Novartis Technical Operations
NTO

# EnMS and Digital Technologies for Energy Efficiency and Productivity at Novartis

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# Novartis in Ireland

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caring and curing

## IN IRELAND

over
**1,500**
PEOPLE EMPLOYED
IN 2 MANUFACTURING PLANTS IN CORK
& COMMERCIAL OPERATIONS IN DUBLIN[1]

**€4,000,000**
spent in
**R&D**[1]

**26** CLINICAL TRIALS
in partnership with 20 IRISH HOSPITALS
giving over 800 Irish patients
ACCESS TO NEW THERAPIES[1]

**4,302** PEOPLE TESTED FOR AMD

**5,033** provided access to SPIROMETRY TESTING since November 2012[1]

Novartis Ireland employees give **+1,700 HOURS** to community projects in 2014[1]



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# Health Safety and Environment at NRL

## Site Context

- 22 Years continuous accreditation EMAS (European Commission Eco-Management and Audit Scheme)
- Multiple awards for energy efficiency and innovation within Novartis Network
- Continuous improvements in energy efficiency and reduction in GHG emissions

## Drivers of Energy Efficiency

- Corporate commitment on GHG emissions
  - -30% 2020 v. 2010 (-20.5% achieved to 2015 v. 2008)
  - Corporate HSE site-specific target for 2017 GHG emissions -4%
- Local budgetary constraints: -20% last 3 years
- Can internal carbon price of $100 / tonne be enabler of projects?

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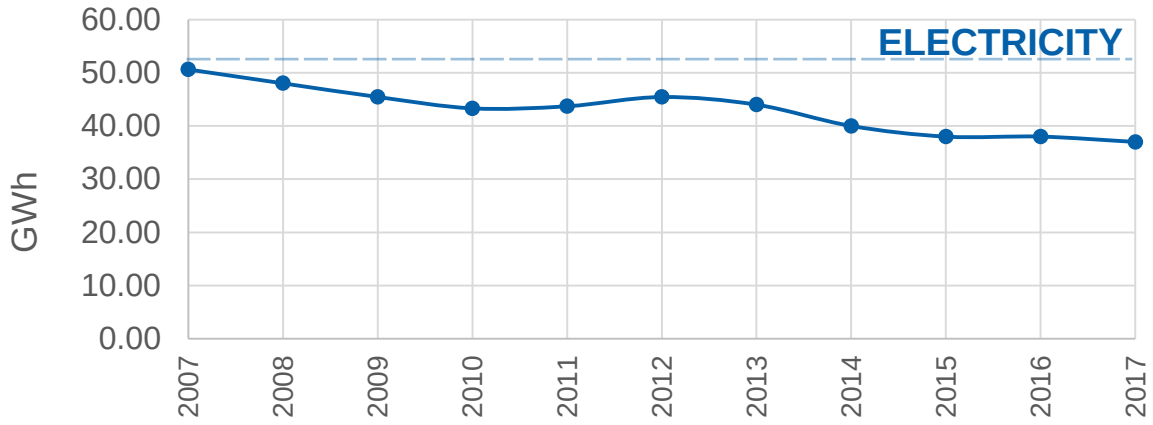
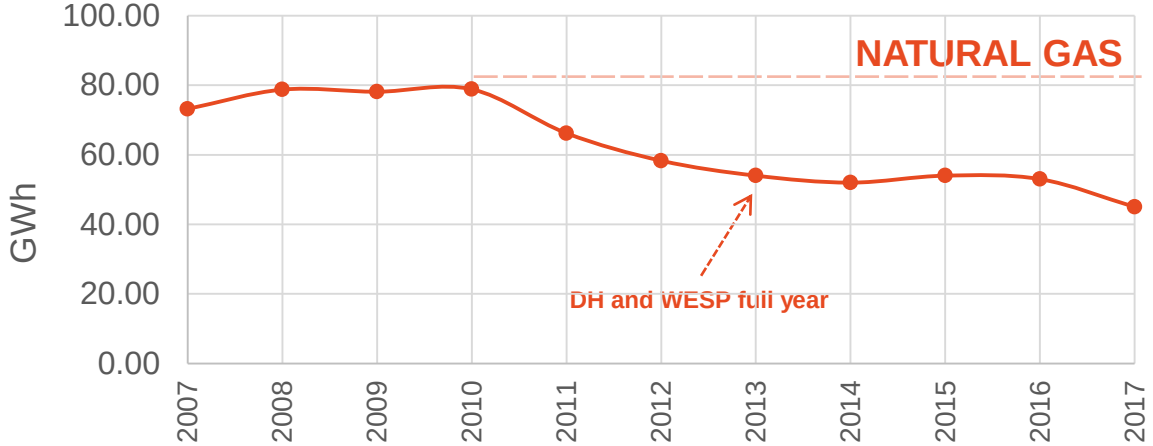
# Impact of CapEx Projects and EnMS




