Energy management in Desalination Plants

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History of Desalination in Malta

1881 - Commissioning of a Distiller for production of potable water following a drought

1966 - 4,500m^3 per day MSF distiller commissioned

1973 - 2,250m^3 per day MSF plant commissioned in Gozo

1982 - 20,000m^3 per day Seawater RO commissioned at Ghar Lapsi

1983 - 4500m^3 per day Brackish RO commissioned at Marsa

1985 - 15,000m^3 per day Seawater RO commissioned at Tigne

1988 - 18,600m^3 per day Seawater RO commissioned at Cirkewwa

1991 - 17,600m^3 per day Seawater RO commissioned at Pembroke.

1994 - Pembroke RO upgraded to 54,000m^3 per day

2004 – 4,000m^3 per day Polishing Plant in Gozo

2021 - 9,000m^3 per day Seawater RO commissioned in Gozo

SWRO Plants

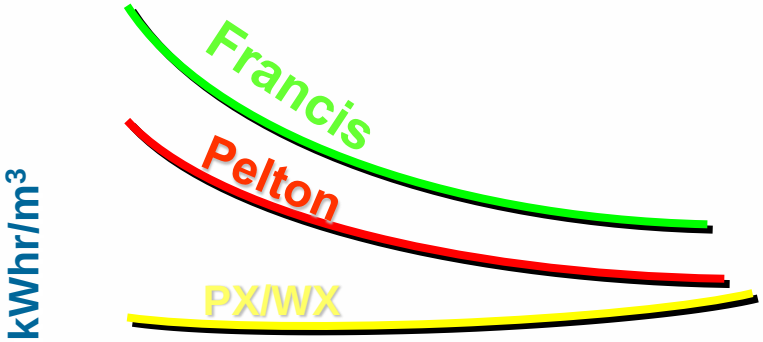
9,000 m³/day

17,500 m³ /day

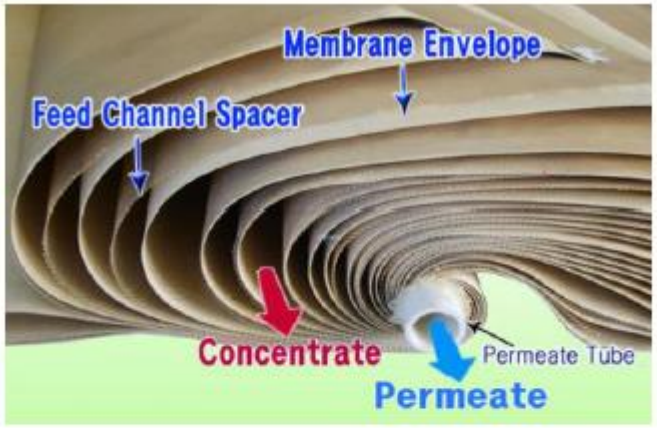
30,000 m³ /day

56,000 m³/day

Energy Recovery Devices

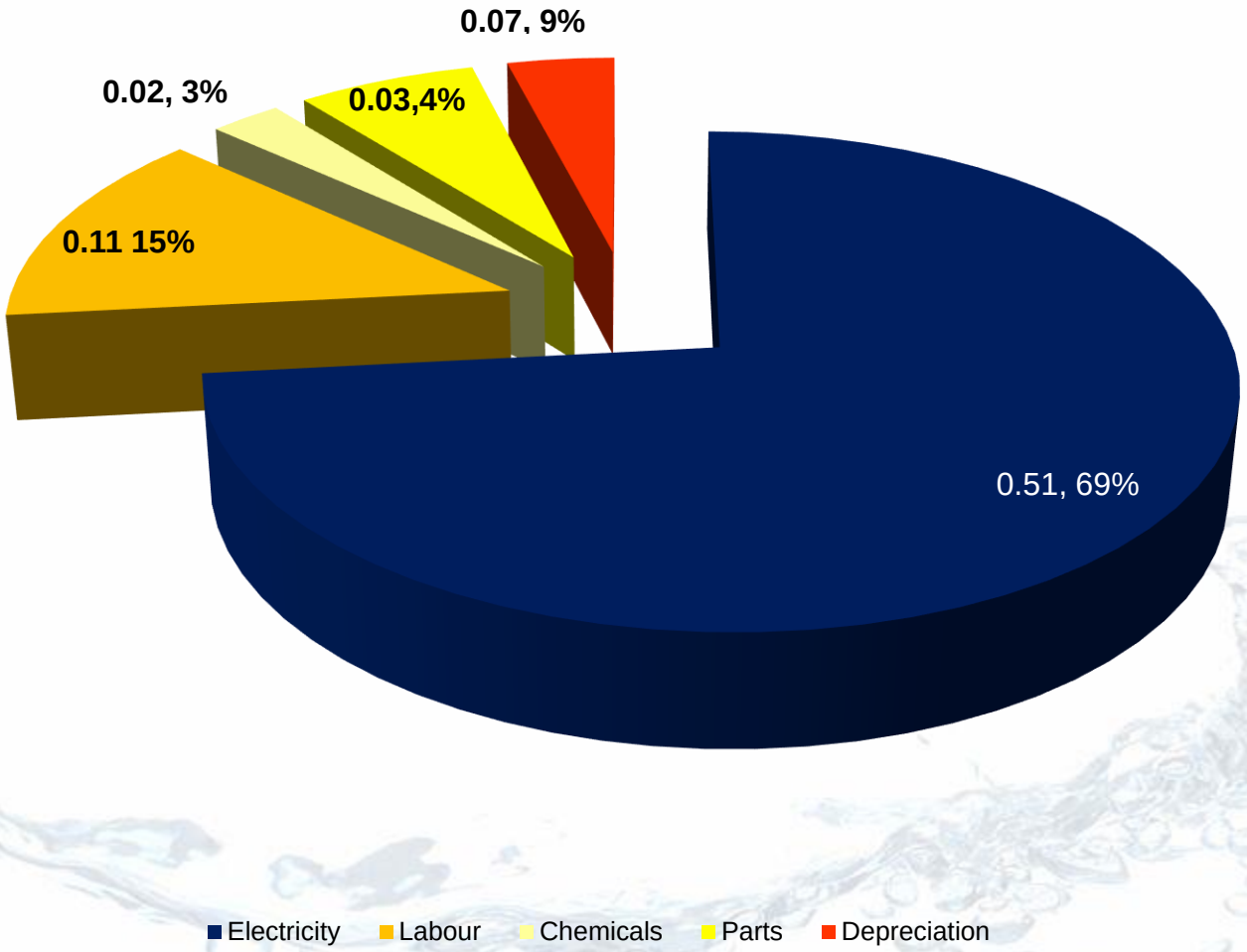


Membrane Development

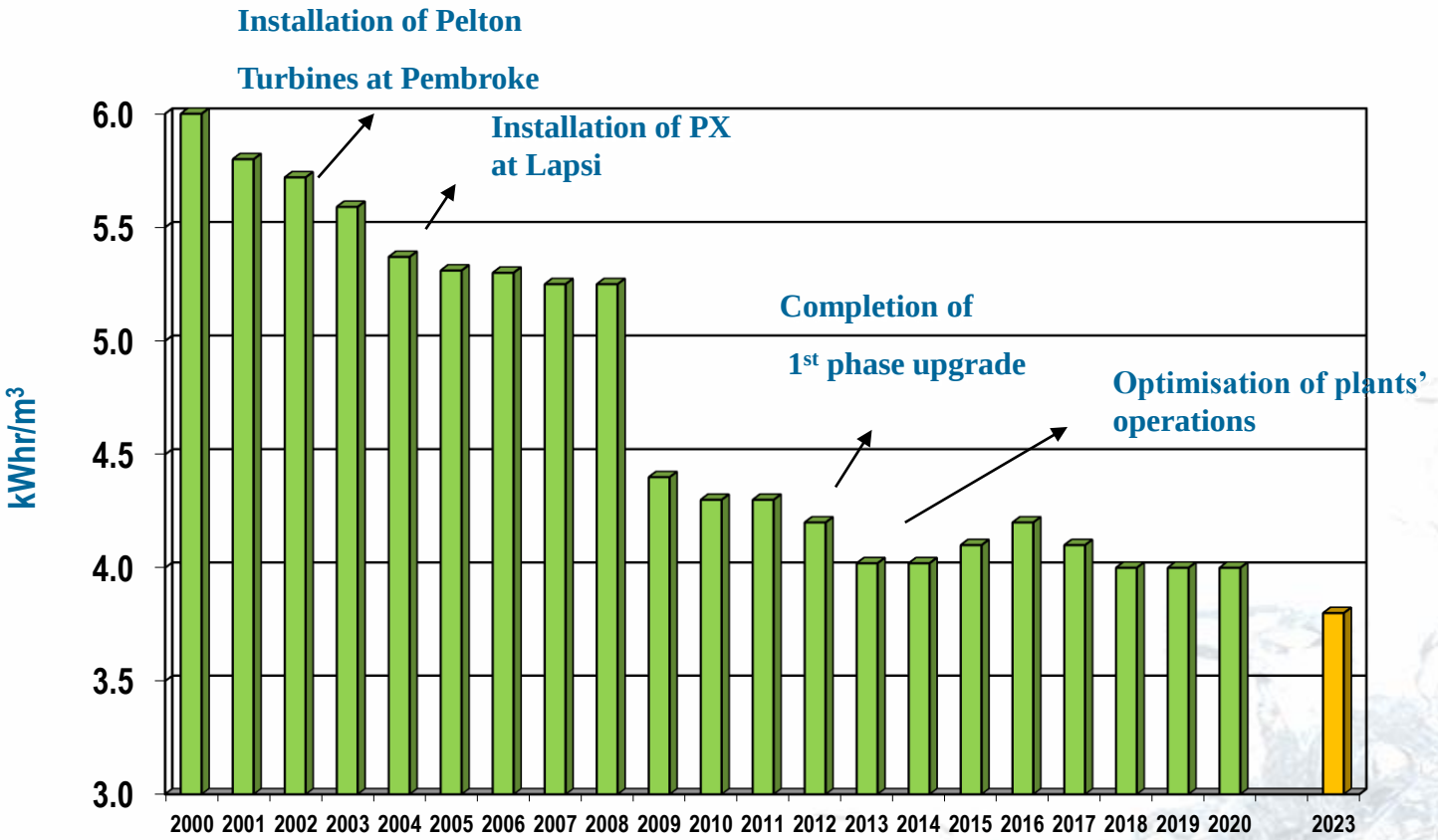


