Annexure- IV

Report on Energy Conservation, Technology Absorption and Foreign Exchange Earning as per the provisions of the Companies Act 2013 and rules notified thereunder

(A) Conservation of Energy:

(i) The steps taken or impact on Conservation of Energy & the capital investment on energy conservation equipments:

During the year 2022-23, 119 Energy Conservation Schemes were implemented across the Indian Oil Refineries wherein energy savings of 2,55,379 SRFY/year, equivalent to a monetary savings of ₹ 840 Crore/year was achieved. Through implementation of the Energy Conservation schemes, IndianOil has achieved reduction in approx. 0.81 MMT equivalent CO2 emission per year. Some of the major schemes implemented during 2022-2023 are provided below:

<table>
<thead>
<tr>
<th>SL No</th>
<th>Energy saving schemes</th>
<th>Estimated Cost (in Lakh)</th>
<th>Estimated Fuel Savings (SRFY) (MT/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Operating of HDT MUGC-B on Grid at Guwahati Refinery</td>
<td>-</td>
<td>3000</td>
</tr>
<tr>
<td>2</td>
<td>Porlite insulation of HP+MP+LP Steam lines (6.5 km) Barauni Refinery</td>
<td>1561</td>
<td>2955</td>
</tr>
<tr>
<td>3</td>
<td>Execution of steam trap management program at BR at Barauni Refinery</td>
<td>875</td>
<td>7530</td>
</tr>
<tr>
<td>4</td>
<td>Piping from BS-VI offsite MP Steam line for supplying MP steam to bitumen terminal at Gajipur Refinery</td>
<td>38.2</td>
<td>3200</td>
</tr>
<tr>
<td>5</td>
<td>Recovery of PSA II off gas and routing to FG header at Gajipur Refinery</td>
<td>673.1</td>
<td>7680</td>
</tr>
<tr>
<td>6</td>
<td>Rectification of identified hotspots of Insulation Survey at Gajipur Refinery</td>
<td>-</td>
<td>6100</td>
</tr>
<tr>
<td>7</td>
<td>PSV passing survey and rectification at Haldia Refinery</td>
<td>6.6</td>
<td>3700</td>
</tr>
<tr>
<td>8</td>
<td>Reduction of steam in VDU-2 1st stage ejector at Haldia Refinery</td>
<td>-</td>
<td>5926</td>
</tr>
<tr>
<td>9</td>
<td>Commissioning of WSA to generate steam and H2SO4 at Haldia Refinery</td>
<td>-</td>
<td>23700</td>
</tr>
<tr>
<td>10</td>
<td>MP steam stoppage in TPT1 Dewatering Matru Refinery</td>
<td>5500</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>O2 enrichment and stoppage of air preheat in SPU (Unit no. 25, 55 &amp; 56) at Panipat Refinery</td>
<td>666</td>
<td>4500</td>
</tr>
<tr>
<td>12</td>
<td>Installation of Tail gas compressor at DHOS for routing of excess PSA Off gas to FG header post processing of H2 rich gases in HGU 06 PSA at Panipat Refinery</td>
<td>2290</td>
<td>4685</td>
</tr>
<tr>
<td>13</td>
<td>Rerouting of flash steam from HRSG de-aerator to UB de-aerator and stoppage of LP import from units at Panipat Refinery</td>
<td>-</td>
<td>5387</td>
</tr>
<tr>
<td>14</td>
<td>Ceramic coating for optimised emissivity in AVU-1 furnaces at Panipat Refinery</td>
<td>98.4</td>
<td>3079</td>
</tr>
<tr>
<td>15</td>
<td>Reducing stack losses in HRSG through MH at Bongaigaon Refinery</td>
<td>20</td>
<td>3608</td>
</tr>
<tr>
<td>16</td>
<td>Coke De-etheranizer/Stripper inlet feed preheater for reduced MP Steam consumption in DCU at Paradip Refinery</td>
<td>214.0</td>
<td>6327</td>
</tr>
<tr>
<td>17</td>
<td>Crude preheat improvement by 5 degree Celsius</td>
<td>-</td>
<td>6266</td>
</tr>
</tbody>
</table>

