FIRESIDE

The House Magazine of the Thermax Group Volume 39 No. 1 January-March 2009

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THERMAX

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Printed at
Vyoma Graphics, Pune

Cover

This dramatic composition of a coconut tree – also referred to as the tree of life – has a wealth of its own.

The coconut gives water, milk and oil and nearly a third of the world's population depends on the coconut tree for livelihood and as a food supplement.

The tree has so many other uses. For example, the quill-shaped leaves are used to thatch roofs and make fences and the fibrous material of the coconut goes into making many coir-based products, including mattresses. Dried coconut shells and stubs are used as fuel.

And the shade they provide on a beach is very welcome, especially on a summer day.

(Picture by Jill Martin)

Back Cover
Views of the new facility in Gujarat.

Comment

"Life is the ultimate work of art."

— Woody Allen

Printed on recycled paper

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ABCI MEMBER

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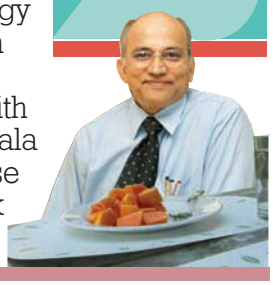
Excerpts from the book *Hot, Flat and Crowded* by the Pulitzer prize winning author, Thomas Friedman, about how GE Transportation makes the most energy efficient locomotives in the world and how Texas Instruments figured out that green is good for the company



Thermax will feature at the climate change conference in Copenhagen

WHAT'S NEW ?

Thermax absorption heat pumps and chillers are essential equipment in these systems that help the energy conscious people of Denmark to demonstrate their respect for a balance between economy and ecology.

Over the last decade, Thermax has worked with its partner, Scandinavian Energi Group (SEG), in optimising energy use in Denmark by installing absorption heat pumps for centralised heating – a reverse application of centralised cooling with absorption chillers. Hot water from a central generation facility is used for space heating in town buildings. The heating companies reduce the energy intensity at generating centres by tapping low grade heat from other sources like geothermal heat from sandstone aquifers or waste heat from town incinerators. Thermax heat pumps absorb heat from these sources and pre heat the water delivered to the buildings.

Since its first installation in 1999, which extracts heat from geothermal energy, Thermax absorption heat pumps are operating in several district installations in Denmark. Besides improving overall energy efficiency, in reducing the load on power stations, they bring down pollution levels of sulphur dioxide, nitrogen oxide and particles. In recent years, Thermax and SEG have installed heat pumps to recover low grade stack exhaust gas heat of 17MW capacity at a waste to energy plant and another 15MW at a geo-thermal energy recovery plant.

Recently, Thermax has bagged an order for a 3.4 MW steam absorption chiller to be installed in down town Copenhagen as part of a district cooling project. The total capacity of the plant is 15MW which, besides the output of the Thermax chiller, would be made up by free cooling using sea water and through ammonia chillers. The plant would "save" 2500 tonnes of carbon dioxide per year. As the Thermax chiller will utilise sea water for heat rejection, it will be provided with special corrosion resistant Titanium tubes.

Denmark has achieved living standards and incomes on par with the US, while consuming only 44% energy compared to America. It makes use of centralised heating and cooling projects to slash carbon dioxide emissions. These projects use an array of heating and cooling technologies – waste to energy plants, heat pumps for recovery of low grade exhaust gases and geothermal heat, absorption cooling, ammonia chillers, cooling by using sea water, etc.

At the upcoming United Nations Climate Change Conference – to be held at Copenhagen in December 2009 – host Denmark would be showcasing some of their green energy systems. World leaders and delegates from 183 countries would be given a guided tour of some of the energy efficient district heating and cooling projects which reduce the country's carbon footprint. Thermax absorption heat pumps and chillers are essential equipment in these systems that help the energy conscious people of Denmark to demonstrate their respect for a balance between economy and ecology.

A Thermax installation : energy efficient

Easy flow of waxy crude with hot water circulation.

Cairn India banks on Thermax heaters for its oil field operations in Rajasthan

At Cairn India's production installation at the Mangala oil field In Rajasthan, three thermic fluid heaters from Thermax are to be commissioned to facilitate crude oil production. They will be installed near the wells to help the flow of waxy crude from the oil wells in this field in Barmer district.

Cairn India, a subsidiary of Cairn Energy, under a production sharing contract with ONGC, is gearing up to produce 30,000 barrels of oil daily from the field by late 2009. Due to its waxy nature, production teams find it challenging to make the Mangala crude flow smoothly from the wells into the pipes and onward to the nearby processing facility. The Thermax heaters, each with an output of six million kilocalories per hour, will be used to inject hot water into the oil well to keep the production lines heated to reduce the oil viscosity and assist its flow. The crude thus produced is stored at the processing facility, where oil, gas and water are separated and desptched.

Thermax heaters, supplied by the company's Heating SBU will be deployed at Cairn's production installation for three applications – the thermal oil inside the heater will pass on the heat to a heat exchanger which in turn will heat water and the hot water will be circulated inside the oil well. Secondly, the heat will also come in useful at the processing facility where oil, water and gas are separated from the emulsion that comes up from the well. Finally, the Thermax systems also heat up the filtered raw water that is injected into identified wells to maintain underground reservoir pressure.

Thermax has already supplied steam generation equipment for assisting the operations of Indian national oil companies. Heaters to assist easy flow of waxy crude is a first for the company. The three heaters will be commissioned at the oil field by June 2009.

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Life extension
in the times of recession

Ranaware with client and other officials at site

For the ten old boilers of Sharjah Electricity & Water Authority (SEWA) it could have been the final trip to the local scrap yard with a R.I.P (Rest in Peace) signboard. But now thanks to technology intervention by Thermax the old boilers, instead of being junked, could be refurbished.

The service arm of the Boiler & Heater group is doing a condition assessment and remaining life analysis study on one of SEWA's 154 TPH boiler. Thermax specialists will use sophisticated diagnostic methods and based on the results will give their recommendations. The client could then implement the recommendations by retrofitting the boiler and get enhanced steam output from it. The assessment and retrofit could then be replicated for the remaining boilers.

Thermax has extensive experience in retrofit and life extension services of old boilers and heaters in India and South East Asia. Its expertise is also increasingly in demand in the Middle East and Africa.

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Besides SEWA, Thermax has received a repeat order from Takreer Refinery of Abu Dhabi. Here, a similar condition assessment and life extension study is planned for the refinery's 250 TPH boiler. Takreer officials, happy with Thermax's expertise on their first boiler, promptly awarded it the second order. Nigeria's PeTech Ltd has also placed an order for retrofitting its three boilers of 80 TPH each. This is a turnkey project where Thermax would do the study and then implement the recommendations for refurbishing.

These three contracts, valued at close to one million US dollars, will follow the same true and tried methodology. First, non-destructive tests are performed on boiler pressure parts to assess the present condition of components. Two, correlating the findings with the boilers' operation and failure history, engineers will arrive at their remaining life. Three, by replacing the worn out pressure parts, the boilers get a lease of new life.

It is a win-win situation. While it opens doors for Thermax to venture into large scale revamp projects in aging installations, it is an unbeatable proposition for industry in the throes of recession. "For as low as 30% of the cost of a new boiler, an old boiler can be retrofitted for improved performance and availability," says Yashwant Ranaware, Head Customer Services (B&H Service).

Thermax potable water plants for Delhi Airport

A line up of RO units : plug and play

Reverse osmosis (RO) plants from Thermax will soon provide safe drinking water at the Delhi International Airport. Forty-one RO plants, supplied by the Water & Waste Solutions (WWS) of Thermax, are being commissioned at various locations of the airport, currently being modernised.

The plants are of standardised design with special attention given to reliability and aesthetics. The plug and play units come in two sizes – 250 litres per hour and 350 litres per hour output.

The Delhi airport would gain from Thermax expertise in treating water of wide variations in quality from the different regions of the country. The RO system is ideal for treating water from bore wells as it takes care of the quality of water which tends to deteriorate over a period of time.

"This is a very interesting, breakthrough order which can be a marketing model for similar large infrastructure projects," says Kiran Sapre, Head of special products group in WWS.

A very interesting, breakthrough order which can be a marketing model for similar large infrastructure projects.

New filtration system for heavy oil fired boilers

A new, highly effective filtration system from Thermax is delivering efficiency improvement to industries that use heavy oil (like furnace oil) fired boilers. The recently launched system is superior to the conventional mesh filtration system as it can filter even finer particles.

Furnace oil comes with a lot of impurities and need to be filtered before it is fed to the boiler. The conventional system using coarse stainers could sieve off only larger particles. Smaller particles below the size of 125 microns clog the nozzles of burners causing wear and decreasing combustion efficiency.

As a result there is huge loss of man hours in routine maintenance and expensive loss of oil when filters are changed. More importantly, due to nozzle failures, equipment downtime tends to be high.

The system works on the centrifugal principle whereby oil fed into it is rotated. Solid particles accumulate in layers on the rotor wall and the cleaned oil is drained off directly by gravity.

A multinational plant using this system is all praise for its effectiveness in improving boiler operations.

A multinational plant using this system is all praise for its effectiveness in improving boiler operations.

The results of innovation are, by its definition, uncertain. So while we applaud and love success stories, we also need to have an appetite for failure in order to encourage creativity.

