NET ZERO Emissions

is achievable
by using

Ultrasonic Flowmeters

FLEXIM

FLUENTA

MEGEX เม็กเอ็กซ์ www.megex.co.th info@megex.co.th Tel. 081 923 1008

MEGEX

บริษัท เม็กเอ็กซ์ จำกัด

ขาญวิทย์ คุ้มโชคไพศาล

Chanwit Koomchokpaisarn

8 Years – Emerson Process Management
Micro Motion & Rosemount Flow

11 Years – GE Measurements & Controls
Panametrics, Druck

6 Years – MEGEX Founder

25 Years Experience in Field Instrumentation

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MEGEX Co.,Ltd.
บริษัท เม็กเอ็กซ์ จำกัด

SHINKAWA

a.i.tek instruments

Protected operating conditions
INTERTEC

ATBV
BANGKOK BIZ

FLUENTA

FLEXIM

RHEONIK
THE CORIOLIS EXPERTS

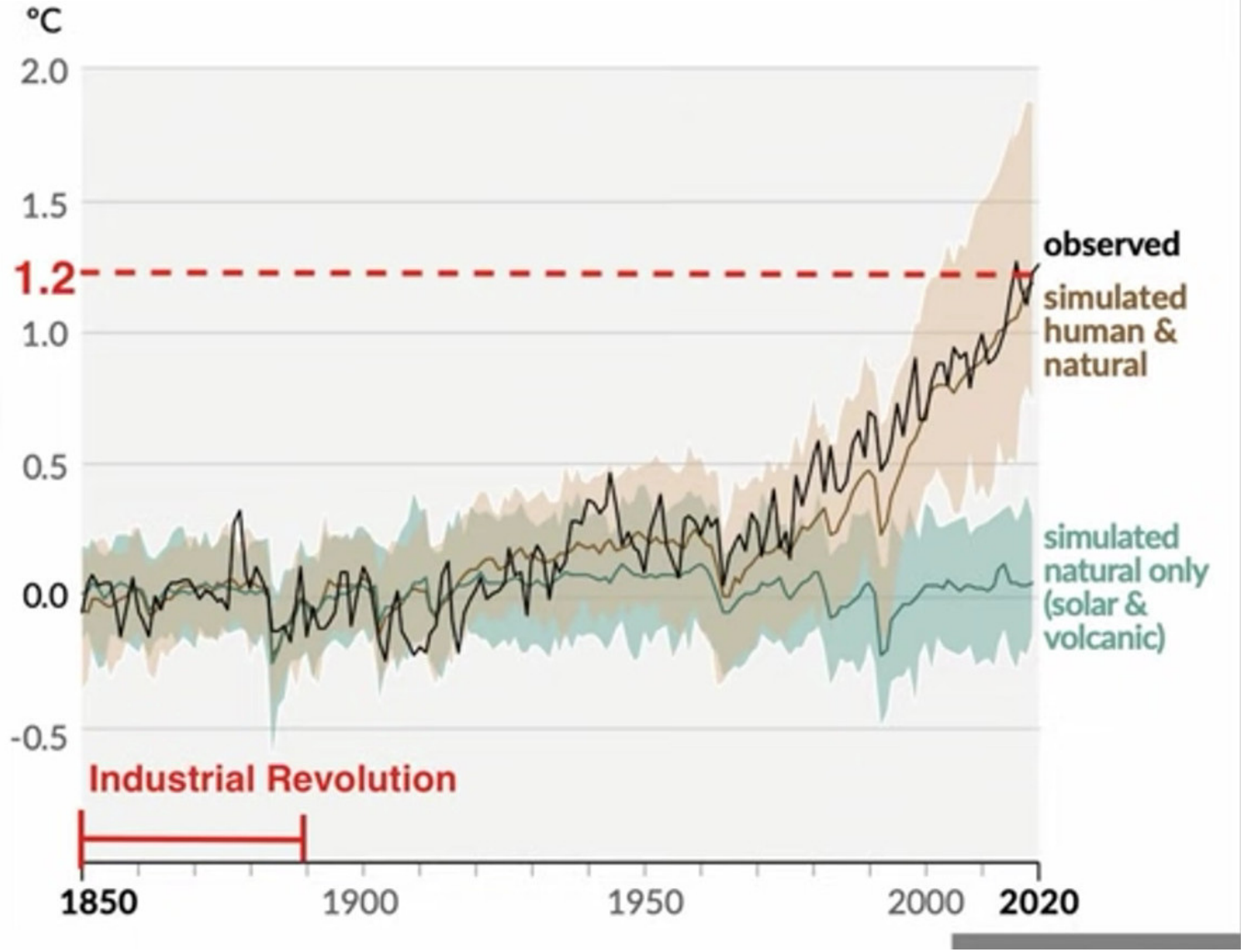
SSS® Clutch

KOENIG
ENGINEERING INC.

NET ZERO

WHY ?

Climate Change



Climate Change

Climate Change

Climate Change

Climate Change

Climate Change

Climate Change


PARIS
CLIMATE
AGREEMENT

Paris Agreement vs NET ZERO

THE STANDARD

3 นัยสำคัญของ Paris Agreement

1. ต้องไม่ให้อุณหภูมิโลกสูงขึ้นเกิน 2 องศาเซลเซียสจากก่อนปฏิวัติอุตสาหกรรม (ไม่เกิน 1.5 องศาเซลเซียสในกรณีที่ดีที่สุด)

2. ต้องมีความพยายามปล่อยก๊าซเรือนกระจกให้ถึงจุดพีก เพื่อให้เข้าสู่ขั้นตอนการลดการปล่อยก๊าซเรือนกระจกอย่างรวดเร็ว

3. วางแผนกลยุทธ์ระยะยาวเพื่อมุ่งสู่ Carbon Neutrality หรือ Net Zero ภายในปี 2050-2100

สำนักงานนโยบายและแผน
ทรัพยากรธรรมชาติและสิ่งแวดล้อม

COP26

31 OCT - 12 NOV 2021
GLASGOW
IN PARTNERSHIP WITH ITALY

Thailand already pledged
to achieve carbon neutral by 2050 and
to achieve net zero greenhouse gas emission by 2065.