SRFT: Standard Refinery Fuel Equivalent Tones

Further, as part of energy conservation initiative, an Energy Efficiency Improvement Study (EEIS) of the 8 IndianOil Refineries (except Paradip) was awarded to Engineer India Ltd. (EIL) through Center for High Technology (CHT) in 2017. After a detailed review of total energy savings schemes by EIL, 122 energy savings schemes with estimated saving potential of approx. 44,330 SRFY/year were identified for implementation/further study, out of which 25 schemes, including all quick-win schemes, with energy saving potential of ~28,000 SRFY/year, were implemented in 2018; 14 schemes with energy saving potential of ~22,800 SRFY/year were implemented in 2019-20; 10 schemes with energy saving potential of ~8,400 SRFY/year were implemented in 2020-21; 10 schemes with energy saving potential of ~14,814 SRFY/year were implemented in 2021-22; 19 schemes were implemented in during 2022-23 with energy saving potential of ~31,000 SRFY/year.

(ii) Steps taken by the Company for utilising alternate sources of energy:

- The renewable energy portfolio of the Company includes grid connected power and off-grid solar power. The Company is replacing fluorescent tube lights & incandescent lamps with LED lighting.
- The Company has 25.57 MWp of solar panels across various refineries with a total annual generation capacity of 33 GWh of electricity.
(B) Efforts made towards Technology Absorption, Adaptation and Innovation

As a continuous effort towards improvement of product pattern, product quality, improvement of energy efficiency as well as to meet the dynamic environmental emission norms to improve profit margin, your Company has adopted most modern technologies in line with the latest worldwide developments in the field of petroleum refining and petrochemicals production. Major technologies adopted by the Company are as follows:

### a. Indigenous Technology

**i. indeDiesel® (Diesel Hydrotreatment) Technology**

indeDiesel® Technology developed for BS-VI quality diesel production by R&D Centre along with Engineers India Limited has been successfully implemented in Bongaigaon, Gujarat (DHDS revamp and DHDT revamp) and Haldia Refinery and is under implementation at Barauni Refinery.

**ii. iIndeJet® Technology**

iIndeJet® Technology is jointly licensed by R&D centre and EIL for treating Naphtha range and EIL for ATF production by selective removal of ultra-low Sulphur (≤ 0.5 ppmw) kTA units at Paradip Refinery for Feed treatment of Isomerisation unit and commissioned in May 2021.

**iii. indDSK® Technology**

indDSK® is low severity Hydrotreating Technology currently operational (Gujarat Refinery and HMEL, Bathinda Refinery).

**iv. iINDAdeptG® Technology**

INDAdeptG® Technology has developed an indigenous process technology for selective removal of light cracked Naphtha through increase in oxygenates has been successfully demonstrated at Gujarat Refinery in 2019. A grassroot unit is being considered for implementation at Gujarat Refinery.

**v. iIndJet® Technology**

iIndJet® Technology is jointly licensed by R&D centre and EIL for ATB treatment by selective removal of mercaptan Sulphur. The technology has been implemented for a grassroot-400 kTA unit at Barauni Refinery which was commissioned in Jun/22.

**vi. iINDS® Technology**

iINDS® is a process technology, jointly licensed for R&D centre and EIL, for treating Naphtha range hydrocarbon streams to achieve product streams containing ultra-low sulphur (≤ 0.6 ppmw). A 235 kTA grassroot unit has been commissioned at Bongaigaon Refinery for Feed treatment of isomerisation unit and commissioned in May 2021.

**vii. iIndSelectG® Technology**

iIndSelectG® Technology in-house developed selective hydrotreating based technology for cracked gasoline desulfurisation with minimum octane loss. A 80 kTA grassroot unit has been commissioned at Guwahati Refinery in July 2022.

**viii. iINDMAX Technology**

INDMAX Technology developed in-house by R&D centre and Lumrus Technology for converting heavy distillate and residue into LPG/light distillate products has been implemented successfully at Guwahati Refinery, Paradip Refinery and Bongaigaon Refineries and are proposed to be implemented at Barauni, Gujarat, Panipat and CPCIL, Refinery. Based on the in-house formulation recipe, INDMAX base catalyst, manufactured and supplied for a commercial trial in FCC unit at Mathura Refinery for performance improvement in propylene yield. Performance test run was successfully completed and met the expected propylene yield.

**ix. Octamax Technology**

Octamax Technology, developed by R&D centre, has been successfully implemented at Mathura Refinery for production of High-octane Gasoline blending stream from refinery LPG streams. A 110 KTPA capacity plant based on this technology is under implementation at Gujarat Refinery under LuPech Project. The technology has also been licensed to CPCIL under CBR Expansion Project.

