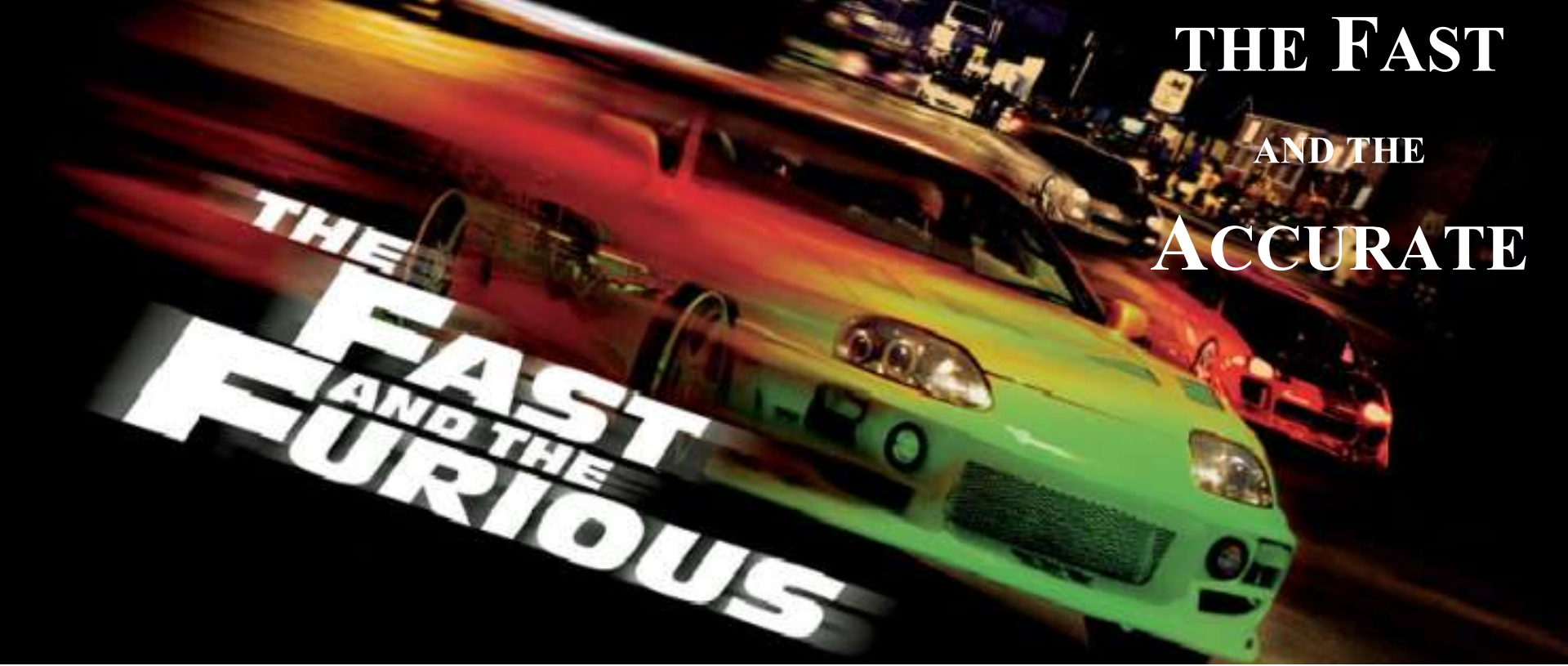
Presenter

Hans-Peter Smid
Product Manager Gas Quality

- Born in 1973, married, two children
- Studied Analytical Process and laboratory Instrumentation (APLI) in Delft
- Working in Elster since 2012
- Office in Essen (B) / living in Netherlands



