sabien managingcarbon™ through energy reduction

Increasing boiler plant lifecycle with retrofit controls

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Pressure to reduce carbon emissions

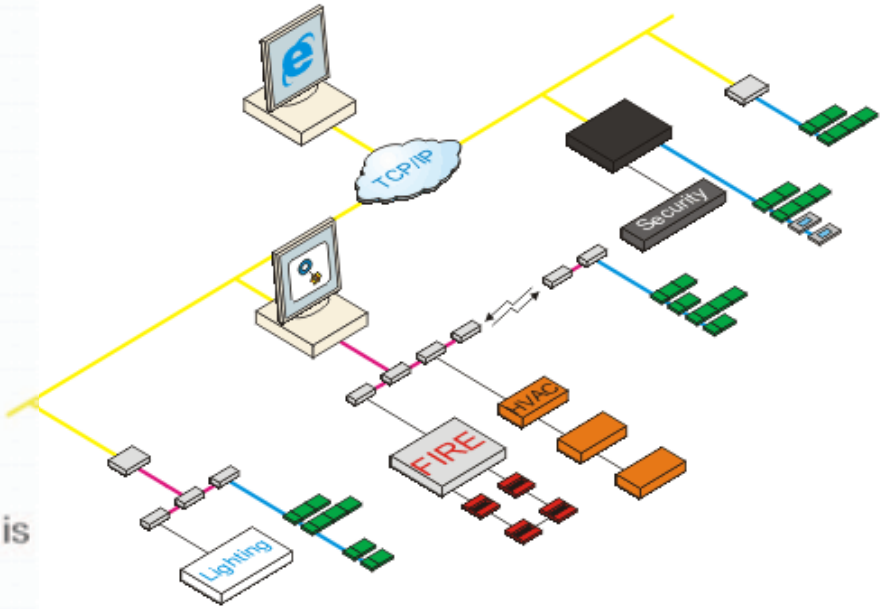
- Organisations are facing increasing pressure to reduce carbon emissions:
  - Increasing legislation
  - Reducing operating costs
  - Organisations reputation
  - Internal and external stakeholders
- Energy efficiency is one of the primary drivers organisations can implement to meet these demands
- Heating and hot water generation can account for up to 60% of your total energy costs
- Increasing the energy efficiency of boiler plant can deliver significant energy savings and increase the lifecycle of the plant

Reducing stress on boiler plant

- Ensuring the longevity of boiler plant is essential
- Replacing boiler plant can be expensive and disruptive
- The application is often different to the scenarios used in the manufacturers “mean time to failure” analysis
- More energy efficient boilers i.e. low water content boilers must not be over stressed

Increased longevity = increased control

- Building and environmental controls are widely used within the commercial sector
  - Building Management Systems (BMS)
  - Building Automated Systems (BAS)
  - Weather compensation (outdoor reset)
  - **Boiler load optimisation**
- Boiler load optimisation ensures boiler plant only fires when required, delivering;
  - Less thermal shock
  - Mean Time to Failure of boiler/burner component is increased
  - Reduced energy consumption
  - Reduced maintenance
  - Less downtime



What is Boiler load optimisation?

- Boiler load optimisation is now widely used
- A retrofit optimiser installed to new and existing boiler plant
- Designed to prevent boilers from firing unnecessary as a consequence of **boiler dry cycling**
- Boiler firings are typically reduced by 50%
- Energy consumption is typically reduced by 10% to 25%