**x. AmyleMax Technology**

AmyleMax Technology, developed by R&D centre, for improvement of octane number of light cracked Naphtha through increase in oxygenates has been successfully demonstrated at Gujarat Refinery in 2019. A grassroot unit is being proposed for implementation at Gujarat Refinery.

**xi. Hexane Hydrogenation Technology**

Hexane Hydrogenation process for production of Food grade Hexane (WHO grade quality), developed by R&D centre with indigenous catalyst has been successfully implemented at Gujarat Refinery.

**xii. Delayed Coker Technology**

Delayed Coker Technology, developed by R&D centre and EIL has been successfully demonstrated for Coker-A revamp at Barauni Refinery. The technology is also under implementation for Coker-B revamp at Barauni Refinery Expansion Project.

**xiii. CBG Technology**

CBG technology developed by R&D centre for production of CBG from cattle dung/paddy straw. A 100 TFD plant on cow dung feedstock was mechanically commissioned at Hingopia, Jaipur during May 2022 and commissioning underway. Also 200 TFD plant based on paddy straw feed is under implementation at Sirshahpur.

**xiv. 2G Ethanol Unit**

Technology from Paj Industries for production of Ethanol from rice straw (2G Ethanol unit) is being implemented at Panipat. Full scale commissioning of the envisaged 2G Ethanol Plant is scheduled during 2023-24. 2G Ethanol project targets production of 100 KLPD of bio-ethanol using waste biomass like paddy straw to enhance country’s energy security providing extra income to farmers and solving environment problems for burning of rice straw in fields.

**xv. NEECOMAX Technology**

NEECOMAX Technology is developed by R&D centre, for production of Needle grade petroleum coke from Clarified Oil, Calcined Needle Coke is a value-added niche product produced from low value feedstock. Needle Coker unit based on NEECOMAX Technology is proposed to be implemented at Paradip Refinery.

**xvi. SR LPG Treatment Technology**

SR LPG Hydrotreater Technology for treatment of SR LPG is under implementation at Panipat Refinery Expansion Project (P-25).

**xvii. iInd-Coker® Technology**

iInd-Coker® Technology developed an indigenous technology for Delayed Coker unit with two stage cracking process to reduce the coke yield and increase the distillate yield from the unit. Existing DCU at Digboi Refinery is being revamped using iInd-Coker™ Technology under Digboi Refinery Expansion Project.

### b. Imported Technology

**i. 3G Ethanol Unit**

Technology from M/s LanzaTech, USA for production of Ethanol from off gas has been implemented at Panipat Refinery.

**ii. Alkalization Technology**

For production of MS, Alkalization Technology from M/s Exxon Mobile, USA has been implemented at Paradip Refinery.

**iii. ATF Treatment Technology**

ATF Merox Treatment Technology from M/s UOP, USA has been implemented at Gujarat and Panipat Refineries. Technology from M/s Merichem, USA has been implemented at Paradip Refinery.

**iv. Biturx Technology**

To produce various grades of Bitumen as well as to meet the quality requirements, Biturx Technology from M/s Porner, Austria is under implementation at Gujarat, Mathura and Barauni Refineries.

**v. Butane Isomerisation Technology**

For production of Alkylate, Butamer Technology from M/s UOP, USA has been implemented at Paradip Refinery.

**vi. Butene-1 Technology**

For production of Butene-1 Technology from M/s Axens, France has been implemented at Gujarat Refinery and at Panipat complex.

**vii. Catalytic Iso-dewaxing Technology**

For improving lube oil quality in line with international standards and augmenting production capacity of API Gr II LOBS. Iso-dewaxing technology from M/s MOBIL, USA has been implemented at Haldia Refinery. Catalytic Dewaxing technology from M/s Chevron Lumrus Global (CLG) for production of API Gr II and Gr III LOBS has been considered in expansion project at Panipat Refinery and LuPech Project at Gujarat Refinery.

**viii. Catalytic Reforming Technology**

For improvement in Octane number of Motor Spirit, Continuous Catalytic Reforming Technology (CCRl) from M/s Axens, France has been implemented at Mathura and Panipat Refineries. Continuous Catalytic Reforming Technology from M/s UOP, USA has been implemented at Gujarat, Paradip and Barauni Refineries. Catalytic Reforming Technology (CRL) with Russian collaboration has been implemented at Gujarat Refinery and from M/s Axens has been implemented at Haldia, Barauni, Digboi and Bongaigaon Refineries. Continuous Catalytic Reforming Technology (CCRl) from M/s UOP has been considered in Expansion Project at Panipat Refinery.