I was recently invited by Bry-Air Asia to give a talk on innovation. With the financial meltdown on the one hand and global warming on the other, the most critical issue for corporates today is innovation and therefore I thought of sharing some of my thoughts on this subject with I had put together for the talk.

Some of you may have read a recent *Indian Express* article which highlighted the need for India to think harder on innovation as we seem to have gone down 18 places to the 41st position in the Global Innovation Index. We may be doing better, but others have moved a lot faster.

Allow me to take you back to the year 1895 when Lord Kelvin, President of the Royal Society, uttered these famous words, "Heavier-than-air flying machines are impossible". Let's fast forward to 1927: "Who the hell wants to hear actors talk?" – a very poignant comment made by Jack Warner of Warner Brothers about making talking movies; and in 1949, *Popular Mechanics* made a forecast that"Computers in the future may weigh not more than 1.5 tons". We all know what the outcome of these so called myths or perceptions are today. So innovation starts with dreaming – with a mindset of dreaming big, setting audacious goals and taking risks. The results of innovation are, by its definition, uncertain. So while we applaud and love success stories, we also need to have an appetite for failure in order to encourage creativity. Who would have thought that the world could come out with a Rs.1 lakh car if we didn't dream big?

So what really is innovation as seen by the corporate world? To my mind, doing something different to make a product, process or service faster, better, cheaper or more user-friendly for a customer, is innovation. It is a repeatable, disciplined process that successfully takes ideas to commercialisation. As a management thinker once said,"you can be tremendous at innovation on the technical side. But if you cannot wrap that innovation into a compelling value proposition, then the innovation isn't worth much at all".

Where India scores over the world is in what Dr. Mashelkar has eloquently termed Gandhian Engineering – which allows us to get more from less for much more. We see this with the telecom industry, where calls in India are the cheapest in the world; the Hepatitis vaccine which costs a tenth of what is available in developed countries; the challenge of creating a Rs.1 lac car or more recently, a $100 laptop – all of which will be affordable for many more people.

It is these unpredictable times that force us to look at our markets and extend our reach to wider segments and sections of society. A new vista of opportunity not thought of earlier, emerges to serve the audience at the bottom of the pyramid and provide them with new products and services.

There are some misconceptions around this subject – the first being that innovation equals technology or products. It certainly is a key part of innovation but it has several other dimensions; an example of which is Air Deccan, which is India's first low cost carrier or Bharti Airtel which has unleashed a least cost business model by outsourcing every backend process – from network operations to IT. In our very own city, Zensar has come out with innovative ways of engaging their workforce, such that in a sluggish market, they have been able to grow PAT by 35% year on year. Moving to green energy, an electric car network company known as Better Place is coming out with an innovative business model by creating a car-charging-infrastructure which feeds in energy generated from renewable sources like wind and solar through a network of plug-in plus battery exchange stations. Just as in the telecom industry, where you buy cell phones from someone and talk time from another, this innovative business model will allow you to buy or hire the electric car from automakers and"miles"from the company Better Place.

The second misconception is that innovation happens by chance. The fact is that innovation is a discipline and

not a random process. Innovation in an organisation should be like any other business endeavor, such as supply chain, finance or HR, with formal systematic processes, people and tools to help direct and execute; with creativity as its chief component. New ideas flow and flourish in informal non-hierarchic environments where"what is right"is considered more important than"who is right".

The third misconception is that innovation is a long term project. Innovation can deliver value over multiple time frames, not just the long term. It provides a steady flow of new offerings over time, not just an occasional blockbuster product or service.

An innovator is one who looks at something that everyone sees, but sees something that no one has seen. Here's an example: A 50 foot long trailer with 48 inch wheels got stuck while entering a tunnel in New York because it was approx. a foot taller than the height of the tunnel. The fire and transportation department spent the whole day searching for a solution, to no avail. Suddenly a child passing by asked her father,"Dad, why can't they deflate the tyres and the height will automatically come down."An example of innovative thinking in our daily lives.

In the corporate environment, the Board's role in supporting investment in systematic innovation over time, is critical. Quarterly pressures for financial results cannot and should not come in the way. These are trying times for all of us world over, and as mentioned in my previous column, cash is paramount. Having said that, we would like to continue all investments planned for R&D and of course innovation, which more often than not requires a mindset rather than resources.

If we move to politics, the U.S. President Barack Obama was acknowledged for his innovative Presidential campaign which creatively harnessed social networking sites on the internet to enlist support, register new voters and generate record campaign funds.

Of course it is ironic that when Obama was campaigning, another dubious innovation in the country sent the world into a tailspin – toxic debts packaged as financial derivatives and sold to millions of unsuspecting investors.

A thought for reflection. Innovative financial engineering , the innovative bloodbath at Satyam unfolding or the recent innovative counterfeit gold coins scandal. Where do we draw the line? Is there a need, perhaps, to introduce the term ethical innovation?

◆◆◆

Two years ago, we decided to discontinue the English Open Forum since it was perceived that the kind of questions asked there were very operational. The Divisional Head and EC member decided to continue the process in their respective divisions, which is an excellent idea and should continue. However, after the success of the Marathi Open Forum this year I must thank Roshan from Corporate Communications for suggesting that we re-start the English Open Forum format too. It gives us a chance to meet a wider audience, listen to your concerns, answer queries, clear any misconceptions and an opportunity for Unny and me to address all of you.

I was very happy with the kind of questions and concerns raised as well as some solutions arrived at, at the forum itself. Am also glad Unny and I had the opportunity to share with all of you the current situation, our concerns, expectations as well as our vision and values. As mentioned in the Open Forum, managing our cash flows prudently, starting Project Everlean to minimise wastage, streamlining our processes and systems to enable robust growth, investment of time and money in innovation are all a MUST, but to what purpose? To realise our vision "to be a globally respected, high performance company providing sustainable solutions in energy and the environment." You will notice that our vision, which was created almost six to seven years ago, has no numbers – this was arrived at intentionally since we believe that becoming globally respected, high performance and sustainable as an organisation will in itself give us the growth and profit, and it will come with a purpose.

"Globally respected"is a very lofty but achievable phrase, which encompasses all

Participate and dramatically eliminate all kinds of waste; significantly improve our service levels to all our stakeholders, invest time and money in innovation and appropriate training and in building skills and talent.

of the following: A healthy balance sheet; a value based organisation; thrives on excellence and customer delight; is constantly re-inventing itself; a front runner in technology; is able to attract and retain talent; a company that is world class and which sets the benchmark.

A "high performance" organisation which is able to bring out the extraordinary in the ordinary; a disciplined yet passionate and committed team of people raring to go; a mindset of enjoying learning, sharing and applying.

"Sustainable Solutions in Energy and Environment": Providing customers solutions that are sustainable and in tune with conserving energy and preserving the environment.

And, of course, the vision we have set for ourselves can only be achieved, if we have a strong bedrock of enduring values.

We have recently refined and documented these values, which are:

Respect:

Respect for human lives and human dignity
Respect for what is right, and not who is right
Respect for diversity – religion, caste, gender
Respect for systems and processes
Respect for performance, behaviour and discipline

Commitment:

Deliver what is promised to all our stakeholders
A commitment to excellence in all that we do

Honesty and integrity:

Being true to ourselves in our personal and professional dealings and doing what is right at all times

Nobody will exploit the company for personal gain or gratification

Concern for society and the environment:

Encourage reuse, reduce and recycle, energy conservation
A strong sense of giving back to society
We must remember business cannot survive in a society that fails.

To summarise my expectations (and I have added one more since the Open Forum):

1. Look for opportunities with a positive mindset
2. Make prudent use of all resources, especially money.
3. Participate and dramatically eliminate all kinds of waste; significantly improve our service levels to all our stakeholders, invest time and money in innovation and appropriate training and in building skills and talent.
4. Invest time in establishing simple yet robust workflows, systems and processes.
5. Performance is critical, but values are sacrosanct.

With best wishes,

Meher Pudumjee

Meher Pudumjee honoured as the CEO of the Year


BS AWARDS

Meher Pudumjee of Thermax is the BS CEO of the Year

Four other award winners also announced

CEO OF THE YEAR

MEHER PUDUMJEE, Chairperson Thermax Ltd

THE JURY From left) Sanjay Nayar, Adil Zainulbhai, Asim Ghosh, Nandan Nilekani, Nitin Paranjpe and Subir

Meher Pudumjee, Chairperson, Thermax Limited, has been chosen the Business Standard CEO of the Year 2007-08.

A distinguished jury headed by Nandan Nilekani, co-chairman of Infosys announced Meher's name. The award acknowledges the sustained growth of Thermax and the value return to shareholders. In a year marked by reports of corporate misgovernance Thermax's reputation in growing without compromising ethics came in for the Jury's special mention.

"While I am happy to receive this award, it is really an honour for Thermax," said Meher reacting to the news. "I would like to acknowledge the dedicated efforts of the entire Thermax team that made it possible."

ROUND UP

Proven water treatment expertise for Karnataka Power

Thermax has won a noteworthy contract to provide a raw water treatment facility to the Karnataka Power Corporation Ltd (KPCL). The facility is for the Corporation's Raichur Thermal Power Station. When commissioned by January 2010, the Thermax facility will give the power station around 1173 million litres per day of treated water for cooling water make-up and other uses.

