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Managing Diversification of Gas Quality in Distribution Grids Using Gas Quality Tracking with Incomplete Measurement Infrastructure

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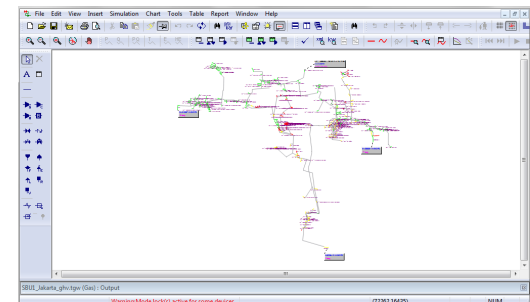
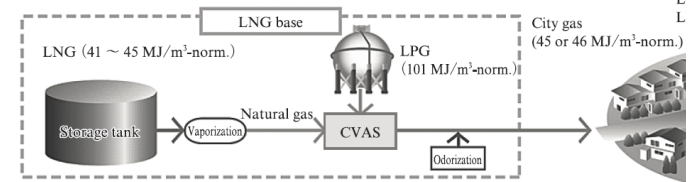
Background



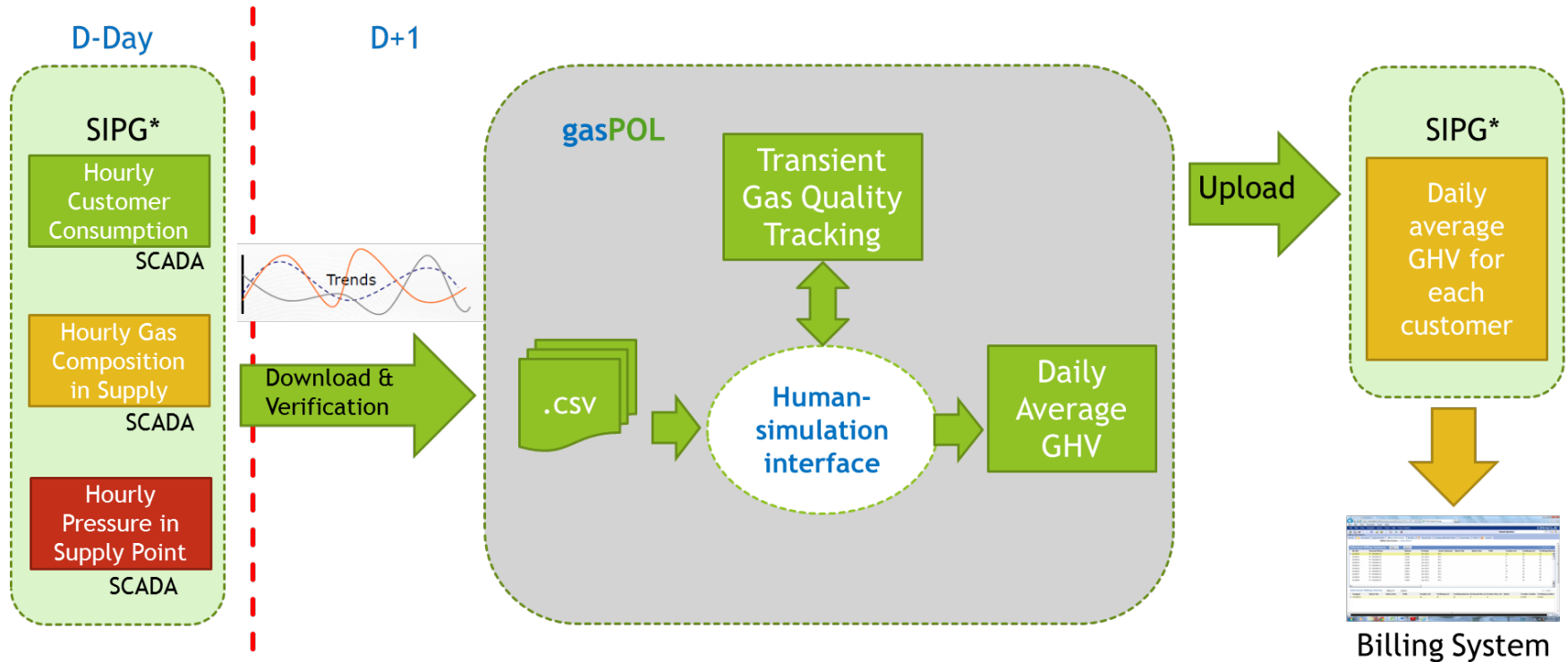
- Growing natural gas demand leads to stronger diversification of gas quality from introduction of LNG in July 2012
- With previous 2 weeks period sampling for energy billing, fluctuation of calorific value led higher business risk

