

Challenging fuel system projects & operations

Joint Initiative for Sustainability



1. Introduction APSCO / HANSA
2. UN Resolution & Sustainability
3. Aviation Fuel Infrastructure Initiatives
4. Start doing: Dynamic Simulation
5. A smart Brain: Control System
6. Start doing: Tightness Integrity Monitoring
7. Start doing: Smart Refuelling
8. Life Cycle Resource Management

- HAACO (Haji Abdullah Alireza & Co. Ltd.) was established in 1845. The company is honored with the distinction of holding the first commercial registration (No.1) issued in the Kingdom of Saudi Arabia.
- APSCO founded in 1961 as a joint venture between HAACO and MOBIL (now ExxonMobil) – APSCO was the first joint venture in the Kingdom’s history
- 3 Strategic areas:

SBU	APSCO Aviation	APSCO Marine	APSCO Lubes
Activity	<ul style="list-style-type: none"> • Into-Plane Fueling Services • Depot Operations 	<ul style="list-style-type: none"> • Marine Bunkering Services (Jeddah & Khorfakkan) 	<ul style="list-style-type: none"> • Lube oil blending plant • Mobil and APSCO lubes sales and marketing
Customer	<ul style="list-style-type: none"> • Saudi Arabian Airlines • International carriers • Hajj and Omra Charters 	<ul style="list-style-type: none"> • Contracted customers include the world’s leading shipping lines 	<ul style="list-style-type: none"> • Mobil, Toyota, Caterpillar, Volvo, ACDelco, Elf, Total, Nile and branded products

- Founded in Germany in 1979
- Globally acknowledged for Aviation Fuel Infrastructure: Project Management, Design, Build, Engineering, Commissioning and Start up
- Global airport reference list with more than 300 airport projects: LHR, AMS, FRA, VIE, MUC, ATH, MAD, SVO JFK, DFW, A380, IAD, ATL, ANC, MEL, SYD, ADL, BNE, CAN, MLE, BLG, JNB ...
- Recent projects in the region: MCT, RUH, DMM, MED, DXB, JXB, HRI, HRG, AMM, CAI, DOH, AUH, SLL ...
- Designed investment volume USD 500,000,000 in last 8 years
- Associate Member JIG Joint Inspection Group
- IATA Strategic Partner
- ISO certified 9001:2008
- Global Service Network



- **25th September 2015:**
United Nations Sustainable Development Summit
World leaders adopted the 2030 Agenda for Sustainable Development which includes a set of 17 Sustainable Development Goals (SDGs) with 169 targets
- **Goal 7:**
Ensure access to affordable, reliable, sustainable, and modern energy for all

What is sustainability?

Sustainability calls for a decent standard of living for everyone today without compromising the needs of future generations.
(United Nations, Sustainable Development Knowledge Platform)

What creates sustainability?

- Economic development
- Social development
- Environmental development



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Airport Initiatives

- Airports Going Green (Chicago Dep Av)
- Responsible Heathrow 2020
- Amsterdam: “Check in to Sustainability”
- LEED Certifications (Medina Airport)

Environmental Sustainability and Safety

- Life Cycle Resource Management
- Pollution Prevention
- Environmental Engineering

