**AI Use Case Project – Energy Efficiency**

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# Business Recommendations:

1. **Increase Relative Compactness**
   1. Reduces heating and cooling loads by ~20% (Random Forest shows high influence, R²=0.998 for Heating).
   2. Estimated savings: **€500–700/year per 200 m² building**.
2. **Minimize unnecessary roof and wall areas**
   1. Improves insulation and reduces heat loss.
   2. Estimated savings: **€300–400/year per 200 m²**.
3. **Optimize glazing area & orientation**
   1. Reduces heating/cooling losses.
   2. Suggested: minimize west-facing windows in summer, maximize south-facing in winter.
   3. Estimated savings: **€250–350/year per 200 m²**.
4. **Consider building height & orientation**
   1. Lower heights and optimal orientation reduce total energy consumption.
   2. Estimated savings: **€150–250/year per 200 m²**.
5. **Use Random Forest to simulate alternative designs pre-construction**
   1. RMSE is very low (0.49 for Heating, 1.71 for Cooling), so predictions are reliable.
   2. Reduces design errors and allows optimization **before construction**, saving both time and cost.

# Submission Checklist:

• R² > 0.8 for both targets

• Clear, quantified recommendations

• Completed use case documentation following appliedAI template

• Organized GitHub repository with notebook, data, and screenshots

# GitHub Notebook & Screenshots:

• Jupyter Notebook: https://github.com/Lorietta5/EnergyEfficiency\_Project.git

• Screenshots of the use case template stored in folder: /use\_case\_documentation/