คุณ อรรถพล ฤกษ์พิบูลย์


ทันข่าวพลังงาน Today
ดร. คงกระพัน อินทรแจ้ง
GC
ทุ่ม 1.65 แสนล้านบาท
มุ่งสู่ Net Zero ในปี 2593
ดร. คงกระพัน อินทรแจ้ง
ประธานเจ้าหน้าที่บริหาร บริษัท พีทีที โกลบอล เคมิคอล จำกัด (มหาชน)

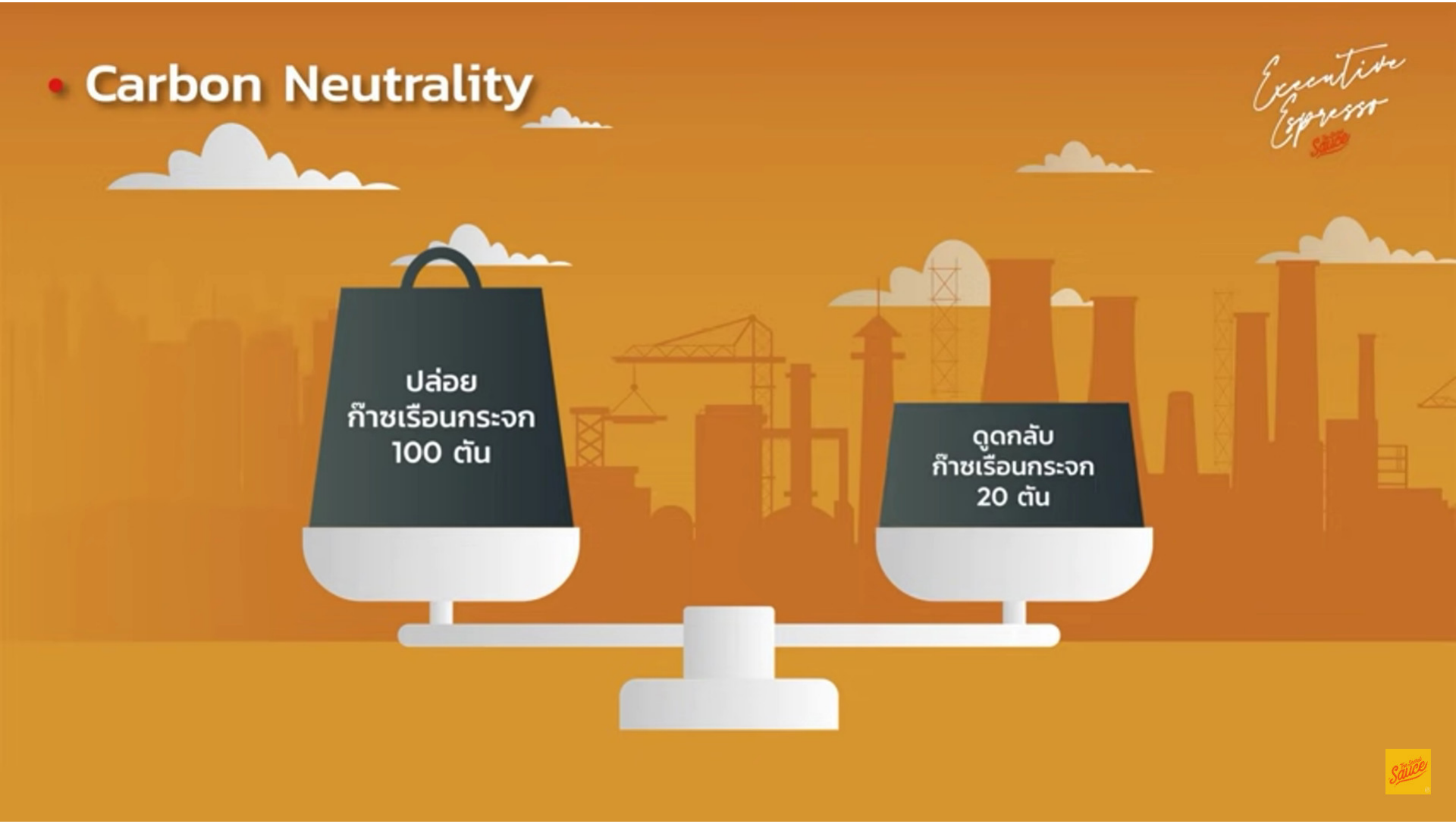
คุณ มนตรี ลาวัลย์ชัยกุล

คุณ รุ่งโรจน์ รังสิโยภาส

คุณ บุญญนิตย์ วงศ์รักมิตร ผู้ว่าการ กฟผ.