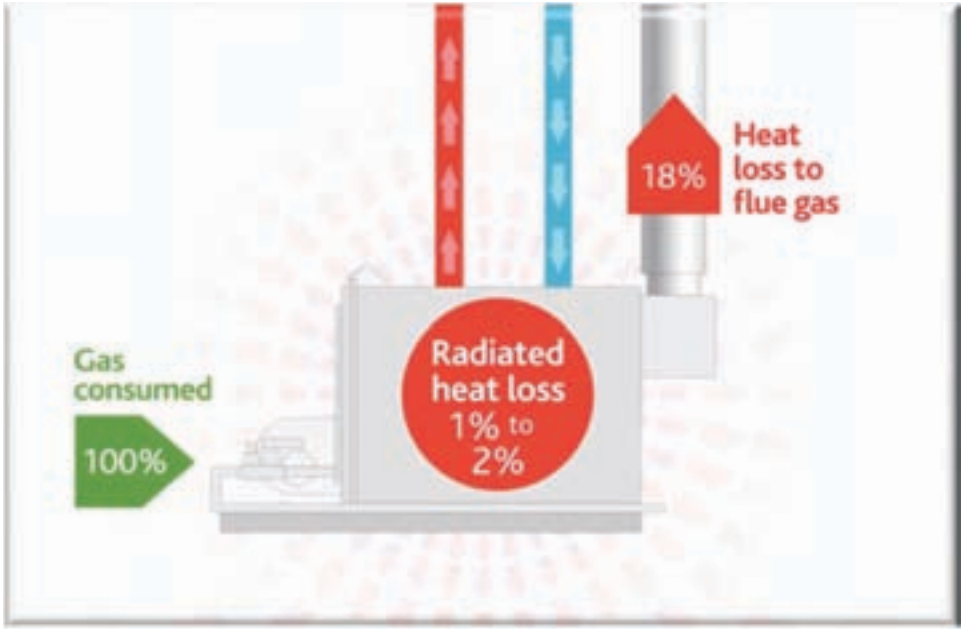
3 boiler load optimisers controlling 3 boilers

- Integrates with existing controls i.e. BMS (BAS)
- No impacts to designed set points or ambient temperatures

What is boiler dry cycling?

- All boilers waste heat, even modern boilers. This is known as "standing losses"

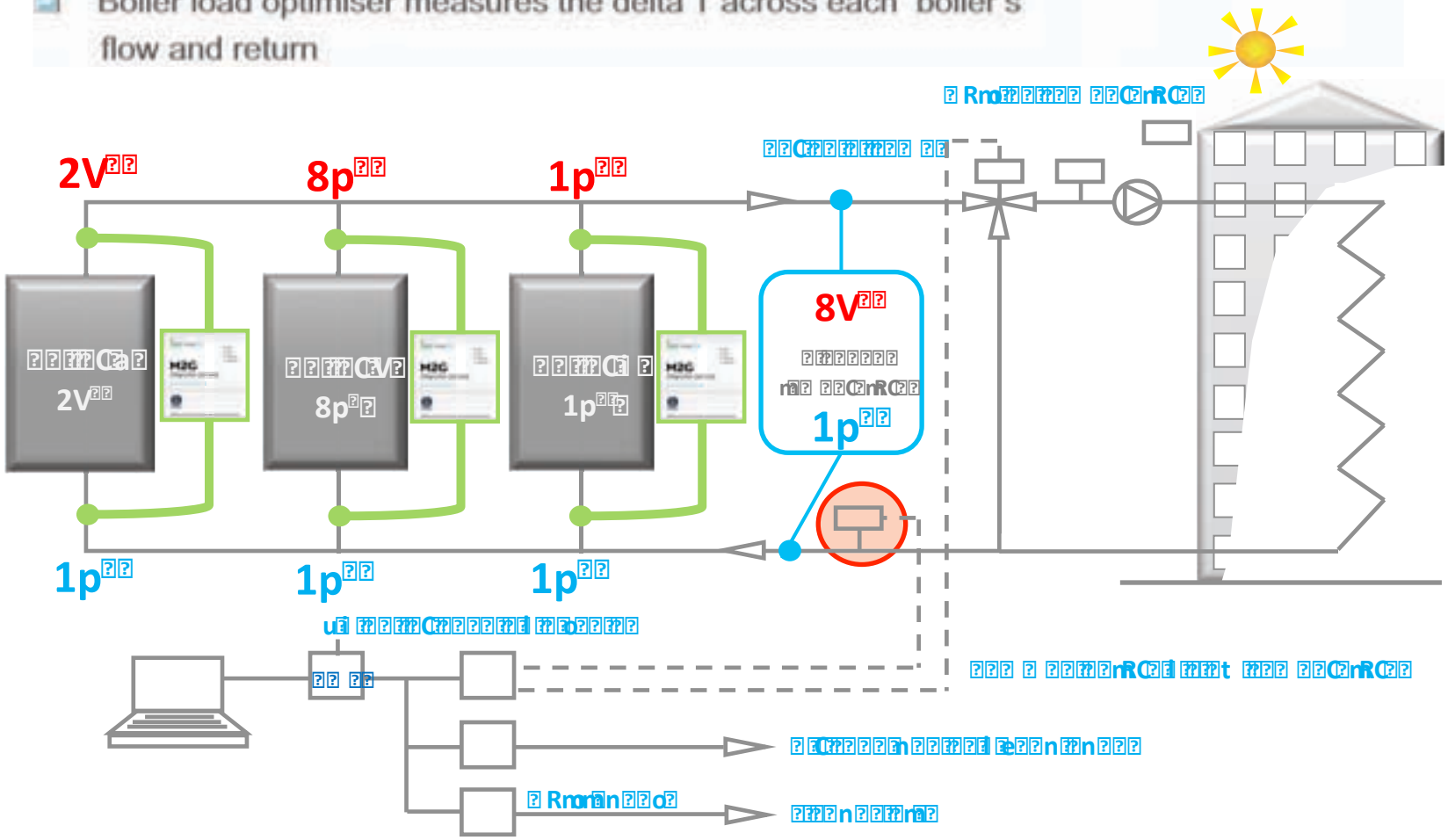
- Boilers often fire to recover these standing losses only
- This is known as "boiler dry cycling"
- Boiler dry cycling is an industry recognised problem
- Many attempts to remove boiler dry cycling have failed