**-27% in 10 years**




**-43% in 7 years**

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# Site District Heating using Waste Heat from Incinerator Scrubber

# Why Digital Technology for Energy Management at NRL?

- Mature site - 1994 – metering of all utilities and process parameters installed from Day 1
- Distributed Process Control System (Bailey)
- Process Information (PI) database
  - Process data / historian
  - Trends / graphics – Performance monitoring
- Broad interdisciplinary EnMS team
  - Production, engineering, projects, finance
- Continuous improvement tool
  - Corrective action
  - Online shared energy savings opportunity list
  - Input into upgrades and construction projects
- Reporting system is evolving from simple consumption reports to ‘normalised’ reporting

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# Energy Management at NRL

## PI DATA BASE

- Over 200 relevant energy meters

## M&T REPORTS

- Separate the signal from the noise
- Now developing ‘normalised’ reports

## Drivers

- Site environmental targets
- Site budgets
- Corporate targets

## SITE ENERGY MANAGEMENT GROUP

## EXTERNAL CONSULTANT SUPPORT

- Maintain energy saving opportunity list
- Develop baselines/reports

## ACTIONS

- Daily corrective actions
- Bi-weekly meetings
- Energy saving initiatives

## SAVINGS

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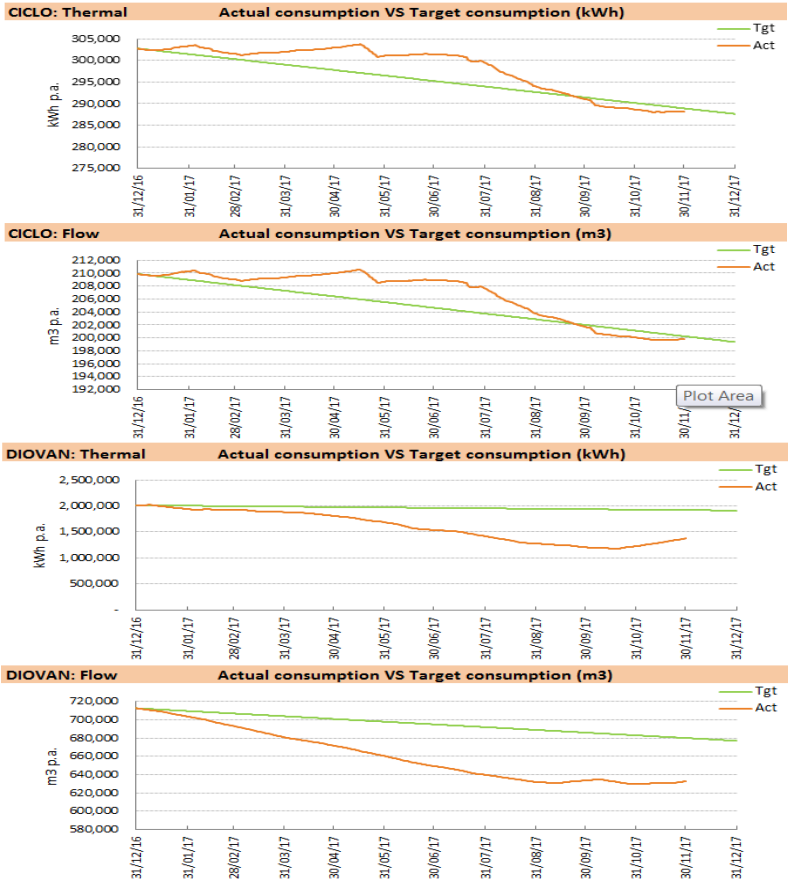
# Example of Automated Site Report

