

A Method to Reduce Compressed Air Usage Through Half-Level Control and Usage Scheduling

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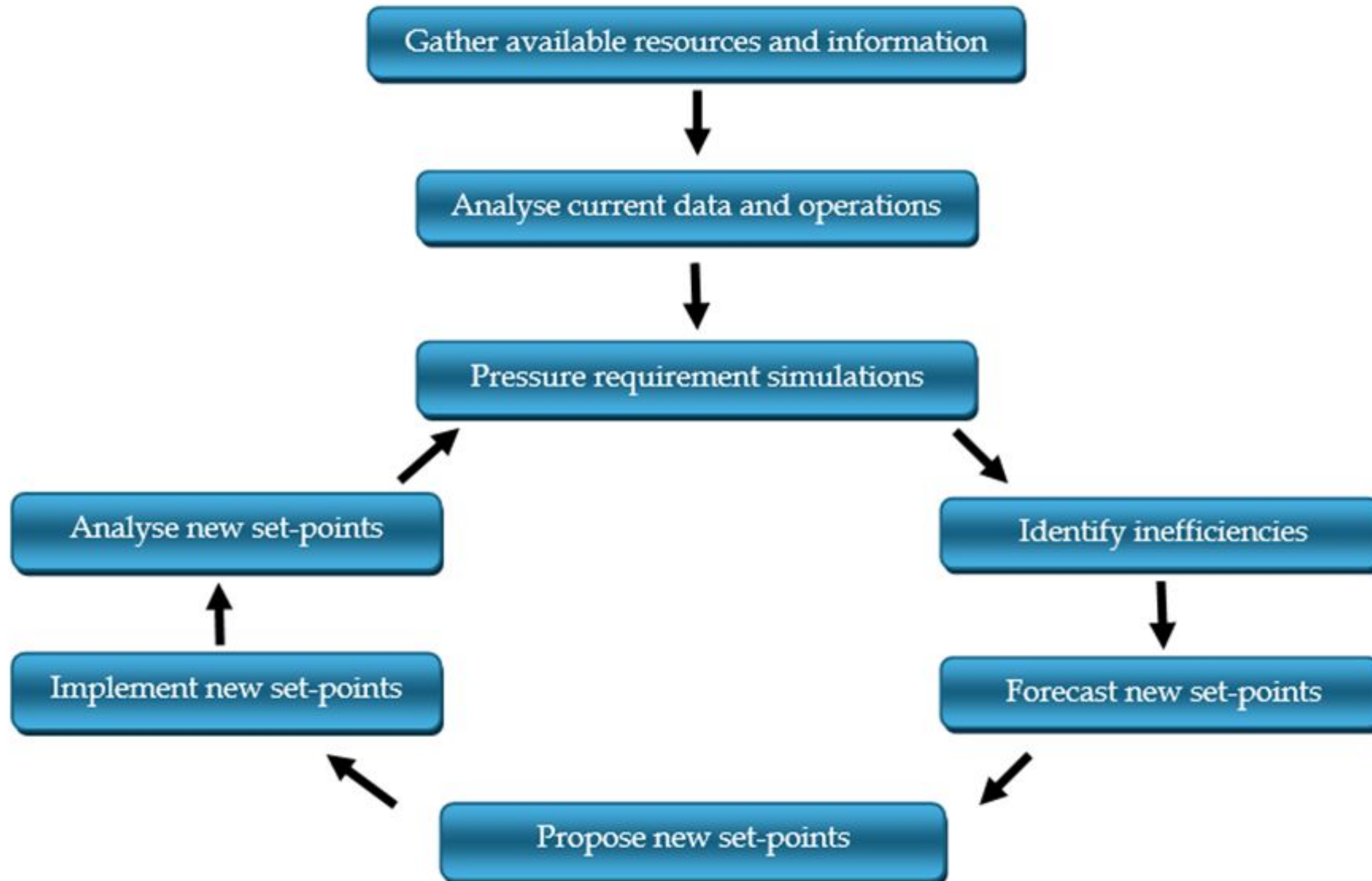
Presentation layout

