



Before the Thar Coal & Energy Board

Tariff Review Petition for Contract Stage Tariff

For

Coal Mine of 7.8mtpa at Block-I of Thar Coalfields

*Pursuant to Rule 10(8) of Thar Coal Tariff Determination Rules, 2014 read with the provisions of Thar Coal & Energy Board Act, 2011*

Dated: 12<sup>th</sup> May 2020

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## 2. DETAILS OF PETITIONER

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### 3. GROUNDS FOR MOTION FOR LEAVE OF CONTRACT STAGE TARIFF

- 3.1 Sino Sindh Resources (Pvt.) Ltd. (“SSRL”) was established to construct, develop, own, and operate Block-I of Thar Coalfields, located in District Tharparkar, Sindh, Pakistan
- 3.2 SSRL, vide its tariff petition dated 2<sup>nd</sup> July, 2019, requested Thar Coal & Energy Board (“TCEB”) in accordance with the authority vested with TCEB to determine Contract Stage Tariff for SSRL’s coal mine of 7.8 million tons per annum (“mtpa”) at Block-I of Thar Coalfields, located in District Tharparkar, Sindh, Pakistan
- 3.3 TCEB pursuant to Rule 10(5) of the Thar Coal Tariff Determination Rules, 2014 (“Rules”), approved determination of Contract Stage Tariff (“Tariff Determination”) for SSRL on 10<sup>th</sup> December, 2019 via determination order bearing reference no. TCEB/Registrar/2-2/2015 dated 31<sup>st</sup> December, 2019
- 3.4 In order to clarify its position vis-à-vis Tariff Determination as detailed in 2.3 above, SSRL requested an extension in time limit for submitting a Motion for Leave for Review or a period of 60 working days, pursuant to Rule 18(2) of Thar Coal Tariff Determination Rules, 2014
- 3.5 TCEB through its order dated 24<sup>th</sup> February 2020 granted an extension of 60 working days from the date of decision of Tariff Determination, i.e. 31<sup>st</sup> December, 2019, for submission of Motion for Leave for Review
- 3.6 Following Tariff Determination, consequent extension of 60 working days, SSRL is filing this Motion for Leave for Review (“Motion for Leave for Review for Contract Stage”), before TCEB, in order to object to, and to clarify key points detailed in Tariff Determination, which played a critical role in determination of Contract Stage Tariff. It is requested that TCEB kindly reconsiders these key points in an objective and holistic manner.
- 3.7 Key issues being covered in this Motion for Leave for Review are as follows, and are elucidated in detail in Section 3 to 9:
  - Construction Time of 18 Months
  - Mining Technology & Equipment Configuration
  - Dewatering Plan
  - EPC Costs
  - Non-EPC Costs
  - Project Development Cost
  - Land Acquisition & Resettlement Costs
  - Effluent Disposal System

- Variable & Fixed Costs
- Rerouting Costs
- Non-EPC Costs
- Proposed Tariff in Review Motion

3.8 It is requested that SSRL be allowed to submit additional evidence, as well as further submissions associated with this Motion for Leave for Review for Contract Stage, if required by TCEB

3.9 We may be pleased to provide any additional information as required by TCEB pertaining to this Motion for Leave for Review

## 4. CONSTRUCTION PERIOD OF 18 MONTHS

SSRL in order to meet its commitments, and to ensure that it is able to provide coal to mine mouth power plants being established, Required Commercial Operations Date (“RCOD”) of which is slated to be 31<sup>st</sup> May 2022 and Scheduled Commercial Operations Date (“SCOD”) is 1<sup>st</sup> March 2021. In order to minimize penalties associated with exceeding SCOD, and definitely have operations in place by RCOD, SSRL has to ensure that COD of mine is attained by 31<sup>st</sup> December 2021.

Although works have been initiated, and procured equipment has either arrived on site, or is currently in transit – overburden removal at full efficiency can only be initiated by 1<sup>st</sup> July 2020. In such a scenario, SSRL essentially has 18 months to attain COD – a herculean task to remove overburden in the range of 160 Mm<sup>3</sup>. It is essential to note here that SSRL has already initiated overburden removal process with existing resources, and has been able to remove 9.34 Mm<sup>3</sup> of overburden till the filing of this petition.

A fairly constrained construction period, relative to an average construction period of 24 to 36 months for similar scope of work, necessitates deployment of equipment, and manpower at a much higher capacity, and efficiency, than previously ascertained. It is pertinent to mention that equipment and manpower deployment is being planned in a highly efficient manner, in order to complete construction within 18 months, while also striving to keep costs low.

The fundamental premise of this review motion is to reconfigure equipment and manpower deployment in a manner which catalyzes fast paced construction, in order to meet COD of mine mouth power plants, while accelerating contribution to the national grid of indigenously sourced, and produced electricity.

It is through this efficient deployment, and a conscious focus on keeping costs low, that cost for overburden removal has been estimated to be in a fairly conservative range of USD 1.42 per bcm. Subsequent sections will elaborate in detail how despite front-loaded deployment, costs are being economized to ensure a levelized tariff which remains market competitive.

## 5. GEOLOGICAL MODEL

Referring to Section 3.1 of Tariff Determination, on Page 5, TCEB advised that proposed increase in overburden volume to 1,942 Mbcm at Contract Stage, from 1,839 Mbcm at Feasibility Stage has not been approved by the competent authority, i.e. Sindh Coal Authority (SCA).

The observation of TCTDC is accepted, and in view of the same, it is requested that the overburden volume of 1,839 Mbcm which was approved for Feasibility Stage is considered for the purpose of this review motion. Considering the restrictive timelines, initiating approval process with the competent authority would require a few months, before any decision can be taken, which will further push construction period, and COD of the mine, thereby resulting in economic losses for all stakeholders, and the economy at large. As overburden volume remains unchanged at 1,839 Mbcm, in-line with Feasibility Stage, stripping ratio is estimated to be 7.80 for 32 years.

However, SSRL will be initiating the process of updating the geological model, and acquiring approval from Sindh Coal Authority in due course – such that by the time COD is near, and SSRL is in a position to apply for COD Tariff, relevant geological model is in place, and is approved by the competent authority.

If TCTDC is able to provide such flexibility to SSRL, it would not only be able to avoid economic losses, but also support accelerated development of the mine, while ensuring that relevant geological model is approved, before a final COD tariff can be determined.

***Considering constraints associated with timeline, and a fairly constrained construction period of 18 months, it is requested that SSRL be allowed to proceed with construction, while initiating process for updating, and seeking approval of the geological model from Sindh Coal Authority. SSRL will strive to ensure that the same is approved ahead of time in order to ensure availability before COD Tariff.***

## 6. MINING TECHNOLOGY & EQUIPMENT CONFIGURATION

Apropos to Section 3.2 of Tariff Determination, TCTDC provides comments regarding *deployment of sub-optimal equipment, as a potential output of 7.8 mtpa necessitates scaling up of equipment*. The observation of TCTDC is understood and accepted, following which SSRL has put in place a plan for scaling up equipment at an opportune stage. It is pertinent to note here that, before any heavier equipment can be deployed assessment of ability of the terrain to withstand such heavy equipment also needs to be in place. Initial deployment of equipment which is being considered sub-optimal can provide the necessary groundwork to assess whether the terrain has the capacity to withstand much heavier equipment<sup>1</sup>.

As assessment of terrain to withstand such heavy equipment is initially an iterative process, SSRL in collaboration with Mehran University of Engineering & Technology is undertaking an extensive study after taking into consideration current equipment configuration, as well as potential heavier machinery to strike the right mix, which will enable economies of scale, while also being suitable to the terrain under consideration. The results of the study being undertaken would be available within twelve to eighteen months, and can then provide the necessary guidance for further improvement of configuration to leverage economies of scale, as the asset replacement cycle kicks in. Going forward, depending on results of the study being undertaken, there can be a gradual transition towards heavier machinery, while phasing out existing machinery towards the end of its useful life.

It may also be pertinent to mention here that Motion for Leave for Review petition filed by SSRL on 20<sup>th</sup> January 2017 further elaborated on selection of mining technology in Section 3.1. On comparing existing deployment and equipment configuration schedule with more scalable equipment (35 m<sup>3</sup> excavators & 220-ton trucks), the savings in operational costs is around CNY 4.8 billion. However, after taking into consideration incremental capital costs in excess of USD 225 million, as well as higher capital costs associated with interest payments, equity payments, Sinosure premium, etc. – the economic benefit arising from cost savings is eliminated, while also reducing the number of jobs, and economic welfare to society in the process.