**ix. Coker Gas Oil Hydrotreatment Technology**

Coker Gas Oil Hydrotreatment Technology from M/s Axens, France has been implemented at Haldia Refinery under DYIP Project.

**x. Coke Calcination Technology**

Coke Calcination Technology from METSO, USA for production of Calcined Needle Coke is proposed to be implemented at Paradip Refinery.

**xi. Delayed Coker Technology**

For bottom of the barrel upgradation, Delayed Coker Technology from M/s Lumrus Technology, USA
has been implemented at Panipat Refinery as part of Panipat Refinery Expansion Project. Delayed Coker Technology from M/s Foster Wheeler, USA has been implemented at Gujarat Refinery under Resid Upgradation Project, at Paradip Refinery and also at Haldia Refinery under Distillate Yield Improvement (DYIP) Project.

xii. Diesel Hydro Desulphurisation Technology Diesel Hydro Desulphurisation (DHDTS) Units have been installed at Mathura and Panipat Refineries with technology from M/s Axens, France and at Gujarat and Haldia Refineries with technology from M/s UOP, USA to meet the Diesel quality requirement wrt Sulphur. Technology from M/s Haldor Topsoe, Denmark is in operation at Gujarat, Mathura, Haldia, Panipat and Barauni Refineries and has been implemented at Gujarat Refinery under Resid Upgradation Project. Similar technology from M/s Technip Energies, the Netherlands has been implemented for Hydrogen generation at Guwahati, Digboi, Mathura and Haldia Refineries. Hydrogen Generation Technology from M/s Technip Energies, Netherlands has been implemented at Bongaigaon Refinery under Diesel Quality Improvement Project.

xiii. Divided Wall Column (DWC) Technology Divided Wall Column (DWC) Technology is a new separation technology which separates a multi-component feed into three or more purified streams within a single tower, thereby eliminating the need for a second column to obtain high purity products. This design saves capital and energy costs by eliminating operation of second separation column. DWC of M/s KBR USA has been implemented at Mathura Refinery at CCRU-NSU.

xiv. Fluidised Catalytic Cracking Technology Fluidised Catalytic Cracking (FCC) Technology from M/s UOP, USA has been implemented at Gujarat Refinery and Mathura Refineries for conversion of Vacuum Gas Oil to LPG, MS and Diesel. Technology from M/s Lummus Technology, USA has been implemented at Paradip Refinery. Technology from M/s Shell Global Solutions, Netherlands is implemented at Paradip Refinery and has been considered in Expansion Project at Panipat Refinery.

xv. Hydrocracker Technology Full Conversion Hydro Cracking Unit (HCU) Technologies from M/s Chevron USA and M/s UOP USA have been implemented at Gujarat Refinery and Panipat Refinery, respectively for conversion of Vacuum Gas Oil to Jet fuel, Kerosene and Diesel. Revamp of HCU Unit based on technology from Chevron Lummus Global is under implementation at Gujarat Refinery under LuPech Project to produce feedstock for LOIS/CDW Unit.

xvi. Hydro-finishing Technology for Treatment of Paraffin Wax/Micrystalline Wax Process Technology from M/s Axens, France for hydro finishing of paraffin wax has been implemented at Digboi Refinery.

xvii. Hydrogen Generation Technology Hydrogen Generation Technology from M/s Linde, Germany was adopted for Hydrogen production and supply to Hydrocracker unit at Gujarat Refinery and has been implemented at Barauni Refinery under M/s Quality Improvement Project. Hydrogen Generation Technology from M/s Haldor Topsoe, Denmark is in operation at Gujarat, Mathura, Haldia, Panipat and Barauni Refineries and has been implemented at Gujarat Refinery under Resid Upgradation Project. Similar technology from M/s Technip Energies, the Netherlands has been implemented for Hydrogen generation at Guwahati, Digboi, Mathura and Haldia Refineries. Hydrogen Generation Technology from M/s Technip Energies, Netherlands has been implemented at Bongaigaon Refinery under Diesel Quality Improvement Project.