- Background
- Continuous Feedback Loop
- Case Study – Mine A
- Results
- Conclusion
- Acknowledgements & References

Background

- Compressed air is one of the most widely used utility in mining, particularly in PGM mines
- Compressed air generation is energy intensive, and often used inefficiently
- Minimizing compressed air wastage throughout the day can be without disrupting production
- Development of automated, data driven method to match supply and demand

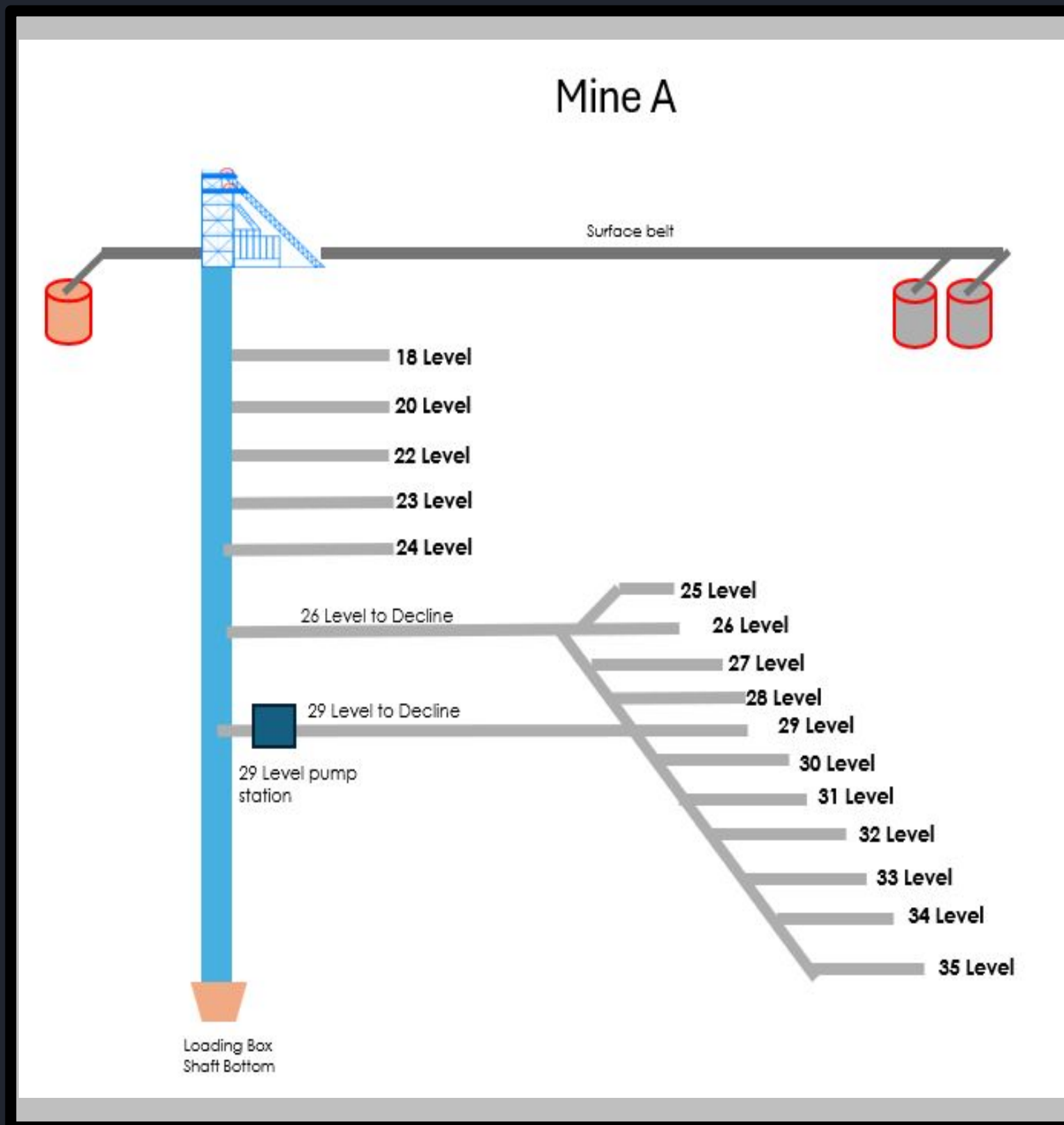
Continuous Feedback Loop



Case Study – Mine A

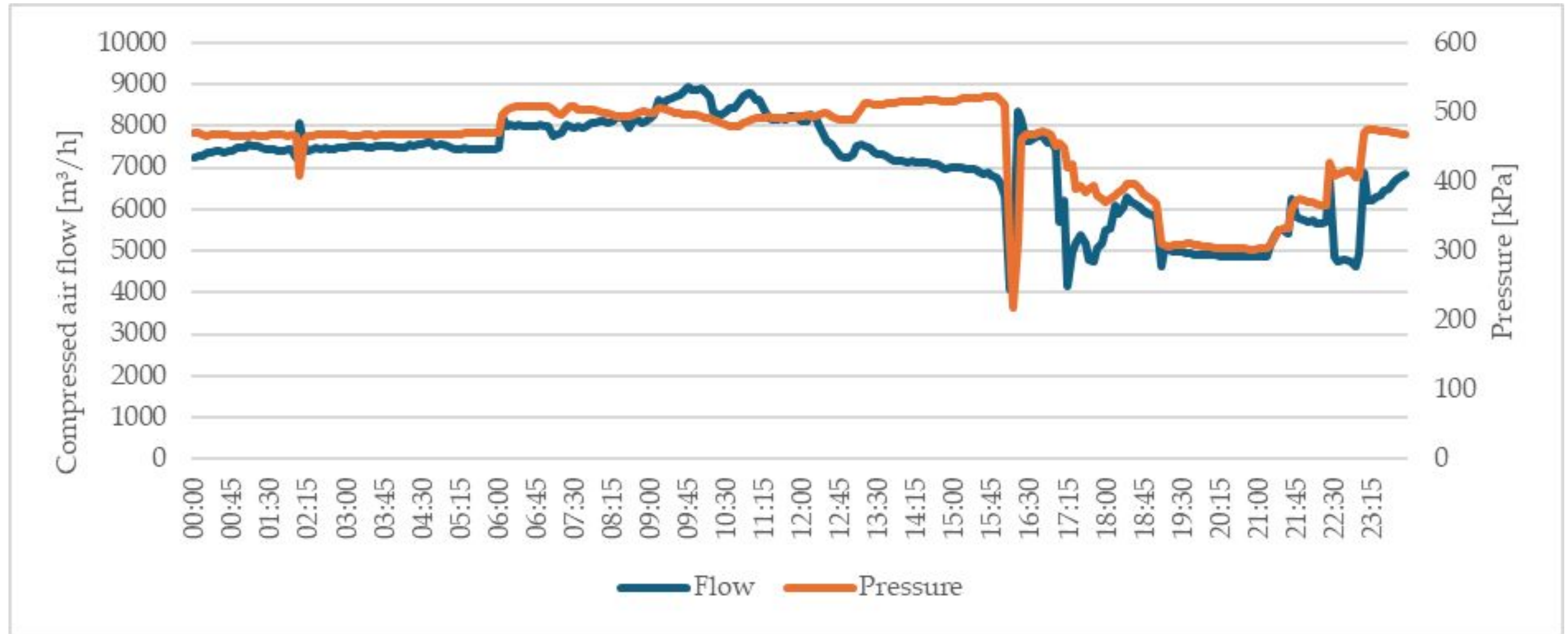
Gathered available resources and information