KPCL awarded the contract to Thermax following the earlier successful commissioning of an ash water recycle system that has substantially reduced the intake of fresh water for plant operations. The company's extensive experience in providing a wide range of water and waste water treatment facilities to power plants was a decisive factor in favour of Thermax in clinching this contract.

Green power plant for JK Lakshmi Cements

The first green power plant : resource efficient

Thermax has bagged an order to build and commission a power plant for JK Lakshmi Cements using the waste heat from their production unit. The 12.1 MW captive plant at Sirohi, Rajastan, will have an air cooled condenser with five waste heat recovery boilers.

Thermax had earlier built one of India's first captive power plants using cement plant waste heat for JK Cements at another location in Rajastan. The new order follows the successful commissioning of that plant in 2008. Thermax will be constructing this plant also with technical assistance from Taiheiyo Engineering Corporation, Japan.

The five Thermax boilers will generate 72 TPH of low pressure steam and feed it to the steam turbine. The air cooled condenser reduces the water intake for the project, a big plus for the water scarce project site.

The project will utilise waste gas at 300°C-400°C from two sources – hot combustion gases coming out of the preheater tower and the hot air coming out of the clinker cooler. Customised dust removal systems and a special boiler design will ensure optimum output with reduced operation and maintenance costs.

For the client it will be a double bonus on the energy and environment fronts. The plant will generate economical green power from the waste heat which will entitle them to claim carbon credits when it is commissioned in 2010.

Export Honour for Thermax

Govind Lal receiving the award from the President

Thermax has won accolades from the Federation of Indian Export Organisation (FIEO) for outstanding export performance. FIEO's Gold trophy and Certificate of Excellence (Niryat Shree) were awarded for exports during 2005-06.

On behalf of Thermax, Govind Lal, Corporate Regional Manager, Delhi, received the award from the President of India.

ERP and ethical leadership with Narayana Murthy

Infosys Chief Mentor Narayana Murthy's visit on 19th January capped the ERP implementation project of Thermax to integrate its processes for operational excellence. Earlier, on 14th and 16th January its Water & Waste Solutions and Enviro businesses went live, bringing them under the ambit of the ongoing ERP progrmme. Infosys, the implementation partner, and the Thermax team drawn from business units and business technology group – successfully implemented the Oracle E-Business Suite (Release 11i) for these SBUs. Successful inventory and accounting closure of the first month complemented the go-live.

The eight month project diligently stuck to the planned completion dates of its major milestones, culminating in the successful go-live. Business benefit workshops for key stakeholders, rigorous monitoring by SBU chiefs and the CIO and a well thought out data migration strategy made the transition from the legacy system smooth and painless.

Murthy at Thermax House : role model

For Infosys this was the first ERP implementation job in India.

On his visit, Narayana Murthy met the core implementation team of WWS, Enviro and BTG who shared their experience of implementation. He complimented the Thermax team for its efforts and initiatives. Later, addressing the senior management, Mr. Murthy spoke about the necessity of ethical business, in the wake of the recent Satyam scandal. Commenting on leadership qualities, he recommended simple but important habits like reading and listening to music.

New head for chemical product performance group

KS Rajan has joined Thermax in February, 2009 as Head of the Product Performance Group in Chemicals.

Before joining Thermax he was General Manager - Technical Marketing with GE Water & Process Technologies, Bangalore. A graduate in chemistry from Calicut University, Rajan brings with him 30 years of rich and varied experience in companies like BARC, Kobe Steel Ltd, ION Exchange India Ltd, Nalco Chemicals and GE Water (Betz India).

Fireside welcomes Rajan and wishes him a successful and rewarding career with Thermax.

Upgraded steam fired absorption chillers launched

At the launch of the new chiller : more for less

Thermax Cooling Business launched its new series of absorption chillers (code named GNxt). At a function held at EERC, Shishir Joshipura and his team unveiled the new steam fired chiller in the presence of top management. Over the next six months, the entire old range of Thermax chillers will be phased out and replaced by the new generation machines.

The double evaporation process reduces the steam consumption and hikes up the efficiency and output of the new chillers. A variable frequency drive for solution pumps helps the new system to improve performance in part load conditions. The new chiller will score high in special applications in the paper and chemical industry.

The new generation chillers have been developed with in-house capabilities and the dedicated work of a cross functional team over one and a half years. "We are geared up for tough times," says Sudhir Vahal, Cooling SBU Head.

Thermax's commitment to HR excellence recognised

At the awards function : Rajeena and Amol

Thermax received a commendation for "Strong Commitment to HR Excellence" at the CII (Western Region) HR Awards for Excellence 2008. The top award went to Hindustan UniLever Ltd and others who also won commendation along with Thermax included EMCO, ICICI Prudential and Larsen & Toubro.

On behalf of Thermax HR, Rajeena Thomas and Amol Warty received the award from S Ramadorai, CEO & MD of Tata Consultancy Services at the HR Summit held in December at Mumbai.

Standard Chartered
Mumbai Marathon 2009

For the 3rd consecutive year Thermax participated in the Mumbai Marathon. Thermax put in a good effort by fielding a 15 member Corporate Challenge Team.

The team ran for Akanksha Foundation and raised a total amount of over Rs. 5 lacs for the NGO.

Thermax presents papers at Steamtech conference

The speakers at the conference : expert views

B & H presented two papers at Steamtech 2008, a national conference on boiler & steam systems held in December at Ahmedabad. Nagaraj Shenoy from field engineering presented a paper on AFBC boiler in bed evaporator coils erosion and its operational controls. His colleague from the Services Group, Vijay Jadhav, read a paper on maximising boiler availability through condition assessment.

B&H Group also participated in an exhibition held along with the conference.

Recognition **for Atul**

Meet Atul Pillai, Class 12 student at Dastur Junior College, who plays football for his college team. Atul has a passion for drums which he loves to play and can't wait for the exams to be over to return to his practice sessions.

He received an award for the Best House Captain (Boys, 2008-09) from Deepak Mane, Director of Sports, Pune University.

Atul's parents, Lalitha and Jagannath Pillai, both work for Water & Waste Solutions in Thermax.

Atul : budding leader

Samruddhi wins fancy dress **competition prize**

Samruddhi : top prize winner

Five year old Samruddhi Deokar won the first prize in the fancy dress competition at her school, Rosary International, Bibwewadi, Pune. A student of Junior Prep class, Samruddhi had earlier won the top prize for 'proficiency in all subjects' in the nursery category for 2007-08.

Samruddhi is the daughter of PD Deokar from the mechanical engineering department of B&H.

Gold Medal for **Amitkumar**

Amit : striking gold

Amitkumar Mistry, a young design engineer with the Utilities boiler group has won a gold medal for a project on 'Hydrogen by steam reforming of naphtha.' The project was part of his final year BE Chemical course at the MS University, Baroda.

Amit is also the author of a published article, Self cleaning fluidised bed heat exchangers in the Chemical Weekly.

Jumde and Bankapur : project expertise

PMP status for **Jumde** and **Bankapur**

Vishwas Jumde from B&H manufacturing services and Vinayak Bankapur of Power – projects, have received the Project Management Professional credentials.

They cleared the PMP exam conducted by the Project Management Institute, USA. They have now joined the select band of professionals in Thermax who have a deeper understanding of project management.

Humane Capitalism

It is sad but true that in recent times business is being looked at with great suspicion and mistrust by people from all strata of society. The global financial meltdown has taken countries, markets and investors – big or small – in its downward spiral. Though the crisis started in the US because of the greed of a select band of "enterprising" people, and was abetted by frighteningly low standards of the professional class and let down by regulatory frameworks in the instruments of policy; it has affected many countries. With the recent happenings, can we claim that India Inc. is above board?

It is a pity that there is such an erosion of faith that it has and can continue to undermine the good work done by hundreds of organisations and can spread an atmosphere of mistrust and cynicism.

Not so long ago, in India, there was a time when government was trusted and the private sector was seen as rapacious and exploitative. Pre-liberalisation we had a closed economy whereby business and profit were dirty words and our economy could grow at a subdued rate of around 4%. Post-liberalisation we were moving in the opposite direction when Government credibility hit an all-time low and the corporate sector was increasingly being seen as the answer to many of the development challenges we face as a country.

Arun Maira, former chairman of The Boston Consulting Group, India, points out in one of his articles that in the early years of Independent India, the Tata group was convinced that what was good for India was good for Tata's too. He contrasted this attitude with the General Motors' Chairman's recent approach in the USA that whatever is good for GM must be good for America too. He was highlighting the sharp contrast between the lofty ideals that inspired some of the local businesses in the early years and the blatant self-centredness that globalised business has come to symbolise today.

Globalisation on one hand has brought the world closer, has helped create wealth, lifted many people from poverty but on the other hand it has destroyed indigenous cultures, created sweatshops of outsourced business from developed economies, unemployment and social unrest.

For me, the question is not whether we want capitalism or not but how do we make it humane and ethical.

Capitalism unchecked has encouraged selfishness and disregard for others. Over the years there has been a shift in our values and nobody questions the means by which people create wealth. People have started glamourising and worshipping "success" which means accumulation and conspicuous consumption of wealth. Media keeps talking about the 'Billionaire Club' and very little is talked about how this wealth is created and utilised. We have forgotten an important lesson taught by Gandhiji about trusteeship.