xviii. ISOSIV Technology at Guwahati Refinery For production of isomerate for blending in MS at Guwahati Refinery. ISOSIV Technology from M/s UOP, USA has been implemented.

xix. Kerosene Hydro Desulphurisation Technology Kerosene Hydro Desulphurisation Unit has been installed at Haldia Refinery with technology from M/s Axens, France.

xx. LPG Treatment Technology Coker LPG Merox Treatment Technology from M/s UOP, USA has been implemented at Panipat Refinery and Haldia Refinery under DYIP Project. FCC LPG Treatment Technology from M/s Merichem, USA has been implemented at Haldia and Paradip Refineries. Straight Run LPG Treatment Technology from M/s UOP, USA has been implemented at Paradip Refinery. LPG Treatment Technology from M/s UOP is under implementation in B-9 Expansion Project at Barauni Refinery.

xxi. MS Quality Upgradation Technology For MS Quality Upgradation, Isomerisation Technology of M/s UOP, USA has been implemented at Mathura, Panipat and Gujarat Refineries. Isomerisation Technology from M/s Axens, France has been implemented at Haldia, Guwahati, Digboi and Barauni Refineries. FCC Gasoline Desulphurisation Technology (Prime-G) from M/s Axens, France has been implemented at Haldia, Mathura, Panipat Barauni and Bongaigaon Refineries. Isomerisation Technology of M/s UOP, USA is under implementation in Expansion Projects at Barauni, Panipat and Gujarat Refineries.

xxii. Naphtha Cracker and Downstream Petrochemical Technology Naphtha Cracker Technology from M/s ABB Lummus, USA has been implemented at Paradip Refinery. Technologies from M/s Basell, Italy, M/s Basell Germany, M/s Novia Chemicals, Canada and M/s Scientific Design, USA have been implemented for downstream polymer plants viz. Poly-Propylene Unit (PP), HDPE Unit, Swing Unit (HDPE/LDPE) and MEG Unit, respectively. Technology from M/s ABB Lummus has been implemented for production of Butadiene. Technology from M/s Basell, Italy is under implementation at Paradip Refinery for production of Poly-Propylene. Technology from M/s Scientific Design, USA is under implementation at Paradip Refinery for production of MEG. Poly-Propylene Unit (PP) with technology developed by M/s McDermott has been considered in Expansion Projects at Barauni and Gujarat Refineries. PP with technology from M/s Basell is under implementation in Expansion Project at Panipat Refinery.

xxiii. FCC Naphtha Treatment Technology FCC Naphtha Treatment Technology from M/s Merichem, USA for removal of Mercaptans and H2S is implemented at Paradip Refinery. Technology for Naphtha Hydrodeashing and Fractionating from M/s UOP, USA is implemented at Paradip Refinery and has been considered in Expansion Projects at Barauni, Paradip and Gujarat Refineries. Naphtha hydro treating from M/s UOP, USA has been implemented at Barauni Refinery under BS-IV Project.

xxiv. Once Through Hydrocracking Technology Once Through Hydrocracking Units (OHCU) have been installed at Panipat, Mathura and Haldia Refineries with the technologies from M/s UOP, USA, M/s Chevron, USA and M/s Axens, France respectively for improvement of distillate yield. OHCU Technology by M/s Chevron Lummus Global (CLG) has been considered in Expansion Project at Barauni Refinery.

xxv. Resid Fluidised Catalytic Cracking Technology The Resid Fluidised Catalytic Cracking (RFCC) Technology from M/s Stone and Webster, USA (now part of Technip) has been implemented at Panipat, Haldia and Barauni Refineries.

xxvi. Resid Hydrocracker Technology H-Oil Technology (Resid-Hydrocracker) from Axens, France for enhancement of distillate yield from the bottoms (Vacuum residue) is being implemented at Paradip Refinery under P-2 E Project.

xxvii. Solvent Dewaxing/De-oiling Technology at Digboi for upgrade the process for production of Paraffin Wax at Digboi Refinery, Solvent dewaxing/ de-oiling technology from M/s UOP, USA has been implemented.

xxviii. Sulphur Pelletisation Technology For production of Sulphur in Pellet form, Technology from M/s Sandox, India has been implemented at Gujarat, Mathura and Panipat Refineries.