Section 3.2 of Tariff Determination also restricts equipment considerably, severely undermining the feasibility of mining operations in the process. Considering a fairly restricted construction period, as well as various factors, such as bucket fill, annual production capacity of excavator, etc. – it is essential to increase the number of equipment deployed to achieve targeted COD.

It may be noted here that the construction period entails removal of cumulative overburden quantity of 160 Mm<sup>3</sup> over a period of 18 months. Assuming a bucket capacity of 7 m<sup>3</sup>, weighted

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<sup>1</sup> On a more normative level, more scalable equipment which has significantly higher capacity will require increasingly less reliance on human capital in that area, resulting in increased unemployment. In order to solve problem of unemployment, while also adding incremental value to economy, existing configuration is optimal. Any drastic move towards equipment with considerably higher capacity would have an adverse effect on employment levels in the region.



cycle time of 31 seconds, 6,000 annual operating hours, material density, loading quantity, etc. – annual weighted production capacity of a single excavator is estimated to be 2.506 million m<sup>3</sup>. Detailed calculations for the same are available in Annexure-B.

The number of excavators required is 37 to remove cumulative overburden quantity of 160 Mm<sup>3</sup> over a period of 18 months. However, for the sake of prudence a number of 34 excavators is being proposed in order to ensure effective and efficient deployment, while keeping upfront costs under control. It is also essential to note here that estimation is theoretical right now, as we are working with various assumptions.

SSRL will be in a better position to assess actual requirements, at the time of COD, as more granular actual mine-level data will be available for estimation, and calculations. The numbers will be actualized at COD stage, when more precise mine-level data will be available.

Overburden Removal (m <sup>3</sup> )	160,000,000
Annual Capacity of Excavator (m <sup>3</sup> )	2,506,000
Excavators Required	34

**Table 1: Number of Excavators Required**

As detailed above, the number of excavators being proposed is already lower than the optimal amount considering the construction period. Any number lower than this may lead to delays, and an extended construction period, resulting in higher Interest During Construction (IDC), and other incidental costs. *It may be noted here that by keeping construction period at 18 months, significant savings associated with Interest During Construction are also in place.*

In order to ensure cost overruns and other incidentals are kept at a minimum or negligible, while COD is attained within a target of 18 months, it is critical to deploy at least 34 excavators during the construction period.

On a similar note, 60-ton dump trucks which have been selected for overburden removal are estimated to have an annual transport capacity of 312,332 m<sup>3</sup>, assuming a bucket capacity of 7 m<sup>3</sup>, transportation distance of roughly 3.44 km, annual operating hours of 5,000, and stowage volume of 34 m<sup>3</sup>. In this scenario, hourly transport capacity of a single 60-ton dump truck is 35.65 m<sup>3</sup>. As detailed above, considering a construction period of 18 months, overburden removal per hour is expected to be in the range of 12,177 m<sup>3</sup>.

Keeping in view hourly capacity of trucks of 35.65 m<sup>3</sup>, the number of trucks required to complete construction given COD constraints is 342. However, for the sake of prudence, the number of trucks deployed during the construction period is 340 – of which 140 trucks have already been procured, which have either arrived at site, or are in transit. Detailed calculations for the same are available in Annexure-C.

It is to be noted here that we accept TCTDC’s recommendation of utilizing trucks for 5,000 hours on an annual basis. Furthermore, we are currently working with assumptions, and all calculations, will be trued up on COD. Going forward, towards the end of the construction period, more

granular and precise mine-level data will be available which would act as a base for a more tried up procurement, and costing structure.

Overburden Removal (m <sup>3</sup> )	160,000,000
Annual Capacity of Truck (m <sup>3</sup> )	312,333
Hourly Capacity of Truck (m <sup>3</sup> )	35.65
No. of Trucks Required	342

**Table 2: Number of Dump Trucks Required**

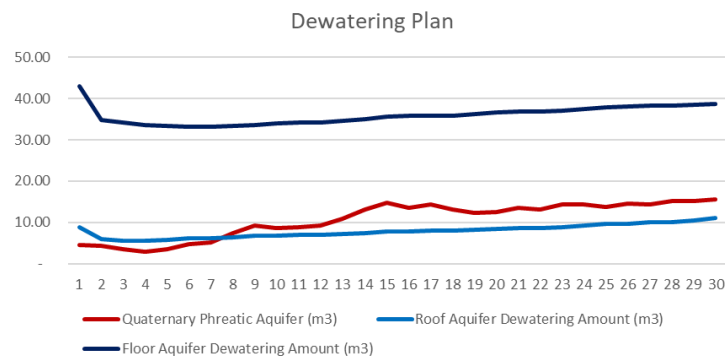
*There exists a strong case for deployment of 34 excavators (7m<sup>3</sup>), and 340 Dump Trucks in order to achieved desired COD in a timely manner, while also economizing operating, and other incidental costs, due to an accelerated construction period. Considering the economic case that exists for the proposed configuration, TCTDC is humbly requested to approve the same. The petitioner also continues to look for a more optimal configuration for the operating period by engaging with, and supporting academia for research & development purposes.*

## 7. DEWATERING PLAN

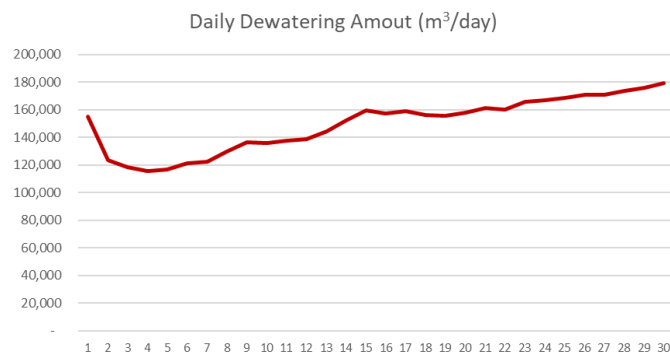
Apropos to Section 4 of Tariff Determination, TCTDC required submission of an annual working plan, and schedule of groundwater production. Relevant data as required is reproduced below, in form of charts, while tabulated data has been provided separately in the financial model. The requirement to seek approvals from relevant authorities is noted, and the same will be sought in due course.

It may however be noted here that calculation of annual dewatering amount is largely based on the hydrogeological model, which is built on the assumption that annual dewatering has reached its intended effect, and dewatering for subsequent year is based on the dropdown of previous year’s dewatering, on the basis of an open-pit mine’s mining scheme. The dewatering model covers a construction period of two years, and production period of twenty-eight years.

It is essential to note here that due to a continuous increase in the size of the pit, there will be complex changes in the groundwater flow field after internal dumping – which cannot be fully predicted, or modeled. The annual dewatering amount hence calculated for operations period is calculated without accounting for the impact of internal dumping.



**Figure 1: Dewatering Plan**



**Figure 2: Daily Dewatering Amount**

## 8. FINANCING STRUCTURE

The Project is being funded with a debt to equity ratio of 75:25, with project debt being denominated in USD. The Project Debt is estimated to be USD 796.4 million, with a maturity of 11.5 years, including a grace period of 1.5 years – which aligns with the construction process. The facility is being arranged by China Development Bank (Shanghai Branch), with Industrial & Commercial Bank of China acting as a Security Trustee.

The debt is priced at is 3-month LIBOR, with a spread of 280 basis points. Debt repayment would be on a semi-annual basis over a period of 10 years, beginning from Project COD.

Referring to Section 5 of Tariff Determination, TCTDC directed to ‘*reduce the interest expense on the project*’. SSRL through extensive negotiations with its lenders has been able to renegotiate the mark-up rate on project debt, for a spread of 280 basis points over 3-month LIBOR. It may be noted that given considerably high sovereign risk<sup>2</sup>, as well as high project risk, through multiple rounds of negotiations, SSRL has been able to reduce the spread.

TCTDC may also be apprised of the fact that despite presence of a sovereign guarantee, lending spread arranged by Block-II of Thar Coalfields (“Block-II”) was 330 basis points over 3-month LIBOR. SSRL has been able to extract a discount of 50 basis points relative to a similar project, without any sovereign guarantee. It may also be noted that external debt raised by Islamic Republic of Pakistan from Commercial Banks during 2018-19 was at an average spread of 254 basis points. SSRL has been able to negotiate a spread at a slight premium over a spread being paid by the sovereign. Demonstrated ability to negotiate a competitive spread exhibits dedication of SSRL to the project.