Regulation and Standards

Economics: Investment, Operation

Reliable Supply/On-Time Servicing

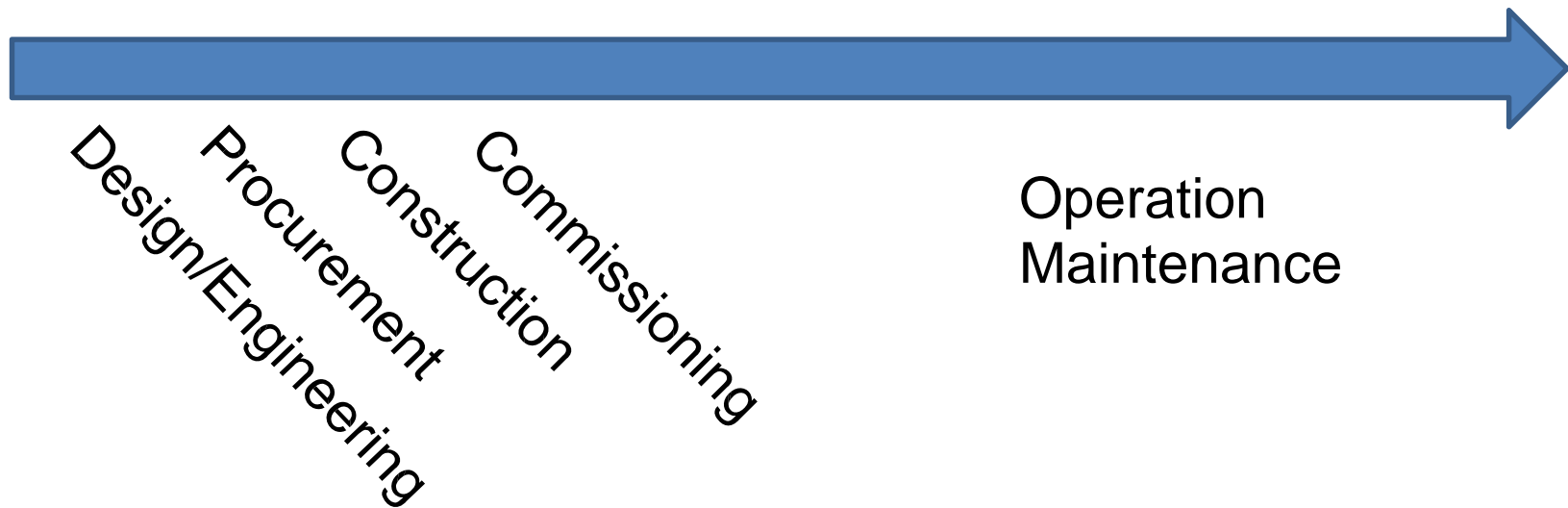
Trained and Educated Staff





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Sustainability across all stages



Joining expertise for operational excellence



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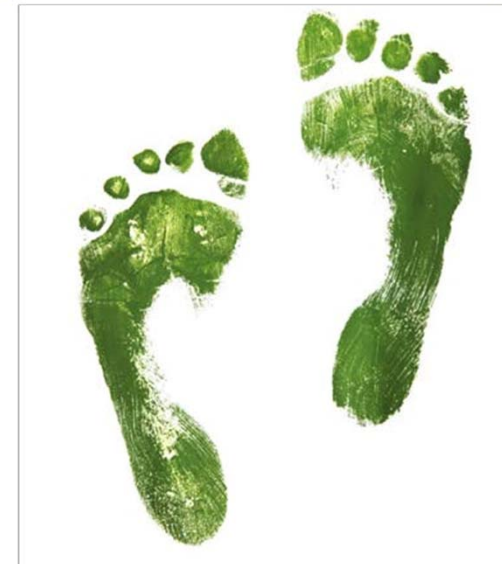
	APSCO	hansa
Consultancy Aviation Fuel Systems		X
Design & Engineering		X
Project Management & on-site support	X	
Procurement & Contract Management	X	
Automation & Controls		X
Mission-critical components & systems		X
Construction Services	X	X
Commissioning & Start-up Services	X	X
Technical & Maintenance Services / JIG	X	X

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How to start with improvement

- Investigate energy consumption
- Identify quick wins
- Create awareness
- Set target
- Appoint someone to manage it
- Invest in simple solutions
- Make energy saving a sport
- Define guidelines and manage