- Actuating control valve on all active half-levels
- Individual set-points possible
- 10 Compressors connected to ring
- Total compressor combination capacity of 51MW
- Number of people and equipment known



Case Study – Mine A

Analyse current data and operations



Case Study – Mine A

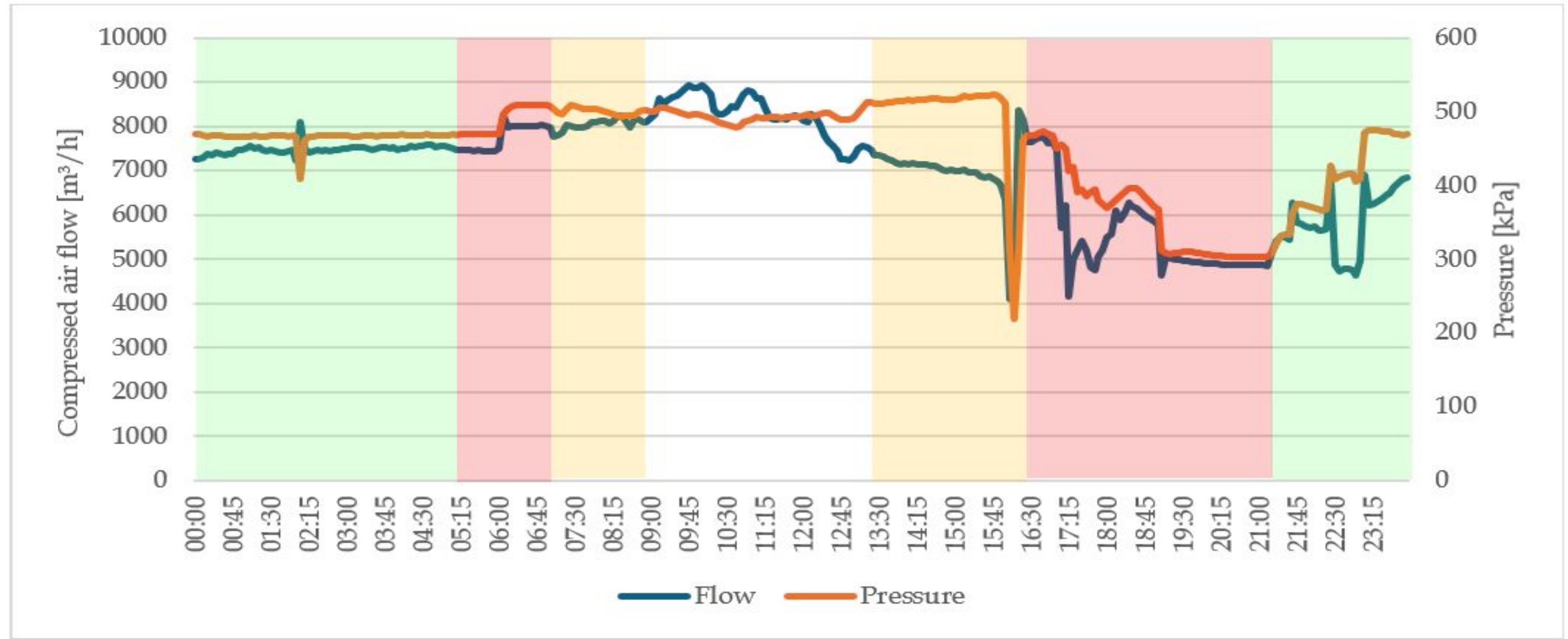


Pressure requirement simulation

- Type of equipment used
- Time of day used
- Number of operators and equipment
- Pipe sizes and distances
- Leaks, faulty valves, open ends, etc.