Post-liberalisation it is true that we reached 9% growth levels and some of the entrepreneurs have done extremely well in India and abroad. But has this Shining India reached out to forgotten Bharat that continues to languish with the most embarrassing statistics?

- India has the highest number of malnourished children in the world. It is 45.9% as against 10% in China and a country like Sub-Sahara which conjures up images of famine and emaciated babies has 25% underweight children.
- After 62 years of independence, 39% of Indian population is illiterate which is almost equal to the population of the U.S.
- Out of 100 children born, 15 will never have a chance to attend school.
- Of the 85 who attend school, 50% will drop out below Class V.
- Of the 50% who stay in school, only 10% will complete Class X.

If you and I belonged to such malnourished and illiterate groups of people, how would we view Shining India? Would we applaud their success or be angered by their insensitivity? Can business ever succeed in a society that fails?

Apart from consumerism and this glorification of success at any cost, in the current capitalistic model, we remain shortsighted. By hook or by crook we want to achieve our quarterly targets. These targets have to be achieved not just for a bloated ego but also because it is tied up with huge financial benefits. Any company

VOICES

While rightly criticising the poverty of political leadership, let us also turn the mirror towards us – how many business leaders do we have today who command public respect?

that focuses on short term at the cost of long term is bound to suffer in the long run. In the short run people, innovation and values can be compromised but for sustained growth, these need to be nurtured. While people at the top need to be rewarded, under our current system, a few are over compensated. The salaries along with incentives and perquisites have gone amok and had it not been for the current crisis, would have climbed to new levels, widening the gap between the haves and the have-nots.

Over the years, regulatory frameworks have come up with many rules and regulations to keep capitalism in check. However, in our greed we find creative ways of circumventing the spirit of the law. There are companies that have blatantly violated the spirit of governance yet behind a facade of appearances, won awards for good governance.

While I am a great believer in corporate social responsibility, I also would urge associations like CII, FICCI, ASSOCHAM and association of NGOs like I-Congo to demand accountability from the Government. The ability of corporates to make a difference in the social sector cannot match the financial resources of the Government. Unfortunately, from Rajiv Gandhi's time it has been openly acknowledged that 85% government spending on social sector is wasted in corruption and mismanagement. Can we all wake up and demand accountability for this spending?

Similarly, there has to be accountability from the corporate world. The best form of regulation is of course self imposed, but by these recent exposes we have forfeited the right to talk about them. A proper regulatory framework and accountability are essential if humane capitalism has to see the light of the day. First of all, it will channelise a company's resources in the proper direction and leave them with enough surplus and inclination to reach out to their communities. I am a strong believer that unless companies succeed financially, they won't be able to discharge their social responsibilities. So, regulation and accountability have to be seen primarily as pre-requisites for the effective performance of business organisations.

During the Independence time, we had value based leaders like Gandhi and Nehru.

If educational institutions, families and media have failed to show what it means to be a decent human being, a child cannot be blamed for joining the rat race and ending up becoming a rat.

In today's time we are all disillusioned with the corruption that has crept into our politics and have started accepting politicians with criminal records. What is worse, there is a nexus between politicians, bureaucrats and businessman so that each can un-ashamedly abuse their power and reap personal gains.

Under unethical capitalism, nobody whose hands are tainted will dare ask the Government awkward questions. The way our society is moving, most people have lost the moral authority to question anyone. The current happenings constitute a shameful chapter in the history of Indian business. It is an indicator of our deep-seated malice. While rightly criticising the poverty of political leadership, let us also turn the mirror towards us – how many business leaders do we have today who command public respect?

The question is where do we begin and who will make our capitalism humane and ethical. I think everyone will need to play an active role in changing. Our definition of whom we consider as successful will have to change. Our awards and rewards will have to be questioned and our values will have to be revisited.

Right at the school level, we have corrupted our kids by insisting that they get the highest marks at any cost. Guide books, tuitions and cheating are all accepted as the price to do well in exams. If educational institutions, families and media have failed to show what it means to be a decent human being, a child cannot be blamed for joining the rat race and ending up becoming a rat.

The current global crisis is a wake up call for all of us to ask some fundamental questions about ourselves, our society and our world.

I would like to end with these lines from the poem "Man in the Glass" by Dale Wimbrow. If leaders can take this to heart, it would make our world a much better place to live in.

You may fool the whole world down the pathway of life

And get pats on your back as you pass

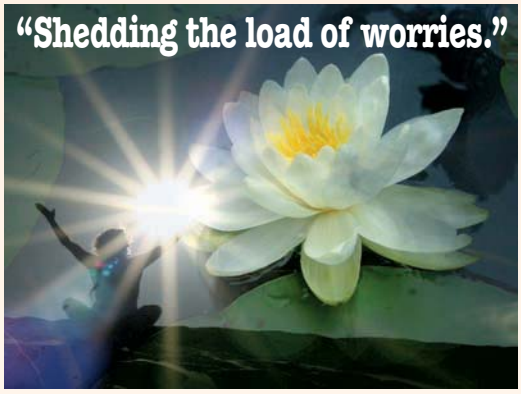
But your final reward will be heartaches and tears

If you've cheated the man in the glass."

(Abridged from a talk by **Anu Aga** at I-Congo, Mumbai, on January 22, 2009)

VIPASSANA:

"Shedding the load of worries."



I heard about Vipassana for first time many years ago when Mrs. Aga participated in a course. When problems at home greatly disturbed me, especially when both my parents died in a gas cylinder blast about six years ago, I really thought of attending such a course. But it never happened. Then, in 2008 when during a Women's Day event, when some of us listened to Mrs. Aga, I felt I shouldn't delay any more. It was time for me to begin practising Vipassana.

It was not easy to make up my mind, as I worried about how I would go leaving behind my children, how to make arrangements for their food and things like that. My colleagues and my children were surprised as I am very talkative and during Vipassana you have to observe 10 days of noble silence. And there were other comments from my children like, "how come you thought of going away now, when even during our 10th and 12th exams, you didn't take leave?"

I reached the Vipassana Centre near Saras Baugh, in Pune, on a Sunday at around 3.45 p.m. There were 87 of us including 27 women. An introductory lecture that evening oriented us about the basic philosophy: everyone seeks harmony and peace, which most of us lack in our daily lives. We ought to live at peace with ourselves, and at peace with others. Vipassana, a form of meditation, would help us by making us see things as they really are. The lecture informed us that it is one of India's ancient techniques developed by Gautama Buddha more than 2500 years ago.

The 10-day residential course that we were attending asked the participants to follow a prescribed code of discipline, learn the basics of the method, and practice sufficiently to experience its beneficial results. For the next 10 days we had to follow a strict regimen – the day begins at 4:00 a.m. with a wake up bell and continues until 9:00 p.m. There are about ten hours of meditation throughout the day, interspersed with regular breaks and rest periods. Every evening at 7:00 p.m. there is a videotaped lecture by the teacher, S.N. Goenka, which helps participants to understand their experience of the day.

During the entire time, we are to maintain silence and to tune off from all media. This schedule has proved workable and beneficial for hundreds of thousands of people for decades.

The course requires hard, serious work which involves a lot of self discipline. First, you have to observe a moral code of conduct – abstain from violence, stealing, sexual activity, use of intoxicants and false speech. This code is for calming the mind which otherwise would be too agitated to perform the task of self-observation. The next step is to develop some mastery over the mind by learning to fix one's attention on the one reality that we can experience – the ever changing flow of breath as it enters and leaves our nostrils.

On the third day I began missing my children. The life that I left behind, office work and so many other things came back to me. Things that we were expected to gently push away as we concentrated on our breathing and emptied our minds. Suddenly, I wanted to run away from the centre and come home. This is something many participants experience in the early stages of meditation. But gradually my fears came down and I was able to settle down to experience the peace that comes with shedding the load of worries that I have been carrying with me.

Vipassana helps us to observe ourselves, through disciplined attention to the physical sensations forming the life of our body that have a deep connection to the life of the mind. I realised during those 10 days that with proper training and practice it is possible to observe one's breathing and body sensations, and today I know that both are related to the state of my mind.

The course gave me an idea of what can be achieved through daily meditation if I continue to focus on the common root of my mind and body. Experienced practitioners tell us that it will dissolve the mental impurities within us, resulting in a balanced mind full of love and compassion. I know I have quite a long way to go, but I am glad I have begun the journey.