Considering the rapidly unraveling economic situation globally, it is also essential to note that 3-month LIBOR over the last few months has reduced significantly, and is currently at 0.43463%. As the global monetary environment converges to an interest rate of zero (and even negative in some cases), the benchmark rate may reduce further, benefits of which would be realized during the early years of the Project.

As the Project is now expected to have a construction period of 18 months – Interest During Construction (IDC) will also be only applicable for 18 months, resulting in savings in terms of accrual of interest during the construction period, as instead of an initially envisaged grace period of 3 years – the grace period will now be only 1.5 years. Total duration of debt is now 11.5 years, instead of 13 years. A shorter construction period certainly utilizes more resources, but on the flipside lower finance costs due to a shorter grace period, and relatively lower IDC compensates for any incremental costs.

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<sup>2</sup> Eurobonds of similar maturity issued by Islamic Republic of Pakistan are currently yield 6.64 percent plus, whereas the cost of debt for the Project is estimated to be 3.23 percent.

A Sinosure Fee of 7% is also applicable on the principal amount, as well as the mark-up. It is understood that TCTDC would prefer a lower level of fee. But considering overall sovereign risk, any reduction would be a tough ask, particularly when Block-II, even with presence of a sovereign guarantee is paying a Sinosure Fee of 6.616%. In absence of a sovereign guarantee, getting an amount equivalent to what Block-II is paying, or even lower would be counter intuitive.

It may also be added here that Sinosure Fee has been agreed between two sovereign nations, under the CPEC Framework, and hence it is not at the discretion of SSRL, or Shanghai Electric to renegotiate the same at a lower level. In such a scenario, Shanghai Electric may not be able to renegotiate a lower level of Sinosure Fee, as decision for the same has been taken at a sovereign level.

<b>Debt Funding</b>		USDm
- Sinosure Fee (% of Total Debt)		7.00%
- Principal Amount (incl. IDC)	USD	796.4
- Currency of Debt	CCY	USD
- Total Debt Maturity	Years	11.5
- Grace Period	Years	1.5
- Debt Repayment Period	Years	10
- 3-month LIBOR	%	0.43463%
- LT Debt Spread	%	2.80%
- Effective Interest Rate	%	3.2346%

**Table 3: Particulars of Debt Funding**

The Project has an equity component of 25%, implying total equity contribution of USD 265.5 million. In order to accelerate development of project, and to ensure that COD is attained within 18 months of construction, significant quantum of equipment has already been procured, which has either reached site, or is in transit.

Roughly USD 125.7 million of equity has already been utilized to procure equipment (c. USD 81.78 million), initiate overburden removal (c. USD 14.57 million), and civil works (c. USD 13 million) on site, in addition to Project Development Costs of USD 13.1 million. In order to avoid any delays in ordering, and shipping of equipment, equity contribution had to be made before Financial Close, enabling timely arrival of equipment on the site.

Keeping in view the opportunity cost of time, injection of upfront equity in excess of the percentage mandated by TCTDC was essential to avoid project delays, and keep project timelines on track. Nonetheless, any benefits that could have accrued due to a higher upfront injection of equity are diluted due to a shorter construction period, as ROEDC on a per ton basis actually marginally reduces (relative to approved FS stage tariff), rather than exhibiting any substantial increase.

### Equity Funding

		USDm
- Equity Investment	USD	265.5
- TCEB Guaranteed IRR	%	20%

**Table 4: Particulars of Equity Funding**

<u>Upfront Equity Outlay</u>	<u>31-Dec-19</u>	
<b>OB Removal &amp; Civil Works</b>		
Overburden Removal	USDm	14.57
Mine Service Facilities (incl. Roads)	USDm	10.00
Office and accommodation	USDm	3.00
<b>Equipment &amp; Installation</b>		
Mining and OB Equipment	USDm	78.28
Coal Handling System	USDm	2.45
Dewatering and Drainage	USDm	1.05
<b>Non-EPC Costs</b>		
Rerouting Costs	USDm	2.75
Development Costs	USDm	13.10
Insurance Cost	USDm	0.52
Total Upfront Equity	USDm	125.72

**Table 5: Upfront Equity Outlay**

*Considering demonstrated ability of SSRL to negotiate a lower debt spread which is lower than the yield on sovereign bonds, without any sovereign guarantee, and high project risk exhibits dedication of SSRL to the project. SSRL will continue to strive to keep funding costs low. Similarly, it is also humbly requested to TCTDC that a Sinasure Fee of 7% is allowed given absence of any sovereign guarantee, and the fact that a neighboring block's actual cost is only 39 basis points lower, even with a sovereign guarantee. Furthermore, it is also requested initial equity contribution is fully allowed, considering its importance in ensuring COD is attained in a timely manner. Any benefits of upfront equity contribution are being diluted by a shorter construction period, which is illustrated by a lower levelized ROEDC. It is humbly requested that TCTDC accepts the pleas in this section keeping in view efforts made to keep overall financing costs low.*

## 9. PROJECT DEVELOPMENT COSTS

Referring to Project Development Costs, covered in Section 6 of Tariff Determination, on Page 7, the same is capped at USD 9 million. It is pertinent to mention here that the amount at which the cost is capped is about 68% of what has been actually incurred.

A review of Note 11.1 of audited accounts of SSRL as of 30<sup>th</sup> June 2019 details that the company received USD 9.63 million as remittance from holding company in FY-2018, while also receiving USD 9.82 million in FY-2019 – accumulating to USD 19.47 million. The amount was received as interest free loan, which was convertible into equity. Similarly, during FY-2019, the company also received approximately USD 18 million from Shanghai Electric Group Co., an Associated Company, to support ongoing Project Development Costs. All of these amounts were received by SSRL before 30<sup>th</sup> June 2019, and are reflected in audited accounts accordingly.

As financial close is attained, the amounts received will eventually be converted into equity of the company, as a condition precedent for project debt. It may be noted here that up till 30<sup>th</sup> June 2019, SSRL had received more than USD 37.45 million in either shareholder loan, or loan from associated company – all convertible into equity. Nevertheless, for the purpose of this petition, only USD 13.01 million is being petitioned to be included as Project Development Costs – considering the expenses actually incurred. A detailed breakdown of all Project Development Costs is provided in the table below:

<b>Development Costs</b>		
- Cost for Coal Petitions	USDm	3.50
- Consultancies	USDm	2.00
- Lease & Guarantee	USDm	1.00
- Legal (Hong Kong, China, Karachi & Site)	USDm	3.00
- Survey & Tests	USDm	3.50
- Environmental Costs	USDm	0.10
<b>Total Development Cost (OpEX)</b>	<b>USDm</b>	<b>13.10</b>

**Table 6: Project Development Costs**

It is certainly understood that all costs shall be accounted for as per actual, and for the same, relevant evidence will be provided to TCTDC, in addition to audited accounts of SSRL. Furthermore, it may also be clarified that *Development & Production Assets* as capitalized by SSRL in its audited accounts amount to PKR 2.169 billion, which if translated at relevant exchange rate, is in-line with the amount being claimed for Project Development Costs in this petition.

It may also be noted here that TCTDC comments regarding appointment of an auditor belonging to the Big-4 Audit Firms are accepted, and the same will be appointed in due course. Keeping in view requirements of Companies Act, 2017 – all relevant requirements will have to be followed for replacement of auditor, and the process will be completed in accordance with relevant regulatory procedures.

*Considering that the company had received more than USD 37 million in Pakistan as of 30<sup>th</sup> June 2019, and Project Development Costs have been incurred in the range of USD 13.01 million – evidence of which is being provided by SSRL, as well as through audited accounts. Keeping in view actual costs incurred, it is humbly requested that TCTDC allows USD 13.01 million as Project Development Cost, certainly after satisfying itself with all evidence provided of actual cost incurred.*

## 10. TAXES & DUTIES

A change in taxation regime has resulted in the Project incurring significant taxes, and custom duties, which were not envisaged earlier, nor were they accounted for. A change in taxation regime resulted in imposition of Additional Custom Duty (effective from 1<sup>st</sup> July 2019), which increased the overall cost structure of the project. As per prevailing taxation and duty structure, the Project is anticipated to pay Import Duties and other taxes in the range of USD 54.99 million on cumulative procurement of USD 289.98 million, implying a tax incidence of 18.96 percent on procurement of equipment, and spares. It is essential to note that due to imposition of such taxes, and duties, the tariff is adversely affected in the range of USD 1.027 per ton – as higher taxes associated with procurement during construction stage pushes up overall EPC & Non-EPC Costs, resulting in higher IDC, and other fixed costs.