xxix. Sulphur Recovery Technologies for reduction of SO2 emissions Refineries at Gujarat, Haldia, Mathura and Barauni are provided with Sulphur Recovery Technology from M/s Wolrey, Netherlands. The Sulphur Recovery Technology from M/s Delta Hudson, Canada has been implemented at Panipat Refinery. Further, Sulphur recovery technologies from M/s Black & Veatch Pritchard, USA have been implemented at Panipat, Gujarat and Paradip Refineries. Technology from M/s Technip Energies, Spain has been implemented at Haldia Refinery under once through Hydrocracker Project. Technology from M/s Wolrey, Netherlands has been implemented under additional Sulphur Recovery Unit at Mathura Refinery. Technology from M/s Lurgi, Germany has been implemented under DYIP Project at Haldia Refinery. Technology from M/s Axens, France is under implementation at Panipat Refinery and Bongaigaon Refinery. Sulphur Recovery Technology from M/s Kinetic Technology is under implementation in Expansion Project at Barauni Refinery and technology from M/s Worley is under implementation in expansion at Paradip Refinery.
xxiv. Technology for Linear Alkyl Benzene (LAB)
Technology from M/s UOP USA has been implemented for production of Linear Alkyl Benzene at Gujarat Refinery.

xxx. Technology for Para-Xylene
For production of Para-Xylene at Panipat, technologies from M/s UOP USA have been implemented. Technology from M/s UOP USA has been considered at Paradip Refinery.

xxxvi. Technology for TAME Technology
For production of TAME at Panipat Refinery, technology from M/s Axens, France has been implemented at Paradip Refinery.

xxxvii. VGO Hydrotreatment Technology
Technology from M/s Invista, USA has been implemented for production of Linear Alkyl Benzene at Paradip Refinery.

xxxviii. Sulphuric Acid Plant Technology
Technology from M/s Axens, France has been implemented at Paradip Refinery. The SRU has been commissioned in June 2022.

xxxix. Technology for Para-Xylene
Technology from BP Amoco has been considered at Paradip Refinery.

xl. Poly Butadiene Rubber (PBR) Technology
Poly Butadiene Rubber (PBR) Technology from M/s Goodyear Tire and Rubber Corporation, USA is under implementation at Panipat Refinery and Petrochemical Complex. PBR Unit is expected to be commissioned in March 2025. The project PBR is a major raw material for Automotive Tyres.

xli. Technology for Isomerate from M/s UOP, USA.
Technology for Isomerate through Isomerisation Unit from M/s UOP, USA has been implemented for production of high grade lubricant base stocks which help in reducing import dependence.

xlii. Technology for Hydrogen Generation from M/s UOP, USA.
Technology for hydrogen generation from HTAS, Denmark has been implemented.

xliii. Technology for Sulphur Recovery Unit, from M/s Linde, Germany.
Technology for Sulphur Recovery Unit from M/s Linde, Germany has been commissioned in March 2023.

xliv. Ethanol from Off-gas of HGU
Technology for Ethanol from Off-gas of HGU from M/s Lanzatech, USA has been implemented.

xlv. Ethylene Glycol (MEG) Project at Paradip Refinery
Technology for Ethylene Glycol (MEG) Project at Paradip Refinery from M/s CB&I Lumus, USA has been commissioned in March 2023.

vi. Fuel Quality Upgradation Project in Guwahati Refinery
The details of technology imported:
- Technology for desulphurisation of FCC Gasoline at Guwahati Refinery, from M/s Axens, France.
- Technology for desulphurisation of gas oils, from M/s UOP, USA.
- Technology for production of Reformate from FCC, from M/s Axens, France.
- Technology for production of Reformate through Ebululated bed Hydrocracker unit, from M/s Chevron, USA.
- Technology for production of Sulphur from M/s Axens, France.
- Technology for production of Reformate through Catalytic Reforming Unit from M/s Axens, France.
- Technology for production of LPG from M/s Axens, France.

The year of import: 2017-18/2018-19
Whether the technology been fully absorbed: The Project is in implementation stage. Expected commissioning by December 2024.

vii. Ethylene Glycol (MEG) Project at Paradip Refinery
Technology for Ethylene Glycol (MEG) Project at Paradip Refinery from M/s CB&I Lumus, USA has been commissioned in March 2023.

The year of import: 2017-18/2018-19
Whether the technology been fully absorbed: The Project is in implementation stage. Expected commissioning by December 2024.

viii. Catalytic Reforming Unit Project in Guwahati Refinery
The details of technology imported:
- Technology for production of Reformate from M/s UOP, USA.
- Technology for production of Reformate from M/s Axens, France.
- Technology for production of Reformate from M/s Axens, France.

