



## Upgradation of Vertical Coke Oven (VCO) Plant

**ESL Steel Limited,**  
(a subsidiary of Vedanta Limited)

**REGISTERED OFFICE:**

Siyaljori, P.O. Jogidih, O.P. Bangaria, P.S.  
Chandankyari, Bokaro, Pin - 828303, Jharkhand, India



**ESL STEEL LIMITED**  
(Formerly known as Electrosteel Steels Limited)

## EXPRESSION OF INTEREST

**Vedanta Limited**, a subsidiary of Vedanta Resources plc. the world's 6th largest natural resources company and a leading producer of zinc, lead, silver, oil & gas, copper, iron ore, aluminum, steel, and commercial power.

**ESL Steels Limited**, a subsidiary of Vedanta Limited, operates 1.5 Million Ton Per Annum (MTPA) integrated steel plant near Siyaljori village in the Bokaro district of Jharkhand. ESL has established excellence at every stage of production by bringing international expertise and solution from reputed manufacturers.

As part of our transformation initiative, ESL invites Expression of Interest (EOI) from Indian & Global partners with expertise in upgradation of Vertical Coke Oven (VCO) Plant by implementing the latest technologies, operational improvement and digitization. Scope shall cover the complete design, Engineering, supply, construction, commissioning and demonstration of Performance guarantee of the facility. Refer detailed Scope of work on website: [www.eslsteel.com](http://www.eslsteel.com)

Interested parties of good repute and having proven track record may send their EOI along with their company profile, client list and other suitable credentials at the below mentioned mail id within 7 days from the publication of this advertisement : [ESL.project@vedanta.co.in](mailto:ESL.project@vedanta.co.in) [esl.bids@vedanta.co.in](mailto:esl.bids@vedanta.co.in)



## SCOPE OF WORK FOR 0.5MTPA VCO UPGRADATION

### 1.0 Objective

Project objective is to enhance the production capacity of Vertical Coke Oven (VCO) plant by 10% over present capacity of ~0.6MTPA on dry basis (Design capacity – 0.5 MTPA) by technological advancement, operational improvement and digitization.

### 2.0 Overview of plant

ESL Coke oven plant consist of 0.5MTPA VCO and 0.5 MTPA HCO. Horizontal Coke Oven (HCO) plant was partially built (not in operation) whereas, VCO is already in operation. Considering capacity of HCO to be 0.6 MTPA on dry basis, EPC partner to check the adequacy of common facilities of VCO and HCO (such as coal blending bin, Coal Crushing system, Mixing system, Coke cutting unit, Coke screening and coke storage house).

### 3.0 Detailed Scope of work

- 3.1 EPC partner scope includes all necessary design, engineering, manufacturing supply, supervision, construction/ erection/ installation, start-up, testing and commissioning to upgrade existing VCO plant for achieving upgraded production capacity from 35x4 coke oven chamber.
- 3.2 EPC Partner shall demonstrate performance guarantee for upgraded capacity of VCO.
- 3.3 Complete responsibility of the project schedule, quality etc. shall be in the scope of EPC partner.
- 3.4 EPC partner shall check the adequacy of existing plant and equipment (Coal storage bunkers, Crusher, Mixer ,Coal tower and its accessories, stamping system, Charging/Pusher car, Oven proper, Flue tunnel, Quenching facilities, Coke cutting and screening system, feeding and discharging conveying system) to ensure the feasibility for enhanced capacity and necessary engineering for all the equipment which need upgradation/modification.

EPC partner shall also ensure that the additional flue gases generated from VCO upgraded capacity should be directed to boilers or chimney and the adequacy of the same to be check.

- 3.5 EPC partner shall study the existing flue tunnel design and address necessary modification, technological advancement to avoid recurring problem of refractory collapse inside the tunnel.
- 3.6 EPC Partner to upgrade the existing VCO capacity with minimum modification and minimum down time. Detailed schedule for upgradation to be furnished along with list of equipment/ part that needs to be replace/modify for aforesaid upgradation. Schedule should clearly mention time required for engineering, supply and execution.
- 3.7 Supply of necessary commissioning spares, all consumables and special tools (if required) shall be in the scope of EPC Partner.
- 3.8 Scope which is not explicitly mentioned above but are required for the smooth completion of VCO upgradation shall be in the scope of EPC Partner.
- 3.9 EPC Partner shall include advanced level (min level II) of automation where ever possible, to reduce manpower requirement during operation, and to improve safety aspect & productivity of the coke oven plant.