คุณอาทิตย์ นันทวิทยา

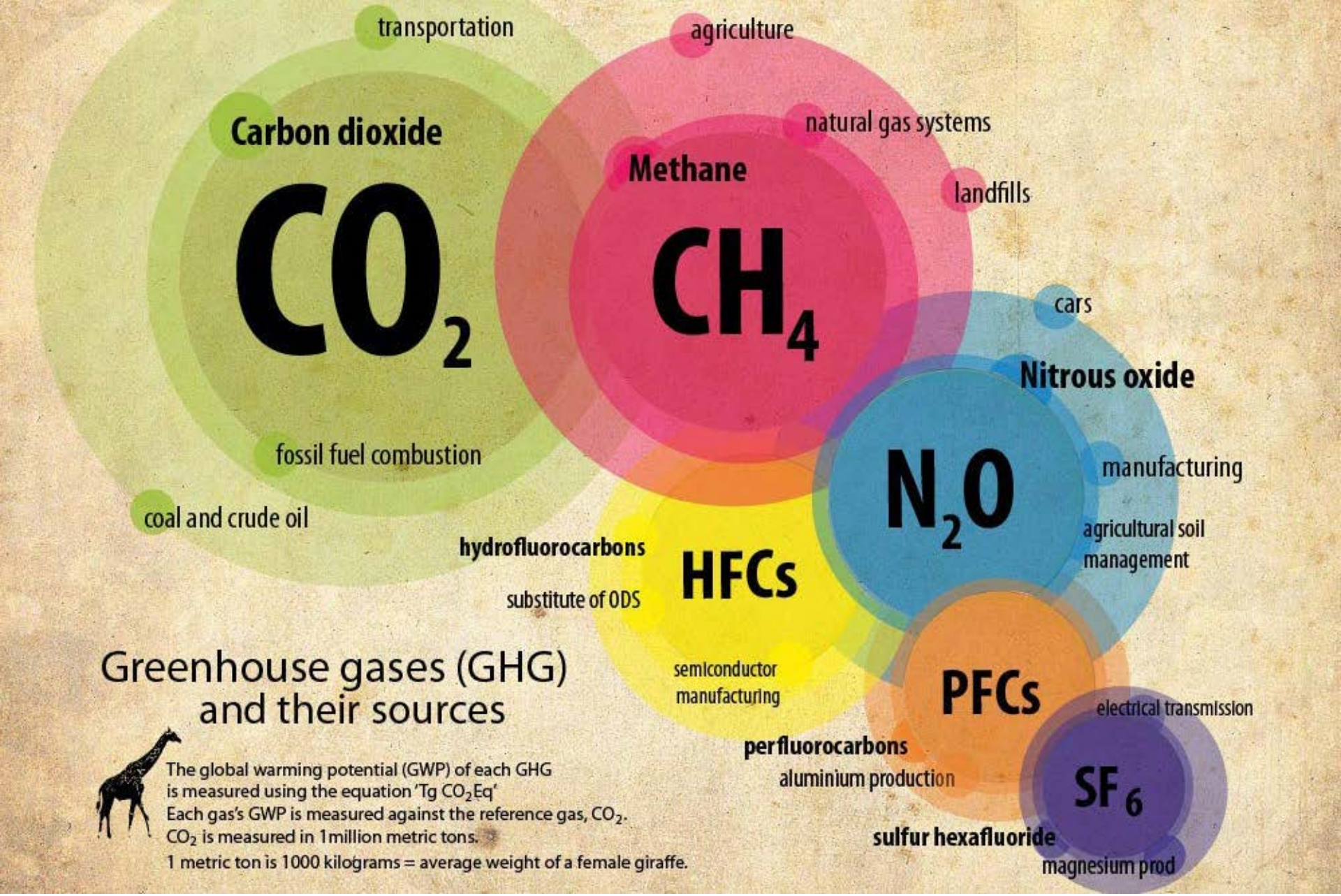
Carbon Neutrality

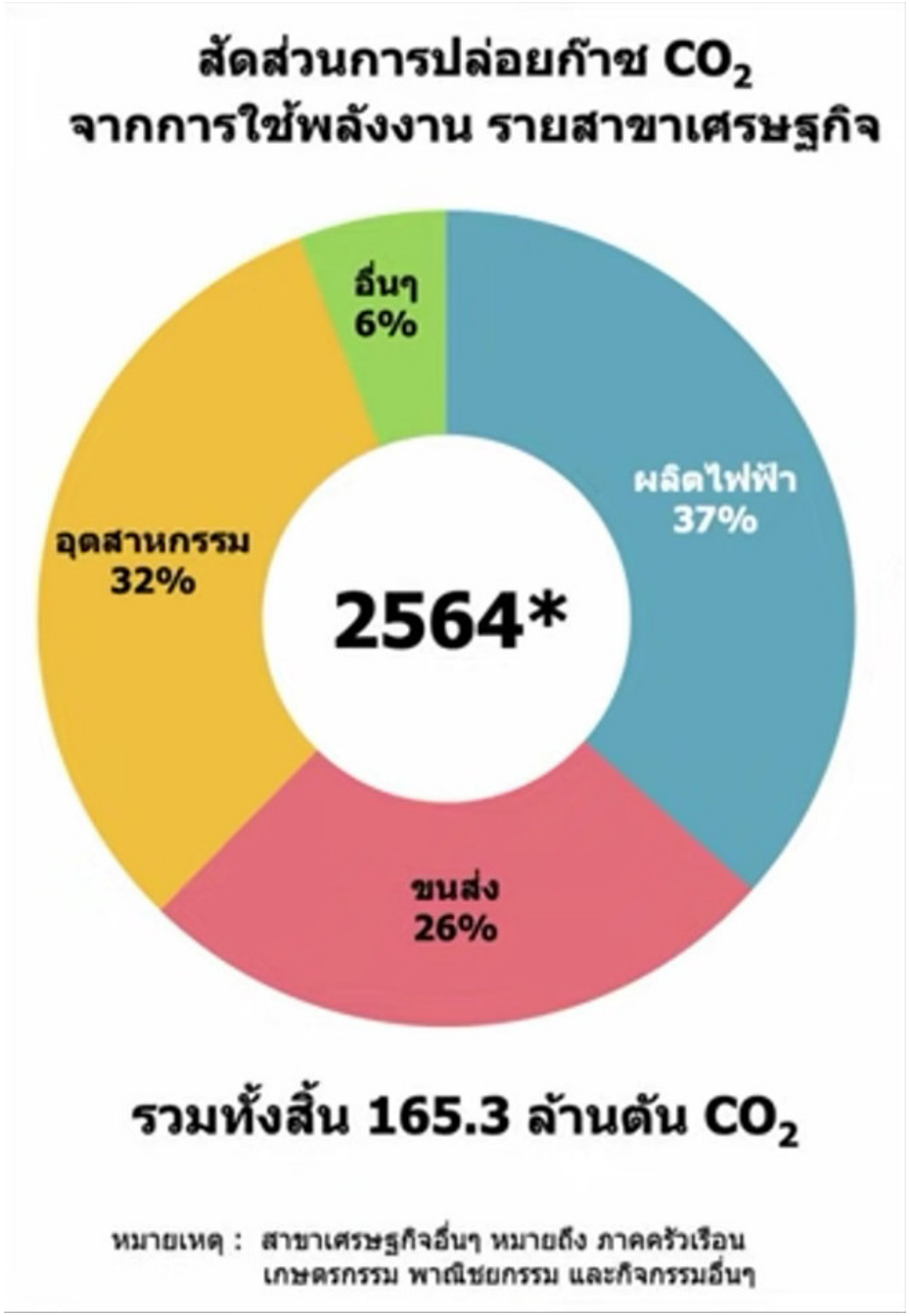


Carbon Neutrality

NET ZERO


Net Zero
ปล่อย
ก๊าซเรือนกระจก
100 ตัน
ดูดกลับ
ก๊าซเรือนกระจก
100 ตัน




สัดส่วนการปล่อยก๊าซ CO_2
จากการใช้พลังงาน รายสาขาเศรษฐกิจ
อื่นๆ
6%
ผลิตไฟฟ้า
37%
อุตสาหกรรม
32%
2564*
ขนส่ง
26%
รวมทั้งสิ้น 165.3 ล้านตัน CO_2
หมายเหตุ : สาขาเศรษฐกิจอื่นๆ หมายถึง ภาคครัวเรือน
เกษตรกรรม พาณิชยกรรม และกิจกรรมอื่นๆ


THE STANDARD
Executive Espresso

NET ZERO

Emissions

