Annexure-3 to the Directors' Report

ENERGY CONSERVATION, TECHNOLOGY ABSORPTION AND FOREIGN EXCHANGE EARNINGS & OUTGO

[Section 134(3)(m) of the Companies Act, 2013 read with Rule 8(3) of the Companies (Accounts) Rules, 2014]

A. Conservation of Energy

(i) Steps Taken for Conservation of Energy

Thermax, a prominent provider of energy and environmental solutions, has made substantial progress towards fulfilling its commitment to decarbonisation. The Company has been proactively implementing operational efficiency initiatives and renewable energy projects to minimise its carbon footprint and promote a sustainable future. Throughout the year, Thermax has undertaken several measures aimed at conserving energy and resources, including:

a. Electricity

Thermax has effectively executed multiple operational efficiency projects at its manufacturing plants. These include addressing compressor leakages, installing Variable Frequency Drives (VFD) on various equipment, deploying motion sensors to prevent unnecessary usage, optimising operations of effluent treatment plant (ETP) blowers, substituting cooling water pumps with energy-efficient alternatives at process cooling towers, and implementing LED lighting in workshops. These initiatives have not only resulted in reduced energy consumption and greenhouse gas emissions for Thermax but have also enhanced operational efficiency and lowered costs.

b. Fuel

Thermax is actively enhancing operational efficiency and minimising its carbon footprint through strategic projects. For instance, at the Paudh plant, measures have been implemented to optimise boiler operations. These efforts have led to a significant reduction of 62.15 metric tonnes in furnace oil (LHS oil) consumption, while at the Dahej plant, Thermax is transitioned to biomass from natural gas resulted into saving of natural gas. These projects have resulted in cost savings and substantial environmental benefits.

c. Water

Thermax has implemented several initiatives, such as conducting water audits through third-party agencies, with the goal of reducing water consumption, conserving water, and minimising losses at its domestic manufacturing sites. These efforts focus on maximising the recycling and reuse of wastewater, implementing rainwater harvesting, and evaluating measures to reduce water usage and achieve water neutrality. During the year, the Solapur plant was certified by a third party for achieving a Water Positive Index, with a surplus of 6.59% compared to its water withdrawal source.

At the Chinchwad, Savli, Paudh, Solapur, Shirwal, and Dahej factories, Thermax's water conservation endeavours have yielded impressive results, saving a total of 261,227 cubic metres of water during the year.

(ii) Steps Taken by the Company for Utilising Alternate Sources of Energy

The Company is actively implementing initiatives to increase the utilisation of renewable energy sources. The Company has procured 58.84 lakh units of renewable energy through open access mechanism. The Company has installed 297 kWp capacity solar PV project at Solapur and 370 kWp solar rooftop capacity at Bhosari plant, Pune. The Bhosari plant will commence generation from the next financial year.

Moreover, Thermax has generated 24.81 lakh units from a combined capacity of 2.83 MWp across its plants in Savli, Jhagadia, Sri City, Solapur and Pune offices, showcasing a strong commitment to adopting renewable energy for its operations.

Overall, Thermax has consumed a total of 83.65 lakh units of renewable power this year, demonstrating significant efforts to reduce its environmental impact through renewable energy adoption.

(iii) Capital Investment on Energy Conservation Equipment

The Company has spent Rs. 11.35 crore (Rs. 4.1 crore for FY 2022-23) as capital expenditure on carbon reduction projects for FY 2023-24.

B. Technology Development & Absorption

1. Efforts, in Brief, Made towards Technology Development & Absorption

- **Coal Gasification**

  The coal to methanol (CTM) project that was undertaken as a part of clean coal initiative received **"Excellent"** rating by DST Committee & NITI Aayog, the funding agency, during the project formal closure in December 2023. Performance of gasifier in terms of higher carbon conversion efficiency and reliability were achieved in 2023-24 through many technical interventions which were demonstrated in many trial campaigns.