- Even buildings with sophisticated building controls and modern boilers are likely to suffer from boiler dry cycling

Optimising each boiler

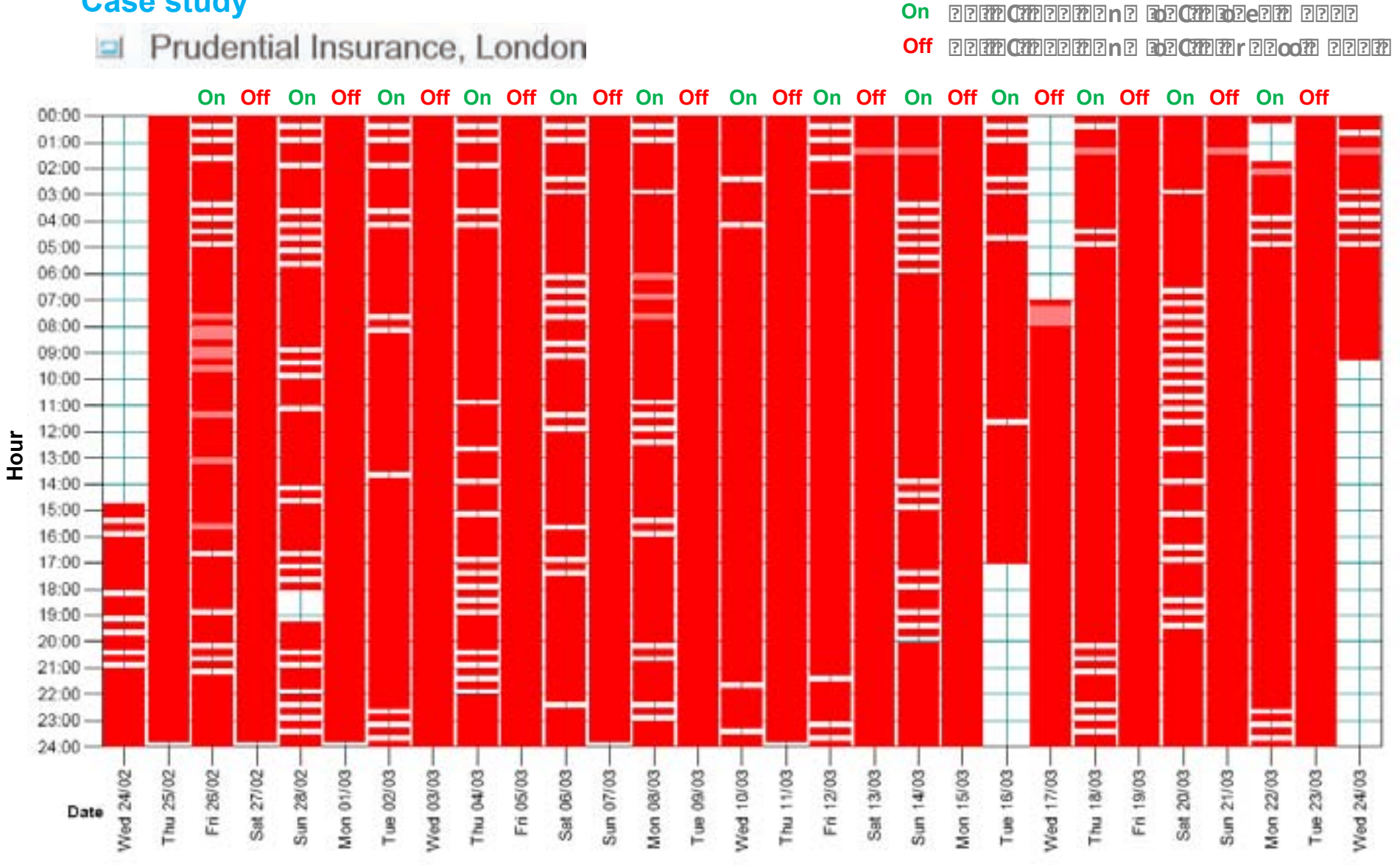
- BMS (BAS) is typically measuring the blended common flow and return temperatures
- Boiler dry cycling cannot be identified unless the flow and return of each boiler is analysed
- Boiler load optimiser measures the delta T across each boiler's flow and return