— **Chhaya Hublikar**
(Front Office, Thermax House)

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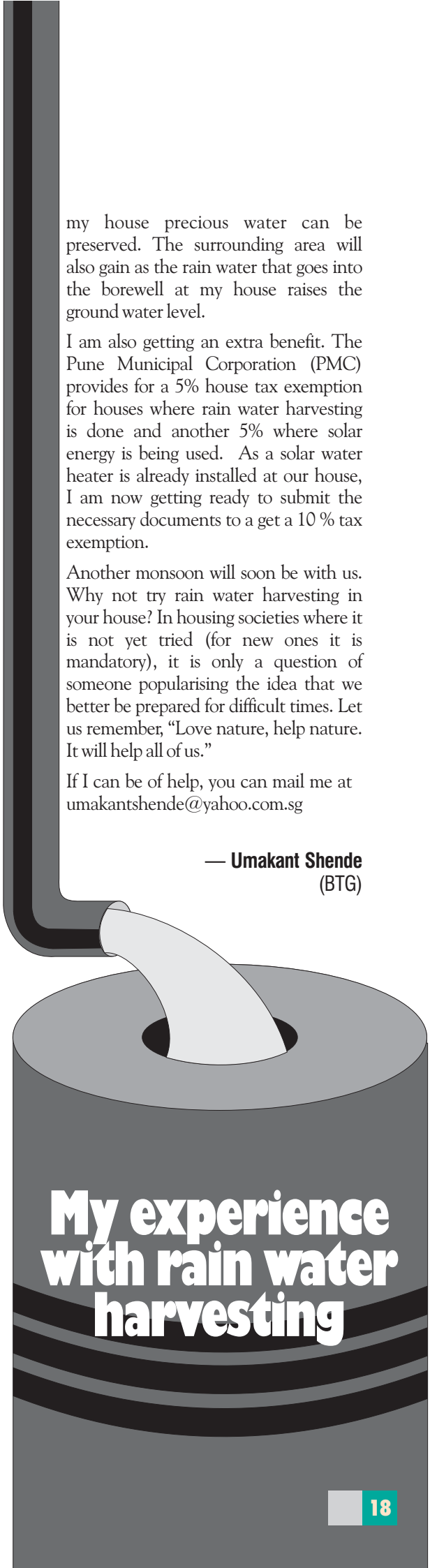
My experience with rain water harvesting



It was while working with our water treatment division (now WWS), about eight years ago, that I came across some good literature on rain water harvesting. It impressed me and I wondered why such a simple scheme to use abundantly available rain water to improve the ground water level is not being followed by everybody. Especially, when there is a drought-like situation in many parts of our country and water is getting to be more and more precious.

Later on, after I moved to BTG, in one of our internal meetings the subject of rain water harvesting cropped up. To add some spice to my mundane days, I compiled information on rain water harvesting, read through the success stories and prepared a presentation on the subject. When my colleagues received my presentation with enthusiasm I was encouraged to take it to people who cared to listen – housing societies, social gatherings and community meetings. The response everywhere was uniformly good and some of my listeners were charged by the idea and wanted to implement it in their premises.

During one such presentation someone asked me if I had really implemented it scientifically. At my house near Padmavati, that's built on a 3000 sq.feet plot, I had only dug a one-foot deep pit in one corner. Some water from a nearby drainpipe flowed into it, but it struck me I was not really capturing the huge quantity of rain water. As the saying goes "practice what you preach", I decided to go about it in a proper way. On the ground, I interconnected the drainpipes that brought down the rain water from the roof top. This water flowed into a new 120 feet deep borewell that I got dug near the house. In the meantime, I also contacted a specialist in rain water harvesting for suggestions and help. He inspected the area around my house and suggested that the water should be filtered before it went into the borewell. At a nominal cost he even supplied the filter, basically a combination of mesh and pebbles to clean the water from the first rains.

Now, throughout the year we have water in the borewell and some time back when we built an upper storey, water for the construction was taken from the well. By saving the money that would have been spent on buying water from tankers, the rain water paid back the cost of the borewell. Though the rain gods sometimes seem to be angry with us, when we do have a good monsoon, I have the comfort of knowing that at my house precious water can be preserved. The surrounding area will also gain as the rain water that goes into the borewell at my house raises the ground water level.

I am also getting an extra benefit. The Pune Municipal Corporation (PMC) provides for a 5% house tax exemption for houses where rain water harvesting is done and another 5% where solar energy is being used. As a solar water heater is already installed at our house, I am now getting ready to submit the necessary documents to a get a 10 % tax exemption.

Another monsoon will soon be with us. Why not try rain water harvesting in your house? In housing societies where it is not yet tried (for new ones it is mandatory), it is only a question of someone popularising the idea that we better be prepared for difficult times. Let us remember, "Love nature, help nature. It will help all of us."

If I can be of help, you can mail me at umakantshende@yahoo.com.sg

— Umakant Shende
(BTG)

I have the comfort of knowing that at my house precious water can be preserved. The surrounding area will also gain as the rain water that goes into the borewell at my house raises the ground water level.

give a free ride for a reality check

The next best thing to car pooling is giving rides to people when you're driving to office and back or on trips out of town. I do it as a matter of routine. On many mornings, I gave a ride to a "regular" who waits at a particular place and waves out as soon as he spots my car. He is a carpenter who works with army canteen stores. Over the years I have come to know his whole life story – his village, his family, his job. He comes from a village of carpenters, called Sutarwadi, which is on the outskirts of Pune. As he is a professional carpenter and I am an amateur one we sometimes "talk shop" on the short journey till he gets off. Once he told me an ironic fact. In his village it is difficult to find a carpenter as all of them have migrated elsewhere! But the name has stuck.

On the same road I sometimes meet a postman who works in the post office inside the University. He had met with a serious accident and it took him many months to resume work and get compensation from the motor tribunal court. Whenever I give him a ride, he always invites me to his house for a cup of tea. I find that very touching.

Once on my way home from office I gave a lift to an old man who insisted that I drop him right opposite his house so that his family could see him getting out of the car. It was amusing!

Giving rides is an interesting way to keep in touch with the reality around you. Once on a road trip to Goa, my wife and I gave rides to a number of villagers on the way. Some of them even offered to pay the "fare" they normally give to tempo and truck drivers for the ride. Obviously we refused which kind of confused them, as they must be wondering about our "motive" for giving free rides.

Of course, I am careful about whom I give free rides to, just avoid any untoward incidents. There are always these hordes of school boys wanting to thumb a ride. And I use my judgement whether to stop or not.

Given the state of the public transport system in Pune, so many people suffer from the lack of environment-friendly and safe mobility. I have noticed that many two wheeler riders give lifts to people when they are riding alone. I am doing the same, with a car, which is grossly underutilised when there's only one occupant. Such a waste! It's something like having a bath in a bathtub which would hold about 200 litres of water versus a bucket bath where you would use 20 litres. Either way, the result is the same. You are clean enough to come to the office and do whatever you do at work.

About two years ago my wife and I were heading towards a beach near Alibaug, when we saw a young local couple with two kids waiting under a tree – obviously for a bus or some other mode of transport. When I stopped near them they didn't make any move towards the car. They just waited stoically till my wife spoke to the woman and told her that the ride was free and they could get in. They did and we dropped them off where they wanted to go which was on our way. While getting out of the car, the woman thanked us and said, "My children have enjoyed this ride in your car." Must have. Ours also used to when they were small.

— **Ahmed Bunglowala**

Giving rides is an interesting way to keep in touch with the reality around you.

Creating an ecosystem for inn

BREAKFAST WITH FS

Dr. R R Sonde, Executive Vice President – Technology & Innovation gives Ahmed Bunglowala a rapid fire update on the company's agenda for technology and innovation and talks about why now is the golden opportunity for Thermax, over a breakfast of dosas, orange juice and papaya on the lawns of the Thermax guest house in Koregaon Park.

The side lane leading to the Pudumjee bungalow in Koregaon Park – which functions as a VIP guest house – is lined with some very old banyan trees which are probably more than 100 years old. The complex ecosystem they have created gives you a feeling of being in another era when everything was okay with the world and humans and nature lived in harmony. Alas!

I am heading to the guest house – after a long drive from Aundh – to meet my guest Dr. R R Sonde, who had expressed his wish to talk about technology and innovation sitting on the lawns of the bungalow – "for a change of scene from restaurants and offices." Ramchandra, the polite caretaker, has put together a healthy breakfast of dosas, sambar and chutney accompanied with orange juice and cut papaya. Just the right menu to go with the natural ambience of the place; and I'm sure it would meet with the approval of "Everlean" Pravin Karve!

To warm up, I ask him about his three personal favourites in innovation that have impacted the world deeply. He thinks for a while and names vaccines, optical fibres and atomic energy as the most significant. While vaccines have helped humanity to survive the hostile world of bugs; optical fibres have singularly caused a collapse in distances; and splitting and fusion of the atom has released a perpetual source of energy. Any talk on energy brings a sparkle in Dr. Sonde's eyes. "We are all manifestations of energy and vibrations," he says, sipping some orange juice. The caretaker brings the first round of dosas – thin and crisp – just the way they should be.

Talking about the Indian context, Dr. Sonde says the role of technologies in recycle and reuse is vast as the country suffers from perennial problems related to land, energy and water. "We can play a role here by developing and providing technologies appropriate to rural and semi urban India, to improve the quality of life and generate livelihood opportunities for millions," he says with his characteristic enthusiasm.

I ask him to describe the emerging blueprint of innovation and technology for Thermax.

He prefaces that you need a very pragmatic approach to innovation and technology and that there is nothing fanciful about it. He has restructured the former R&D set up as the RD Aga Research, Technology and Innovation center (RDA-RTIC). As recession hit unexpectedly, he has had to put on hold the construction plans for a new innovation and technology centre in Pune. "I had to quickly invert the model on development of technologies in these difficult times," he states. The existing infrastructure at the Energy & Environment Research Centre (EERC) is being put to use to get things going.