is achievable by using

Ultrasonic Flowmeters

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FLUENTA

Ultrasonic Flare Gas Meter

FLEXIM

Clamp-on Ultrasonic Flow Meter

UFM can serve Net Zero Emissions by helping customers measure GHG emission value and also improve efficiency of production processes consequently reducing emissions of greenhouse gases

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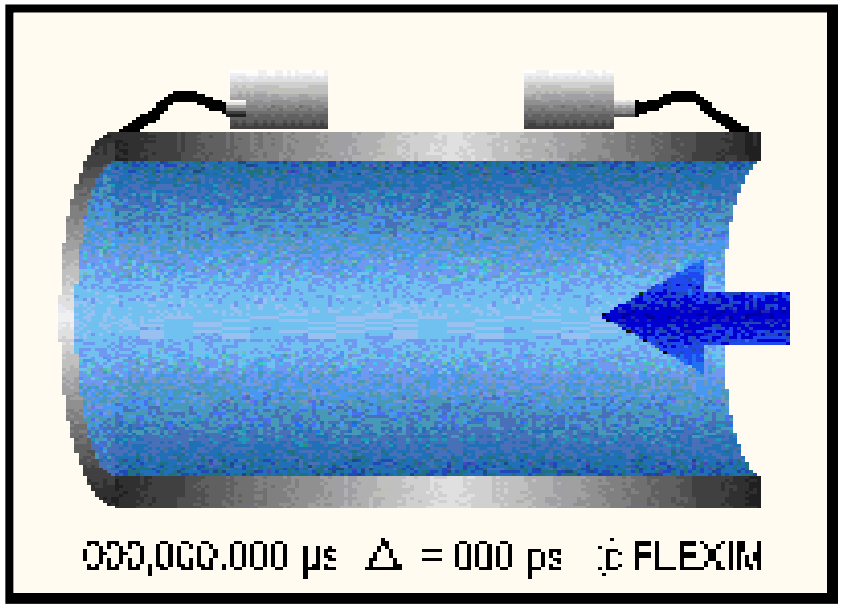
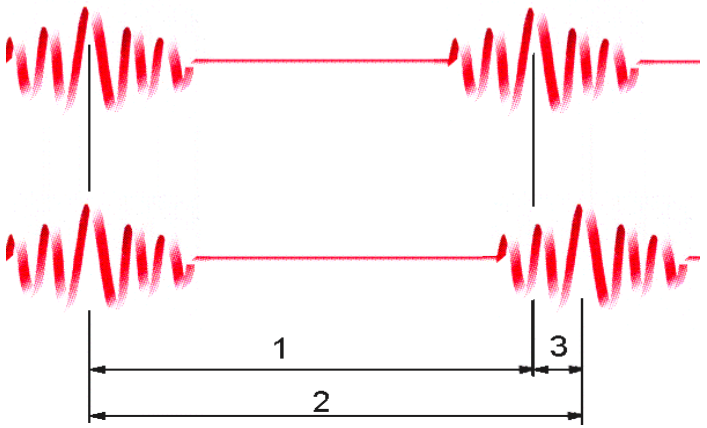
Measuring Principle (Transit Time)

