two assumption identified, the overall recovery estimates during the period 2015-2018 are exhibited in the figure below.



Note: *Fiscal Years*

[8] Based on research study published in 2018 (Calculation of Yearly Output of Reusable Materials of Ship Recycling Industry in Bangladesh)

[9] Another estimates of reusable material factor

The analysis further extended to the calculation of steel scrap from the reusable material factor (a & b, both). The proportion of scrap and other reusable materials are obtained on the basis of following rules.

'Special Procedures for Ship Breaking Industry Rules, 1997 (Rule 8 sub-Rule (3)):

> *(3) Subject to the maximum aggregated wastage upto seven per cent, the following shall normally be percentage or proportion of scrap and other products obtained from the breaking of oil tankers, bulkers, cargo ships, drilling ships, war ships, passenger ships and cattle carriers, namely:-*
>
> *(i) ship plate and profiles of ½" thickness and above…….. 40%*
> *(ii) ship plate and profiles of 3/8" thickness and above but below ½"…… 20%*
> *(iii) second quality re-rollable scrap of short lengths…… 15%*
> *(iv) small irregular pieces and re-meltable scrap…… 15%*
> *(v) cast iron, pipes or cast steel …… 7.5%*
> *(vi) non-ferrous metals…… 0.5%*
> *(vii) stores or machinery …… 2.0%;*

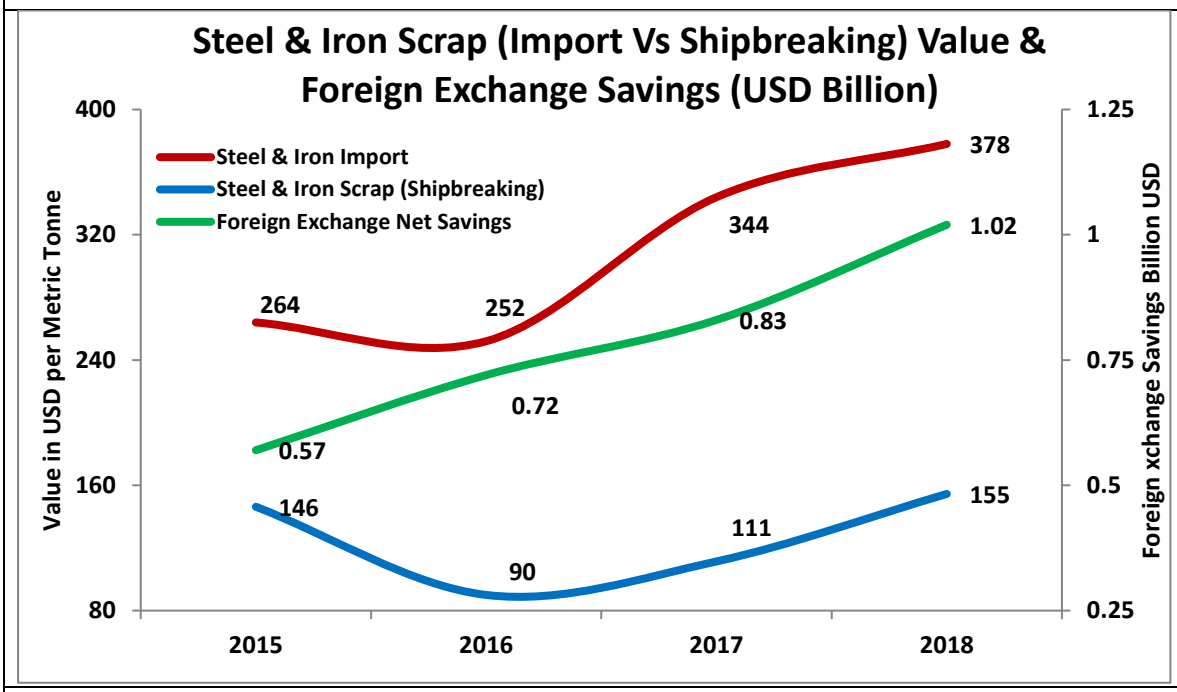
As per the Ship Breaking Industry Rules, 1997, the first five sub-items of Rule 8, sub-rule (3), mainly accounts for different types of steel scrap. The share of these different types of scrap stood at around 97.5 percent of the total reusable material factors. Based on this, the estimated quantity of steel scrap for the last four years is exhibited in the table below.

Financial Year	**Reusable material (b) GT**	**Rollable Material as per rules in GT (c=b x 0.975)**	**Rollable Material as per rules in MT (d=c x 1.016)**
2015	5.05	4.92	4.84
2016	4.67	4.55	4.48
2017	3.70	3.61	3.55
2018	4.76	4.64	4.57

Table 4 Rollable Material in GT and MT after Discounting "Reusable Material" from proportions given in Shipbreaking Rules

In our calculations to get value of scrap per metric ton (scarp obtained from ship breaking), import value of ships is used which has been provided by SBP. Note that the import value provided by SBP is based on greater number of ships as compared to number of ships and their relevant tonnage as derived in above table.