The table below details various import duties & taxes on various items.

S.No.	Equipment	Quantity	Unit Price (USDm)	Assessed Value	Sub Total
1	Hydraulic Excavator 7.0 m3	34	1.36	46.90	-
2	Hydraulic Excavator 2.0 m3	4	0.34	1.37	-
3	Dump Truck 60t	340	0.16	54.48	7.02
4	Wheel Loader 5.0 m3	5	0.26	1.30	-
5	Crawler Dozer 320 HP	12	0.25	3.04	-
6	Grader 220 HP	6	0.26	1.60	-
7	Sprinkling Tanker 50t	8	0.15	1.21	0.08
8	Hydraulic Excavator 1.1 m3	3	0.17	0.50	-
9	Fuel Tanker	8	0.07	0.57	0.16
10	Grease Vehicle	3	0.39	1.20	0.08
11	Slope Stability Monitoring System	1	1.76	1.79	0.46
12	Crusher System	1	5.30	5.37	2.36
13	Stacker and reclaimers	3	2.30	6.99	3.07
14	Coal lithotypes laboratory and Chemical laboratory	1	0.37	0.38	0.20
15	Conveyor Belt	1	12.66	12.82	2.56
16	Dewatering submersible pumps	73	0.12	8.61	-
17	Pumps( mining field)	3	0.31	0.94	-
18	Pumps (Rainstorm)	3	0.39	1.18	-
19	Pumps(working bench)	8	0.01	0.06	-
20	Dewatering hole and Water drainage pipeline	1	12.66	12.82	6.72



21	Auxiliary Equipment	1	0.27	0.27	-
22	Disposal pipeline pumps	4	0.26	1.06	-
23	Pumps (Flood protection levee)	3	0.01	0.02	-
24	Communication System	1	7.37	7.47	4.54
25	Control System	1	2.00	2.02	-
26	RFO generator	1	18.12	18.36	8.08
27	Power Distribution System	1	15.65	15.86	5.07
28	Water treatment system	1	2.40	2.43	-
29	Sewage treatment system	1	0.47	0.47	0.09
30	Oil sewage drainage system	1	0.19	0.19	0.04
31	Workshop & Warehouse Vehicles	1	5.77	5.84	4.29
32	Gas station & Oil depot	1	0.78	0.79	0.16
33	Site Vehicle	1	4.41	2.23	5.44
34	Air conditioning and ventilation/ Ventilation system	1	12.89	13.06	-
35	Lighting	-	-	-	-
36	Kitchen Appliance	1	0.50	0.51	0.70
37	Dewatering Pipe		-	-	-
38	Mine Service Facilities Spare parts		1.81	1.29	0.09
39	Mine Service Facilities Tyres		0.09	0.09	0.01
40	Dewatering Spare parts		2.93	2.05	0.39
41	Dewatering Tyres		0.00	0.00	0.00
42	Overburden Spare parts		57.07	28.90	2.02
43	Overburden Tyres		22.32	24.61	1.33
	<b>Total</b>				<b>54.99</b>

**Table 7: Taxes & Duties**

*Keeping in view largely unavoidable nature of import duties & taxes, and the fact that the same were not expected to be levied earlier, and were not accounted for – it is humbly requested from TCTDC that cumulative tax & import duties paid are allowed to be recognized as a pass-through items, on the basis of actuals. It is understood that tax code is dynamic, and may often change during the lifecycle of the Project – hence it is requested that any incidence of tax or duties is allowed by TCTDC to be considered as a pass-through item. Furthermore, all taxes will be pass-through on the basis of actualization, evidence of which will be provided to TCTDC.*

## 11. EPC COSTS

Referring to Section 10 of Tariff Determination, on Page 9, TCTDC has restricted EPC Cost to USD 565.48 million. The amount allowed by TCTDC is significantly lower than what may be economically feasible, and may simply not be sufficient to establish the Project under consideration. In order to ensure economic competitiveness of the Project, it is being humbly petitioned to TCTDC to reassess, and review the EPC cost again, after considering the following factors:

- Overburden Removal cost per m<sup>3</sup> is USD 1.42 per bcm, which is largely in the range of what TCTDC had approved in Review for Motion of FS Stage Tariff, while also being in-line with Overburden Removal cost of Block-II. A reduction in construction period from 30 months to 18 months has enabled SSRL to significantly reduce overheads and other fixed costs, while enhancing efficiency of mining equipment to ensure attainment of COD within 18 months. In this scenario, total Overburden Removal, and Dewatering cost is being petitioned at USD 241.61 million.
- Civil Works as a part of EPC Contract is being estimated to be USD 134.02 million, which is lower than an amount of USD 149.6 million, which was approved by TCTDC during Review of FS Stage Tariff. All costs have been accounted for in a cost-conscious manner, a detailed break-up of which has been provided in the financial model.
- EPC Costs allocated to Equipment & Installation amounts to USD 270.04 million, increasing from approved cost of USD 206 million, as in Review of FS Stage Tariff. Increase can largely be attributed to two distinct costs:
  - o Change in configuration of equipment for deployment as discussed in Section 5 above, resulting in higher capital expenditure associated with procurement of excavators, dump trucks, among other equipment. It is to be noted here that price of equipment has changed only marginally since last approved tariff, demonstrating dedication to taking a more cost-conscious route towards mine development
  - o Establishing a 20 MW solar power plant on the site to supplement power generation at a considerably lower price, vis-à-vis RFO. Even though upfront costs of establishing a 20 MW facility is around USD 12.4 million, but the potential savings in operational expenditure outweigh the initial capital expenditure. EPC Cost per MW of solar capacity is estimated to be USD 620,000 with an overall efficiency of 18.10%. Cost of electricity generated from solar is expected to be around US cents 6.2, which is

considerably lower than RFO generated cost of US cents 7.4. Indigenous generation through solar, also hedges against volatility in price of RFO.

#### Characteristics of Solar Power Generation

- Capacity	MW	20.00
- EPC per MW of Solar Capacity	USDm per MW	0.620
- Total CAPEX for Solar Capacity	USDm	12.4
- Annual Degradation Rate	%	0.85%
- Working Hours	Hours per annum	1,669
- Efficiency of Working Hours	%	95%
- Effective Working Hours	Hours per annum	1,586
- Efficiency of Solar Capacity	%	18.10%
- Energy Generated by Solar Capacity	kWh per annum	31,711,000
- Maintenance Cost	RMBm per annum	1.40
- Maintenance Cost	USDm per annum	0.20
- Price of Electricity (Solar) - <i>Maintenance Cost</i>	USD per kWh	0.0062

**Table 8: Characteristics of Solar Power Generation**

- Increase in Dump Trucks from 254 trucks, to 340 trucks during the construction period. The increase in trucks is primarily due to a shorter construction period of 18 months, due to which it is essential to have at least 340 trucks to run construction operations in an efficient manner. The incremental cost of equipment is estimated to be roughly USD 10 million

Total EPC Cost is now proposed to be USD 714.78 million, with selective escalations, primarily in equipment configuration, and solar panels – interventions which reduce overall operating costs through lower IDC, fixed overheads (due to shorter construction period), and lower energy costs (due to lower electricity cost through solar panels). It is to be noted that the proposed cost is considerably lower than EPC Cost of USD 896.49 million, proposed in earlier Contract Stage Tariff petition, largely due to incorporation of valuable guidance provided by TCTDC. A considerable decline in EPC Cost is an effort to demonstrate the cost-conscious focus that SSRL has with respect to the Project.

