

INFORMATION MEMORANDUM

ECOMB AB (publ)

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The Ecotube system represents a new means of optimising combustion processes and principally comprises retractable lances equipped with injection nozzles supplying combustion air with high velocity – a technique that gives unique advantages in terms of emission reductions and lower maintenance costs



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1. Introduction

This Memorandum has been delivered to a selected number of potential investors and does not constitute a Prospectus.

The Swedish company ECOMB AB (publ) has taken the first steps towards international expansion with orders of installations of the Ecotube system in the UK and pre-engineering studies in Holland, France and the USA.

Buying new shares in a small growing company, like ECOMB AB, will involve risks, such as;

- the invested capital can be partly or entirely lost

- the part of the company can be diluted through future new issues of shares

ECOMB is a potential worldwide supplier of the patented Ecotube system for improvements of combustion processes in a wide cross section of industry combustion applications. Improved combustion results in radically reduced emissions of pollutants like NO_x , CO, SO_x and HCl. Boiler load and thermal efficiencies are increased while corrosion and erosion are reduced.

Nine (9) Swedish installations of Ecotube systems and two (2) installations in the UK have been carried out to date. The main applications have been the retrofit of Waste-To-Energy plants and Utility boilers, but there is also a wide range of industrial applications.

In January 2003 Coventry & Solihull Waste Disposal Company Ltd placed an order worth roughly 1 Million € for an installation of the Ecotube system on Units 2 & 3 during 2003. Unit 1 was retrofitted in 2001 and the new order will be a strong asset on the UK market.

In order to achieve this international expansion ECOMB needs to obtain additional financial investment as well as to obtain new partners for efficient market penetration and project assistance.

2. Technical Overview

The Ecotube system represents a new <u>cost-effective optimisation tool for combustion processes</u> and principally comprises retractable lances - Ecotubes – that are equipped with injection nozzles. Various agents can be introduced through the nozzles at high pressure and velocity into the furnace media. The Ecotubes are strategically positioned within the furnace enabling the injected agents to create a radically improved mixing of the combustion products, resulting in destruction of laminar gas columns and the formation of completely new improved flow patterns.

Ecotube system advantages:

- Radically improved turbulence and mixing of combustion gases
- Reduced NO_{x} CO, SO_{x} HCl and particles in the flue gas
- Lower stoichiometric ratio (less excess air) in the furnace
- Increased thermal efficiency
- Increased load capacity
- Lower ID fan motor HP
- Reduced boiler-wall metal corrosion
- Reduced erosion in Super Heater and Economizer
- Minimum unit down time (3-4 days) needed for installation
- Lower maintenance costs
- No large ducts or furnace modifications required

3. Why clients invest in an Ecotube system

- Reduce flue gas emissions in order to meet new emission limits / directives
- Increase boiler load and thermal efficiency
- Reduce boiler maintenance costs



4. Results from reference installations

The first Ecotube system installation was performed in 1995 and have since been installed in 8 Waste-to-Energy boilers (12-85 MW_{th}) and 3 Biomass fired boilers (25-50 MW_{th}). The following customer improvement experience has been achieved and validated:

- 30-90% NO_x reduction
- 30-90% CO reduction
- 10-30% fly-ash reduction
- 5-10% increased load
- Reduced boiler maintenance costs

5. Important New Emission Limits / Directives

- New EU Emission Limit Directives for Waste-To-Energy plants

Beginning in 2006, all WTE plants within the EU have to meet more stringent emission levels of CO and NO_x . Ecotube has demonstrated and validated achievement of these new more stringent levels. A recent example of successfully meeting the more stringent emission requirements is our latest installation at the Coventry WTE plant in the UK.

- <u>NO_x Regulations under the Clean Air Act Amendments in USA</u>

Beginning in 2004 more stringent NO_x emission limits are mandated in many parts of the US. Additional areas of the US will implement more restrictive emission limits for many different industries from 2004 to 2010.

6. Patents

Approval of five patent applications, named "Ecotube I-V", in the following countries: Ecotube I: Sweden, England, France, Holland, Italy, Spain, Germany and USA Ecotube II: Sweden, Belgium, Denmark, Finland, Ireland and Switzerland Ecotube III: Sweden Ecotube IV: Sweden Ecotube V: -PCT applications, extracted from Ecotube III-IV (V at later dates), have been designated in order to cover essential world markets.