**Overview of utility energies and costs** — **GLYCOL**

**Target Savings:** 5%
**End Date:** 30/11/2017

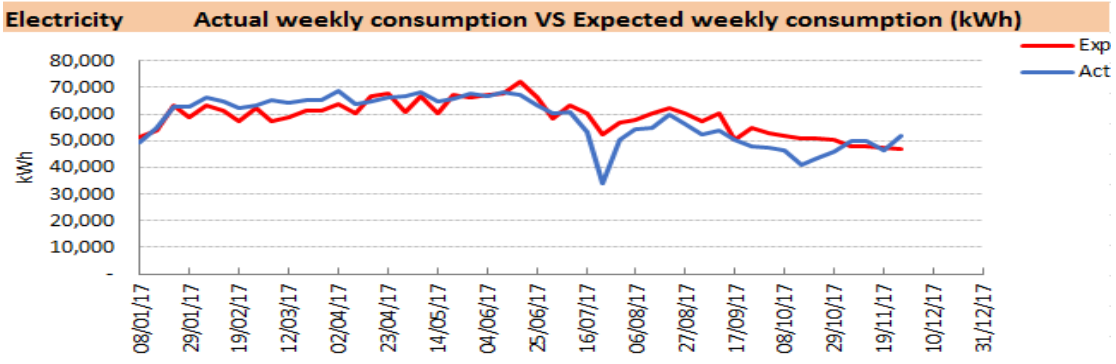
| SERVICE | TARGET | CONSUMPTION | SAVINGS | | | COST | AVERAGE |
|---|---|---|---|---|---|---|---|
| | last 7 days | last 7 days | % | YTD | last 7 days | last 7 days | last 7 days |
| CICLO: Thermal | 4,923 kWh | 5,309 kWh | -5.2% | -€ 775 | € 7 | € 284 | 32 kW |
| CICLO: Flow | 3,412 m3 | 3,680 m3 | -5.2% | -€ 107 | € 1 | € 39 | 22 m3/h |
| DIOVAN: Thermal | 22,495 kWh | 58,438 kWh | -34.7% | -€ 34,083 | € 1,857 | € 3,121 | 348 kW |
| DIOVAN: Flow | 11,442 m3 | 13,472 m3 | -12.3% | -€ 858 | € 15 | € 144 | 80 m3/h |
| PEPTIDES: Thermal | 589 kWh | 656 kWh | -20.9% | -€ 8,067 | € 0 | € 7 | 4 kW |
| PEPTIDES: Flow | 5,753 m3 | -1,558 m3 | -23.9% | -€ 87 | -€ 81 | -€ 17 | (9) m3/h |
| PB1: Thermal | 77,231 kWh | 136,339 kWh | 14.8% | € 24,074 | € 2,940 | € 7,282 | 812 kW |
| PB1: Flow | 13,476 m3 | 7,588 m3 | -15.3% | -€ 1,082 | -€ 70 | € 81 | 45 m3/h |
| PB1A: Thermal | 21,309 kWh | 45,337 kWh | -10.0% | -€ 6,690 | € 1,223 | € 2,422 | 270 kW |
| PB1A: Flow | 8,998 m3 | 10,037 m3 | 5.3% | € 217 | € 6 | € 107 | 60 m3/h |
| **TOTAL Thermal** | 126,547 kWh | 246,080 kWh | **-6.7%** | **-€ 25,540** | **€ 6,027** | **€ 13,115** | |
| **TOTAL Flow** | 43,083 m3 | 33,220 m3 | **-9.3%** | **-€ 1,917** | **-€ 130** | **€ 355** | |