Greenovation - Go Green

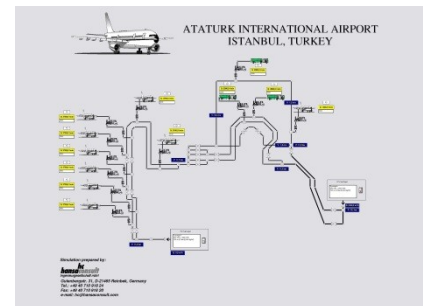
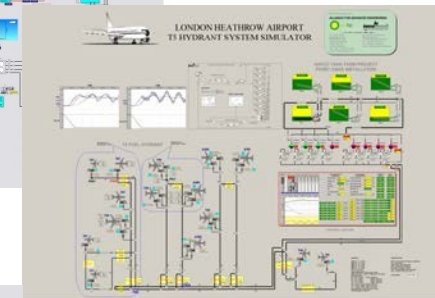
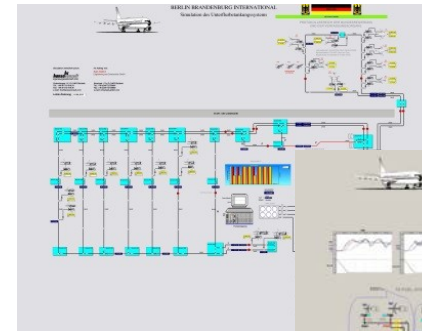
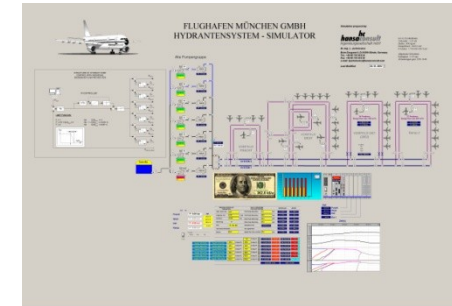


And start doing

Focus on the main energy consumer of the fuel facility

→ **PUMPS!**

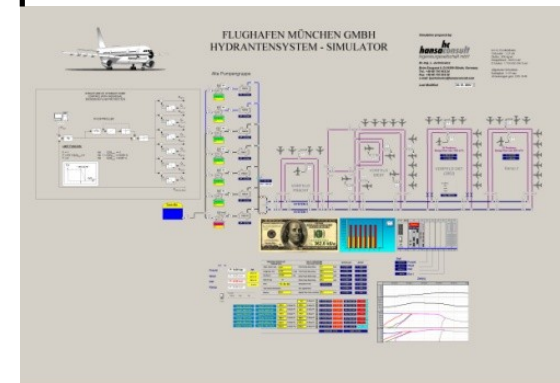
- Up to 50 % reduction of power consumption can be achieved by optimizing the hydrant pressure (hydraulic study)
- Reduced Risk Exposure during refuelling Extended
- life cycle of the hydrant pipeline



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Identify quick wins ...

- Design/Verification system dimensioning (pump capacity)
- Identification design defects/deficiencies
- Reduction of energy consumption
- Pressure Surge Analysis / Hydraulic calculation
- Operational Validation including Control System
- Operator Training on all operational aspects

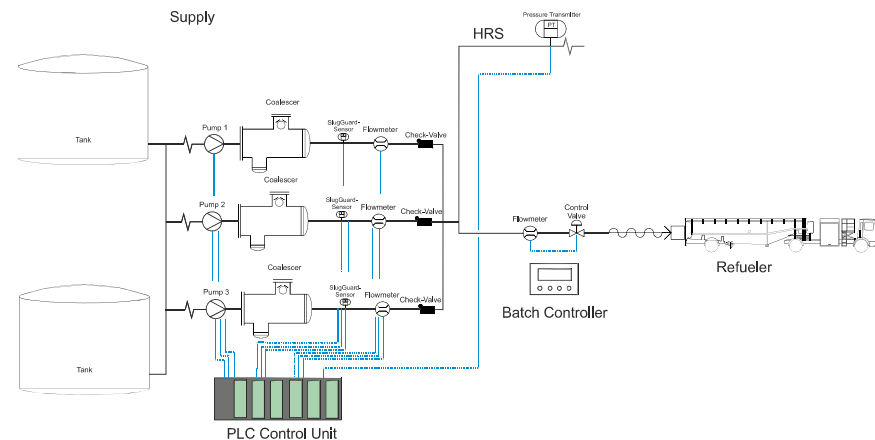


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Focus on the main energy consumer of the fuel facility