Plants' Upgrade

Specific cost

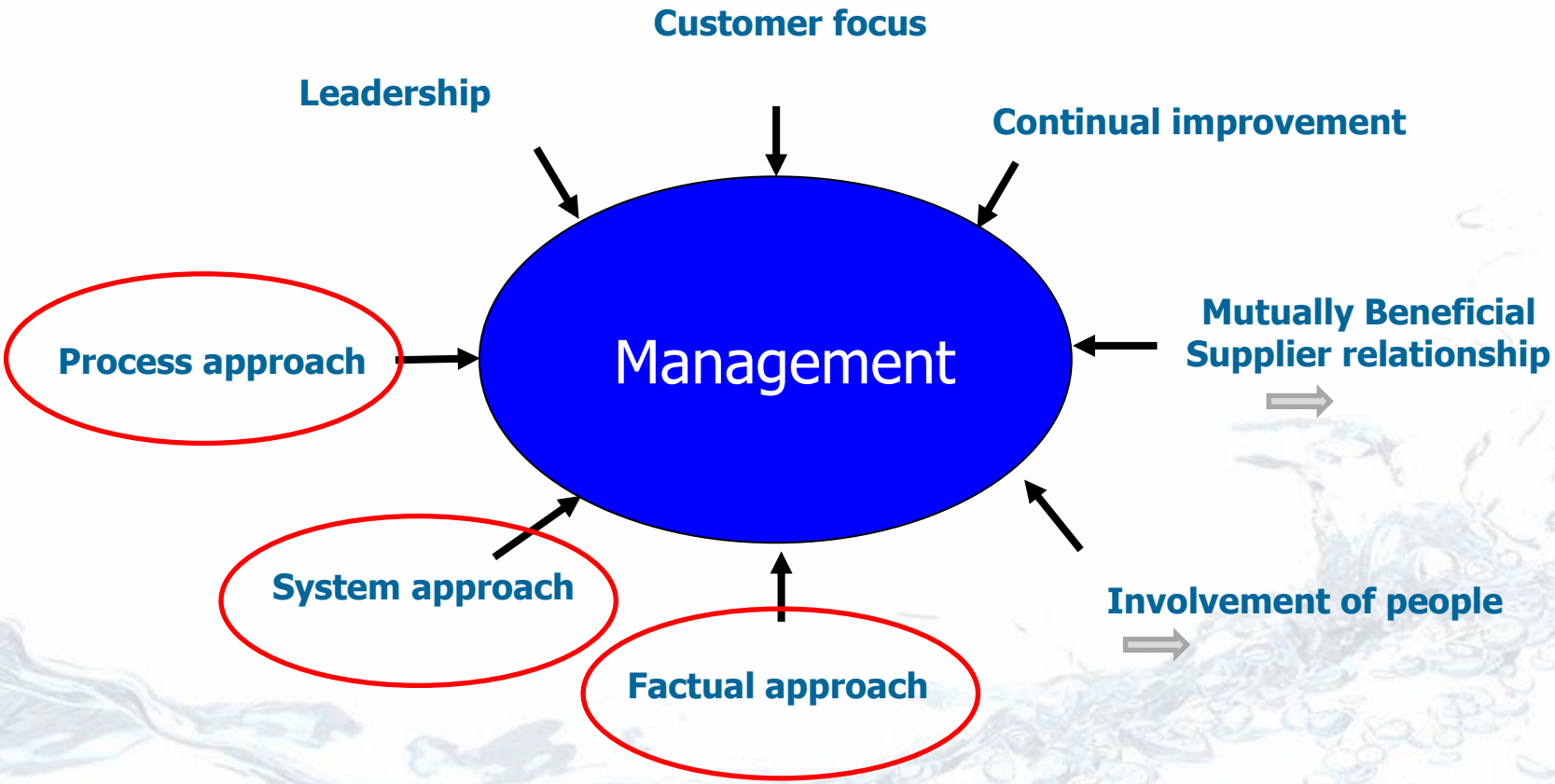


Specific Power – Trends



NB Specific power includes Energy utilised for well and booster pumps but excludes transfer pumps

Key Success Factor – ISO 9001



Objectives of Automation

- **To operate more efficiently by managing related resources and activities as a process**
- **To manage interrelated processes as a system**
- **To base decisions on the analysis of factual data and information**
- **To Interface the various software packages to the SCADA system in order to automate plant operation and generate on line reporting for efficient and effective :**

  - Maintenance management
  - Process optimisation
  - Membrane management
  - On line Energy Audits

Maintenance Management

- **The new SCADA system continuously monitors the operational parameters , compares data with design values and initiate alarms on out of specs values**

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CONDITION BASED MAINTENANCE

- **Requests for maintenance based on running hours is also generated by the SCADA**