Example of reduced firings with boiler load optimisation

Case study

Prudential Insurance, London



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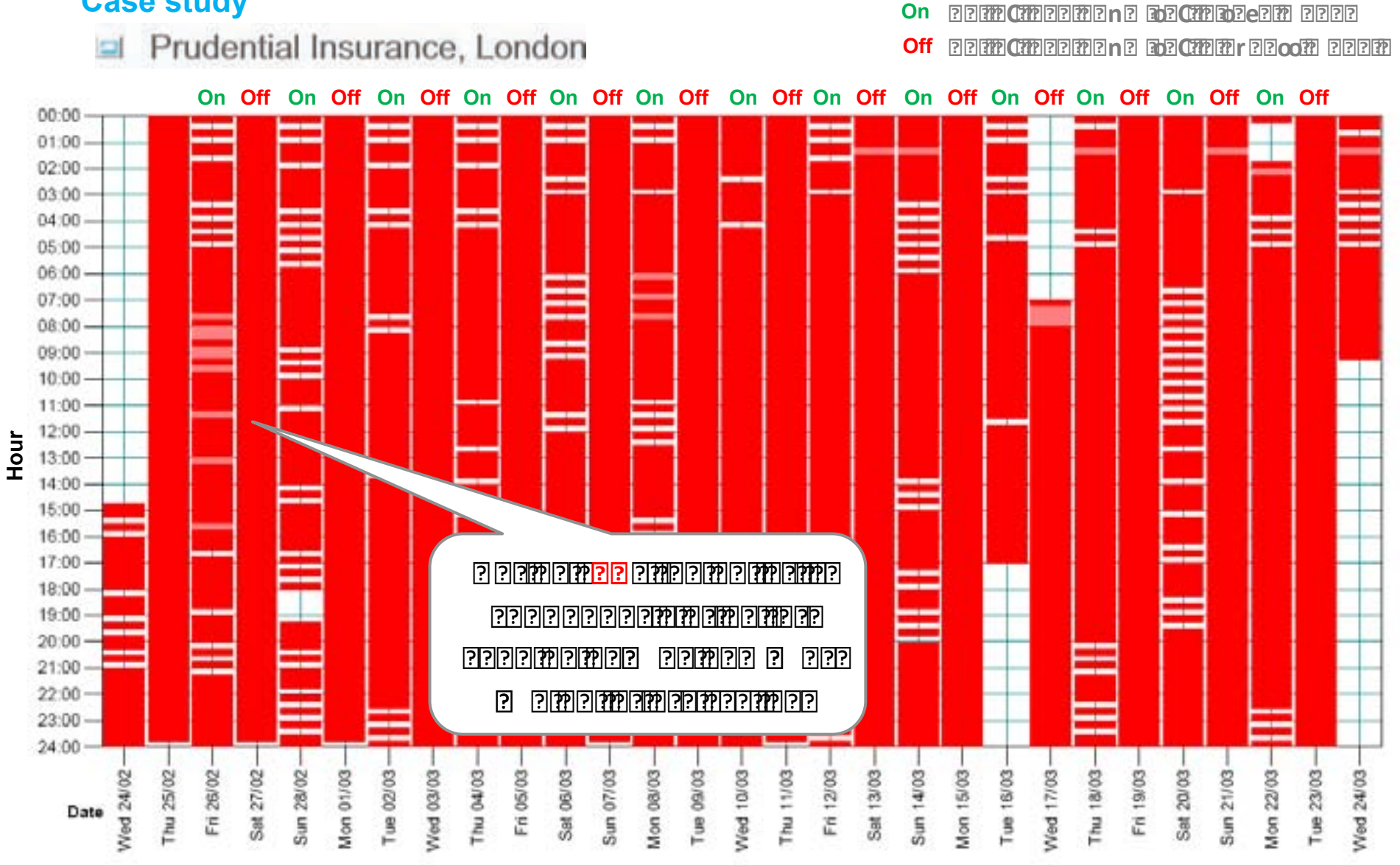