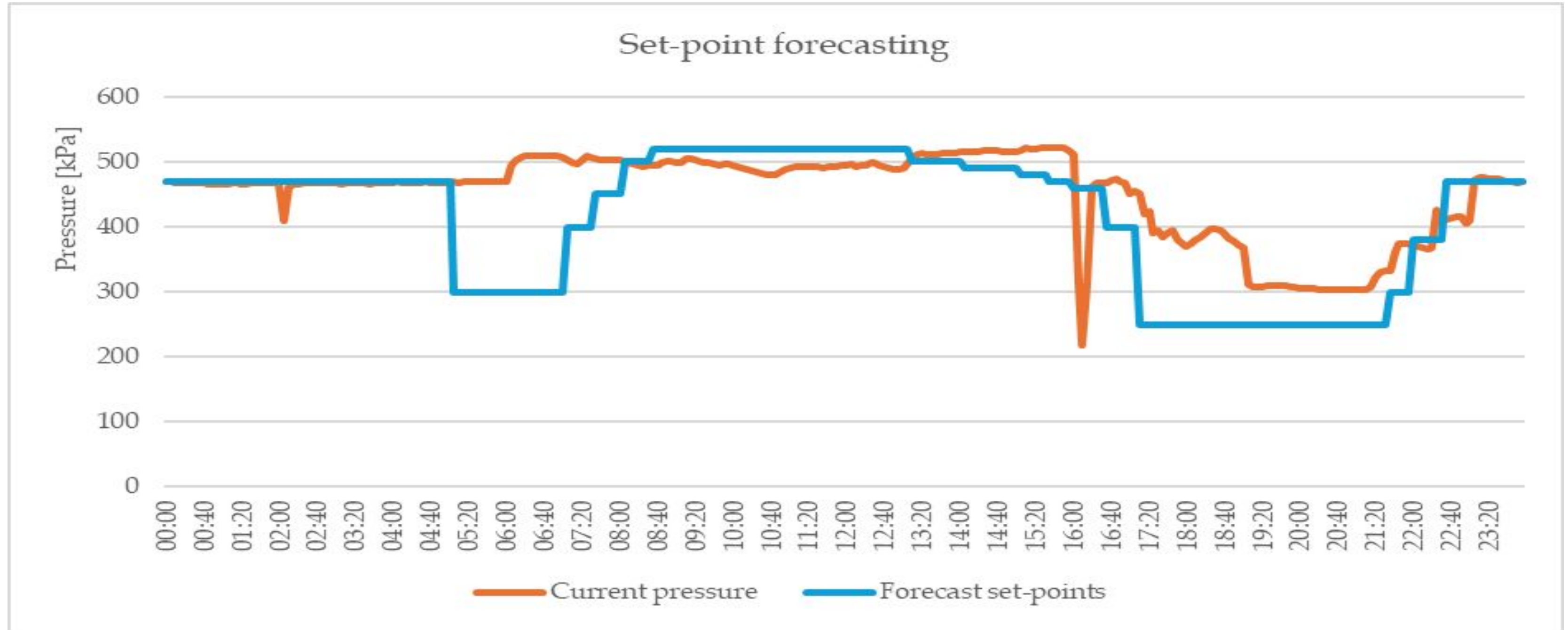
Case Study – Mine A

Identified inefficiencies



Case Study – Mine A

Forecasted new set-points



Case Study – Mine A

Proposed new set-points

- Communicated changes to affected personal
- Sign-off received
- Document approval