Online gas chromatographs vs correlative measurements for natural gas

Content

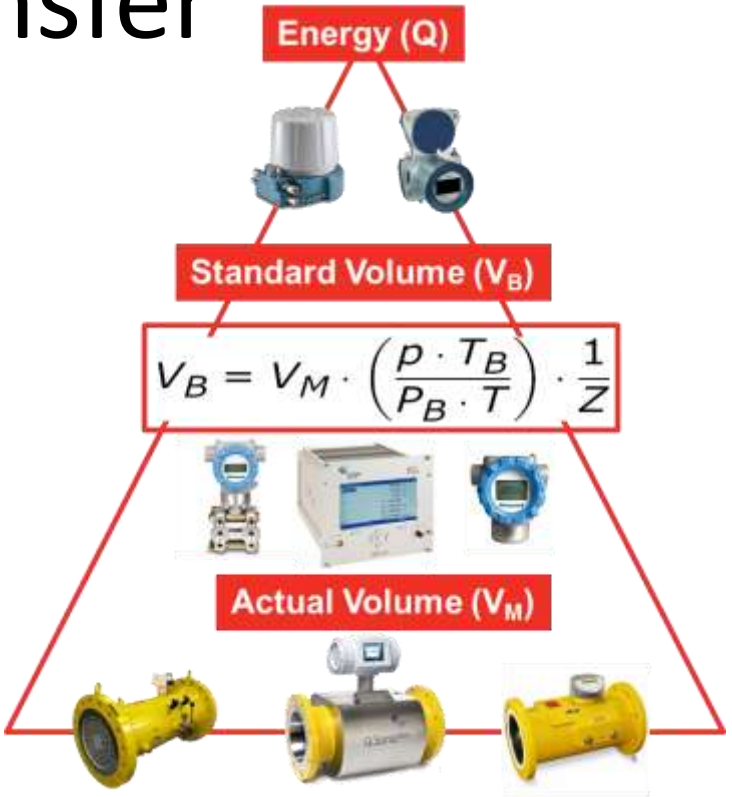
- Why we measure
- How we measure (now)
  - Overview of measurement techniques
- The showdown
- Conclusion
- Questions

Why we measure

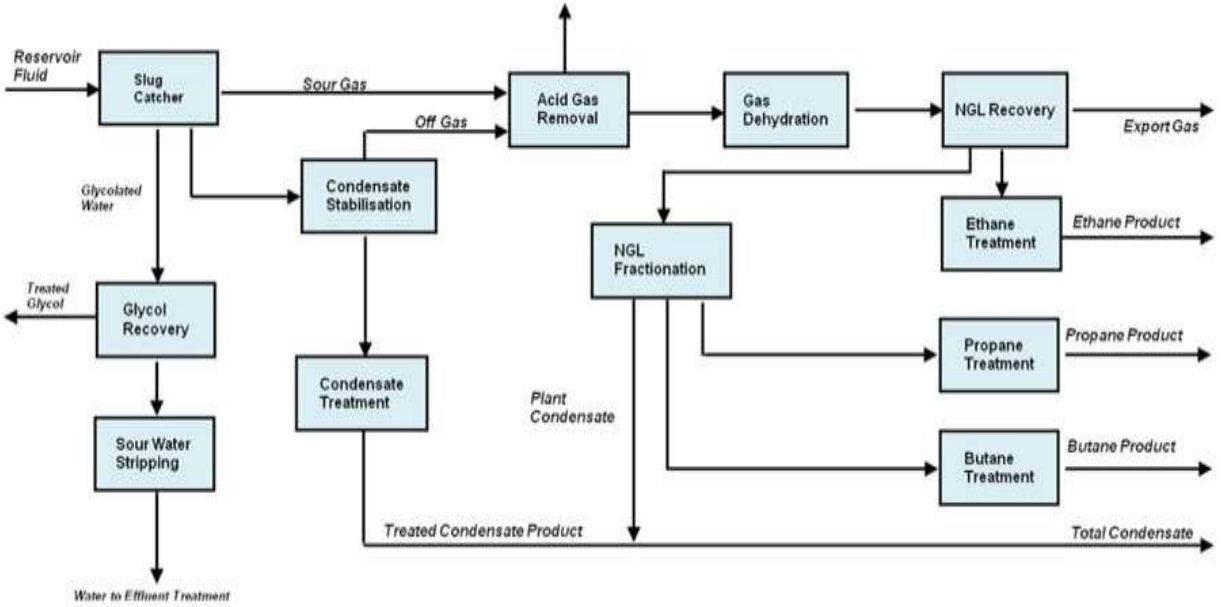
- Custody transfer
- Gas turbine control
- Blending / distribution metering
- Burner control
- Quality / emission