He tells me that 23 company-wide projects have been identified and these will be implemented in the span of six, 12, and 18 months. He mentions two to give me a flavour of the projects – a permanent solution to in bed tube failure and carving a niche market in inlet air quality. "This is a collaboration between RTIC and the business units to find solutions and make improvements in our products and processes. I have been constantly provoking and challenging our business units into action," he says. In a broader sense, he describes his role as helping in "creating an ecosystem" for research, technology and innovation to make things happen in a sustained way. In terms of the balance sheet, he mentions that Unnikrishan estimates that Thermax can add Rs. 2,200 crore to its top line if all the 23 projects are wrapped up successfully. "The focus needs to be sustained," he cautions.

I ask him whether innovation is too top heavy in Thermax. He firmly believes that innovation has to be driven from the top for it to percolate fast. "Everyone has to be innovative in the organisation," he says. According to him there are no short cuts to innovation and the "constraints of time" have to be overcome. "We have to make it happen and there's no conflict between invoicing and innovation," he asserts. Thinking and acting strategically will do the trick, he adds. The long term focus areas for Thermax, as he outlines them, are in renewable energy, clean coal technologies, nuclear energy (balance of

ovative thinking and doing

plant equipment to begin with), waste to energy projects and desalination. "We have to take a quantum leap in technology," he says. His impatience to push things through is palpable. "I feel we are too soft sometimes," he complains.

I invite his views on what kind of corporate culture encourages innovation to flourish. He mentions four things. First, where there's freedom with responsibility – "we are blessed with that freedom." Second, rewards and recognition – "we need to develop a mechanism to reward talent." Third, team effort for success – "there's a lacunae in this in Thermax." And, fourth, tolerance to failures – "Thermax needs to cultivate this trait."

Given its past record, he says, Thermax is well poised to make innovation a way of life once the "ecosystem" he mentioned earlier is in place. He names three "significant" Thermax innovations in the past – creating a successful state-of-the-art absorption cooling business; designing incinerator systems for difficult wastes and developing combustion systems for a variety of fuels, including biomass.

He believes there's a lot to be gained by working together with academics and academic institutions to further the reach and scope of innovation in Thermax. "The big advantage is that you can get their knowledge and expertise at a very reasonable cost and we have already made a good beginning in this," he says.

Two of Dr Sonde's favourite words are passionate and involved. About BARC, where he spent 22 years as a nuclear scientist, he says: "We didn't work for the money but for the excitement." The technology denial regimes, he adds, further added to the challenge and excitement of working in a world-class institution created by Dr. Bhabha. When he moved to NTPC to a "tough job" of business development he had to revisit himself and it's in this phase of his life that he took to yoga with Sadguru "It has been the nectar of my life ever since," he says. Yoga, he elaborates, gives him the positive energy to add value every day and that he can do without sleep or food but the daily yoga regimen is sacrosanct.

We are satiated with Ramchandra's delectable dosas and we refuse his offer to have one more. He looks a little disappointed and we settle for some more orange juice to wind up the conversation. Dr. Sonde tells me that his transition from the public and semi-public sectors to the private sector was with "mixed feelings" and that he knew Thermax to be a very competent company before he joined up about nine months ago, on the personal invitation of Dr. Mashelkar and Unnikrishan. What also helped to make up his mind is the dozen or so text messages from Meher Pudumjee, who obviously shares his passion for innovation and technology (see *Expressions*). He's feeling upbeat and likes to take things in his stride, he says. On a philosophical note he adds: "Between misery and happiness you are the sole arbiter."

He sums up that the world is in the throes of climate change and the financial meltdown and that the human intellect is very capable of finding solutions to get out of these self-made messes. "We have to change our lifestyle and moderate our consumption," he exhorts.

Talking about Thermax, he observes: "What we do today in innovation will have a big impact tomorrow on business." In other words, this is the golden opportunity for Thermax "to be a globally respected company," according to him, quoting from the company's vision statement.

We say our goodbyes and we thank the caretaker for his hospitality. On my way out I pause for a while to admire the majestic banyan trees again. Looking at them, what Dr Sonde said about creating an "ecosystem" for sustained innovation made perfect sense. In the big picture, ecosystems are the repository of nature's "free services" which sustain life on this planet.

> ***We have to change our lifestyle and moderate our consumption.***

If It Isn't Boring, It Isn't Green

In his new bestseller* Hot, Flat and Crowded, *Thomas Friedman draws attention to the urgency of a "green revolution" in the face of destabilising climate change and rising energy demands. Two excerpts from the book which show the way in energy efficiency innovation.

So here's a little news quiz:

Which city in Pennsylvania has a trade surplus with China, Mexico, and Brazil?

ANSWER: Erie.

How could an old-line, blue-collar manufacturing city like Erie have a trade surplus with China, Mexico, and Brazil?

ANSWER: One company, GE Transportation.

Well, what does GE Transportation make in Erie that is so exportable?

ANSWER: It makes big o1' locomotives – those huge industrial size diesel engines that pull long trains!

So how did GE Transportation, located in the former heartland of American manufacturing, now the heartland of America's rust belt, become the most profitable maker of locomotives in the world?

ANSWER: A combination of great engineering by a traditional American company in a traditional American town, a global market looking for cleaner locomotives, and a U.S. government that demanded higher and higher standards. Those high standards helped to drive the innovation of a big train engine that spewed out less pollution, while also increasing fuel economy and thereby lowering CO_2 emissions in the bargain.

And it is that interaction between government regulators and corporate managers and engineers – that dull, gray, boring interaction about standards – that is essential on a grand scale if we are going to spur the innovation we need to have a real green revolution.

Sure, everyone wants to be an eco-star. Knowledgeable eco-stars like Al Gore are critical; they draw attention and passion to an issue. But they make a difference only if they are followed up by "revolutionary bureaucrats" – men and women who can write emissions and efficiency standards, and who, with the flick of a pen, can change how much electricity fifty million air conditioners consume or how much diesel a thousand locomotives guzzle in one year. That's revolutionary.

When regulation meets technology

When it comes to the role of regulation in stimulating energy efficiency innovation, there is no better example than GE Transportation, which employs 5,100 people, many of them engineers, in its headquarters in Erie and in another plant in nearby Grove City.

GE Transportation's president and CEO, John Dineen, describes his locomotive factory as a "technology campus," because "it looks like a hundred year-old industrial site, but inside those hundred-year-old buildings are world-class engineers working on the next generation's technologies. People look at our big factory and they mistake it for a traditional manufacturing business, when what really drives this business is technology."

Hourly workers at GE Transportation make almost double the average wage in their respective cities – thanks largely to the export of the 240,000-plus-pound, $4 million Evolution Series diesel locomotive, or EVO for short. GE Transportation will have exported about three hundred of them to China by the end of 2009 and also sells them to railroad companies worldwide, including in Mexico, Brazil, Australia, and Kazakhstan. You'd think one thing that a railroad-based country like China would be making is its own locomotives, and you would be right. China does make its own locomotives, thousands of them, and they are much cheaper than GE's, but it turns out that GE's are the most energy efficient in the world, with the lowest emissions of CO_2, traditional soot particles, and nitrogen oxide, and they get the best fuel mileage per ton pulled. That's why China buys them. The EVO's new twelve-cylinder engine produces the same horsepower as its sixteen-cylinder predecessor. Best of all is that these locomotives are reliable. "They don't stop on the tracks," says Dineen.

One of the key factors driving GE Transportation to design the EVO the way it did was the U.S. Environmental Protection Agency's Tier II emissions standards for locomotives and other transportation vehicles. The new standards were issued in 2004 and required big reductions in the emissions of both nitrogen oxide and particulates. GE had no choice but to meet the new baselines, but the big question was how. Whenever a company making locomotives faces a standards issue like this, it can choose to trade off different variables. It can make its engine cleaner, for instance, at the expense of miles per gallon or miles per hour or reliability. GE's chairman, Jeffrey Immelt, decided that instead of just tweaking the company's existing locomotive engine, which met the Tier I standard, so that it could meet Tier II, they would simply start over.

'We knew we had to lower emissions," recalled Dineen. "If we wanted, we [also] knew we could trade things off on fuel efficiency and reliability, but we made a bet instead to advance all three through technology by redoing the whole engine. . . When you want to move all the variables in the right direction at the same time, you need to start with a clean blackboard. We went to a larger, more robust engine that could handle higher firing pressures in the cylinders, with new materials, new designs, and new pistons. We went for better reliability, lower emissions, and more miles per gallon – all at the same time." Yes, ultimately it was GE's engineers who figured out how to do this, and GE influenced the EPA on where to strike the balance. But the spark was definitely the 2004 Tier II emissions standard, said Dineen. "The EPA can be credited with instigating the need to drive new technologies into these locomotives."

Carbon emissions are directly correlated to a diesel locomotive's miles per gallon; as mpg goes up, emissions go down. So when GE decided to build a new engine that not only met the new Tier II EPA standards for

If It Isn't Boring, It Isn't Green

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nitrogen oxide, but would also get better mileage per ton pulled, it was able to reduce both the nitrogen oxide emissions of the EVO and its CO_2 emissions.

Back in 2004, this latter improvement seemed like just a nice added touch. CO_2 reductions were not part of the EPA Tier II agenda. But in the past two years, carbon emissions, especially for a country like China, became a huge issue, and China's government-owned railroads and a lot of other customers suddenly became eager to buy a locomotive that got better fuel efficiency and produced lower nitrogen oxide pollution and lower CO_2 emissions. "We were not sure the Chinese would be interested in lower emissions, but they are," said Dineen. Actually, given the fact that China in 2008 overtook the United States as the world's leading carbon emitter, with all the opprobrium that entails, it is not surprising that big state-owned Chinese companies would be eager to improve their emissions in a cost-effective way. The key, though, was to make lower emissions almost a free add-on that China's railroad companies could afford. When CO_2 emission reductions come through reductions in fuel consumption, said Dineen, "we see very quick adoption rates, not only in the U.S. market but in international markets that do not have government mandates."