Reduced boiler firings

Case study

Prudential Insurance, London

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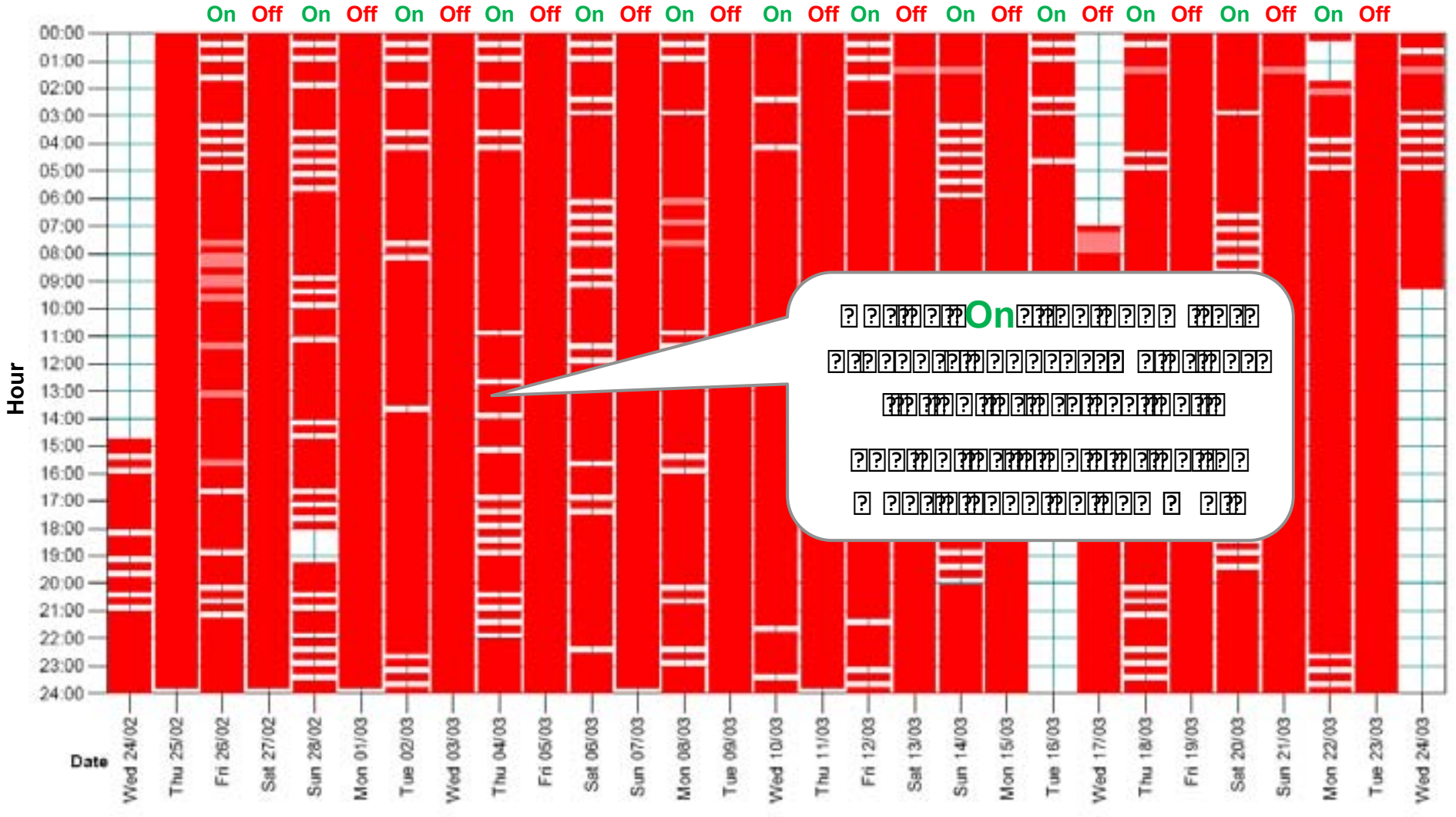
Off [illegible]



