Karel Goedkoop
RAVO Sweepers

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RAVO at Glance

- Based in Alkmaar, The Netherlands, Established in 1964
- RAVO is the Inventor of Compact Street Sweepers
- Production capacity of 500 sweepers per year
- 160 Employees, 10 in Research & Development
- Market Leader Mid-size Sweepers
- World wide active with Professional Distributors for Consultancy, Support and Service
- Innovative products that serve the Well-being of people

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RAVO: Global Market Leader in City Cleaning

Trend Mix in City Sanitation

- **Sustainable Solutions**: Zero Emissions, Healthcare, Safety, Good Global Citizen, and more Well-being

- **Premium Brands**: Preference for Best Quality available, Providing more Value-for-Money to its tax payers

- **Budget Constraints**: Rising National Debt and Lower Tax Income
Market / Product Mix

Type A: Early Adopters, CCI-cities*
Type B: Pioneers, Missionary Cities
Type C: Emerging Markets and cities with Budget constraints

*Clinton Climate Initiative partner- and affiliate cities

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Sustainable Solutions

- It is our starting point; long term, consistent commitment
- Embedded sustainability in our New Product Development process of:
  - Reduce, re-use, recycle
  - Life cycle thinking
- NPD process is a constant balance between
  - Functionality, structural need of the product
  - Design aspects
  - Environmental aspects
- Production and supply chain playing a crucial role
- Experts and partners active involvement is critical to success
Life Cycle Assessment

- production
- use
- transport
- end-of-use
- materials
Life Cycle Thinking

- Consequences on my planet?
- Consequences on my internal processes?
- Consequences on my user’s health/well-being?
- Consequences on my money?

End-of-use
- Tracked partners?
- Sustainable development report?
- Product disassembly?
- Recyclable materials?
- Take back?

Use
- Product lifetime?
- Maintenance?
- Product weight?
- Health/well-being?

Production
- Lea?
- ISO 14001 Certification?
- Number of plants and suppliers?

Transport
- Packaging & volume?
- Consequences on my money?
- Consequences on my internal processes?

Materials
- Hazardous materials?
- Conforming to laws & norms?
- Plants’ action plans?

Environmental policy?
- Sustainable development report?
- Trusted partners?

Products’ environmental impacts?
- Ethic, social, health & safety?
- Transport impacts?

Life cycle thinking

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What did we do so far…

**Some examples:**

- Launched alternative fuel sweepers
  - CNG, Bio-Gas, Bio-Diesel
- Lowest noise emissions
- Reduced dust emissions
- Restyling, looks
- Fuel efficiency software
- Sweeper with reduced water usage and water recycling
- Material choices, recyclable plastics, reviewed processes
- Sunlight in factory
- Simplify manufacturing/sourcing footprint
What did we do so far...

Lowest noise sweeper

- Lowest sound power and lowest sound pressure
  - up to 10 dB(a) less than standard machines
  - for citizens and operators well-being
  - approved with TuV certificates
- Identify dominant source and then:
  - absorption (apply materials that do not reflect noise)
  - isolation (keep noise inside and make the machine “noise-tight”)
  - reduction of noise or removal of source
- Software controlled reduction of operating RPM and air-flow
  - system redesign and optimization ensures suction power is still sufficient and not loosing sweeping performance.
  - results in lower noise and lower fuel consumption; thus uptime effectively improvement and cost efficient
- Market received this very well and RAVO was rewarded with Decibel D’Or
What did we do so far…

Sweeper with reduced water usage and water recycling

- **Re-use of the water for dust suppression without using a pump**
  - using gravity and air flow (venturi principle)
  - the introduction of the water recycling system reduces the use of fresh water by approximately 50%

- **Software that stops water-spraying when sweeper stops**
  - by intelligent dosing and switching of nozzle’s, water consumption is reduced considerably: spray water only where and when it is needed

- **Means longer uptime and cost efficiency**
  - no cost of pump, no maintenance cost, no energy cost
  - lower cost of water consumption
What did we do so far...

RAVO introduced the world’s cleanest sweeper:
The 4-Series CNG / Biogas

- **Specially Developed for Cities**
  Small enough to reach those difficult areas, but robust enough for the tough jobs

- **Environmental Friendly Sweeping**
  The CNG engine is up to 70% more silent than a diesel engine

- **Powerful Sweeping**
  Due to the use of a dedicated CNG engine no power is lost compared to using a similar Diesel engine. And because the CNG is stored in protected bottles on the roof a long action radius is guaranteed without losing loading capacity

- **Economical Sweeping**
  CNG is cheap compared to Diesel or Petrol
CNG / Biogas: The Natural Choice

➢ The best alternative for Diesel
  • NOx reduction
  • CO² reduction
  • No carbon emission

➢ Safe
CNG is stored in protected cylinders which are safe and explosive proof

➢ Proven Technology
CNG is not new and many municipalities already discovered the benefits of CNG powered vehicles

➢ Clean
CNG is a clean fuel. These days many cities have “green zones”. A CNG Sweeper is the way to underline the green ambitions of your community
EU initiatives (example)

- The public-private partnership "Factories of the Future" (PPP FoF) is targeting the manufacturing industry. Manufacturing is still the driving force of the European economy, contributing over 6 500 billion euro in GDP and providing more than 30 million jobs. It covers more than 25 different industrial sectors, largely dominated by SMEs, and generates annually 1 500 billion euro of value added.
- “Building on the EU's excellent R&D base, the future of manufacturing is vital to European economic growth and sustainability. The long-term shift from a cost-based competitive advantage to one based on high added value requires that European manufacturing increases its technological base and develops a number of new enabling production technologies with cross-sectoral benefits. There is an increasing demand for greener, more customised and higher quality products. This initiative will help European industry to meet these needs by converting to a demand-driven industry with lower waste generation and energy consumption.”
- Newly-developed industrial technologies, ICT and materials will improve the competitiveness of the companies

Source: [http://ec.europa.eu/research/industrial_technologies](http://ec.europa.eu/research/industrial_technologies), OECD and Eurostat
Final

- Sustainability, regulations, demand for improved wellbeing and environmental protection drives manufactures to invest in innovation.

- Innovation that we pass on to our customers: with sweepers that clean cities, providing a safer and healthier living area and that help to protect the environment thanks to their innovative technology.

- These innovations makes our machines also more effective (e.g. use in night shifts) and more efficient.

- Sustainability applies to everything a company does; how it produces, sells, transports and manages. It is much stronger and convincing when the ‘green activities’ are part of the business model.

- Market research shows that only something like 10 percent of the consumers actually spend ‘sustainably’
Final

• Authorities are playing a crucial role in sustainable solutions and should be pro-active
  – Incentives for innovations
  – Acting as launching customer
• Cities, acting as early adaptors for sustainable solutions, forces manufacturers to invest in more innovative solutions, beyond regulations
• Cities in emerging markets and cities with budget constraints will benefit from these innovations, pushed by early adaptors, over time
• Partnerships between Authorities-Manufacturers-Knowledge Centers (Public-Private-Partnerships) are essential
• But will only work as People-Planet-Profit principle is in place. Sustainable solutions and innovations should also have a business reason for improved performance and profitability
• **Sustainability is not just a buzz word!!** Something real is happening and manufactures and authorities are moving in the right direction but … much more needs to be done…
Thank You for Your Attention

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