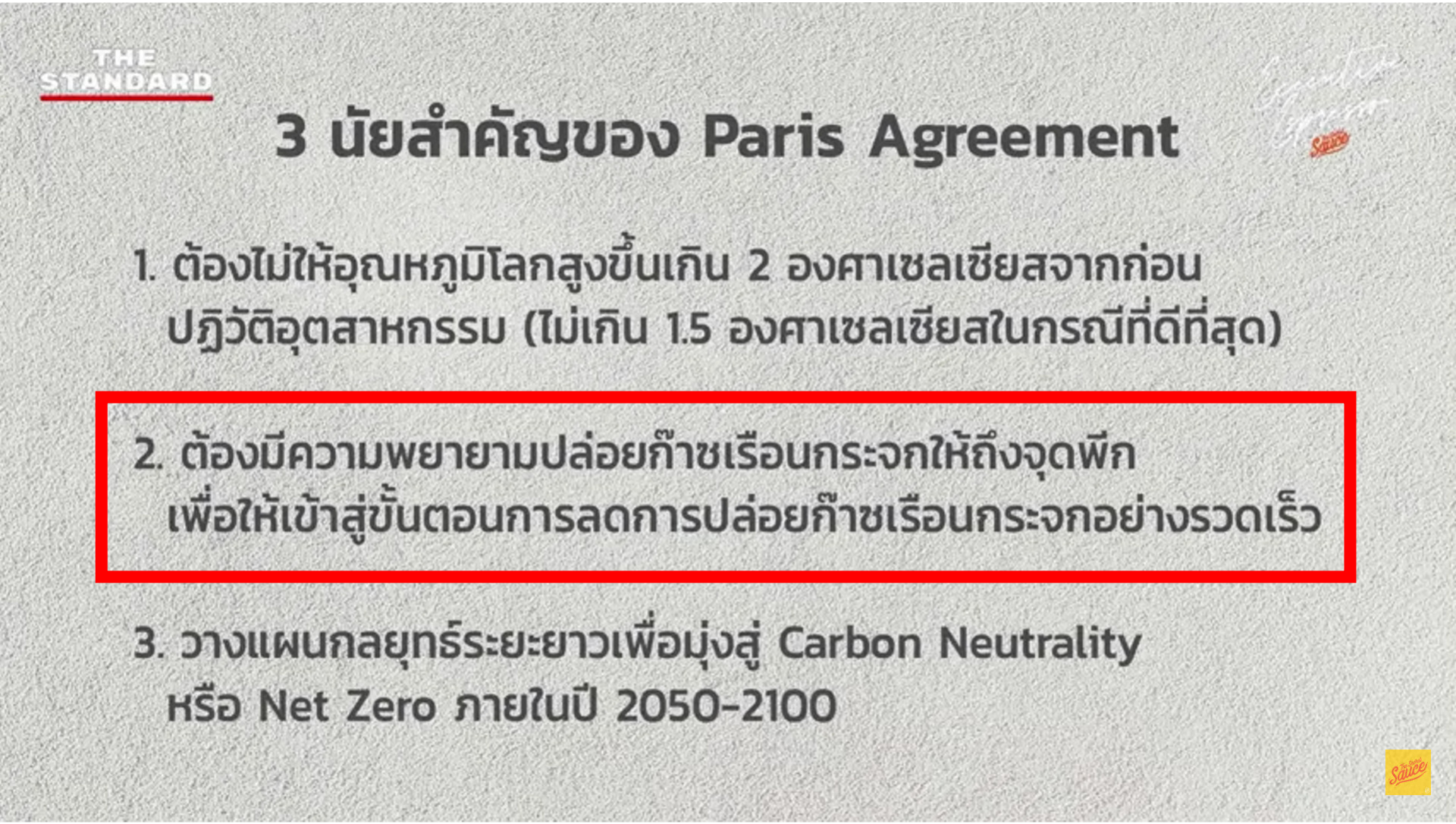
- Time of Flight ultrasonic flow meter:

1. The first signal traverses the pipe in the direction of the flow
2. The second signal traverses the pipe against the direction of the flow
3. The result is the transit time difference