7. Historical milestones

- 1992 ECOMB AB was founded by Eric Norelius and Ulf Hagström
- 1995 First commercial Ecotube-system installation
- 1997 ECOMB AB became public, 600 new share holders, issue of new shares
- 2001 First international order, issue of new shares

8. Owners	Number of shares	% of votes
- Ulf Hagström	500.000	27,3
- Eric Norelius	500.000	27,3
- Swedish Industrial Fund	366.532	19,6
- Others	709.375	25,8
Total	2.075.907	100



9. Share History

ECOMB is a public company, but the shares are not officially noted on any market lists.

An advising service for selling and buying ECOMB shares was utilized by ECOMB during 1997-2000 and thereafter Onoterat AB of Sweden has been responsible for that service.

Share trading has in general been low with approximately 50 transactions per year being traded at prices of €2,0-3,3 per share during 1997-2002.

Issue of new shares in 1997	€1,9 per share
Issue of new shares in 2001	€2,2 per share

10. Capital Contribution

We project our offer to issue new shares of ECOMB stock shares to raise an estimated total of \notin 500,000-1,000,000, this process being carried out at two or more occasions. In a first step, during February-March 2003, we project our offer to issue new shares to raise an estimated \notin 200,000-300,000. This new funding will be used to address the continued development of ECOMB AB products and market share. The following areas have the highest priority for new funding application:

- Geographical expansion, mainly via international partners
 - Strategic focus on
 - North America,
 - England,
 - France,
 - \circ Holland and
 - o Germany
- Increasing market potential, new applications

Additional new development to exploit market potential by applying the following new Ecotube research applications;

• Injections of limestone, sodium-bicarbonate etc for reduction of hydrochloric acid and sulphur emissions,

in-furnace inspection and combustion process evaluation through our camera technique
 Note – both of the new research initiatives have been successfully tested in field applications by the industry (US utilities, etc). We expect to be able to successfully implement joint client / ECOMB funded research projects in these areas.

11. Organisation

ECOMB is a "cutting edge" environmental product technology company. All manufacturing of the patented Ecotube system, ancillaries, control software and installation are subcontracted to vendor-assessed suppliers. All project contracts are managed and supported from the ECOMB headquarters in Södertälje, Sweden. ECOMB AB's international marketing activities are supported by local partners. These partners provide marketing, sales and contract engineering services to support Ecotube system installations. Today ECOMB AB has 5 employees and a worldwide network of 20-30 people supporting the company in various situations.

12. ECOMB International Project Strategy

ECOMB AB has a strong belief that growing together with partners on the international market is the most <u>efficient way forward</u>. Established sales networks and client relations are key factors for successful implementation of our concept. As the project develops, we provide our local partners with "the heart" of our concept, i.e. the Ecotube assemblies, together with our deep knowledge of combustion processes. Our



local partner is responsible for installing the Ecotube assemblies as well as for selecting and implementing the auxiliary equipment required in such an installation.

ECOMB AB strongly believes that developing local partners is the best way to accelerate international sales. The partner is able to market our patented technologies and our validated reference list while participating in a strong value-add way by supporting the marketing, engineering, and implementation process. This joint value proposition with our partners provides an excellent way to move forward on an international basis to quickly maximize the utilization and increase market share of the unique ECOMB AB products and services.

13. Markets in Focus

Our marketing activities in the short term will be focusing on two client categories:

- <u>WTE plants in Europe (approximately 500 units)</u> Client driving forces:
 - Meet new EU Directives, control emissions of CO and NO_x
 - Increased boiler load
 - Reduced boiler maintenance costs
- <u>Coal-fired Utility boilers in USA (approximately 950 units)</u> Client driving forces: - NO_x emission reduction

Long-term market focus will move to all industries that utilize the combustion process including pulp and paper, manufacturing, petrochemical, etc.

14. Today's Price Strategies

Today's market prices for the Ecotube system, to be installed in WTE plants within Europe and coal-fired utility boilers within USA, will reflect all new client benefits discovered from our reference installations.

Annual client savings for <u>WTE plants</u> (30-60 MW_{th}) have been estimated to:

		Annual Savings
- Reduced fly-ash (10-20%)		20,000 - 40,000
- Increased load (1-2%)		50,000 - 200,000
- Lower FD / ID fan motor HP		5,000 - 10,000
- Reduced down time for erosion/corrosion (3 days)		100,000 - 200,000
- Savings for boiler tube exchanges due to corrosion		50,000 - 100,000
- Low maintenance costs for Ecotubes	(less)	10,000 - 20,000
Total annual savings		€215,000 -530,000

Annual client savings for <u>Coal-fired utility boilers</u> will be estimated after our first project has been carried out.