→ **PUMPS!**

- Up to 30% reduction of power consumption can be achieved with frequency controlled pumps



pressure drop → pump 1 = 80 % max. speed → start pump 2
flowrate coalescer controlled through flowmeter with frequency controlled pumps

Start doing: With a SMART Brain



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- Monitoring and Control of Fuel Reception, Tanks, Hydrant Pumps etc.
- Monitoring and Control Hydrant Tightness
- Controlling Emergency Situations EFSO
- Fire Fighting Functionalities
- Interface to 3rd party commercial systems (stock accounting, into-plane operations etc.)



Start doing: With a SMART Brain



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- **Reduce power consumption**
Frequency control to meet the changing fuel demand by a smooth (de)activation of equipment
Hydraulic Study to identify the optimum pressure
- **Protect plant equipment**
Avoid pump operation under no flow conditions
Pressure Surge Analysis
- **Correct operating procedures**
Operator can only open a tank's outlet valve after confirmation of correct sampling and tank release procedures
- **Safe operation**
Identify alarm conditions and shut down of relevant installation
Control of over-filling tanks or vehicles to prevent spills
- **Detection of leaks**
Typically resulting from underground pipe work, pump shaft seals...

Start doing: Tightness Integrity Monitoring



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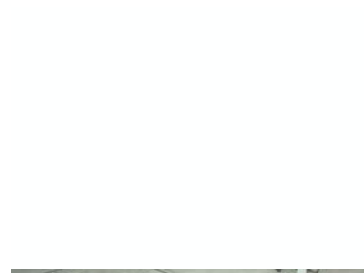
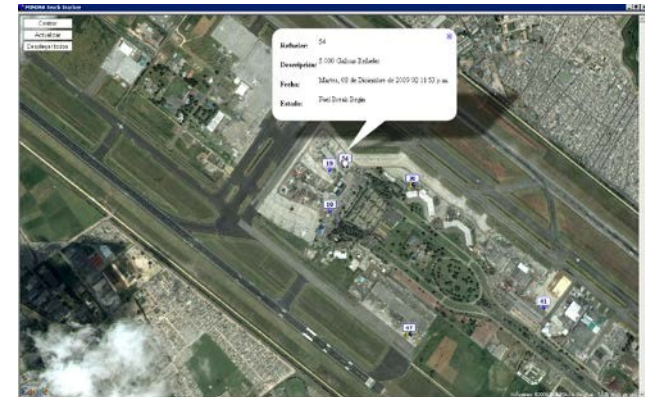
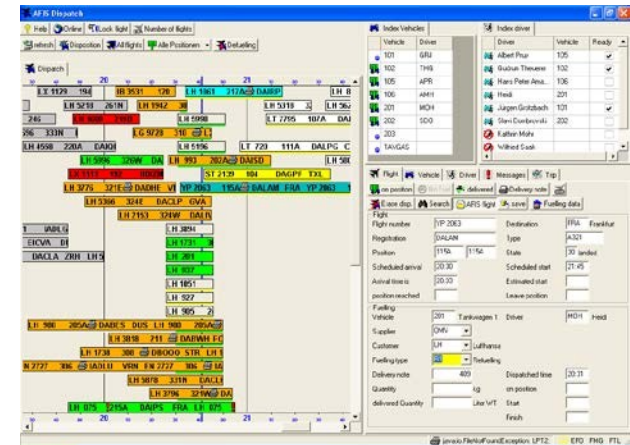


Start doing SMART Aircraft Refuelling



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- Electronic Fuel Order with integration in FIDS
- Optimize Dispatch and reduce ways on the apron to save energy
- Monitor refueller position on a digital airport map
- Receive data on fuelling status
- E-Tickets: Optimize invoicing real-time incl product quality data (laser sensing)



- Energy source for aircrafts
 - Integration of renewable energy sources like solar panels and wind energy
 - Communication with the surrounding facilities to optimize the energy consumption and production
 - Re-use of resources inside the fuel farm
 - Use of new and/or local materials for buildings



