

Site: Nyon

Location: Switzerland

Sector: GMS Manufacturing

Project Type: Energy Kaizen

Date: January 2016

HVAC Energy Saving Opportunity Summary-



Several Key Area HVAC Saving Opportunities

Usual Suspects HVAC Saving Areas Reviewed

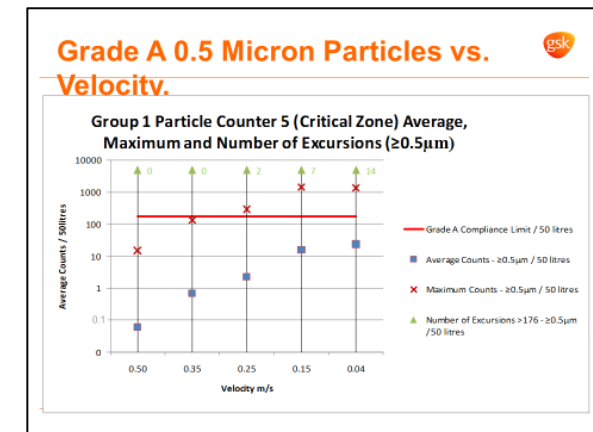
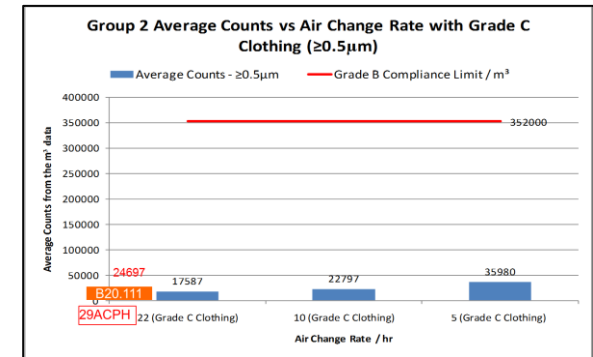
- Air change rate Reduction
- Fresh Air Reduction
- Setback
- Low Energy Filters
- Maintenance
- Dehumidifier Improvements

Level 1 & 2 & 3 Optimisation

- Review Zone classifications vs Current. Many OTC products manufactured in Zone 3 / ISO 8 areas. - Require GSK Central QA support (Sydney, Panama, Dungarvan)
- ACPH Reduction to GSK Standards (Same as Novartis)
- Setback Strategies
- Fresh air reduction by reducing leakages, pressure regimes and fixed minimums
- Low Energy Filtration savings. Also extend HEPA Life with confidence.
- Optimize BMS Controls

Capital Project review for Commissioning Opportunities

Class	Site	GSK	Used for Analysis
Zone 1	29-38	>20	20
Zone 2	?	>10	10
Zone 3	15-22	>5	10



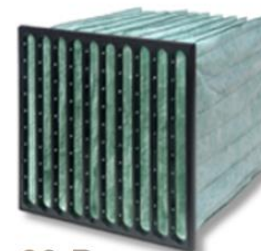
- **LAF Energy Reduction**

- LAF's operated as ISO 7 but tested to ISO 5
- Reduce operational Velocities (0.35 m/s?)
- Test to ACPH & Particle requirements
- Set back control (out of ours)
- Smoke vis both situations