#### Construction / EPC Costs

##### Total Overburden Removal

Overburden Removal	USDm	227.63
Dewatering Cost	USDm	13.98
<b>Total Overburden Removal</b>	<b>USDm</b>	<b>241.61</b>

##### Civil Works

Roads for overburden and dump yard	USDm	-
Coal Handling System	USDm	27.97
Roads - MSF	USDm	8.19
Construction of dewatering wells and pipeline network	USDm	14.60

Communication system	USDm	-
Power Supply System	USDm	3.56
Water treatment and supply	USDm	12.19
Workshop	USDm	10.97
Warehouse	USDm	3.87
Office and accommodation	USDm	35.48
Leveling, pavement and boundary of MSF	USDm	17.49
Environmental Protection	USDm	-
<b>Total Civil Works</b>	<b>USDm</b>	<b>134.32</b>
<b>Equipment &amp; Installation</b>		
Mining and OB Equipment	USDm	114.21
Coal Handling System	USDm	31.18
Dewatering and Drainage	USDm	41.70
Communication & Control Systems	USDm	9.37
Power Supply System (RFO + Solar)	USDm	46.19
Water treatment and supply	USDm	3.06
Workshop and warehouse	USDm	6.54
Site vehicles and office equipments	USDm	17.80
<b>Total Equipment &amp; Installation</b>	<b>USDm</b>	<b>270.04</b>
<b>Other EPC Costs</b>		
Consultancies and Studies	USDm	-
Legal & Professional Services	USDm	-
Detailed Design Engineering	USDm	11.00
Mine Service Facilities Operating Expenses	USDm	16.75
EPC Contractor Operating Expenses	USDm	16.12
Security Cost	USDm	-
Coal Cost for Power Plant Commissioning	USDm	24.94
<b>Total CAPEX / EPC Costs</b>	<b>USDm</b>	<b>714.78</b>

**Table 9: EPC Costs**

*Considering the essential nature of escalations, and a cost-conscious focus, it is therefore requested that increase in EPC costs be allowed, as the same is primarily being used for increased equipment deployment for a quicker turnaround, and hence lower fixed costs, as well as a solar power plant which will keep energy costs low throughout the lifecycle of the Project. It is essential to note that overburden removal cost at USD 1.42 per bcm remains highly competitive.*

## 12. LAND ACQUISITION & RESETTLEMENT

Referring to Section 8 of the Tariff Determination, land acquisition, and resettlement cost has been capped at USD 50 million – however, the same amount may not be sufficient to acquire land, and more importantly to ensure resettlement in a dignified, and amiable manner.

Total land required by SSRL is 8,581 acres, of which 6,700 acres is land that is being provided by Government of Sindh, while 1,881 acres is land that is being acquired from private individuals. Cost of GoS Land has been fixed at PKR 500,000 as per Letter No. Mukh/953 of 2019 dated 16-Dec-19, in which price was assigned as per Category B for Commercial Purpose for Deh Khari Ghulam Shah. Similarly, estimate of PKR 260,000 per acre for private land is based on actual transactions that SSRL has entered into, for acquisition of land. In-effect, land acquisition will require USD 24.9 million. It is however understood that prices may fluctuate due to multiple factors, and the amount can be rationalized on the basis of actual transactions.

<b>Land Acquisition Costs</b>		
Cost of Land (GoS)	PKR per acre	500,000
Cost of Land (Private)	PKR per acre	260,000
Cost of Land (GoS)	USD per acre	3,127
Cost of Land (Private)	USD per acre	1,626
Land Required (GoS)	Acres	6,700
Land Required (Private)	Acres	1,881
Total Land Required	Square km.	34.73
Total Land Required	Acres	8,581
Administrative Cost for Land Acquisition	USDm	0.79
<b>Total Cost of Land</b>	<b>USDm</b>	<b>24.8</b>

**Table 10: Land Acquisition Costs**

Resettlement involves a multi-pronged approach to community development, and simply does not involve just cash transfers. In order to provide a holistic community driven solution, through a resettlement plan, and with consultation with locals, extensive working has been done to develop housing colony, mosques, temples, basic health units, and schools, among other key pillars of community living. A detailed breakdown of all such costs is provided below, and is estimated to cost USD 49.7 million, at an average cost of USD 52,441 per household.

<b>Resettlement Costs</b>		
Number of Households to be Resettled	Households	948
Goucher (Grazing Land)	USDm	5.00
Construction of Village	USDm	1.25
Housing Colony (incl. Sewerage)	USDm	32.61
Mosques	USDm	0.50
Temples	USDm	0.20
Basic Health Units	USDm	1.25
Schools	USDm	0.75

Community Halls	USDm	1.00
Commercial Areas	USDm	1.25
Link Roads & Streets	USDm	4.38
Solar Lights (Home & Street)	USDm	1.25
<b>Total Cost of Resettlement</b>	USDm	<b>49.44</b>

**Table 11: Resettlement Costs**

*It is humbly requested to TCTDC that the cap that has been imposed is removed, and SSRL be allowed to provision up to USD 74.24 million for land acquisition and resettlement. The amount will be trued up and actualized as and when progress is made regarding acquisition, and resettlement. Considering a focus on enabling community living, a more holistic approach to resettlement planning is required, which can be achieved through the community driven interventions, and support.*

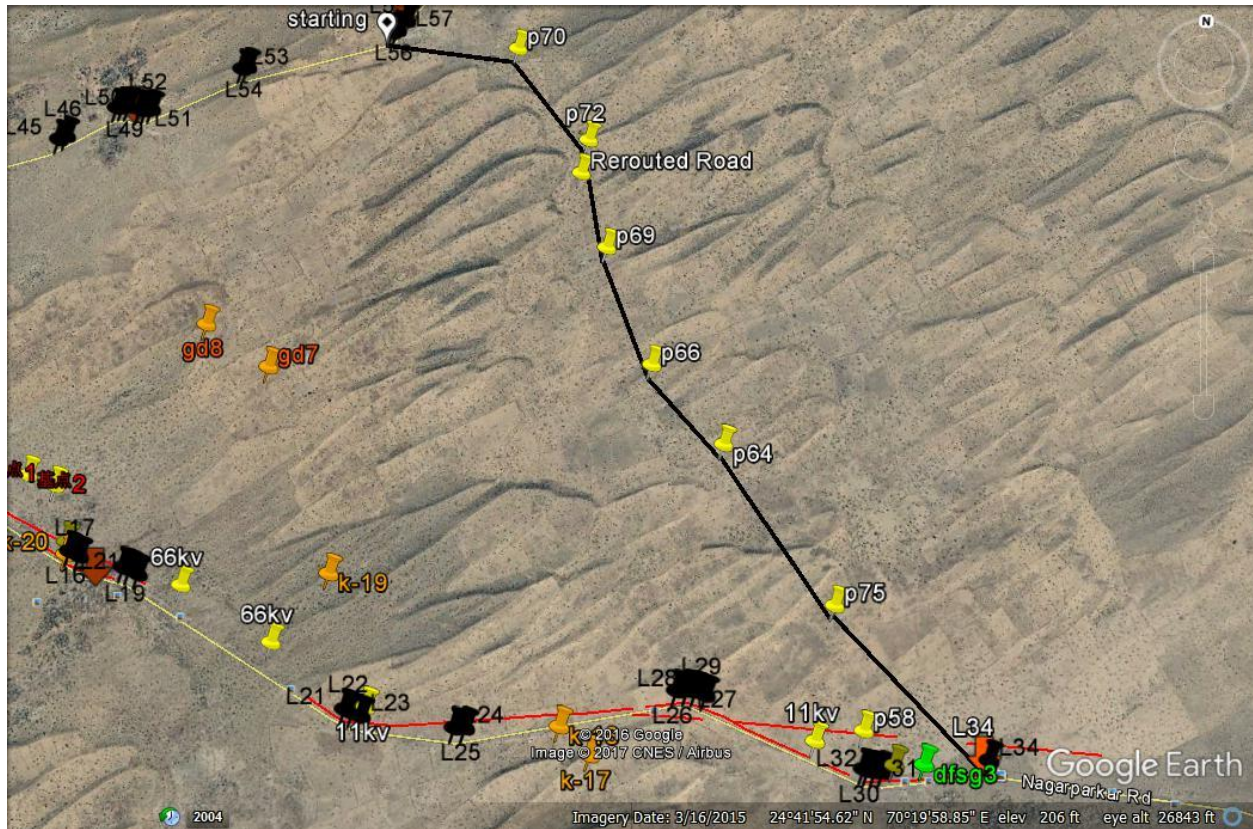
### 13. RESERVOIR & PIPELINE

Dewatering is an essential requirement for open-pit mining, and for that purpose it is essential to have an Effluent Disposal Scheme (EDS) in place, with bare minimum requirements being a pipeline, and a reservoir to efficiently manage effluent disposal. As EDS is not directly a part of mining operations, and is ancillary in nature, hence civil work of the same is being considered as a part of Non-EPC cost, while equipment is being considered as an EPC cost.