As described earlier imported scrap is another commodity which is used in steel re-rolling as raw material. Due to its high import value and impact on import bill, this has been calculated per MT ton value. This MT value is later used for comparison between two commodities and exhibited in the next figure.



Note: *Fiscal Years*

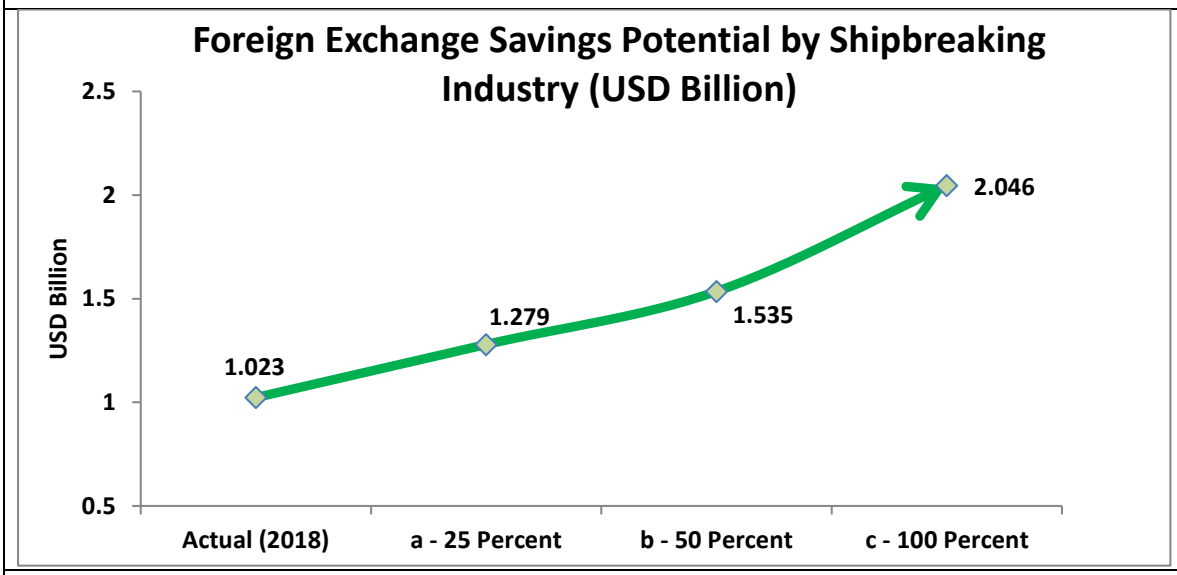
In chart comparison as exhibited above (See annex for details in Table 11) of import value of the two commodities clearly indicates that scrap obtained from shipbreaking industry is cheaper as compared to imported scrap. The difference in values is actually the savings in terms of foreign exchange outflow of the country in the absence of shipbreaking industry. The average saving per MT during the last four years is amounted to USD 184 per MT (***max*** in 2017, USD 233; ***min*** in year 2015, USD 117). The overall savings during the last four years is highest in 2018 amounted to over 1 billion USD. This also means that incase of no shipbreaking and the domestic industry requires to import the same scrap, additional foreign exchange outflow amounted to over 1 billion USD. Thus there is a need to increase shipbreaking for further reduction in country's import bill which is the major focus of the current government. Following assumptions are used to understand the potentiality of the shipbreaking sector enhancement / increase[10]:

1- If we increase scrap collection in shipbreaking by 25 percent, we will be saving USD 1.3 billion, **or**

2- If we increase scrap collection in shipbreaking by 50 percent, we will be saving USD 1.5 billion, **or**

3- If we double the shipbreaking we will be saving USD 2.0 billion.

[10] calculation based on values for year 2018



Note: *Fiscal Years*

The Illustration of above scenarios and estimations not only intends to understand the potential contribution of shipbreaking industry but also provide alternate perspective for public policy decisions to improve fiscal deficit and ease off negative trade balance and balance of payments of Pakistan. All calculations above only provide estimates of "import value of scrap" which should not be taken as purchase/input price of scrap for re-rolling mills (or other users and beneficiaries).

Issues to the Shipbreaking Industry

Labour Issues and Lack of Legislation

The ship-breaking industry at Gadani, Balochitan has been declining due to labour rights exploitation by the employers, non-implementation on the internationally accepted labour standards and the criminal negligence of the government and its authorities. Oil tanker tragedy in Gadani, caused on November 1, 2016, in which 29 workers were killed, it is the clear indication of non-adherence of labour standards.[11]

In the beginning of 2017, five workers lost their lives in another explosion of a tanker. This led to a moratorium on the import of tankers for 2017 imposed by the government – yet the ban has been reportedly lifted in the spring of 2018, without concrete measures in place to prevent the reoccurrence of these tragedies.