The year of import: 2018-19
Whether the technology been fully absorbed: The Project is in implementation stage. Expected commissioning by December 2024.

ix. Catalytic Reforming Unit Project in Guwahati Refinery
The details of technology imported:
- Technology for production of Reformate from M/s UOP, USA.

The year of import: 2018-19
Whether the technology been fully absorbed: The Project is in implementation stage. Expected commissioning by December 2024.

x. Ethylene Glycol (MEG) Project at Paradip Refinery
Technology for Ethylene Glycol (MEG) Project at Paradip Refinery from M/s CB&I Lumus, USA has been commissioned in March 2023.

The year of import: 2017-18/2018-19
Whether the technology been fully absorbed: The Project is in implementation stage. Expected commissioning by December 2024.
Technology for Ethylene Glycol from M/s Scientific Design, USA.
The year of import: 2016-17/2017-18
Whether the technology been fully absorbed: The Project has been commissioned in February 2023.

xi. Gujarat Refinery Expansion Project
The details of technology imported:
- Technology for production of Reformate and Isomerate from M/s UOP, USA.
- Technology for Poly Proplene production from M/s Lummus Novolen, Germany.
- Technology for production of Lube oil base stock through HCU revamp and Catalytic Dewaxing Unit from M/s. Chevron Lummus Global, USA.
The year of import: 2018-19
Whether the technology been fully absorbed: The Project is in implementation stage - Expected commissioning by 2024-25.

xii. Panipat Refinery Expansion Project
Technology for desulphurisation of gas oils, from M/s Shell.
Technology for desulphurisation of Vacuum Gas oils from M/s UOP, USA.
Technology for production of Reformate and Isomerate from M/s UOP, USA.
Technology for upgradation of bottom of barrel to distillates by Resid hydrocracking from M/s Axens, France.
Technology for production of API Gr II and Gr III LOBS from M/s CLG, USA.
Technology for production of Polypropylene Unit from M/s Basell Polyolifine, Italy.
Technology for Sulphur Recovery Unit from M/s Worley.
The year of import: 2018-19/2019-20
Whether the technology been fully absorbed: The Project is in implementation stage - Expected commissioning by September 2023.

xiii. Poly Butadiene Rubber Project, Panipat
Technology for Butyl Acrylate Unit, from M/s Mitsubishi Chemical Corporation, Japan.
Technology for Acrylic Acid Unit, from M/s Mitsubishi Chemical Corporation, Japan.
Technology for Normal Butanol Unit, from M/s JM Davy, UK.
The year of import: 2017-18/2018-19
Whether the technology been fully absorbed: The Project is in implementation stage - Expected commissioning by January 2024.

xiv. Catalytic Dewaxing Unit at Haldia
Technology for CDW Unit, from M/s CLG, USA.
The year of import: 2018-19
Whether the technology been fully absorbed: The Project is in implementation stage - Expected commissioning by November 2023.

xv. Acrylics/Oxo Alcohol Project at Dumad, Gujarat
Technology for PX Unit, from M/s UOP, USA.
Technology for PTA from M/s BP Amoco, USA.
The year of import: 2017-18/2018-19
Whether the technology been fully absorbed: The Project is in implementation stage - Expected commissioning by March 2025.

xvi. Expenditure on R&D
(a) Capital - ₹ 409.26 Crore
(b) Recurring - ₹ 288.95 Crore
(c) Total - ₹ 698.21 Crore

(C) Foreign Exchange Earning and Outgo
The total Foreign Exchange earned and outgo during the year is as under:
Foreign Exchange earned: ₹ 26,857.11 Crore
Foreign Exchange outgo: ₹ 5,12,231.90 Crore

IndianOil is driven by its sustainability and net-zero commitment. Our ‘Unbottled’ initiative transforms discarded plastic bottles into uniforms to be worn by our frontline energy soldiers. By choosing recycled polyester (rPET), we reduce plastic waste and help protect the environment. Currently, 100 million plastic bottles are being recycled per annum. The garments are being sold at select IndianOil Retail Outlets. Demonstrating its commitment to circular economy, IndianOil launched its new brand of polymer recycle, Cycleplast. The brand blends recycled petrochemicals with a proportion of virgin or solo plastic and is expected to be a game-changer in the industry.