Significantly reduces the number of boiler firings and energy consumption

Case study

- Plaza Towers Condominium Association, Atlanta, Georgia

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Significantly reduces the number of boiler firings and energy consumption

Case study

- New Hanover County Schools, Ashley High School, Wilmington, North Carolina

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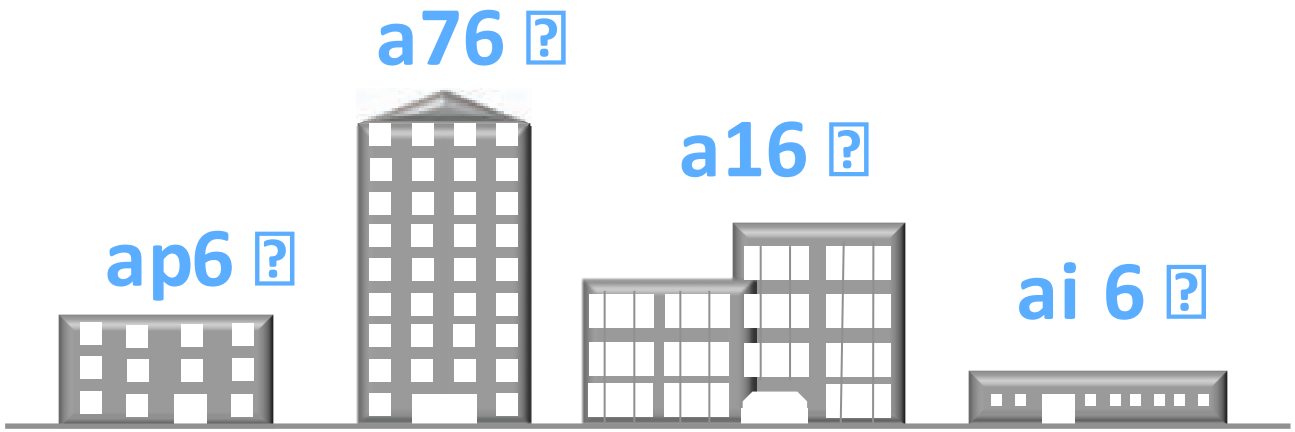
Average estate wide savings c.15%



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Summary

- ✓ Primary objective to reduce energy consumption and carbon emissions
- ✓ Typical savings of between 10% and 25% paybacks under 2 years
- ✓ As a consequence boilers firings are reduced by c.50%
- ✓ Boiler only fires for genuine demand
- ✓ Reduced "wear and tear" on boiler plant i.e. less thermal shock
- ✓ "Mean Time to Failure" of boiler/burner components can be extended
- ✓ Low cost – minimal disruption
- ✓ Integrates and complements existing controls i.e. BMS (BAS)
- ✓ No impacts to designed set points or ambient temperatures