Source: hansaconsult Ingenieurgesellschaft mbH

Benefits of a sustainable fuel system



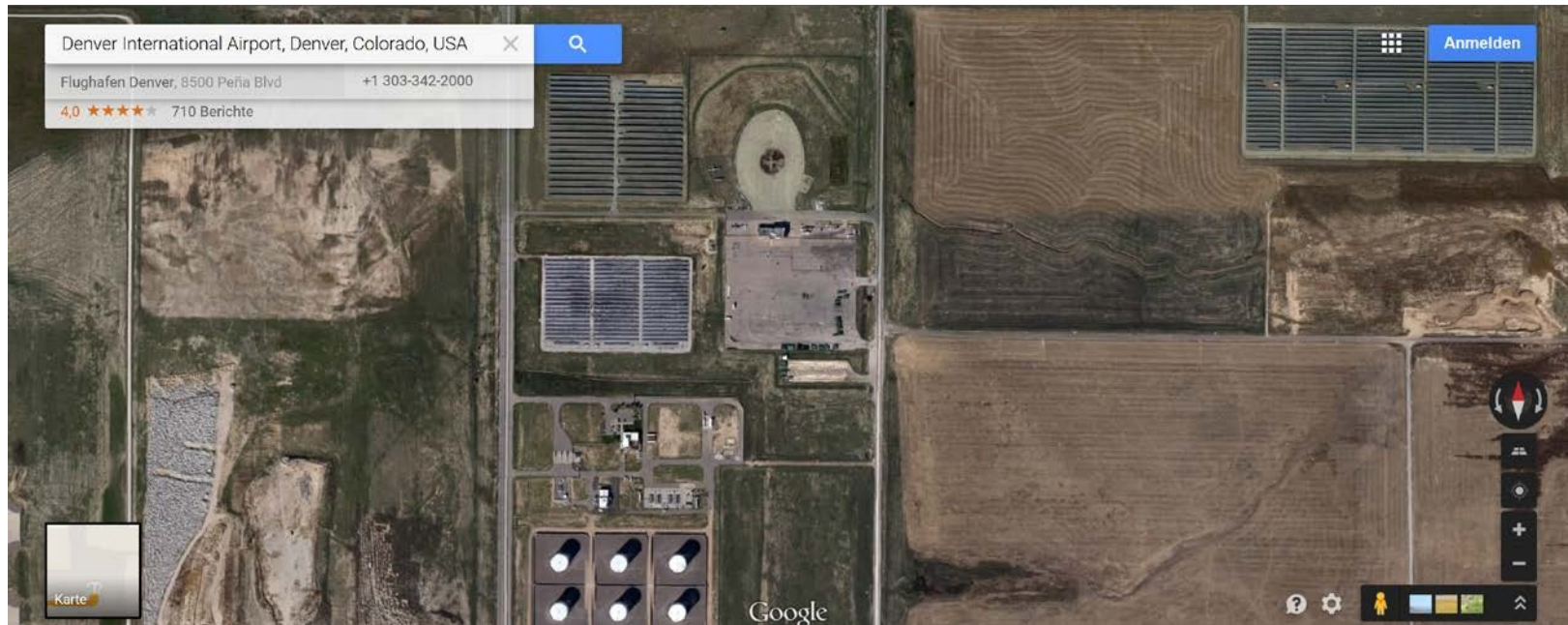
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- Saving cost
- Reduced environmental footprint
- Balance with nature
- Increased competitiveness through lean operations and reduced operating and life-cycle costs
- Optimization of new and better technologies
- Reduced costs of asset development
- Long term function building
- Brand/Company reputation
- Improved benefits to and greater support from the community
- Improved work environment for employees leading to higher productivity
- Reduced environmental, health and safety risks

Denver Int. Airport Fuel Facility Inspiring!



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Source: googlemap

- Integration of a 1,6 MW solar power plant storage and distribution facilities.

to
power
the fuel

**Any questions
Please do not hesitate
to contact us ...**

Greenovation - Go Green



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