- **Low Energy Filters**

- Camfil Low Energy Filter Upgrade
- VSD Control



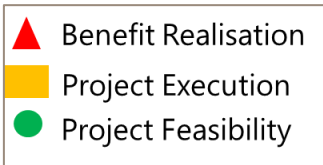
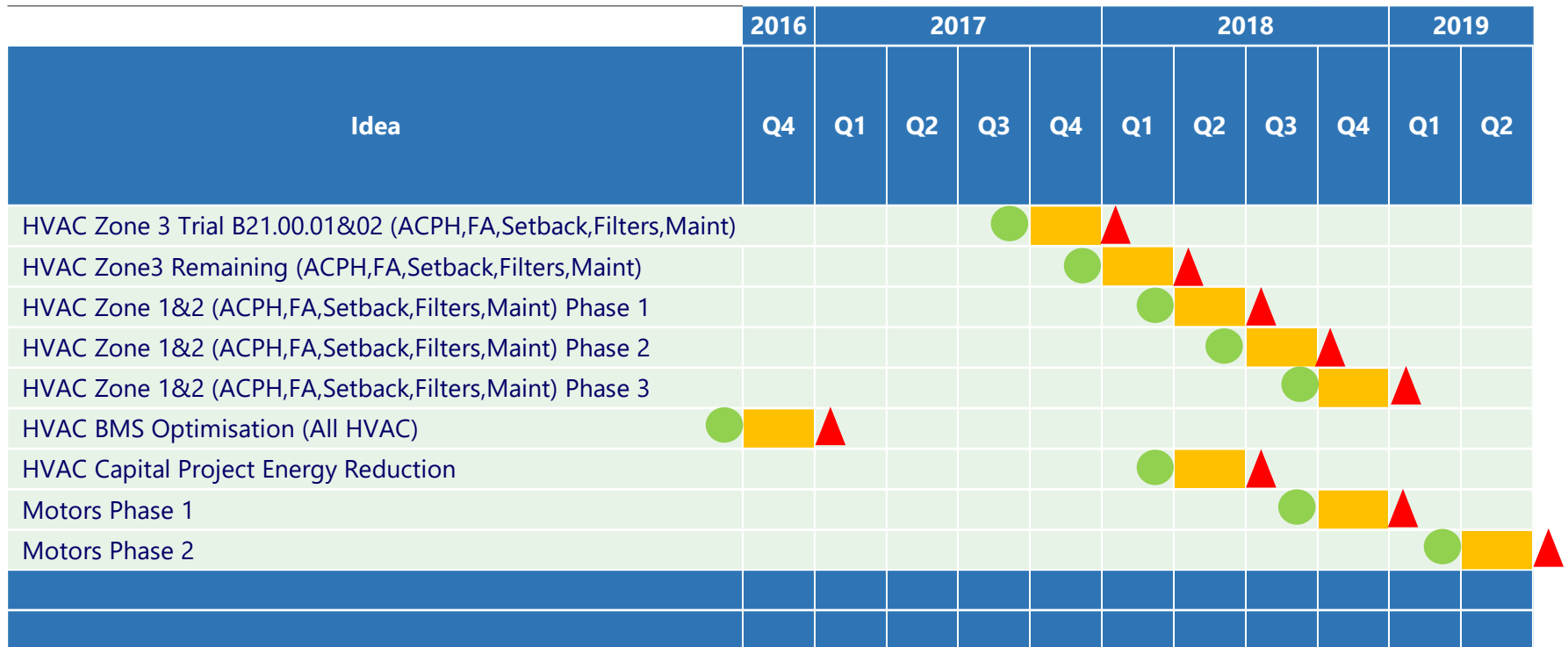
XLT – 80 Pa

- **Maintenance**

- Thermal Imaging
- Pressure Testing coils (Air & Water side)
- Fan & Motor Upgrades
- Laser Alignments



HVAC Proposed Plan



HVAC Optimisation Benefits



Idea	Total Energy Saving kWh	Saving €	CO ₂ (t.)	Capital Cost €	Simple Payback	CuSum Saving	%	CuSum Capital Cost	%
HVAC Zone 3 Trial B21.00.01&02 (ACPH,FA,Setback,Filters,Maint)	178,327	14,688 €	18	CHF 39,468	2.7	\$14,688	7%	\$39,468	7%
HVAC Zone3 Remaining (ACPH,FA,Setback,Filters,Maint)	822,409	74,092 €	60	CHF 191,268	2.6	\$88,780	42%	\$230,736	38%
HVAC Zone 1&2 (ACPH,FA,Setback,Filters,Maint) Phase 1	354,939	28,794 €	36	CHF 92,460	3.2	\$117,574	56%	\$323,196	53%
HVAC Zone 1&2 (ACPH,FA,Setback,Filters,Maint) Phase 2	354,939	28,794 €	36	CHF 92,460	3.2	\$146,369	69%	\$415,656	69%
HVAC Zone 1&2 (ACPH,FA,Setback,Filters,Maint) Phase 3	354,939	28,794 €	36	CHF 92,460	3.2	\$175,163	83%	\$508,116	84%
HVAC BMS Optimisation (All HVAC)	413,409	29,389 €	56	CHF 33,120	1.1	\$204,552	97%	\$541,236	90%
HVAC Capital Project Energy Reduction	-	0 €	0			\$204,552	97%	\$541,236	90%
Motors Phase 1	43,874	4,572 €	1	CHF 40,903	8.9	\$209,124	99%	\$582,139	96%
Motors Phase 2	23,095	2,406 €	1	CHF 22,333	9.3	\$211,530	100%	\$604,471	100%
	2,545,932	\$211,530	244	\$604,471	2.9				
	12%	13%	11%						

HVAC & BMS Implementation Strategy



Step 1 - Feasibility / Trial Project – Zone 3

- Carry out feasibility study & Scheme design for Trial HVAC / BMS Projects
- Engage with Quality. Produce agreed document templates
- EECO2 / SE / will support the implementation of Trial Project development & delivery.
- Option to Provide temporary M&T for project & future measurement of benefits(EECO2 MEMU)
- Training of Nyon staff during project
- Delivery Project with minimum shut down / live (3-4 days)
- Agree roll out strategy and develop detail programme to ensure delivery



Step 2 - Energy Project Delivery 2016 – 2019 – Post Trial

- Carry Out Measurements & feasibilities**
- EECO2 / SE / support coordinated HVAC programme
- Engage to provide feasibility & developed Design
- Local delivery of Projects supported by EECO2 / SE
- Training & Support to site teams
- Site to support engagement & planning

Capital Project Support for GMP & Energy Optimisation