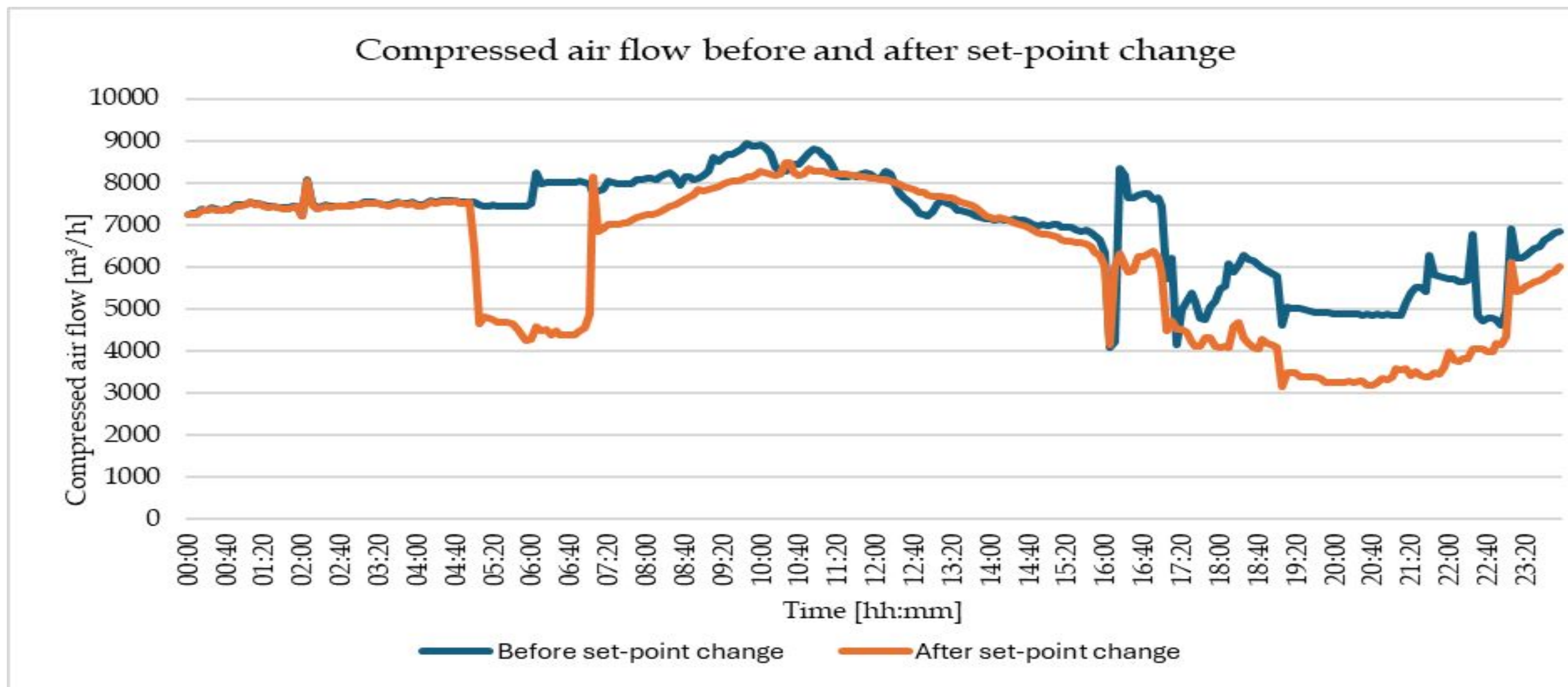
Implemented new set-points

- Made changes to individual valves set-points
- Same method used for each individual valve

Analysed new set-points



Results



Results

- An average of $\pm 10,000$ m³/h reduction shaft compressed air usage
- Forecasting 4.7 GWh reduction per annum
- Cost saving of R 11.35 mil per annum
- Cost saved calculated according to compressor combinations run according to compressed air demand



Conclusion

- Inefficiencies can be noted by inverse relationship between flow and pressure
- Set-point optimisation proven to reduce power consumption and cost (R 11.35 mil per annum)
- Data driven, scalable solution for sustainable mining practice
- Integrating automation and analytics enhances energy management

Acknowledgements & References

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Key References:

Nell (2017); Fouché (2017); van der Merwe et al. (2022);
Mathews et al. (2019); Burger (2024).

THANK YOU