Aims

- Option of methods:
 - Adding LPG for low quality LNG
 - Installing numbers of composite sampling
- Complete measurement in distribution grid is expensive
- A cost effective method is using daily average calorific values from gas quality tracking based on pipeline simulation

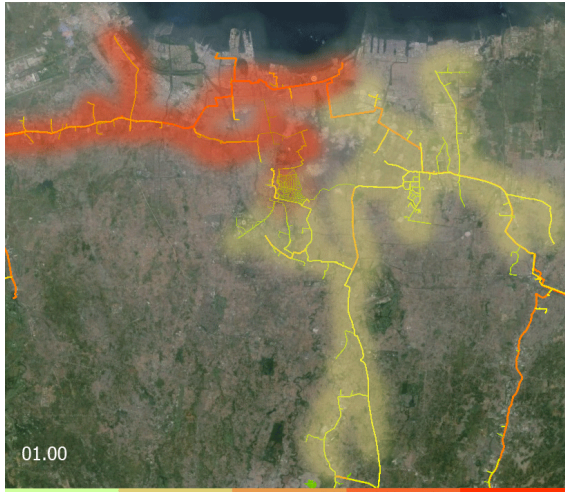


Method: Gas quality tracking with transient simulation



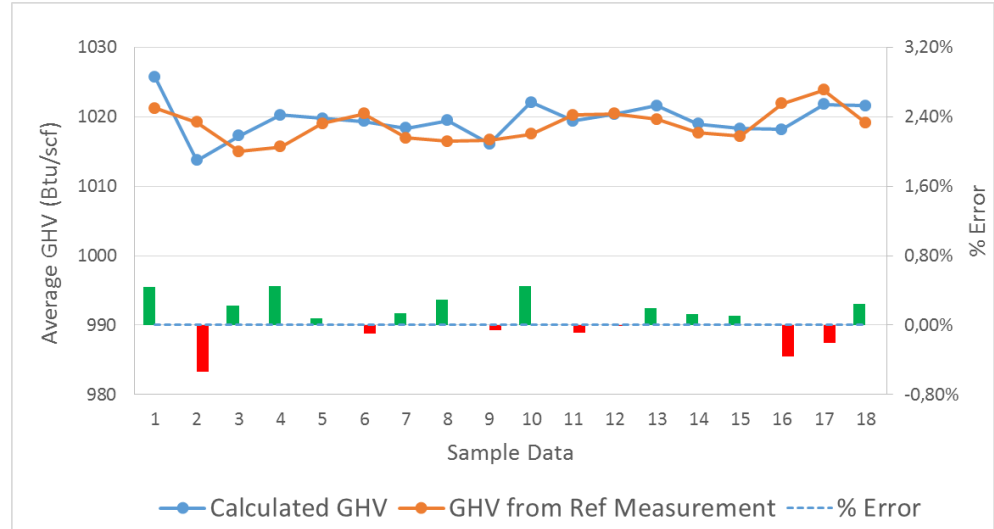
*SIPG: Gas Delivery Information System Portal

Method: Validation Results



1020 Btu/scf

1030 Btu/scf



OIML (*International Organization of Legal Metrology*) with recommendation No. R-140 in 2008 required level of accuracy of $\pm 1,25\%$ for class B (industry)

Results

- The amount and quality of input, simulation model and output data are sufficient for billing purpose and valid for:

Parameter	Min	Max
GHV (Btu/scf)	900	1120
CO ₂ (% mole)	4	8
Specific Gravity	0,5	0,9

- PGN start to implement daily determination of GHV for energy billing in October 2014
- The offline simulation model make it easier for correction, modification and for traceability.

Conclusion

- Daily determination of calorific value based on pipeline simulation could allocate a more accurate energy billing in a dynamic distribution system and mitigate the business risk.
- Gas quality tracking tools provide a cost effective method for managing diversified gas quality.
- The daily energy billing approach provides a good basis for promoting natural gas and other renewable gases as precise and clean energy.