#### 4.0 Major Technical Index

##### 4.1 Main dimension and specification of LRJ-2005 clean type heat recovery coke oven

S. No	PARTICULARS	Unit	Values
1	Total height of coking chamber	Mm	4430
2	Total length of coking chamber	Mm	12670
3	Average width of coking chamber	Mm	560
4	Centre distance of coking chamber	Mm	1240
5	Quantity of dry coal per charge of coking Chamber (Dry)	MT	~24
6	Gradient of coking chamber	Mm	10
7	Centre distance of Vertical flue	Mm	460
8	Density of charged coal cake	Ton/m3	1.05~1.10
9	Coking Hours	Hr.	34-38
10	Number of chambers (Ovens) for 0.5million tons	No's	4x35

#### 4.2 Raw Material Parameters

S. No	Design Parameters	Unit	Values
1.	Coal Ash	%	8-10
2	Volatile Material	%	<24
3	Sulphur	%	<0.6
4	Moisture (max)	%	<10
5	Caking Index		76-85

#### 4.3 Desired Coke Quality

S. No	Design Parameters	Unit	Values on dry basis
1.	Coke Ash (max)	%	10-13%
2	Sulphur	%	<0.6
3	Moisture	%	<5%
4	Coke strength		
	-M40 (min)	%	>82
	-M10	%	5-7
5	CSR (min)	%	>64
6	CRI	%	23-25

#### 4.4 Production Data

S.N	Description	Unit	Design values	Present values
1	Gross carbonization time	Hr.	34 -38	33.5
2	Coal Bulk Density	Ton/m3	1.05~1.10	1.05~1.10
3	Quantity of dry coal per charge of coking Chamber (Dry)	MT	~24	~24
4	No of oven pushing per day	No's		100
	a. 100% utilization)		88	
	b. (95% utilization)		84	
5	Gross coke yield (Dry)	MTPA	0.5	0.6
6	Waste Gas Generation			
	a. Flow	Nm3/h	358624	358624
	b. Temperature	°C	950-1050	1100-1250

## 5.0 Plant Facilities & Major Equipment's

5.1 VCO and HCO is having common facilities as mentioned below (S. No 7-S.No 12):

S. No.	Major facilities & equipment	Quantity/capacity
1	Pusher car	2 No's
2	Quenching car	2 No's
3	Coke guide car	2 No's
4	Stamping machine	2 No's
5	Waste recovery boilers	2x75 TPH
6	Waste gas chimneys	2 No's
<b>Common Facilities for VCO and HCO</b>		
7	Coal silos	10 No's-500 Tons each
8	Coal blending bin with weigh / disc feeder	10 No's
9	Hammer mill	2 No's – 400 Tons each
10	Mixer machine	1 No
11	Coke cutter	2 No's
12	Coke screen	6 No's

## 5.2 Coal Charging & Pusher Car Details

S. No.	Particulars	Values
1	<b>Car Travel Mechanism</b>	
	Travel speed (LT)	62 m/min
	Travel gauge	8025 mm
	Motor power (LT)	22 kwx4
2	<b>Coke Pushing Drive Mechanism</b>	
	Pusher drive speed	27 m/min
	Pusher Stroke Length	16420 mm
3	<b>Coal Cake Drive Mechanism</b>	
	Drive Speed	16 m/min
	Conveying Coal Stroke	14500 mm
	Rotary Speed of Motor	589 r/min
	Motor Power	900KW
4	<b>Pusher Car Track Line</b>	QU120

### 5.3 Electric Engine & Quenching Car

S. No	Particulars	Values
1	<b>Traveling mechanism of car</b>	
	Traveling Speed (LT)	89 m/min
	Track gauge	1676 mm
	Motor power	55KW
2	<b>Mechanism Quenching car</b>	
	Inclining angle	30°
3	<b>Model of track</b>	P50

### 5.4 Stamping Station

S. No	Particulars	Values
1	Rammer Weight	446 Kg
2	Rammer stroke	400 mm
3	Rammer frequency	69 rpm
4	Travel gauge length	2000 mm
5	Traveling motor	22 KW
6	Traveling Speed	~ 9.9 m/min
7	Power of stamping with 6 pieces of rammer	60 KW
8	Total power of stamping station coal tower for 0.5 MTPA	240 KW
9	Weight	24.5 Ton/set
10	Motor power of dupler feed at each side	7x4 KW

### 5.5 Coke Guide & De-dusting Car

S. No.	Particulars	Values
1	Traveling speed (LT)	87.6 m/min
2	Track gauge length	1600 mm
3	Travelling motor power	11 kw
4	Rotary Speed	711r/min
5	Dia. of wheel	600mm
6	Moving stroke of guiding barrier	500 mm
7	Moving stroke of open door	1000 mm
8	Speed of lifting door	2mm/min
9	Stroke of lifting door	150mm
10	Air Pressure	1100pa
11	Flow Rate	44128 m3