As in India and Bangladesh, the yards in Gadani operate directly on the beach. Most of the shipbreaking workers in Gadani are migrant workers from the poorest regions of Pakistan.[12]

They do not get the facility of paid weekly holiday and double rate overtime, as their employment and wages are not regulated under any law.

Union Issues

There exists an Illegal Jammadari labour contract system where a Jammadar (the labour contractor) had made a fake labour union, it's been claimed that a single referendum had been conducted to elect the collective bargaining agent (CBA) since the past fifty years. Also reported is that the fake labour union collecting contributions from workers.[13]

Efforts by Unions and other organisation

Workers' bodies had already submitted a draft bill on ship breaking to get labour laws implemented in ship breaking sector. Seeing no progress, preparation is being done to file a petition in the Supreme Court (SC) consulting with the leading lawyer and ex-president of SC Bar Association, Justice (r) Rashid A Rizvi on the matter[14]

Environmental Concerns

The experts also mentioned that the country needs to strengthen safety and environmental standards for its ship breaking industry on the face of new rules being compiled through the European Commission for Asian ship-breaking industry to ensure compliance with its criterion by 2019.[15]

"Ship owners should be held accountable. They carelessly sell vessels to cash buyers that bring the ships to the Pakistani yards. The high profit margin is a clear indicator of destination: the higher the price, the worse the yard", says Ingvild Jenssen, Director of NGO Shipbreaking Platform. "We are concerned over the political clout ship owners seem to enjoy:

[11] https://nation.com.pk/16-Apr-2018/ship-breaking-industry-on-decline
[12] https://safety4sea.com/the-problems-of-shipbreaking-in-pakistan/
[13] https://dailytimes.com.pk/317519/thousands-of-ship-breaking-workers-suffering-due-to-govts-apathy/
[14] ibid
[15] http://www.pakistaneconomist.com/2018/07/16/shipbreaking-review-pakistan-against-its-neighbors/

Greek owners alone are responsible for 1/3 of the ships that are currently beached in Gadani, yet Greece is pushing hard to undermine European laws aimed at improving practices globally."[16]

Challenges and Threats

As much as the business is lucrative it is attracting international agencies to strengthen the laws and regulations related to shipbreaking. The regulations deals with every step involved in recycling of ships starting from buying of ship, its cutting process, labour safety and compensation, and environmental hazards.

South Asian countries for long have been admonished for their malpractices, and so is the case with Pakistan. However amid competitions India and Turkey are taking steps to improve their processes, Indian ship breakers are taking initiatives to get ISO certifications and EU's approval to get included in "Approved yards for ship breaking for EU-flagged ships" All yards included on the list have to fulfil strict environmental and safety requirements set out in the EU regulation, thereby granting the yards exclusive access to the recycling of end-of-life ships flying the flags of European Union members. In its latest version, published in December 2018, the list has 18 approved yards situated in EU itself, one yard located in US and 2 in Turkey. Here it is important to note that total of 11 Indian, 7 Turkish and 4 Chinese yards applied to get EU approval[17].

When we tried to get pulse for apparent disinterest of Pakistani shipbreakers in getting standardized certifications and approvals it brought to light 3 pivotal administrative issues.

1- ***Uncertainty of lease***
   Shipbreakers get yards on "yearly lease" with no guarantee that they will get the same lease next year. In turn this discourages them to make any investment on the yards.

2- ***Provision of Basic Amenities***
   There is no proper infrastructure for provision of basic utilities, which makes yard operations difficult as well as expensive. Whereas unclean water and improper sanitization is causing fatal diseases among workers. There is dire need for government to pitch in and develop infrastructure for basic utilities. However as observed and there further verified that there exists an overlap in jurisdiction of government institutions as a result no one owns the responsibility for infrastructure development. Currently its Balochistan Development Authority (BDA) that oversee administration in Gadani, which itself is struggling due to shortage of funds and misplaced priorities.

[16] https://gcaptain.com/accidents-prompt-pakistani-officials-to-halt-ship-breaking-activities-at-gadani-yards/
[17] https://shippingwatch.com/carriers/article10867049.ece

3- ***Statistics and Press***

During our meeting with Chairman of Shipbreaker Association Pakistan, it was highlighted that there is near to no information about Pakistani shipping industry available, which gives all image building power in hands of international institutions, press and media. The observation is also supported by the case that member of shipbreaking association claims that many yards at Gadani are ISO compliant, but no such claim can be verified by media resources or reliable institution. Whereas, information about India and other countries' shipbreaking industry is easily available on internet.