The carbon emissions issue, added Dineen, "came up on us faster than we ever could have imagined. We got out in front of it, because of our own regulations. Regulations pushed us out there, we were early, and by the time others were interested, we had an advantage in this area."

The new EVO was 5 percent more fuel efficient than its predecessor. What's 5 percent? Over the twenty-year life cycle of the locomotive, it saves approximately 300,000 gallons of diesel fuel and the corresponding carbon emissions. And when one railroad buys hundreds of these locomotives at a time, that can add up to a lot of fuel and carbon saved.

"Now we're already deep into discussions about Tier III and IV standards," said Dineen. "The more. carbon gets taxed, and fuel prices increase, the more it will push us to become more fuel efficient. GE and the EPA have recognized the lesson from Tier II and are looking for technology solutions that reduce traditional pollutants like nitrogen oxide, while improving fuel efficiency and carbon emissions. And, by the way, the higher the standards, and the more technology necessary to achieve them, the smarter the engineers we need to hire."

Indeed, GE Transportation has a huge appetite for talented engineers, but the Erie school system was struggling to keep up in its ability to teach math and science. So the GE Foundation put $15 million into improving the math and science program in the local schools. It is not that GE is hiring high school grads from Erie to be its engineers, but if it wants to attract quality engineers to Erie and keep them there, it needs to help maintain a quality school system.

"This is western Pennsylvania," said Dineen. "This is not Silicon Valley. I spend a lot of time with the local government trying to get the leaders to recognize that our competitive advantage is rooted in technology, and not low-cost welding. So we are challenging this town to make sure we are constantly improving math and science education."

In short, companies like to locate where the engineers are the best and most plentiful and where the standards are constantly pushing

them higher. Everything is connected: Higher climate and emissions standards demand smarter products, smarter products demand smarter workers, and smarter workers like to live in clean environments with good schools, so they end up demanding still higher standards. If America wants to thrive in the Energy-Climate Era, the federal, state, and local governments all need to be driving that virtuous circle all the time.

Probably the most oft-cited theory about the relationship between environmental regulation and innovation is the "Porter hypothesis," first expounded by the Harvard Business School professor Michael Porter in 1991. He asserted that " appropriately planned environmental regulations will stimulate technological innovation, leading to reductions in expenses and improvements in quality. As a result, domestic businesses may attain a superior competitive position in the international marketplace, and industrial productivity may improve as well."

Another way of putting it, Porter explained to me, is that pollution is simply waste: wasted resources, wasted energy, wasted materials. Companies that eliminate such waste will be using their capital, technology, and raw materials more productively to generate maximum value and, therefore, will become more competitive. So, properly crafted environmental regulations give a kind of two-for-one kick – they can improve both the environment and the competitiveness of a firm and a nation.

It's the Design, Stupid

SO one day a few years back your boss calls you and says, "Have I got a deal for you! We're deciding where to build our next wafer fabrication facility for producing leading-edge microprocessors. China, Taiwan, and Singapore have all offered tempting subsidies and tax breaks if we build it in one of their countries. But we'd like to stay here in the Dallas area, near our microchip design center and other facilities. Wherever this building goes, though, you – the building team – need to erect the new plant in 2005 for $180 million less than we built its predecessor for in 1998."

"Oh, yeah, right," you say. "Build a new building for $180 million less than its predecessor cost seven years earlier. Who does that?

Sounds crazy, but that is exactly the challenge that the leadership of Texas Instruments laid down to its building team in the early 2000s, and here's what's really crazy: The building team went and did it. And here's what's even crazier: The cost-saving strategy the building team adopted was to make the building as green and as energy efficient as possible and that is how they hit their target. Designing green *was how they saved money,* and therein lies an important tale.

Besides making homes and cars more energy efficient, there is a mother lode of energy efficiency waiting to be exploited in commercial buildings through building design – illustrated by the Texas Instruments wafer factory in Richardson, Texas. And the key to it is the realization that a properly designed energy-efficient building can not only be cheaper to operate, it can be cheaper to build than a conventional building. Buildings use roughly 40 percent of the total energy consumed in the United States and 70 percent of total electricity. When the general public comes to believe that green is the cheapest way to *build and operate,* the revolution is really under way. I visited the new TI wafer factory in 2006 while making a documentary on energy for the Discovery Times channel. (By the way, what is a wafer? According to the technology dictionary Webopedia.com, it is a thin, round slice of semiconductor material, usually silicon, from which microchips are made. The silicon is processed into large cylindrical ingots, sliced into ultra thin wafers, and then implanted with transistors before being cut into smaller semiconductor chips.) Wafer factories always had a minimum of three floors, because of the complicated cooling systems and support equipment that had to surround the manufacturing line.The TI design team came

If It Isn't Boring, It Isn't Green

The LEED Green Building Rating System encourages the adoption of sustainable green building practices by creating a recognized benchmark for the design, construction, and operation of high-performance green buildings. LEED, which was spearheaded in the mid-1990s by Rob Watson, the eco-consultant, is managed today by the U.S. Green Building Council. It gives out basic, silver, gold, and platinum certifications to buildings based on five criteria – sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

up with a way to build the 1.1. million square-foot Richardson factory with just two floors – a huge savings in square footage and all the mass and energy needed to support it. TI also consulted with Amory Lovins and the green building experts at the Rocky Mountain Institute to design other parts of the plant in a way that would lower its resource consumption, a savings that, over the life of the factory, can exceed construction outlays. Together, TI engineers and the RMI team designed big water pipes and air-conditioning ducts with fewer elbows, which reduced friction loss and let them use smaller, energy-saving pumps. To bring down cooling costs in sun-baked Texas, engineers designed a plastic membrane that reflects 85 percent of the sun's radiation from the roof. In addition, the windows in the administrative wing were designed with special shelves that reflect light deep into room interiors, reducing the need for artificial lighting. Recycled water was used to run cooling equipment and irrigate outdoor landscaping whose environmental impact the designers minimized by using native plants. These moves, together with innovations in how air is circulated, cooled, and recovered naturally, reduced total heat so much that TI was able to get by with one less huge industrial air conditioner than would normally have been required.

"We needed seven chillers instead of eight," said Paul Westbrook, who oversees sustainable design and development for TI's worldwide building team and helped turn TI leaders on to green building by taking them to tour his solar home. "Those chillers are about 1,600 tons each and cost about $1 million each to buy and install." Green building is not necessarily about producing your own power with windmills and solar panels, he added, "it's about addressing the consumption side with really creative design and engineering to eliminate waste and reduce energy usage. It's the next industrial revolution. Green building added some cost, but overall, we built a green building for 30 percent less per square foot than our previous facility six miles away."

The key to pulling that off, explained Westbrook, was making the TI factory in Richardson "the Prius of wafer factories." How so? 'We didn't just take the old design and try to tweak it to save a little money here and there. We took out a blank piece of paper, we looked at how everything interacted with everything else, and we came up with a whole new design that turned out to be not only cheaper to build but cheaper to operate."

The main lesson of this, said Westbrook, is that if you rethink every process and all the connections between each process – for instance, how waste heat from one system can be used to power another, rather than just cooled with another air conditioner, or the way the Prius used braking to generate electricity to charge the batteries – you can actually take two goals that everyone thought had to be in opposition (saving money and building and operating green) and accomplish them together.

It is not easy, though. You need to put a lot more thought into the original design. You have to think of a house or building not just as walls, windows, and floors, with lights, heating, and cooling, but as a system of systems, and then rethink how they all interact. Historically, the heating and air-conditioning never talked to the windows. The windows never talked to the lighting. The lighting never talked to the doorways. So everything was usually on all the time and nothing talked to anything, let alone to the grid or to the energy market. With an intelligent building, with occupancy sensors in every room, you could have the ting and

auditorium, classroom, or office heated and lit only when it is in use. But more than that, smart windows can let in more light and heat when it is cold and dark and keep out more when it is hot and sunny, and these windows can be constantly talking to both the overhead lights and the heating and air-conditioning systems. Solar walls can be used to light up the school or power the battery of the school bus. When you start to think of a building as system of systems, not a block of bricks, all kinds of things become possible. And just imagine all these highly efficient smart buildings being integrated into an intelligent Energy Internet, where each building's flexibility is used to serve the needs of other buildings, not just its own. Although completed by 2006, the TI factory has been delayed from going into operation by a downturn in the chip business. But the building is ready to go and all the systems have tested out. The tests indicated that when it is fully humming "we should see about $1 million a year in utility savings in the first year and around $4 million a year in lower utility bills when fully running," given current electricity prices, Westbrook said. That is about a 20 percent savings on electricity and a 35 percent savings on water from its predecessor, he added. "When we do start production, it will ramp up over a number of years – and our savings will ramp up with it."

Texas Instruments was proud "to prove you can [be] green and energy-sensitive and reduce costs and increase profits," Shaunna Black, TI's vice president for worldwide facilities, said to me back in 2006, when the building was just being finished. "Amazing things happen when people claim responsibility for creating the impossible."