Custody Transfer

- Heating Value
- Density
- Wobbe index
- Compressibility
- Composition



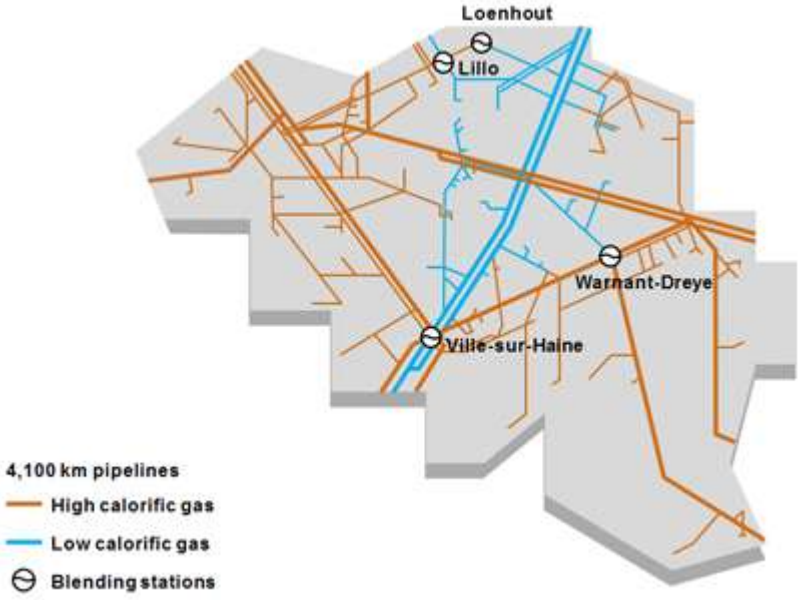
Gas processing

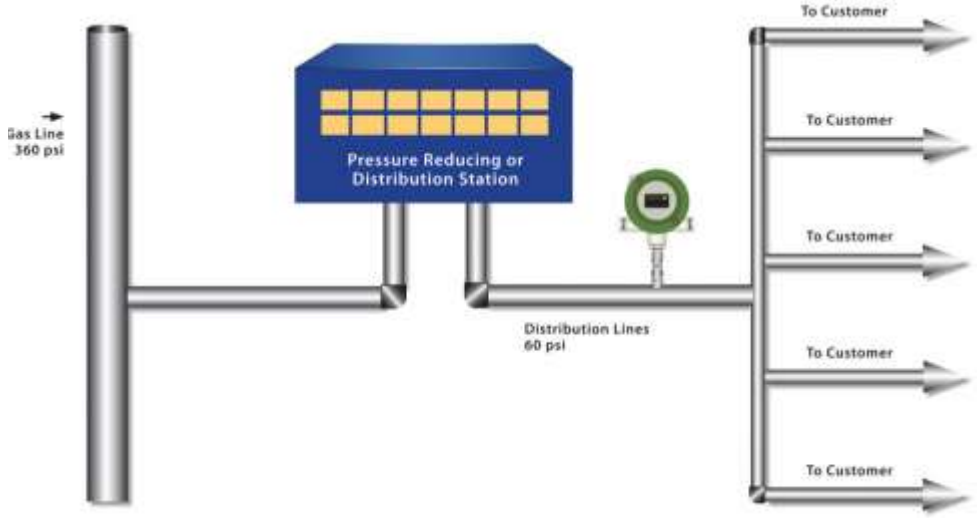


Gas turbine control

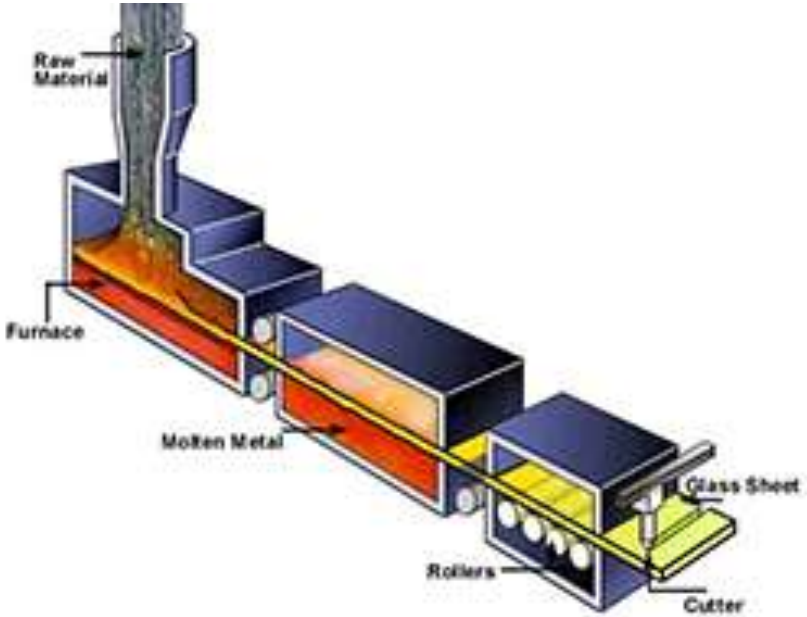
- Combustion stability

Blending / distribution metering

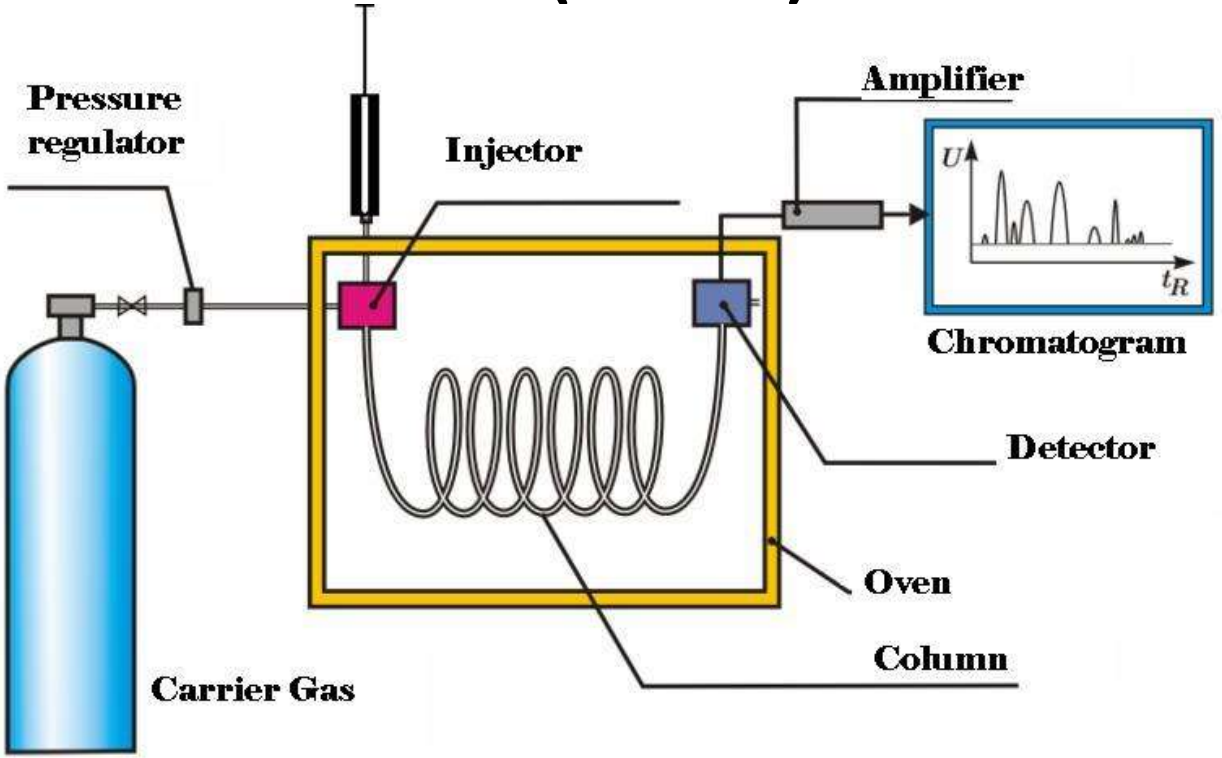




Gas burner control / Quality Control

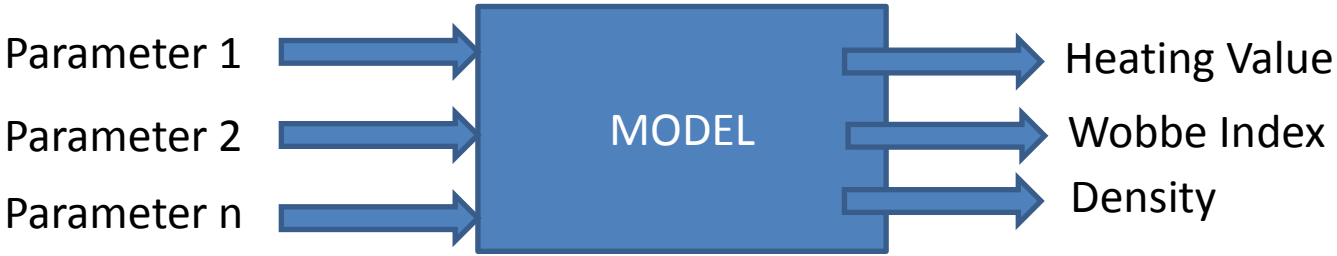


How do we (now) measure



How we also can measure

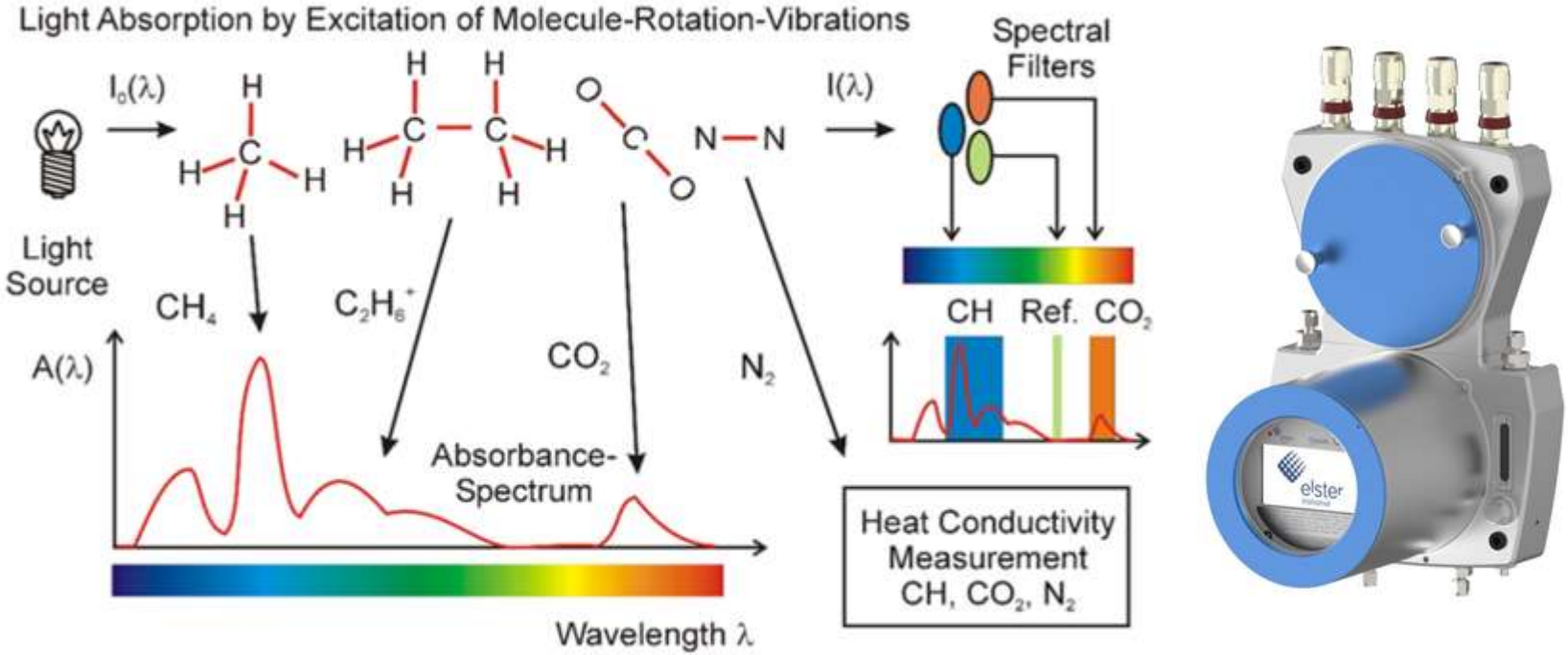
correlative



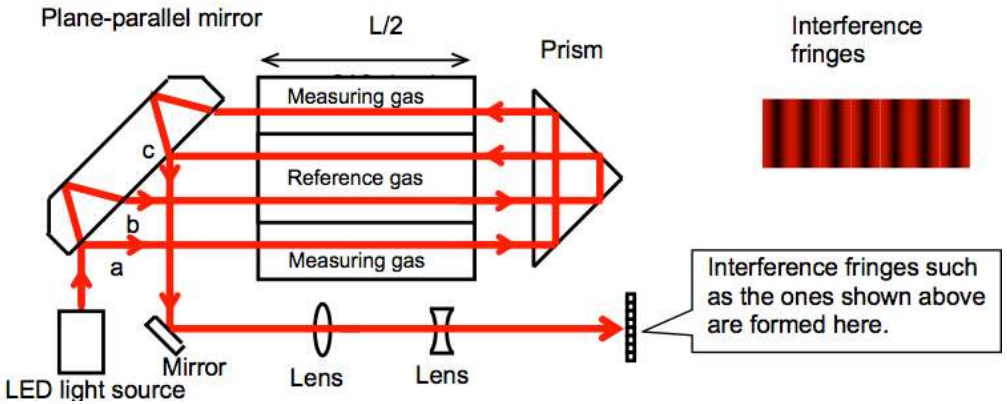
How we also can measure

- Correlative parameters
  - IR + TCD + VOS
  - IR + TCD
  - VOS + Refractive index
