Challenges of bringing the (R&D) work on green environmental technologies of Singapore to the world maritime arena
Our R&D work
R&D

Why?

- Knowledge based – PMEs
- No immediate return
- A continuous hard work & gambling process
Objective & Vision

- For environment?
- For money?
- For name?
- Just a job?

- Need passion & love!
- Must be able to feel it, smell it & sense it.
Singapore environmental technology for the world

The Singapore business history & background –
Trading, service, properties, manufacturing, engineering services but not technology inventor, not R&D center.

Key factors
- Manpower.
- Funding, investors attitude.
- Supporting Industries.
- Facilities and cost of doing business.
Idea & reality

- C&M vs R&D
- Original ideas
- Papers reviews & Statistics
- Me too attitude
- **World Market needs**
- Creating needs
- Nice to have, should have & must have.
- Know your strength
- Understand the mariners behaviors
Marine Green
Environmental Technology
R&D team key members

Basic qualification –
Must taste salty

Multi-disciplines thinker - creative bridging of science, engineering, sales & marketing, and finance.

Mad scientists – Not a follower, not afraid to challenge the book and school teaching.

Non conservative engineer – Able to convert science or technology into an implementable marine system.

Good money hunter – NKF fund raising skill
Marine Green Environmental Technology R&D team key members

The quality -

Street Smart not book Smart. Think like a businessman not just an engineer.

Must be positive. Prove it right, not to prove it wrong.

Believe in what you have seen, not what you had learnt.

Willing to step out of comfort zone.

Dare to challenge the impossible or unknown.

Ready to be classed as pseudoscience or non main stream. (Ego problem).
Money Talk

R&D don’t stop here!

Entering the fatal zone

Success of R&D

Technology/idea incubation

Market, Business & Product Development

Commercialization

Sales - early technology adoption

Cash flow - early technology adoption

Sales - late technology adoption

Cash flow - late technology adoption

Valley of death

Internal funding, Entrepreneurial investors

Financial Institution, IPO etc
### Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Duration</th>
<th>Cost</th>
</tr>
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<tbody>
<tr>
<td>Cooling water treatment</td>
<td>.....+ 12 years</td>
<td></td>
</tr>
<tr>
<td>Emission control</td>
<td>.....+ 6 years</td>
<td>S$ 8 mil</td>
</tr>
<tr>
<td>Ballast Water Treatment</td>
<td>10 .....+ 2 years</td>
<td>S$ 6 mil</td>
</tr>
<tr>
<td>Marine Corrosion control</td>
<td>30 .....+ 2 years</td>
<td></td>
</tr>
<tr>
<td>Marine Bio-fouling control</td>
<td>9 .....+ 3 years</td>
<td></td>
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<tr>
<td>Fuel Treatment</td>
<td>.....+ 10 years</td>
<td>S$ 4 mil</td>
</tr>
<tr>
<td>Oil viscosity reduction</td>
<td>.....+ 10 years</td>
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</table>
Mariners want proven product –
Kills the new technology.
No urgent needs to accept new concept.

Classification society endorsement or type approval –
New technology ahead of rules or standards.
No rules for new technology.
Approval slowed down the implementation.

Mariners want turn key solution not technology or ideas –
Need engineering solution or system integrators to make the technology acceptable to mariners.
New product

Market entry obstacles

Existing players set obstacle—Use influencers to block the entry.

Existing players play politics—Example, discharging pH 3 water into the sea.

Use legal proceeding to block entry—Use court injunction to block entry. Kill the original IP owner by draining their financial resources through lengthy IP court fight.
New breed of copy cats
Not just Asian cats!
Very smart, intelligent, alert, well trained, strong muscle, choosy in food, very good in distorting facts, lots of friends, many disciples, born in rich family and well protected.

How to breed copy cats
Get a team of surgeons to diagnose & tweet the DNA to produce or clone a new cat. Use third party to pressure parent cat to disclose DNA information.

NDA does not protect copy cat pregnancy!
New Technology

Common Technical Issues

System integration and liability
Need strong marine engineering team to support especially for marine technology. New technology must be able to integrate into other system and plant.

Evaluation process and equipment.
Many evaluation processes, criteria, and test instruments are not suitable for new technology.

R&D and Patent
It is not your life protection amulet. R&D is a continuous process. Don’t perform time wasting R&D work.

Facing the unknowns & Sizing up
New product

How to bring it to the world?

Too humble in selling the products to the world—Asian culture and teaching.

Asian technology inferiority complex – Industrialization starts from the West not East.

Lagging behind in modern way of marketing, PR and branding—Marketing, PR and Branding are more important than Patent right.
Collaboration with Sembawang shipyard

New Technology

What we have done
New Technology

What we have done
New Technology

What we have done
Thank You!