The EDS in the case of SSRL comprises a 34-kilometer long single pipeline with a capacity of 50 cusecs, and a terminal reservoir. The costs associated with development of EDS are associated with procurement of land falling enroute, earth work, route alignment, procurement of special purpose pipes, specialized vehicles, construction of reservoir, etc. As the costs are being incurred by the Project, rather than Government of Sindh, Project costs have been notched up accordingly.

The EDS involves laying of 1200 mm diameter Glass Reinforced Polyester (GRP) Pipes for a length of 34 kilometers, for draining of wastewater, and as an effluent channel from mining area of Block-I of Thar Coalfields. It is estimated that the pipeline would cost around USD 25.84 million, of which roughly USD 17.07 million can be attributed to procurement of GRP pipes. As the pipeline will stretch over 34 kilometers, and will mostly be underground, pipes of stiffness class (SN) 5,000 and 10,000 are being procured for the same, with a cost of USD 427 and USD 555 respectively per Running Meter. Total cost for laying a pipeline is estimated to be around USD 0.502 million per kilometer. Detailed calculation for the same has been provided in the financial model.

The pipeline will be connecting mining area with the terminal reservoir, which is estimated to be constructed at a cost of USD 14.86 million. The cost being budgeted is largely in-line with the cost incurred in construction of Gurano reservoir in the neighboring mine, providing a fair estimate regarding the cost to be incurred for the terminal reservoir.



**Figure 3: Anticipated Route for Pipeline**

*Considering the importance of an Effluent Disposal System, and its criticality in mine operations, as well as a focus on value consciousness in estimation of costs, it is humbly requested that TCTDC allows a cumulative cost of USD 40.70 million, for both pipeline (USD 25.84 million), and terminal reservoir (USD 14.86 million) to be a part of Non-EPC Costs. Enabling incurrence of same would allow SSRL to initiate construction of EDS in a priority manner, in order to ensure the same is completed in-line with project timelines.*

## 14. REROUTING COSTS

Referring to Section 17 of Tariff Determination, TCTDC has raised the question regarding non-recognition of re-routing expenses in Feasibility Stage, while also capping re-routing expenses at USD 6 million for each case subject, viz. transmission line, water pipeline, and road.

It is to be noted here that the same expenses were incorporated in feasibility stage, and were modeled for, in the financial model accordingly. However, considering the peculiar nature of these costs, the same are being explained in sufficient detail, as these expenses are beyond the scope of generic mining EPC costs

It is estimated that the cost of road relocation would be around USD 9.5 million, cost components of which have been provided in sufficient detail in the financial model. It may also be pertinent to mention here that significant civil works have already been completed, and only carpeting of the road remains. Similarly, relocation costs of USD 2.5 million have been allocation for re-routing of transmission line, and USD 2 million have been allocated for relocation of pipeline. On a cumulative basis, total relocation costs are estimated to be USD 14 million, for which firm contracts are already in place, with civil works already in process. In order to ensure transparency, and to corroborate such expenses, relevant contracts are also being submitted with this petition. It is also essential to note here that pipeline will be along rerouted road. In the rerouting map below, green line represents the 132 kV Transmission Line, the black line represents the PHED Pipeline, and the yellow line represents the rerouted road.



***Considering the essential nature of rerouting costs, which largely fall outside the scope of mining, it is humbly requested from TCTDC to allow such costs to be a part of overall project cost. It is further implored that since total cost of USD 14 million is lower than the sum of cap of USD 6 million each as designated by TCTDC – the rerouting costs are accepted, and be rationalized on the basis of actuals at the COD stage.***



## 15. VARIABLE & FIXED COSTS

Variable O&M Costs on a levelized basis have been reassessed to be USD 8.43 per ton, which is much lower than approved levels of Tariff Determination. The reduction in cost can largely be attributed to decline in fuel costs, with the impact being rationalized by higher utilization of equipment being deployed, particularly in the case of hydraulic excavators, and dump trucks. It is being estimated that annual operating hours of hydraulic excavators, and dump trucks would be 6,000 hours, and 5,000 hours respectively – previous the same were 5,400 hours, and 4,500 hours respectively.

It may also be noted here that tremendous effort has been put in reducing costs across the board, through which, SSRL has been able to significantly reduce Power Costs, through introduction of solar power, as operating cost of solar is only a small fraction of operating cost of RFO unit, resulting in an overall lower blended power cost. Despite a reduction in RFO prices pushing down overall power costs, solar continues to be more competitive, keeping blended cost lower. Similarly, costs associated with lubricants have also considerably reduced, with blended cost of lubricants being in the range of USD 4.13 per liter, relative to earlier costs of USD 12 per liter. It is also essential to note here that salary & management costs have either reduced, or have been kept in the same range as they were approved in Review Motion of FS Stage.

	Levelized USD per ton
Spares & Consumables	2.27
Fuel Costs	4.84
Lubricants Costs	0.67
Tyre Costs	0.65
Power Costs	0.85
Labour & Management Salary	3.23
Safety & Security Cost	0.26
SSRL Operating Expenses	3.07
Other Costs	3.01
Variable O&M	8.43
Fixed O&M	10.41
Operating Cost	18.84

**Table 12: Levelized Variable & Fixed O&M Costs**

***Variable & Fixed O&M costs have considerably been reduced compared to earlier approved levels, not just due to lower price levels, but also due to lower power, and other costs. Keeping in view significantly lower Variable & Fixed O&M costs, it is humbly requested that TCTDC allows the same. We would like to apprise TCTDC of the fact that significant work has been done in rationalizing costs associated with lubricants, and power, which will feed into a lower tariff in the longer run.***

## 16. OTHER PROJECT / NON-EPC COSTS

Non-EPC and Other Project Costs amount to USD 272.8 million, most of which have either been pegged at similar levels to FS Stage Determination, or have been shifted from EPC Contract, to Other Project Costs, as the nature of such costs was beyond the scope of the EPC Contract.

It is to be noted here that Consultancies & Studies, Legal & Professional Services costs, and Security Costs have been kept unchanged relative to FS Stage approved tariff. However, the same will be actualized at the time of COD, with relevant evidence provided to TCTDC. Similarly, Development Costs have been rationalized, and have been further discussed in detail in Section 9 of this document. In addition, Import Duties & Taxes have also been considered as Non-EPC Costs, and have been discussed in detail in Section 10 of this document

Civil Works for EDS & Terminal Reservoir have been shifted from EPC Costs to Non-EPC Costs as their nature was beyond the scope of the EPC Contract. They have been discussed in detail in Section 13 of this document.

### Other Project Costs / Non-EPC Costs

		USDm
- Consultancies and Studies	USDm	28.41
- Legal & Professional Services	USDm	10.00
- Security Cost	USDm	3.00
- Development Costs	USDm	13.10
- Terminal Reservoir	USDm	14.86
- 34 km Drainage / Effluent Water Channel - Civil Works	USDm	8.77
- Crush Stone Filling for Roads	USDm	14.24
- Re-routing Works (Road+Water+Transmission)	USDm	14.50
- Insurance Cost	USDm	3.79
- Arrangement & Commitment Fee	USDm	5.94
- Interest During Construction	USDm	26.42
- Sinosure Fee	USDm	67.46
- Revenue from Pre-COD Coal Sales	USDm	(23.51)
- SSRL Operating Expenses	USDm	22.05
- Environment Conservation	USDm	8.80
- Import Duties & Taxes	USDm	54.99

**Table 13: Non-EPC Costs**

In a nutshell, all costs detailed above have been discussed in sufficient detail in the petition, while detailed calculations of the same are also provided in the financial model.

***Keeping in view genuine, and operations critical nature of costs detailed above, it is humbly requested that TCTDC accepts the costs accordingly. It is understood that all such costs will be actualized, and trued up at a latter stage, with all evidence to be provided to TCTDC as and when required***

## 17. PROPOSED TARIFF IN REVIEW MOTION

Coal Tariff Determination Order No. TCEB/Registrar/2-2/2015 dated 31<sup>st</sup> December 2019 determined a levelized tariff of USD 35.84 per ton. The determined tariff was not economically feasible, keeping in view significant challenges associated with the terrain, and the project, as well as tight deadlines. Considering the inability of creating an economic case at the determined tariff, the review motion attempts to provide a higher, more reasonable level of tariff, at which level the project would be economically feasible for all stakeholders involved. The review motion proposes a levelized tariff of USD 43.41 per ton, with a production payment of USD 22.10 per ton, and capacity payment of USD 21.31 per ton. The table below provides a detailed comparison of tariff proposed in EPC Review stage.