That is the challenge we need to lay down across America – taking responsibility for creating the impossible. If I could wave a magic wand and impose one regulation to hasten achieving that goal, it would be a law requiring every first-year drafting, engineering, and architectural student to take a course in LEED (Leadership in Energy and Environmental Design) building and system design. The LEED Green Building Rating System encourages the adoption of sustainable green building practices by creating a recognized benchmark for the design, construction, and operation of high-performance green buildings. LEED, which was spearheaded in the mid-1990s by Rob Watson, the eco-consultant, is managed today by the U.S. Green Building Council. It gives out basic, silver, gold, and platinum certifications to buildings based on five criteria – sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. The TI facility in Richardson is LEED Silver.

LEED is a perfect example of an energy/environmental standard that did not come from the government down, but from society up, as society has come to value more sustainable workplaces. The standard has spread virally, so far, so fast, and so compellingly that studies now show that occupancy, rental rates, and sale prices are higher in LEED-certified buildings than in conventional ones.

But we cannot just depend on volunteerism. Landlords chronically under invest in energy-efficient designs, building construction, and appliances, because their tenants pay the electric bills. When the tenant pays, the landlord doesn't care about forward operating costs, so he will minimize all upfront capital expenditures. When the landlord pays, the tenants don't care about efficiency and will not look to optimize and minimize ongoing energy consumption. And oftentimes, people just don't know that this light bulb or that dishwasher is better than another in terms of energy efficiency, so they will not make the right choices, even if they are economically incentivized to care. That is why you want the government to step in and guide the marketplace.

This can be done in many ways, including outlawing certain kinds of energy-greedy light bulbs or mandating performance standards for cars, buildings, and appliances – so people don't have any choice but to be energy efficient. As the Stanford climatologist Stephen Schneider put it in an interview with Katherine Ellison, published on July 2, 2007, on Salon.com : "Volunteerism doesn't work. I've said this about 85,000 times. It's about as effective as voluntary speed limits. No cops, no judges: road carnage. No rules, no fines: greenhouse gases. We're going to triple or quadruple the CO_2 in the atmosphere with no policy."

(Excerpted from
Hot, Flat and Crowded
by Thomas Friedman)

Sewage yields more gold than top mines

Resource-poor Japan just discovered a new source of mineral wealth – sewage.

A sewage treatment facility in central Japan has recorded a higher gold yield from sludge than can be found at some of the world's best mines. An official in Nagano prefecture, northwest of Tokyo, said the high percentage of gold found at the Suwa facility was probably due to the large number of precision equipment manufacturers in the vicinity that use the yellow metal. The facility recently recorded finding 1,890 grammes of gold per tonne of ash from incinerated sludge.

That is a far higher gold content than Japan's Hishikari Mine, one of the world's top gold mines, owned by Sumitomo Metal Mining Co Ltd, which contains 20-40 grammes of the precious metal per tonne of ore.

The prefecture is so far due to receive 5 million yen ($55,810) for the gold, minus expenses.

It expects to earn about 15 million yen for the fiscal year to the end of March from the gold it has retrieved from the ashes of incinerated sludge.

"How much we actually receive will depend on gold prices at the time," the official said.

Some gold industry officials expect prices this year to top the all-time high above $1,030 per ounce set in 2008, on buying by investors worried about the deepening economic downturn.

(Source: Reuters)

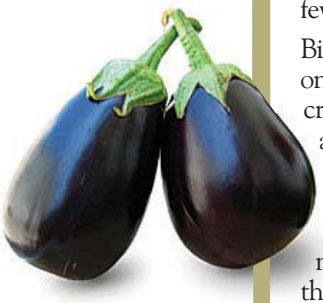
SLICE OF LIFE

The power of agreement

One fine day, Emperor Akbar was discussing the brinjal with Birbal. He told him what a delicious and nutritious vegetable it was. Much to Akbar's surprise, Birbal thoroughly agreed with him and even sang two songs in praise of the humble brinjal.

After a couple of days the royal chef cooked brinjal curry for lunch. Birbal was also eating at the palace that day. When the brinjal curry was served to Akbar, he refused it, saying it was a tasteless vegetable, full of seeds and lacking in nutrition. He then asked that it be served to Birbal who loved brinjal.

But birbal too refused, saying it was not good for health. At this, Akbar impatiently asked him why he had changed his mind when just a few days ago he was all praise for the brinjal.

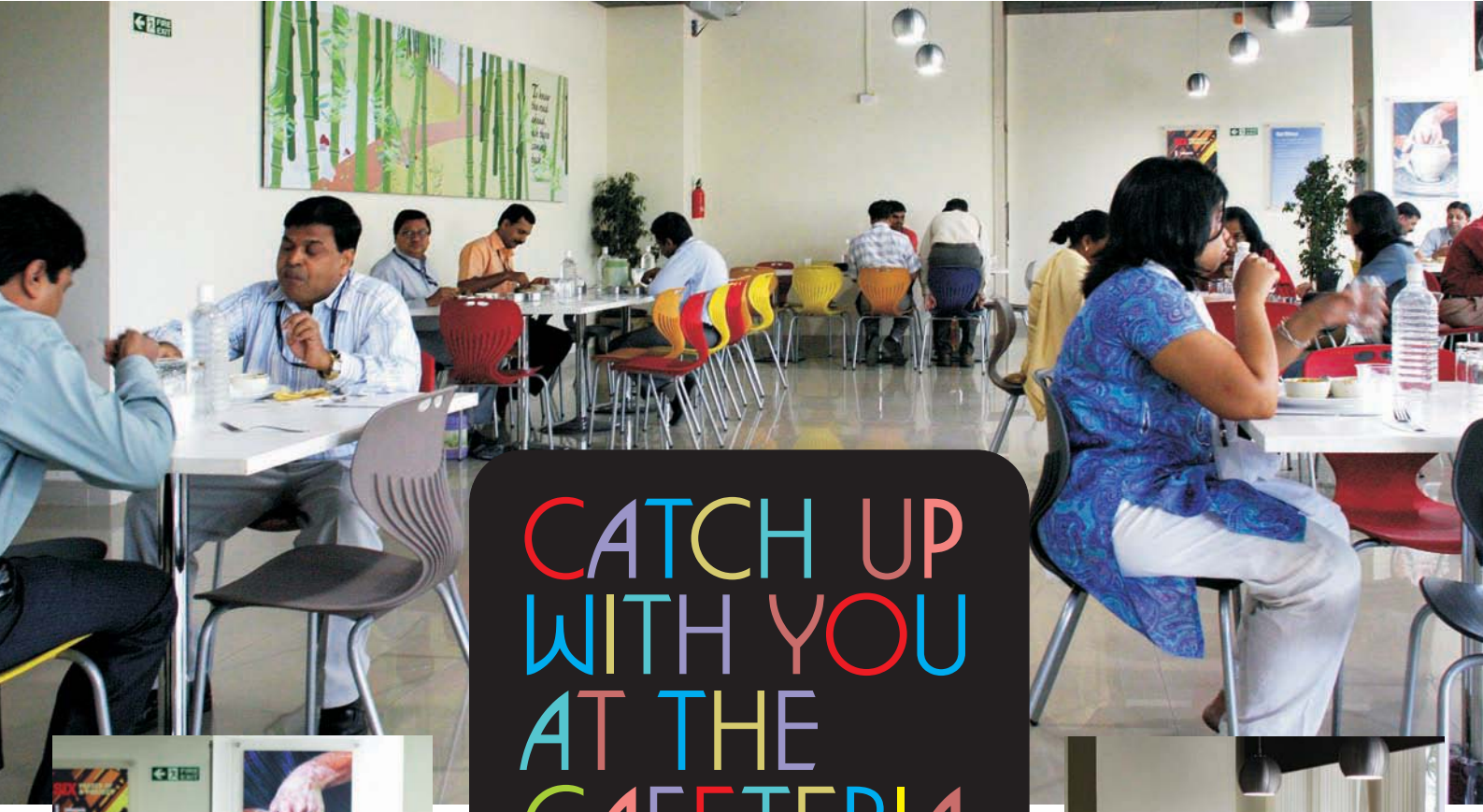


Birbal replied that he had praised the brinjal only because his emperor had praised it and criticised it when his majesty had critisised it, as he was loyal to his emperor and not to the brinjal. He said the brinjal could not make him a minister no matter how much he praised it. He went on to say that he was his majesty's obedient servant, and not that of the brinjal.

Akbar was pleased by his honest and witty response.

(Source: Birbal Stories)

... And this poster



CATCH UP WITH YOU AT THE CAFETERIA

Lunch time at the cafeteria at Thermax House, which is a mix of eating, sharing and conversation. How have you been in the first half today?
Not bad, could have been better.
Try some of this aloo methi.
Thanks, I love it.

Savli delivers the goods.

The new manufacturing facility of Thermax, at Savli in Gujarat, strengthens the company's manufacturing muscle for boilers.

The four plants in operation – drum, coil, panels and shell – provide a boost to project completion and timely despatches.

The well-equipped facility has already shipped heating systems to Thermax customers in India and abroad which includes a single piece 100-ton consignment to Saudi Arabia.

Glimpses of the manufacturing action on the Savli shopfloors