Market prices for the Ecotube system have, based upon market price levels for competing techniques and annual client savings, been established as for:

- WTE plants (30-60 MW _{th}):	€ 550,000-825,000
- Coal-fired utility boilers (100-200 MW _e):	€2,000,000-3,000,000



15. Market Competition and Positioning

ECOMB has a very strong business concept based upon a deep understanding of combustion processes and an extensive experience of various combustion techniques. The Ecotube system has proven to be a very cost-effective tool for combustion improvements on this market.

Price levels for Competing CO and NO_x reduction techniques

WTE plants:	
 <u>SNCR</u> (Selective Non Catalytic Various in-furnace injection tec Market price: 	c Reduction) for NO _x reduction (no impact on CO) - chniques utilizing ammonia or urea as chemical agents. €300,000-500,000
- <u>SCR</u> (Selective Catalytic Redu Honeycomb inorganic structure principally the same as catalyst	ction) for NO _x or CO reduction es coated with various chemically active metals, ts for cars
Market price:	€1,000,000-2.000,000
- <u>Standard OFA</u> (Overfire Air) s Supply of air from boiler wall i resulting in significantly less er Ecotubes.	ystems njectors, limited gas mixing control possibilities mission reduction potential compared with
Market price:	€200.000-400.000
- <u>Flue Gas Recirculation</u> (FGR) Flue Gas is recirculated and sup technique with limited possibil other techniques, such as the Ed Market price:	pplied to one or more zones within the furnace, established ities to achieve low emissions, preferably combined with cotube system €100,000-200,000
 <u>ROFA</u> (Rotating Overfire Air) A special application of OFA, through air injection at various compared with Standard OFA, certain boiler applications, thu Market price: 	systems where a rotating flow pattern in the furnace is created s levels from the corners. Better reduction potential , a competitor to the Ecotube system, but only for s not as flexible. €500,000-800,000
Utilities: - <u>SNCR</u> (Selective Non Catalytic Various in-furnace injection tec agents. Technically difficult to the Ecotube system emission p Market price:	c Reduction) for NO _x reduction (100-200 MW _e) chniques employed utilizing ammonia or urea as chemical o reach acceptable low emission levels and can not achieve performance levels. €1,000,000-2,000,000
- <u>SCR</u> (Selective Catalytic Redu Honeycomb inorganic structure the same as catalysts for cars. Market price:	ction) for NO _x reduction – es coated with various chemically active metals, principally Ammonia injection. Very low NO _x levels possible. €10.000.000-30.000.000
- <u>Standard OFA</u> (Overfire Air) s Supply of air from boiler wall i resulting in significantly lower system. Difficulties to reach ac system.	ystems njectors, limited gas mixing control possibilities emission reduction potential compared with the Ecotube ceptable low emissions and not as low as from the Ecotube

Market price:

€1.500.000-2.000.000



<u>ROFA</u> (Rotating Overfire Air) systems
 A special application of OFA, where a rotating flow pattern in the furnace is created through air injection at various levels from the corners. Better reduction potential compared with Standard OFA, a competitor to the Ecotube system, but only for certain boiler applications, thus not as flexible.
 Market price: €2.000.000-3.000.000

- <u>Low NO_x burners</u>

Improved burners for low NO_x applications, retrofit installations. Has difficulties reaching acceptably low emissions and not as low as from the Ecotube system. Market price: €3.000.000-5.000.000

Positioning in the market

The Ecotube system can be successfully positioned to overcome competition from the above alternative techniques as follows:

- The Ecotube system is a powerful and flexible combustion optimization tool, strategically positioned in the upper boiler section where influence of strong mixing is very efficient. Reduction of gas velocities, laminar flows, and acid laden fly ash provide corrosion and erosion reduction to improve availability. None of other alternatives provides this advantage.
- The Ecotube system provides multiple benefits using "in-furnace" technology where emissions are prevented from forming [compared to post combustion techniques (filters, catalysts etc] and where remaining emissions are efficiently reduced better than other technologies due to the strategic location of the Ecotube lances.
- The Ecotube system can easily be combined with efficient supply of various chemical agents, such as ammonia, limestone and natural gas, in order to meet various demands in compliance with new legislation on different markets.
- New options, such as our camera technique for in-furnace visualisation will significantly increase the value of the Ecotube system.

16. Sales Forecast

Young companies in an expansion phase often face various obstacles. Finances; access to new experienced staff; and organizational development are all key issues for ECOMB AB successful growth. We do believe ECOMB today has a very strong position for growth. To some extent this growth depends on how successfully we can open up new agreements with partners on the various international markets. Meanwhile history has provided us with the much more realistic understanding that sales growth always takes longer time than expected. Due to these facts we will not present any sales forecast beyond this year of 2003.

The predicted sales forecast for 2003 is expected to €1,500,000 and is expected to rise substantially for the coming years