	SSRL Review Determination (9-Jan-17)	SSRL Petition (2-Jul-19)	SSRL Determination (10-Dec-19)	SSRL EPC Review Petition
<b>Levelized Tariff (USD per ton)</b>				
Variable O&M	8.98	11.49	9.73	<b>8.43</b>
Fixed O&M	10.82	10.52	8.41	<b>10.41</b>
Working Capital Interest	0.38	1.19	0.39	<b>0.47</b>
Insurance	1.16	0.80	0.51	<b>0.49</b>
Asset Replacement Reserve	2.25	3.02	2.24	<b>4.20</b>
Royalty	3.33	3.53	2.50	<b>3.26</b>
ROEDC	2.06	2.71	1.23	<b>1.83</b>
ROE	6.75	7.58	4.82	<b>6.84</b>
Principal	6.30	7.06	4.52	<b>6.50</b>
Interest	2.34	2.74	1.49	<b>0.99</b>
<b>Levelized Tariff</b>	<b>44.37</b>	<b>50.63</b>	<b>35.84</b>	<b>43.41</b>

**Table 14: Levelized Tariff Comparison**

It can be seen from the table above that costs have largely been kept in-line with FS Stage Review Determination, with escalations only in certain cases to account for increased deployment due to tight construction deadline. The levelized tariff is actually lower than FS Stage Review Determination. Significant effort has been put in to rationalize costs across the board, with the base cost being considered the approved FS Stage Review cost. It is at this level SSRL feels that the Project is economically feasible, with the bandwidth for further cost reductions being very tight, and narrow. It may also be noted here that review petition has significantly rationalized costs vis-à-vis earlier petition submitted, in-line with valuable guidance provided by TCTDC.

*Considering the strategic importance of the Project, and demonstrated ability of SSRL to keep costs low despite the challenging nature of the Project, which has been further illustrated in detail throughout the petition, it is humbly requested from TCTDC that a levelized tariff of USD 43.41 per ton is approved, which is largely in the range of earlier determinations, as well as in-line with the precedence that exists for neighboring block. It is fully understood that all costs will be actualized, and SSRL will continue to focus on rationalizing costs across the board to keep overall cost levels under control*

## 18. ANNEXURE-A: LEVELIZED TARIFF

Coal Tariff Table Levelized (USD per ton)											
Year	Variable O&M	Fixed O&M	Working Capital Interest	Insurance	Asset Replacement Reserve	Royalty	ROEDC	ROE	Principal	Interest	Tariff
1	9.81	10.09	0.60	0.49	8.79	4.02	1.83	6.84	8.87	2.33	53.67
2	9.56	10.65	0.55	0.49	4.73	3.72	1.83	6.84	9.13	2.15	49.64
3	9.56	11.07	0.55	0.49	4.73	3.76	1.83	6.84	9.39	1.96	50.17
4	9.56	11.01	0.55	0.49	4.73	3.76	1.83	6.84	9.69	1.73	50.19
5	8.15	10.12	0.52	0.49	3.96	3.52	1.83	6.84	10.01	1.50	46.93
6	7.95	10.16	0.52	0.49	3.96	3.51	1.83	6.84	10.34	1.25	46.84
7	7.95	10.18	0.52	0.49	3.96	3.52	1.83	6.84	10.67	1.00	46.95
8	7.93	10.39	0.52	0.49	3.58	3.51	1.83	6.84	11.02	0.74	46.83
9	7.88	10.19	0.52	0.49	3.99	3.53	1.83	6.84	11.38	0.47	47.11
10	7.88	10.32	0.52	0.49	3.99	3.55	1.83	6.84	11.75	0.19	47.35
11	7.88	10.72	0.36	0.49	3.99	2.60	1.83	6.84	-	-	34.71
12	7.88	9.99	0.36	0.49	3.99	2.54	1.83	6.84	-	-	33.90
13	7.88	10.28	0.36	0.49	3.99	2.57	1.83	6.84	-	-	34.22
14	7.88	9.93	0.35	0.49	3.97	2.54	1.83	6.84	-	-	33.82
15	7.88	10.53	0.36	0.49	3.97	2.59	1.83	6.84	-	-	34.47
16	7.88	10.78	0.36	0.49	3.97	2.61	1.83	6.84	-	-	34.74
17	7.88	10.12	0.33	0.49	2.02	2.39	1.83	6.84	-	-	31.89
18	7.88	10.36	0.33	0.49	2.02	2.41	1.83	6.84	-	-	32.15
19	7.88	10.57	0.33	0.49	1.97	2.42	1.83	6.84	-	-	32.33
20	7.88	10.22	0.33	0.49	2.05	2.40	1.83	6.84	-	-	32.04
21	8.39	11.03	0.34	0.49	1.99	2.51	1.83	6.84	-	-	33.41
22	8.39	10.44	0.34	0.49	2.31	2.48	1.83	6.84	-	-	33.11
23	8.39	10.86	0.34	0.49	1.67	2.47	1.83	6.84	-	-	32.87
24	6.44	10.04	0.31	0.49	1.67	2.24	1.83	6.84	-	-	29.85
25	6.44	9.88	0.31	0.49	1.67	2.23	1.83	6.84	-	-	29.67
26	6.44	10.23	0.29	0.49	0.48	2.16	1.83	6.84	-	-	28.75
27	6.44	9.78	0.29	0.49	0.48	2.12	1.83	6.84	-	-	28.26
28	6.44	10.07	0.29	0.49	0.48	2.14	1.83	6.84	-	-	28.58
29	6.44	9.89	0.28	0.49	0.00	2.09	1.83	6.84	-	-	27.86
30	6.44	10.08	0.29	0.49	-	2.10	1.83	6.84	-	-	28.06
	<b>8.43</b>	<b>10.41</b>	<b>0.47</b>	<b>0.49</b>	<b>4.20</b>	<b>3.26</b>	<b>1.83</b>	<b>6.84</b>	<b>6.50</b>	<b>0.99</b>	<b>43.41</b>

Figure 4: Coal Tariff Table Levelized (USD per ton)

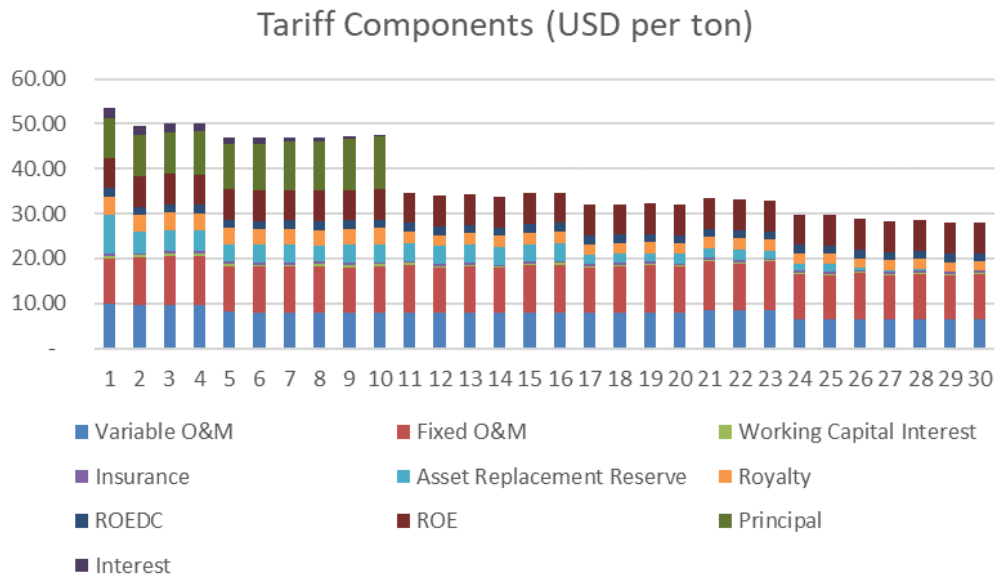


Figure 5: Tariff Components (USD per ton)

