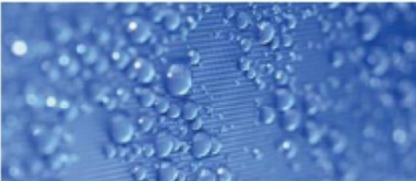


IBD 2013

5 March 2013

Peter Bristow



EFFLUENT TREATMENT PLANT – WHITE ELEPHANT OR WATER RESOURCE



GLOBAL WATER CRISIS

- World-wide water crisis
- Rapid urbanisation, industrial development, increasing demands on limited resources
- Global distribution of water has no correlation to human activity
- Global annual water consumption has risen 6-fold in last century, double the rate of population growth
- Two thirds of the world's pop. Or estimated five and a half billion people, will by 2025, be living in water stressed areas.
- Water – primary catalyst for world conflict





AFRICA – AN OPPORTUNITY

- It takes an average of 155 litres of water to produce 1 litre of beer
- World wide in brewery avg. production ratio – 5.5hl water/hl beer produced
- Sub-Saharan African in brewery avg. Production ratio's – 7-8hl water/hl beer
- Infrastructure is generally old or poorly maintained

Winds of change:

- Massive reinvestment in plant, people, development and resource
- New breweries developed and old ones reinvented
- Driving motivation – changed from production to sustainability
- Supplanting the realities of potential resource limitation – opportunities from Africa's rapidly expanding consumer markets