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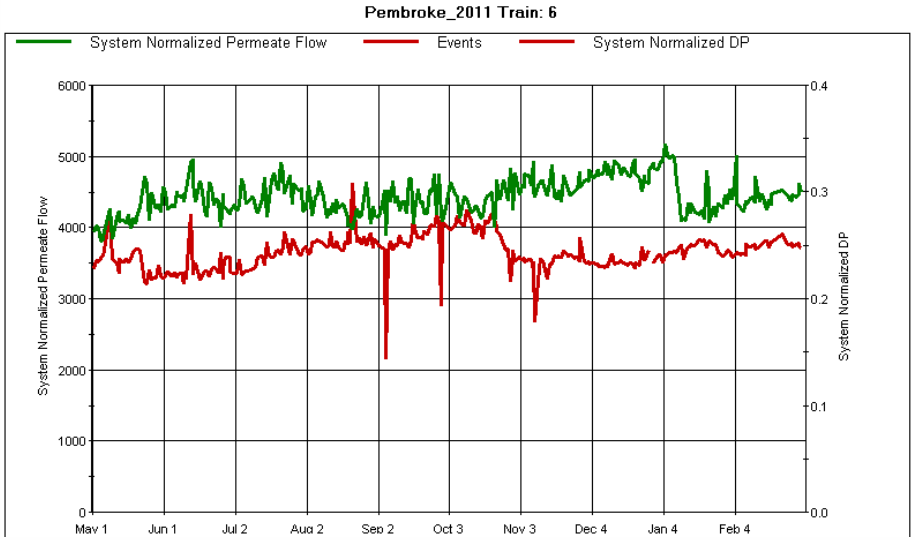
PERIODIC MAINTENANCE

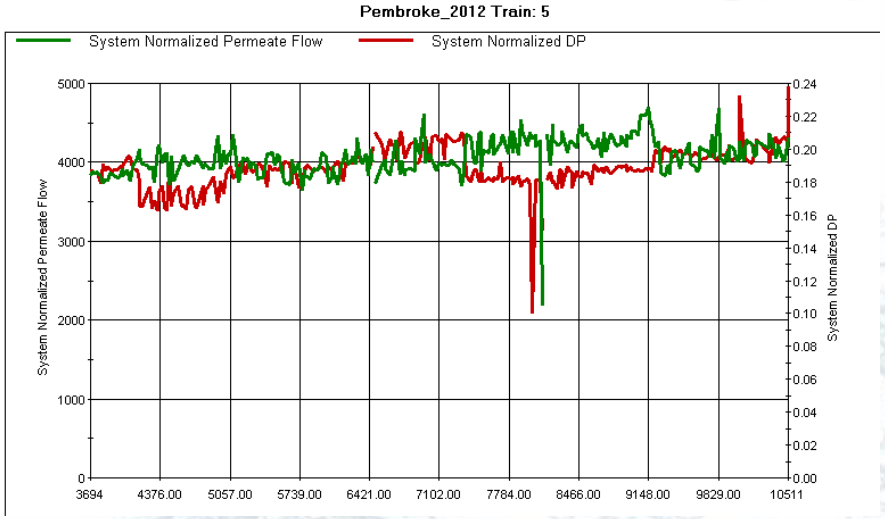
Membrane Management

Managing the performance of 10,000 membrane elements is a very difficult task. The SCADA system is interfaced with a dedicated software package where data retrieved from the PLC is normalised to be able to monitor performance of this costly element over a period of time under standard operating conditions.

Special algorithms are programmed to detect irregularities in the performance of the membranes hence prolonging the lifetime of membranes and ensure operating costs always kept to a minimum

Typical Trending





Other Benefits of Automation

The upgrades carried out in conjunction with the new SCADA system improved the operational performance of the RO plants in several ways including but not limited to:

- **More effective operation**
- **Better utilization of human resources**
- **Improved equipment reliability**
- **Reduced equipment downtime hence improved customer service**
- **Reduced energy consumption**
- **Reduced operational cost**
- **Enhanced safety of employees**

Thank you