  Under the initiative of decarbonisation, a new technology development & demonstration project on carbon capture and utilisation (CCU) was proposed and sanctioned by DST. The industry-academia partnership project will be executed at an investment of Rs. 32 crore with a 15% contribution from Thermax. The MoU between Thermax and the academic partner (IITD) is being worked out. The technology can be applied to sectors like steel, cement, and power.

- **Solar**

  In 2023, the Company continued its engagement with the new technology partner and adopted a phased approach to commercialisation of perovskite based flexible solar thin film for the Indian market.

  The Company imported samples of ambient light harnessing photovoltaics (PV) powered IoT (Internet of Things) solution and carried out key tests towards battery-less operation addressing battery landfill for a scaled-up business automation.

  This unique offering was demonstrated to the potential customer, and key feedback and expectations on the solution were gathered.

  Currently, the Company is working on pilot trial with the potential customer and exploring product localisation with a strategic partner.

  For an outdoor application, the Company has identified a product value chain and is working on primary tests towards reliability, scalability, compliance and manufacturability of *Power Generating Glass through Flexible PV* with a strategic partner.

- **THVAC**

  The THVAC prototype for bus application has been demonstrated to a leading Indian OEM.

  The Company is working towards developing a matured product design to meet customer expectation.

  The Company has also developed an in-house 'Proof of Concept' for a waste heat recovery-based truck cabin air-cooler unit. This innovation addresses the significant issue of discomfort faced by truck drivers due to non-air-conditioned cabins.

- **Hydrogen (AEM/GPS/BIO)**

  An AEM-based programme has started, with cell-level testing completed with repeatability, and stack-level (2.5 KW) performance testing is now underway.

  The Company had initiated a new in-house modular gas purification system (GPS) which will reduce the footprint and cost compared to conventional systems. Currently POC trials are being conducted on the new gas purification system. A conventional GPS is also built, and trials are taken simultaneously to create a baseline with which the new design will be compared.

  A biomass-based hydrogen generation plant has started, and the performance and stabilisation of the process are currently underway.

2. Benefits Derived as a Result of the Above Efforts – Product Improvement, Cost Reduction, Product Development, Import Substitution, etc.

- **Coal Gasification**

  The indigenous technology development has garnered interest from various stakeholders, including Indian private corporations and PSUs, aiming to scale up coal-to-chemical projects. With the CCU project sanctioned by DST, the company now has the opportunity to develop technology for converting CO_2 into value-added products such as methanol, DME etc.

- **Solar**

  Thermax with the technology partner shall accelerate the product localisation, customer acquisition, manufacturing plan and commercialisation for perovskite based flexible solar thin film in India. There is a good response from potential customers for these new applications which will create a game changing product/business line for Thermax.

- **THVAC**

  The bus fuel economy improvement has been observed to the tune of 5% to 6%.

  Use of natural refrigerant has been ensured and less than 5% lower CO_2 emissions have been achieved. The Company has received two POC orders for truck applications.

- **Biomass-based Hydrogen**

  Biomass-based Hydrogen can help us produce 20% more hydrogen than conventional biological route. The POC trials are going on and steady progress in achieving the target results are seen in these trials.

3. In Case of Imported Technology (Imported During the Last Three Years Reckoned from the Beginning of the Financial Year), the Following Information is Furnished:

Nil

4. Expenditure on R&D

Particulars	Amount in Rs. in crore	
	Current Year 2023-24	Previous Year 2022-23
a. Capital	1.71	0.71
b. Recurring	35.02	32.21
c. Total	36.73	32.92
d. Total R&D expenditure as a percentage of turnover	**0.4%**	**0.4%**

5. Foreign Exchange Earnings and Outgo

The Company's operations in export markets are elaborated in the Management Discussion and Analysis which is a part of its Director's Report.

The details of the foreign exchange earnings and outgo are given below:

Particulars	Amount in Rs. in crore	
	Current Year 2023-24	Previous Year 2022-23
Inflow	1,296	1,437
Outflow	455	442
Net	**841**	**995**

For and on behalf of the Board

Meher Pudumjee
Chairperson
DIN: 00019581
Pune, May 10, 2024