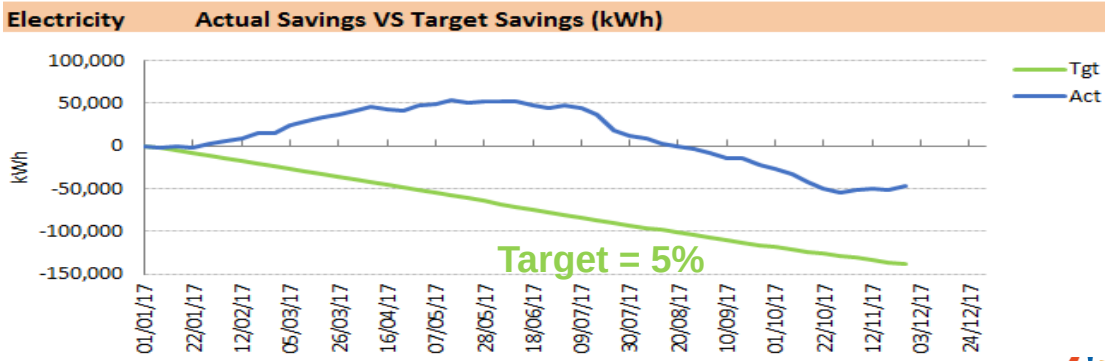



| | |
|---|---|
| **Red:** | **Higher than expected consumption** |
| **Yellow:** | **Lower than expected but higher than target** |
| **Green:** | **Savings ahead of target** |

# Next Step - Regression Analysis – 'Normalised Consumption'

**Energy use for this Production Unit is normalised based on 5 different variables (5 product steps)**

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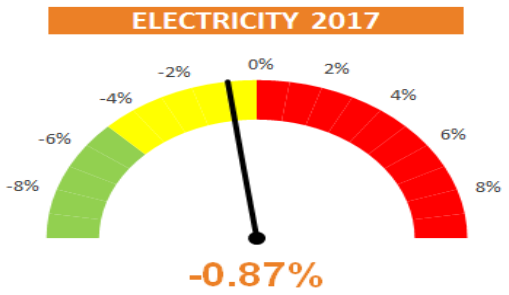
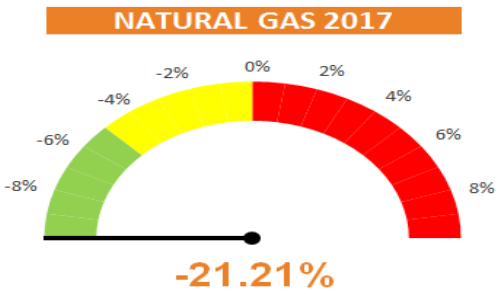
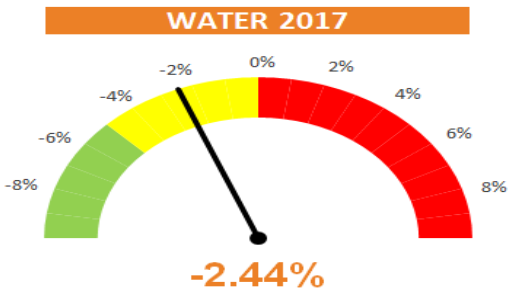
# Site Status – Site-Wide Visualisation




| | | | |
|---|---|---|---|
| TOTAL SAVINGS 2017 (€) | -€ | 461,568 | |
| TOTAL SAVINGS 2017 ($tCO_2$) | - | 2,227 | t |

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# Attitude to Technology Adoption Novartis Digital Strategy

- Novartis is on a journey to adopt more digital technologies
- Robotics Process Automation pilots currently being rolled out in diverse business processes including FRA, Procurement and Product Release
- Digital technologies seen as key to
  - Reduced processing time for repeatable high volume transactions
  - Improved quality of output
  - Supporting business decisions
  - Managing increasing workloads
  - Meeting expectations of regulators
  - Delivering innovative medicines more quickly to more patients

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# Key Benefits of Digital Technologies in EnMS at Novartis

- Data, Analytics and Connectivity – Scalable and Flexible
- Enables fast response to consumption anomalies
- Provides visibility on budget and emissions target tracking
- Enables participation in ‘Smart Grid’ initiatives such as demand response
- Low and falling costs
  - e.g. Recently installed digital power meters on all electrical distribution boards reporting directly to PI data-base via RS 485 / Ethernet interfaces

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# Thank you

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