  - IR Scanning
  - Diff. Pressure over orifice / kinetische viscositeit

How we also can measure



How we also can measure



The showdown

The showdown (technical)

	Correlative	GC
Analysis time (s)	Real time	180
Carrier usage	none	20 cc/min
Range	Limited	0-100 MJ/m^3
Uncertainty on Heating Value	3.0 - 0.5%	Typically 0.1%
Repeatability	0.3 – 0.05% RSD	0.005% RSD
Cal gas	None or single / binary gas	11 components

The showdown ($)

Item	Correlative	GC
CAPEX analyzer	20k	25k
CAPEX auxiliaries	5k	15k
OPEX (/year)	1k	3k
Total over 10 years	35k	70k

The fast or the accurate?

GC for accuracy

Correlative for speed (and or $)

Questions?

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Sprekersoverleg

- Het sprekersoverleg vindt plaats in week 24
- De concept presentaties graag mailen aan: paul@fhi.nl / petra@fhi.nl
- Alle sprekers maken gebruik van de template
- Alle sprekers worden verzocht hun (concept)presentatie op te sturen en bij het overleg aanwezig te zijn.
- Tijdens het sprekersoverleg gaan we:
  - presentaties inhoudelijk bespreken
  - elkaar helpen naar een nog sterker verhaal
  - onderlinge afstemming van presentaties

How does a GC compare to correlative

Attributes	Accuracy / Speed	CAPEX	OPEX	Application
Honeywell EnCal 3000	• uncertainty of <0.1% or 0.08% when using multilevel calibration • Repeatability <0.005%RSD • Runtime : 3 minutes	• List price = 30k • Installation : 1 day • Start-up : 1 day	• Carrier gas • Calibration gas • Maintenance per year 3k$	• By choosing different column sets, we can do virtually any application
Honeywell GasLab Q2	• Uncertainty of <0.5% • Repeatability <0.1%RSD • Update time : 1 second	• List price =25k • Installation : 1/2 day • Start-up : 1/2 day	• No carrier gas • Methane only • Maintenance per year 1,5k$	• Natural gas only • No compositional break down of values
So What?	• **GC is more accurate** • **Correlative is faster**	• **Correlative is the cheaper solution**	• **Correlative is the cheaper solution**	• **Choose GasLab for fast natural gas** • **EnCal for any other gas application**