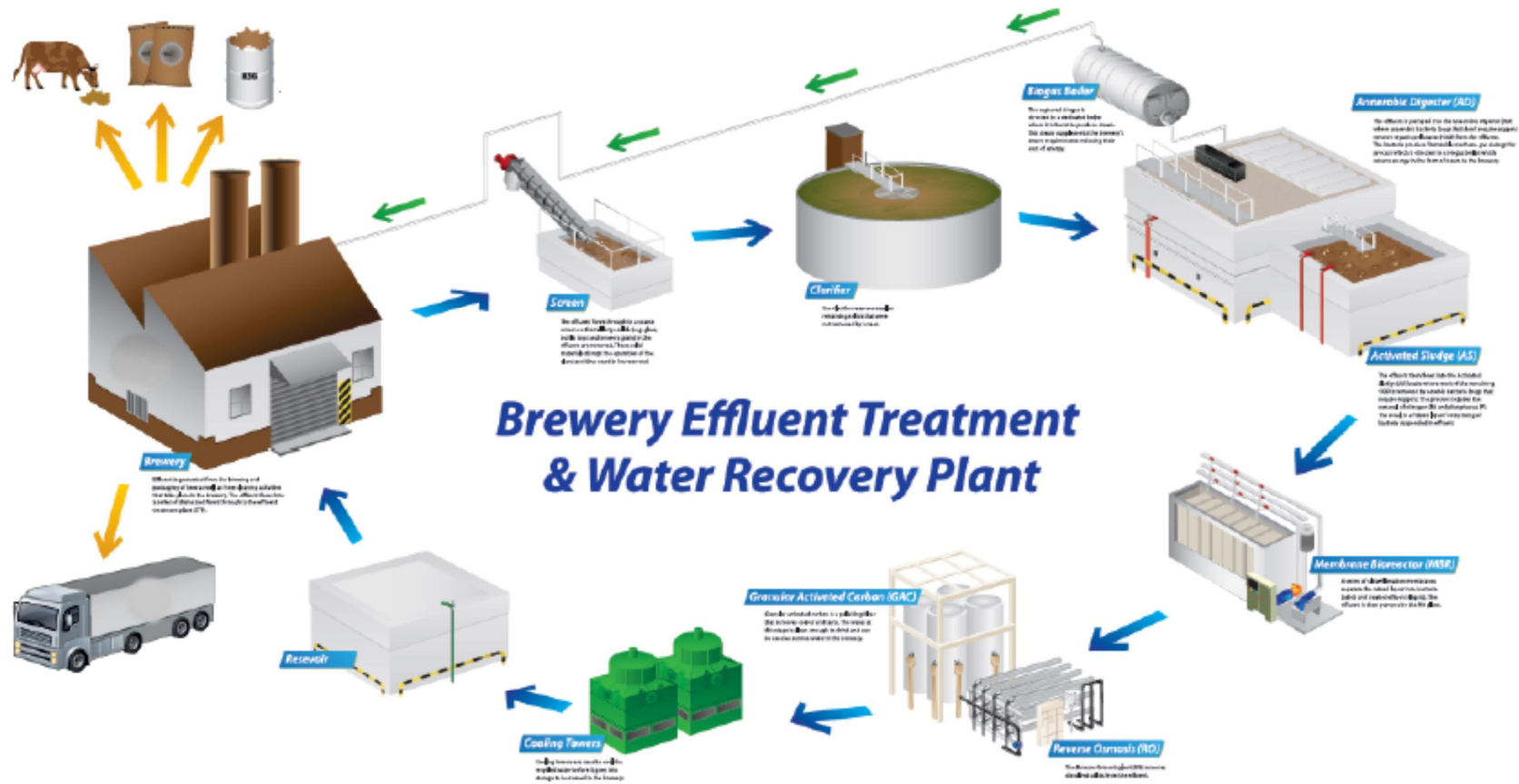




BREWERS WATER CYCLE

- Waste streams – integrated separation
 - Kieselghur
 - Yeast
 - Brewers grain
- Primary treatment – Screening
- Equalisation – through effluent storage
- Biological treatment
 - Anaerobic treatment
 - Aerobic treatment
- Tertiary treatment – polishing – settling by way
 - Clarifier
 - Membrane bio reactors (MBR)
 - Membrane filtration (Nano- RO)





Brewery Effluent Treatment & Water Recovery Plant

MAINTENANCE & OPERATION

- Repairing, replacing & modernising infrastructure
- Implement clearly defined process management system
- Contribute rather than only comply

- Reduce, reuse, recycle – effects ETP/effluent management
 - Concentrates effluent components
 - Production integrated waste management
 - Focus on separation, removal & reuse of waste



THE EFFLUENT TREATMENT PLANT

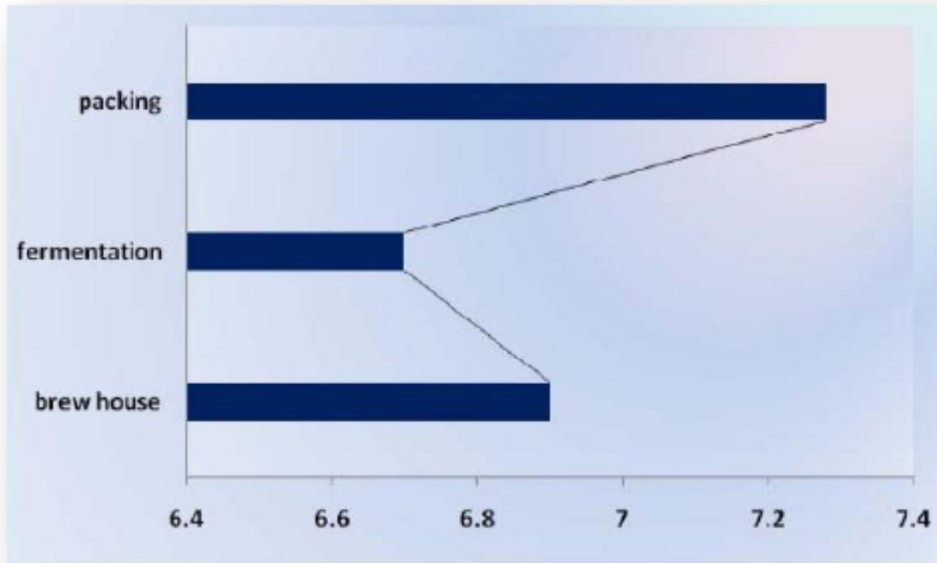
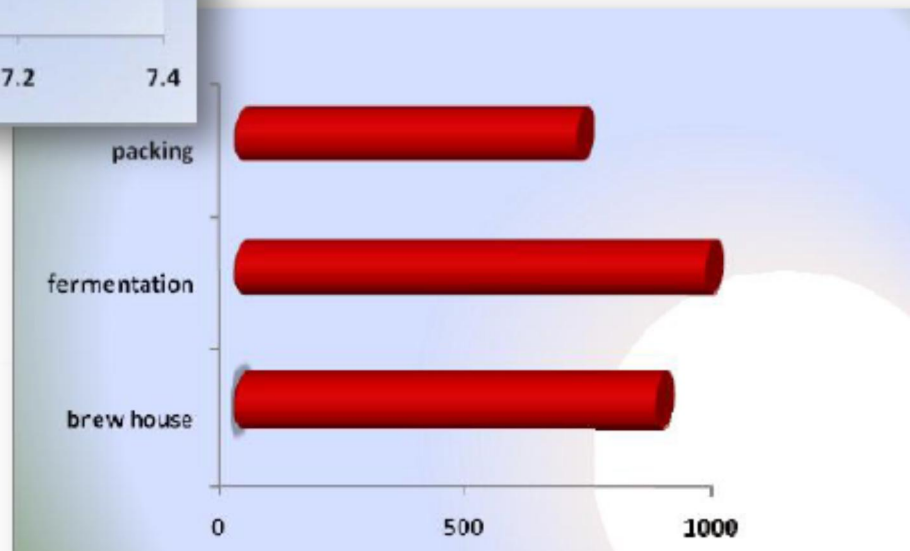