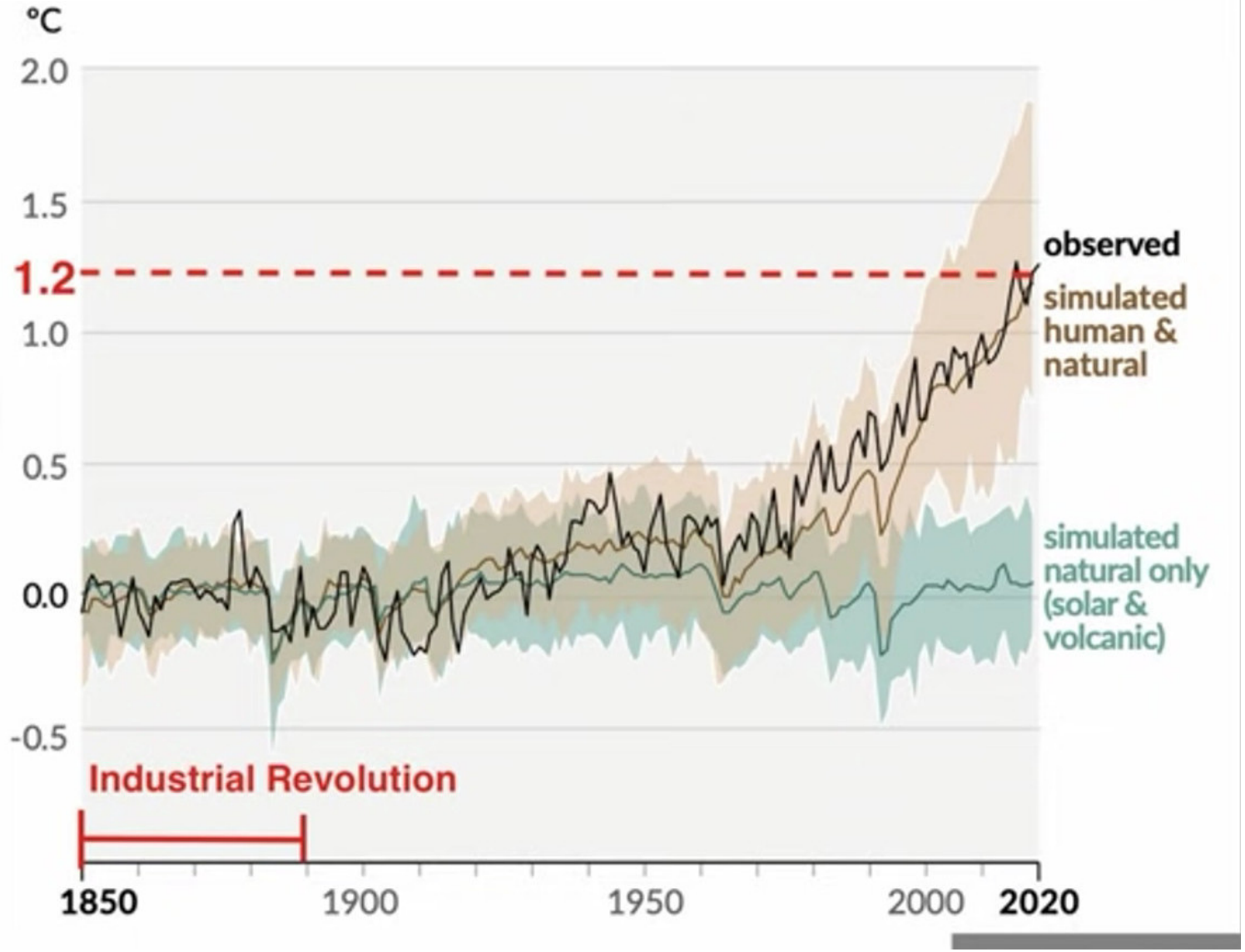




Paris Agreement vs NET ZERO



Climate Change



Thailand Commitment

PEAK

GHG Emission

370 Million Tons

YEAR 2030

FLUENTA

Ultrasonic Flare Gas Meter

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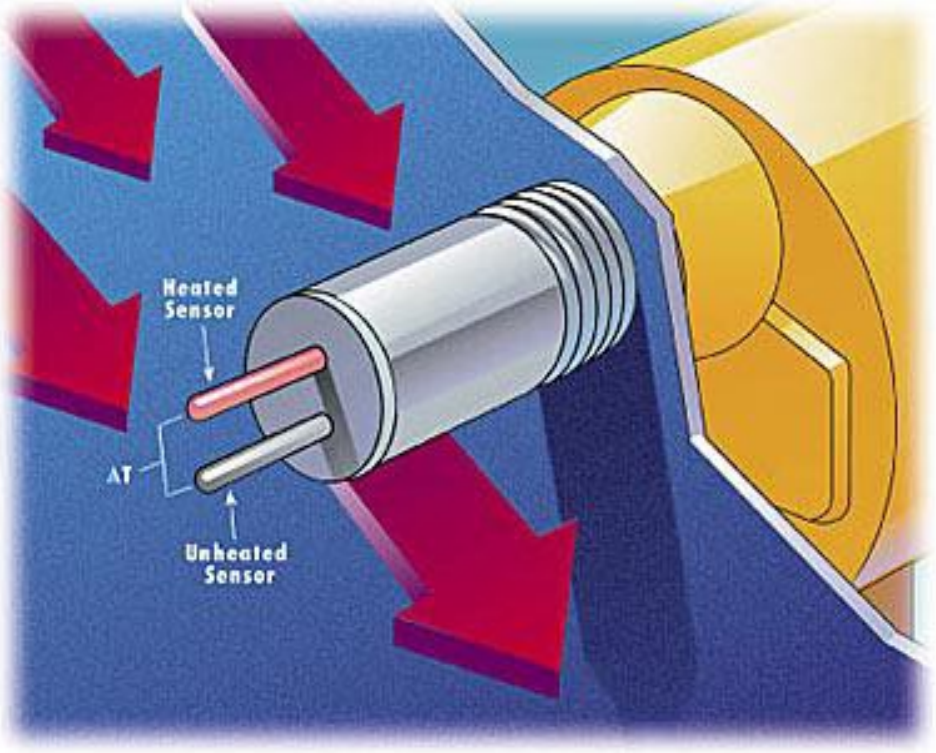
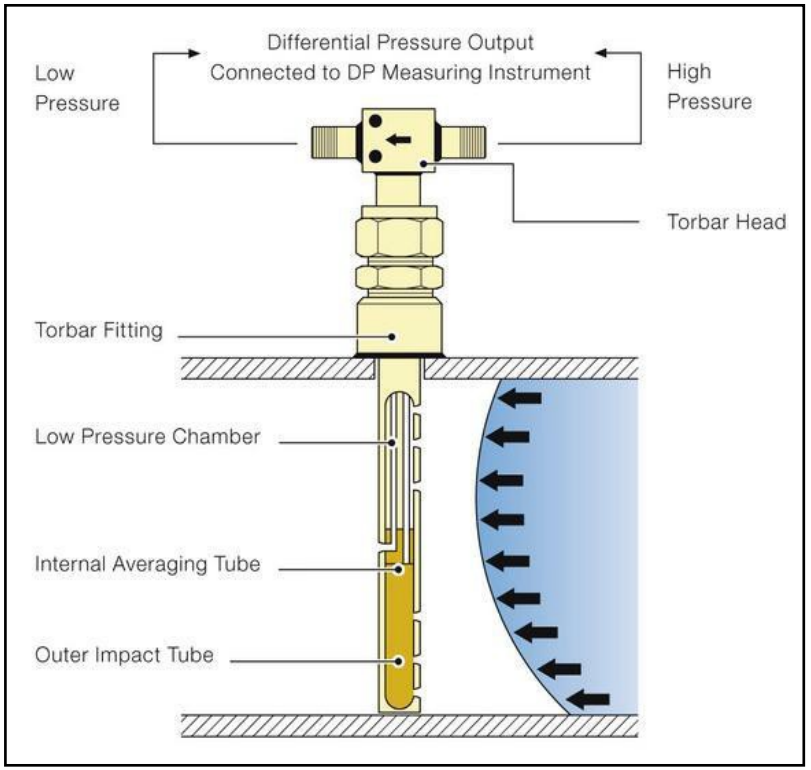
FLARE MEASUREMENTS