## 19. ANNEXURE-B: CALCULATION OF EXCAVATORS

No. 序号	Item 项目	Unit	Mining coal seam C 开采C煤	Mining coal seam A、B 开采A、煤	Stripping 剥离 Sand 沙	Stripping 剥离 Sand Rock 硬岩	Stripping 剥离 Weighted Average 加权平均
1	Capacity of bucket 挖掘机斗容	m <sup>3</sup>	7.0	2.0	7.0	7.0	
2	Cycle time of excavator 挖掘机循环周期	s	34.0	34.0	23.4	32.0	28.6
3	Loading of truck 卡车载重	t	60.0	60.0	60.0	60.0	
4	Stowage volume of truck 卡车堆装体积	m <sup>3</sup>	55.0	55.0	34.0	34.0	
5	Full bucket rate of each bucket 每斗满斗率		0.8	0.8	1.0	0.8	0.8
6	Loose coefficient of materials 物料松散系数		1.3	1.3	1.3	1.3	
7	Density of materials 物料容重	m <sup>3</sup> /t	1.3	1.3	1.8	1.8	
8	Actual loading capacity of each bucket 每斗实际装载量	m <sup>3</sup>	4.2	1.2	5.3	4.2	
9	Quantity of spoon 计算勺数		10.5	36.7	5.1	6.5	
10	Actual loading quantity of each vehicle 实际装车斗数		10.5	36.7	5.1	6.5	
11	Cycle number 循环次数		11.0	37.0	5.0	7.0	
12	Pure loading time 纯装车时间	s	374.0	1,258.0	117.0	224.0	
13	Time of waiting for the caller 等调时间	s	30.0	30.0	30.0	30.0	
14	Total of each vehicle loading time 每台车装车时间合计	s	404.0	1,288.0	147.0	254.0	
15	Loading quantity per hour 小时装车数		8.9	2.8	24.5	14.2	
16	Production capacity per hour of excavator 挖掘机小时能力	m <sup>3</sup> /h	392.1	123.0	666.1	385.5	
17	Annual production time of excavator 挖掘机年作业时间	h	6,000.0	6,000.0	6,000.0	6,000.0	
18	Annual production capacity of excavator 挖掘机年作业能力	10 <sup>4</sup> m <sup>3</sup> /a	235.0	44.0	400.0	231.0	298.6
19	Annual production capacity for design 设计采用能力	10 <sup>4</sup> m <sup>3</sup> /a	235.0	44.0	400.0	231.0	298.6

Figure 6: Calculation of Excavators

## 20. ANNEXURE-C: CALCULATION OF TRUCKS

Operation Period - Calculation of mining equipments						
No. 序号	Item 项目	Unit	Operation Period 1 year		Operation Period year	
1	truck type 卡车类型		stripping truck		coal truck	
2	Mining coal seam 开采煤层		Mining coal seam C 开采C煤	Mining coal seam A、B 开采A、煤	Mining coal seam C 开采C煤	Mining coal seam A、B 开采A、煤
3	Annual transportation volume 年运量	10 <sup>4</sup> m <sup>3</sup>	468.00	145.52	468.00	145.52
4	Transport distance 运距	km	4.60	4.60	4.60	4.60
5	Capacity of bucket 单斗挖掘机斗容	m <sup>3</sup>	7.00	2.00	7.00	2.00
6	Full bucket coefficient 满斗系数		0.75	0.75	0.75	0.75
7	Cycle time of each bucket 每勺循环时间	s	34.00	34.00	34.00	34.00
8	Solid weight of materials 物料实方容重	t/m <sup>3</sup>	1.25	1.34	1.25	1.34
9	Loading of truck 卡车载重	t	60.00	60.00	60.00	60.00
10	Stowage volume 堆装体积	m <sup>3</sup>	34.00	34.00	55.00	55.00
11	Loose coefficient 松散系数		1.25	1.25	1.25	1.25
12	Annual valid working time of truck 卡年年有效工作时间	h	5,000.00	5,000.00	5,000.00	5,000.00
13	Calculation of truck loading spoons of each vehicle 计算每车装载勺数取值		6.48	22.67	10.48	36.67
14	Cycle number of excavator 挖掘机装车循环次数		7.00	23.00	11.00	37.00
15	Running speed 运行速度	km/h	14.55	14.55	14.55	14.55
16	Loading time 装车时间	min	3.97	13.03	6.23	20.97
17	Running time of round transport 往返运行时间	min	37.95	37.95	37.95	37.95
18	Waiting time 等车时间	min	-	-	-	-
19	Unloading time 卸车时间	min	2.00	2.00	2.00	2.00
20	Cycling time 循环时间	min	43.92	52.98	46.18	60.92
21	Annual running times per set 台年运行次数		6,831.12	5,662.16	6,495.85	4,924.76
22	Annual transport capacity per set 台年运输能力	10 <sup>4</sup> m <sup>3</sup> /a	18.58	15.40	28.58	21.67
23	Calculation of truck number 计算卡车台数	Set 台	25.19	9.45	16.37	6.72
24	Designed value(Truck number) 设计取值(卡车台数)	Set 台	26.00	10.00	17.00	7.00
25	Calculation value of excavator for mining 计算采煤挖掘机台数	Set 台	1.99	3.31	1.99	3.31
26	Designed value of excavator for mining 采煤挖掘机设计取值	Set 台	2.00	4.00	2.00	4.00
27	Designed value(Coal mining Truck number) 设计取值(卡车台数)	Set 台		36		24

Figure 7: Calculation of Mining Equipment (Operation Period)

Construction and operation Period - Calculation of stripping equipments								
No. 序号	Item 项目	Unit	Construction Period 18月	Operation Period 1 year	Operation Period 5 year	Operation Period 6 year	Operation Period 21 year	Operation Period 24 year
1	Annual transportation volume 年运量	Mm3	160.00	60.06	60.06	58.50	63.18	44.54
2	Transport distance 运距	km	3.44	3.70	2.60	2.60	2.60	2.60
3	Capacity of bucket 单斗挖掘机斗容	m <sup>3</sup>	7.00	7.00	7.00	7.00	7.00	7.00
4	Full bucket coefficient 满斗系数		0.83	0.83	0.83	0.83	0.83	0.83
5	Cycle time of each bucket 每勺循环时间	s	28.56	28.56	28.56	28.56	28.56	28.56
6	Solid weight of materials 物料实方容重	t/m <sup>3</sup>	1.80	1.80	1.80	1.80	1.80	1.80
7	Loading of truck 卡车载重	t	60.00	60.00	60.00	60.00	60.00	60.00
8	Stowage volume 堆装体积	m <sup>3</sup>	34.00	34.00	34.00	34.00	34.00	34.00
9	Loose coefficient 松散系数		1.25	1.25	1.25	1.25	1.25	1.25
10	Annual valid working time of truck 卡年年有效工作时间	h	5,000	5,000	5,000	5,000	5,000	5,000
11	Calculation of truck loading spoons of each vehicle 计算每车装载勺数取值		5.85	5.85	5.85	5.85	5.85	5.85
12	Cycle number of excavator 挖掘机装车循环次数		6.00	6.00	6.00	6.00	6.00	6.00
13	Running speed 运行速度	km/h	14.55	14.55	14.55	14.55	14.55	14.55
14	Loading time 装车时间	min	2.86	2.86	2.86	2.86	2.86	2.86
15	Running time of round transport 往返运行时间	min	28.40	30.53	21.45	21.45	21.45	21.45
16	Waiting time 等车时间	min	-	-	-	-	-	-
17	Unloading time 卸车时间	min	2.00	2.00	2.00	2.00	2.00	2.00
18	Cycling time 循环时间	min	33.25	35.38	26.31	26.31	26.31	26.31
19	Annual running times per set 台年运行次数		9,021	8,479	11,404	11,404	11,404	11,404
20	Annual transport capacity per set 台年运输能力	10 <sup>4</sup> m <sup>3</sup> /a	24.54	23.06	31.02	31.02	31.02	31.02
21	Calculation of truck number 计算卡车台数	Set 台	434.69	260.41	193.62	188.59	203.68	143.59
22	Designed value(Truck number) 设计取值(卡车台数)	Set 台	435.00	261.00	194.00	188.00	203.00	143.00
23	Calculation value of excavator for stripping 计算剥离挖掘机台数	Set 台	35.72	20.11	20.11	19.59	21.16	14.92
24	Designed value of excavator for stripping 剥离挖掘机设计取值	Set 台	36.00	21.00	21.00	20.00	22.00	15.00

Figure 8: Calculation of Mining Equipment (Construction & Operating Period)