Figure 1. pH relationship by brewery production cycle (after Devolli, A., et al (2010))

Figure 2. COD relationship by brewery production cycle (after Devolli, A., et al (2010))





PLANT PERFORMANCE

- Planned management approach to achieve optimal performance
- Factors effecting performance:
 - Condition & Age
 - Incoming water supply processing
 - Product
 - Product components
 - Production methods
 - Training & motivation
 - Additives and cleaning agents
 - Configuration & location of ETP
 - Maintenance state & operator competence

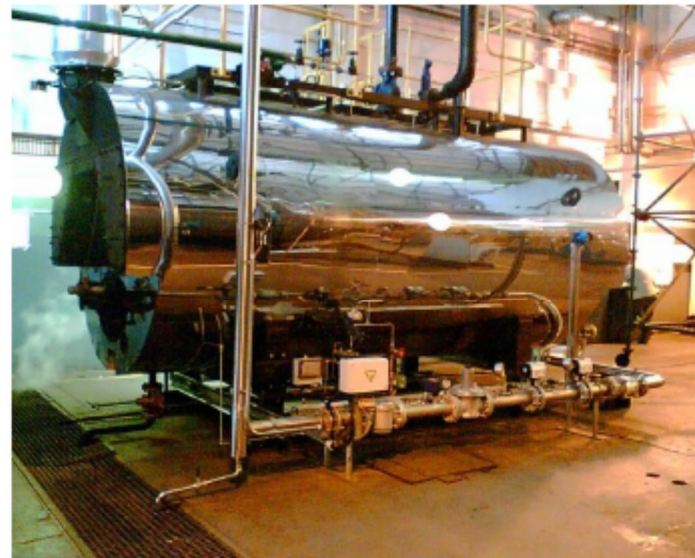




RESOURCE RECOVERY - ENERGY

- Requires further investment
- Compliance becomes achievable

- Biogas infrastructure
- Pay back of 3 years
- Harvested for brewery boiler





RESOURCE RECOVERY - WATER

- Water recovery
 - From polishing
 - Used on gardens to potable water
 - 60-70% of effluent is recovered
 - Payback determined by cost of water & supply
-
- Reduction of water use
 - Long term sustainability
 - Improved environmental, commercial & social impacts