As much as yards are trying their best to be compliant to international standards and best practices, big shipping companies like Maersk also setting up their own internal compliance protocols in order to be in line with international standards. Maersk has drafted its Responsible Ship Recycling Standard (RSRS) according to which it checks "fitness" of shipyards for recycling of its ships.

Conclusion & Recommendations

Shipbreaking industry because of its low-cost output in the form of steel scrap is considered important for developing nations. Pakistan being one of the developing states should develop plan and policies to modernise and advance shipbreaking sector which will augment feasibility in other sectors. Many developmental and investment projects are in pipeline, for which economists have forecasted increase in demand of steel and iron. In this paper we compared the two resources from where steel re-rolling mills are procuring their raw materials and learned that scrap obtained from shipbreaking is 2.21 times cheap as compared to direct scrap imports[18].

It is also pertinent to mention that shipbreaking sector directly and indirectly provides employment to most underdeveloped/less-skilled people of the country, which in case of direct import of scrap reduces chances of employment. Employment is the second benefit that we can drive by promoting shipbreaking industry.

From recent global trends it is expected that trade will slows down due to trade war between US and China thus ship breaking activities will increase because older ships are not worth their costs.[19]

[18] Comparison is in import value of commodities, not in buying value for re-rolling mills.
[19] https://www.brecorder.com/2018/10/10/444812/shipbreaking-sector-in-the-graveyard/

ANNEXURE

	Number of ships dismantled by type of ship					
Financial Year	Bulk Carrier	Cargo	Container Ship	Other	Tanker	Total
2015	81	6	0	5	31	123
2016	86	4	0	2	18	110
2017	65	10	15	3	7	100
2018	40	16	14	15	24	109

Table 5 Number of ships dismantled by type of vessel

	Quantity of ship (in Million GT) dismantled by type of ship					
Financial Year	Bulk Carrier	Cargo	Container Ship	Other	Tanker	**Total**
2015	3.66	0.06	-	0.04	1.42	**5.19**
2016	4.11	0.04	-	0.01	0.63	**4.78**
2017	2.51	0.12	0.86	0.10	0.32	**3.92**
2018	1.78	0.17	0.55	0.43	2.20	**5.12**

Table 6 Quantity of ship (in GT) dismantled by type of ship

	Number of ships dismantled		
Financial Year	NGO Shipbreaking Platform (a)	State Bank of Pakistan (b)	Variation (a-b)/b
2015	123	131	6%
2016	110	124	11%
2017	100	111	10%
2018	109	126	13%
Total	**442**	**492**	**10.16%**

Table 7 Number of ships dismantled (variation in data set)

In both data sets actual number of ships-dismantled is varying within the limit of 10.16% (see annex Table 7). Based on pessimistic approach we have used NGO's number (as it is lesser than SBP's number) for estimates in the document.

	Reusable Material (in GT)					Reusable material-Total
Financial Year	Bulk Carrier	Cargo	Container Ship	Other	Tanker	
2015	3,584,436	49,451	-	32,618	1,381,411	5,047,916
2016	4,025,827	32,118	-	5,395	606,327	4,669,667
2017	2,460,456	97,333	749,245	78,090	314,635	3,699,758
2018	1,744,954	128,795	478,396	340,469	2,134,753	4,827,366

Table 8 Reusable Material (in GT)

	Value of Scrap (Shipbreaking) per MT		
Financial Year	Rollable Material as per rules (Million MT)	USD value for ship import (Million USD)	USD value per MT (Scrap from Ship breakage)
2015	4.84	708.5	146.3
2016	4.48	403.4	90.0
2017	3.55	395.4	111.4
2018	4.57	706.1	154.5

Table 9 Value of Scrap (Shipbreaking) per MT

	Value of Scrap (Import of Iron and Steel) per MT		
Financial Year	Quantity Million MT	USD value for scrap import (Million)	USD value per MT (Scrap Import)
2015	4.25	1,120. 6	264
2016	4.32	1,087.6	252
2017	3.03	1,043.1	344
2018	2.0	756.9	378

Table 10 Value of Scrap (Import of Iron and Steel) per MT

Financial Year	USD value per MT (Scrap from Shipbreakage) (a)	USD value per MT (Scrap Import) (b)	Difference in value USD (b-a)
2015	170	263.8	93
2016	105	251.8	147
2017	130	344.5	215
2018	178	378.3	201

Table 11Comparison of per MT value of scraps

Different Types of Reusable Materials			
Steel & Iron	Sanitary Wares	Cabin Materials	Bunks
Glass	Insulators	Utensils	Refrigerators
Pipes & Fittings	Food Items	Crockery	
Furniture	Cosmetics	Removable Electrical Items	
Beds	Glass Ware	Electronic Appliances	

Table 12 Different Types of Reusable Materials