Thermal Flowmeters

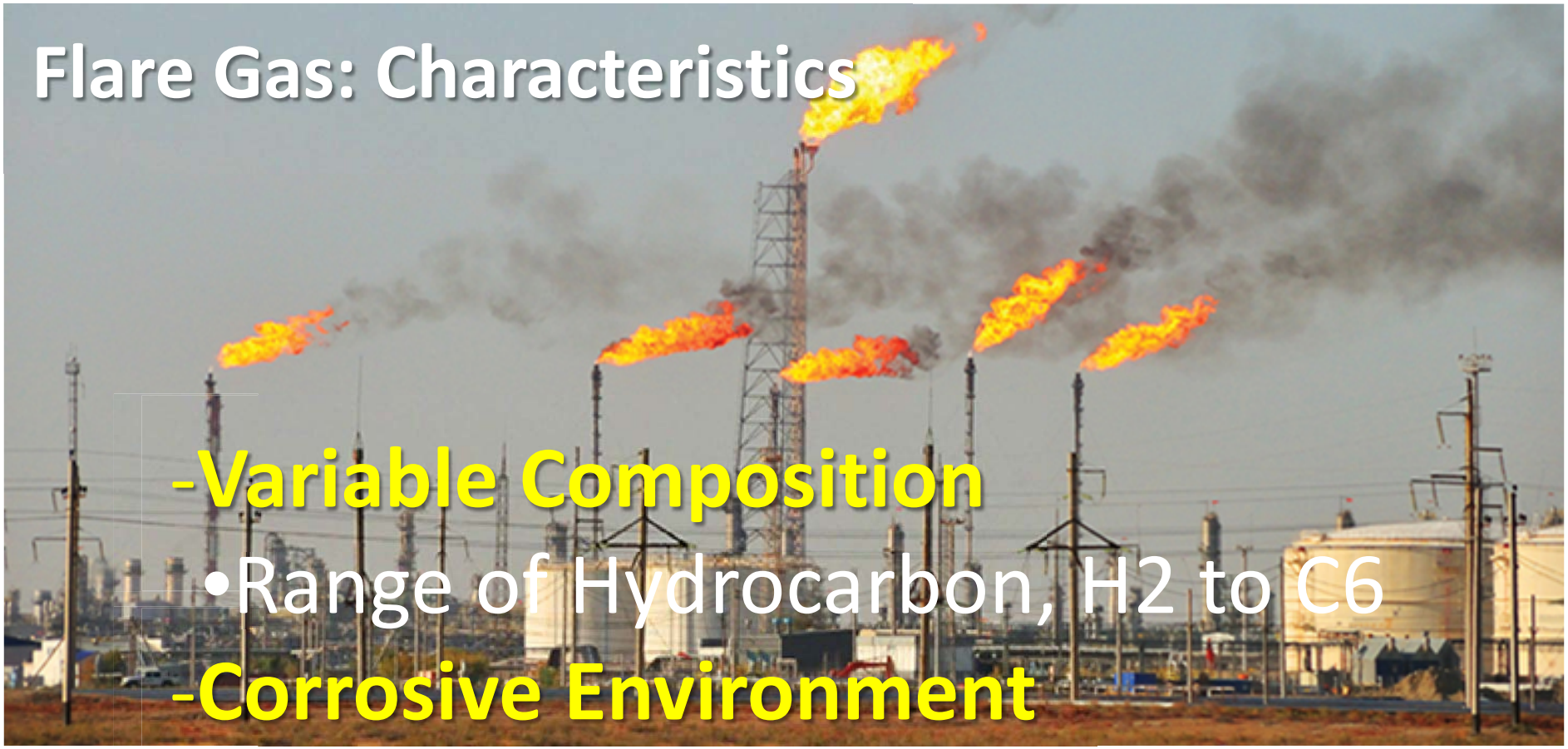
Pitot Tube (DP Technology)

Flare Gas: Characteristics

-Variable Flow Rates

- Low Flow: Normal Flare
- Moderate Flow: Inadvertent Flare
- High Flare: Emergency Flare