Understand problem - effluent

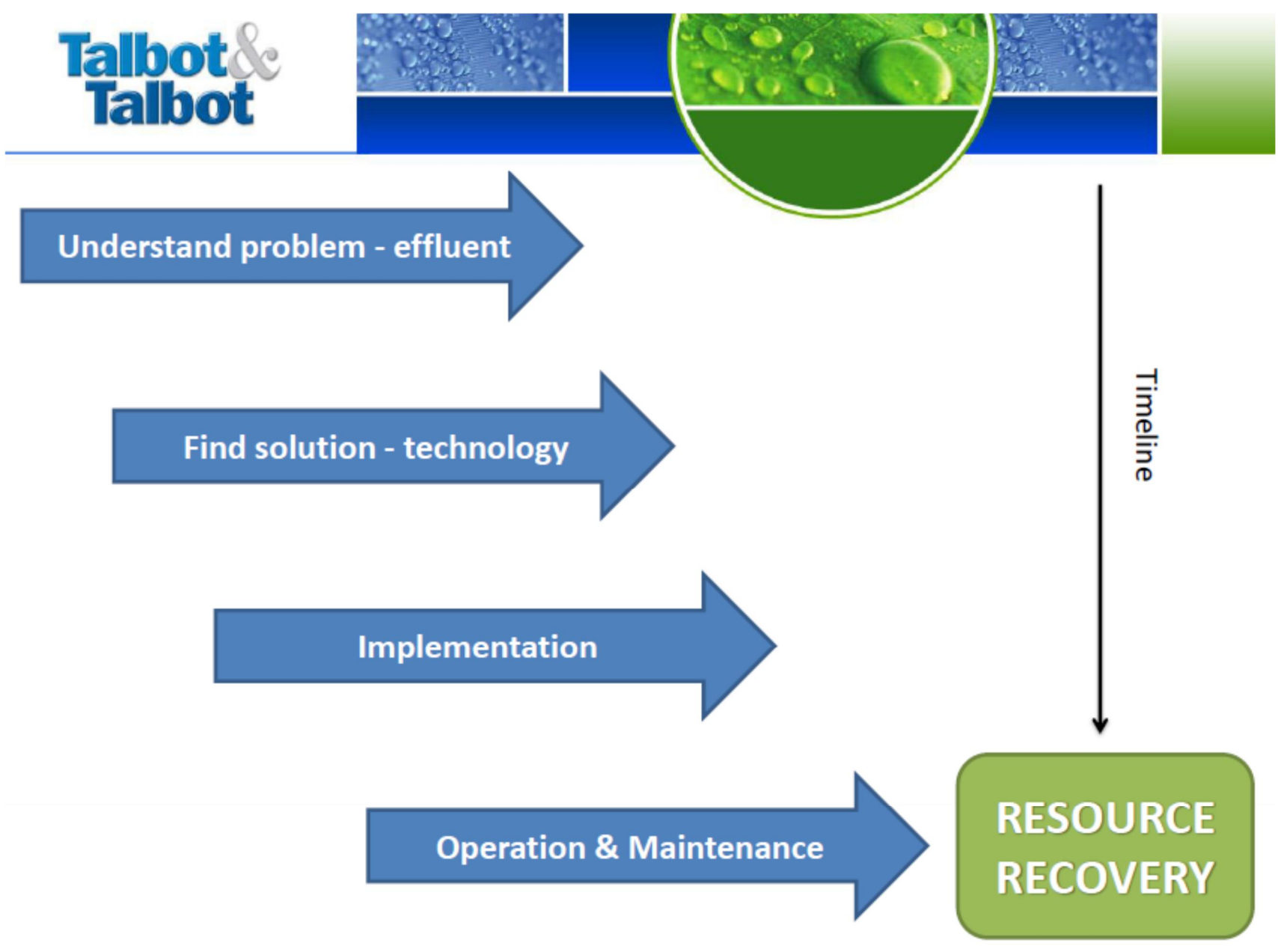
Find solution - technology

Implementation

Operation & Maintenance

**RESOURCE
RECOVERY**

Timeline





CONCLUSION

- Africa is economic destination of choice
- Social, Environmental & Commercial factors need to be considered
- Environmental abuse needs to be curtailed in order for Africa to sustain our population



“For brewers to enhance sustainability & protect markets they supply, they will need to ensure judicious use and reuse of available resources”