
Who is Actually Driving this Building?

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Who is driving the building?



**Under the
Hood:
Operations
and
Maintenance**

- Nobody, it's on cruise control!
 - We have a DDC system, it decides what to do.
 - Set and forget.
 - Somebody still has to watch the traffic, steer the car, read the gauges, and add gas
- An unlicensed driver?
 - The custodian?
 - Administrative assistant?
 - Jack knows everything about this system!
- A driver with "road rage"
 - They never give us any training!
 - This !\$@#& system has never worked right!

Who is driving the building?



Under the
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- There is no steering wheel!
 - No front end
 - I don't have a laptop
 - The PC is in Jack's office
- The steering wheel is disconnected!
 - It is a dial-up system on a shared line
 - IT won't let us on the network
 - The gateway/modem/server went down
 - Disconnected actuators
- The tires are flat, the gas tank is empty and my credit card is maxed out
 - We don't have the money to fix anything.
 - Get Jack to fix it, he can fix anything!



Who is driving the building?



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■ Jack of all trades

- The temperature light was on, so I put tape over it.
- We ran out of gas, so I added paint thinner and moth balls.....It works the same.
- It takes so long for the heater to warm-up that I just let her run all night!
- The cruise control broke, just put this brick on the gas pedal.
- The motor burned out, so I use these vice grips to turn the window down for summer & up for winter.
- I do it all myself. I even write directions on the fender for when I am not around.





Under the
Hood:
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- Common faults
 - Overrides and manual operation
 - Sensors and transmitters out of calibration
- Typical causes
 - Budget constraints
 - Lack of training
 - Mechanical systems
 - Control systems
 - Cost of neglect
 - Lack of maintenance
 - Misaligned goals
 - Construction vs. operations vs. maintenance



How Do We Repair This?



**Under the
Hood:
Operations
and
Maintenance**

- Chilton Manual
 - Develop and follow a programmatic approach to repairing, re-commissioning, and maintaining control and mechanical systems
- Pit Crew
 - Management support
 - The right people with the right training
 - In house staff supported by consultants and subcontractors
- Tool box
 - Training, training, training
 - Service contracts
 - Performance contracting
 - Energy retrofits
- Diagnostic Tools – Measure the results
 - System alarming via front end
 - Historical trend information
 - Operational reports





The drivers responsibilities



**Under the
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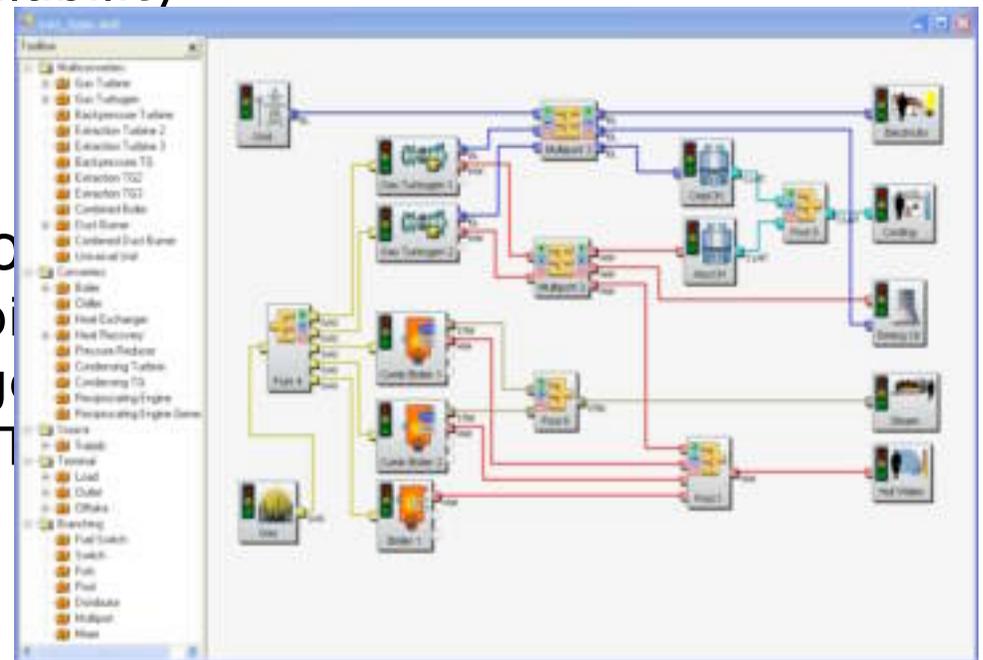
- Keep your eyes on the road
 - What is up ahead
 - Seasonal changes, occupancy changes, system expansion
- Check the instrument panel
 - Monitor alarms
 - Equipment runtime (how many miles on this set of tires?)
- Communicate with your pit crew
 - Management reports
 - Success stories
- Don't skip the pit stop!
 - Perform preventative maintenance
 - Repair it, don't just fix it!





Under the
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- Load Optimization Software
 - Software which manages the local mix of energy assets so as to maintain peak system operating efficiency based on:
 - current load requirements
 - equipment availability
 - fuel options
 - emission limits
 - energy costs
 - Optimization Roles
 - Chiller Plant/Boiler
 - Thermal Storage
 - Co-generation/Trigeneration

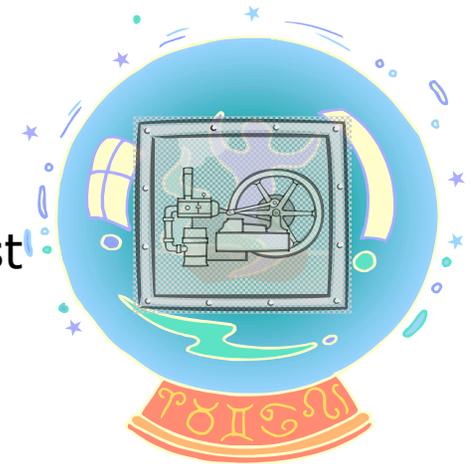
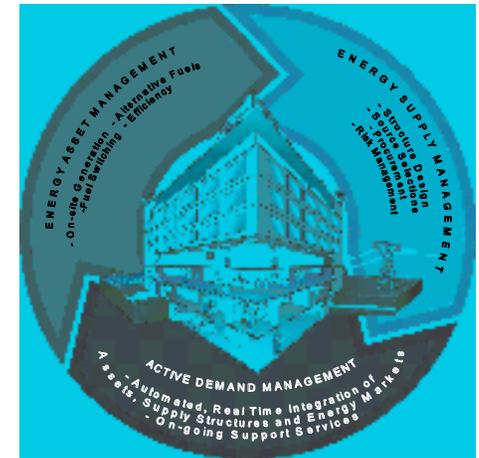




Under the
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- Active Demand Management
 - Utilization of building control systems to optimize energy assets so as to minimize energy cost and risk
 - Fuel switching/Bio-mass
 - Load Management
 - Cost allocation

- Fault Detection and Diagnostic
 - Advanced diagnostic software which continually interrogates building control systems in order to identify mechanical deficiencies which affect equipment operating and life cycle cost
 - Defective actuators
 - Short cycling motors and control sequences
 - Under performing equipment





Critical Success Factors



**Under the
Hood:
Operations
and
Maintenance**

- **Planning:**
 - Comprehensive & long-term
 - Budget to do it properly
- **People:**
 - Executive sponsorship
 - The right people with the right training and the right tools
- **Execution:**
 - Follow the Chilton manual
 - Measure and report the results



The right training and the right tools!