Flare Gas: Characteristics



-**Variable Composition**

- Range of Hydrocarbon, H2 to C6

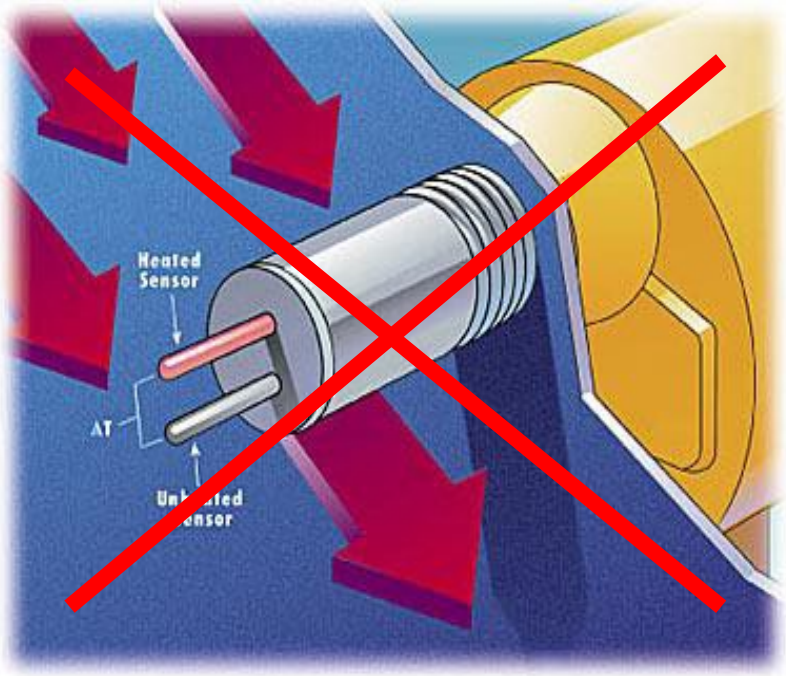
-**Corrosive Environment**

- H2S, Liquid Dropout

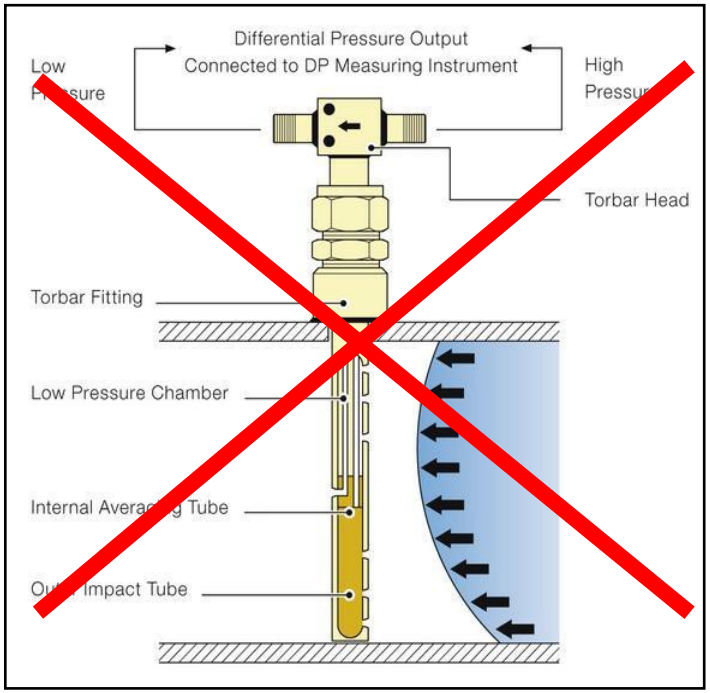
-**Low Pressure**

- Atmospheric (slightly positive)

FLARE MEASUREMENT



Thermal Flowmeters



Pitot Tube (DP Technology)

Calculations

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Ultrasonic Flare Gas Meter

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FLUENTA FGM 160X
Ultrasonic Flare Meter

- Volume, Density, MW, Mass
- Performance is unaffected by gas composition changes
- Combination of Continuous Wave (CW) and Chirp Signal (CS)
- 10D Up & 5D Down Stream Installation
- 0.03 to 120 m/s Turn Down Ratio 4000:1 with ONLY Single Path System
- Highly robust, nonintrusive transducers
- Accuracy +/-2.5% to 5% (non calibrated) or +/-1.5% to 2.5% (calibrated)
- 100% CO2 content in pipes >10”
- 100% H2 content in pipes <10”

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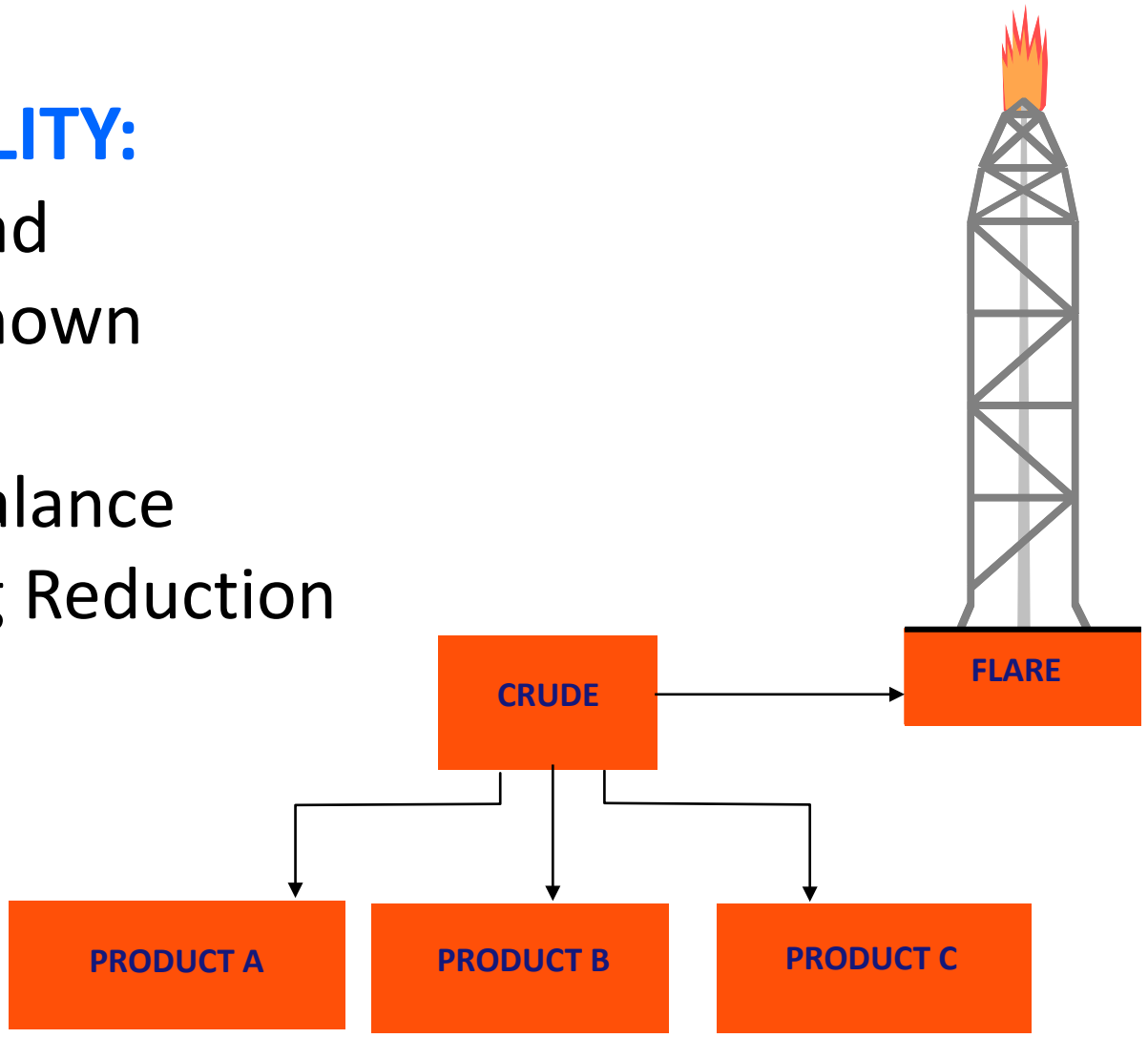
How FLUENTA Helps Industries to Reduce GHG Emission

ACCOUNTABILITY:

- Flare Base Load
  - Typical Unknown
- Mass Balance
  - Complete Balance
  - Drive Flaring Reduction



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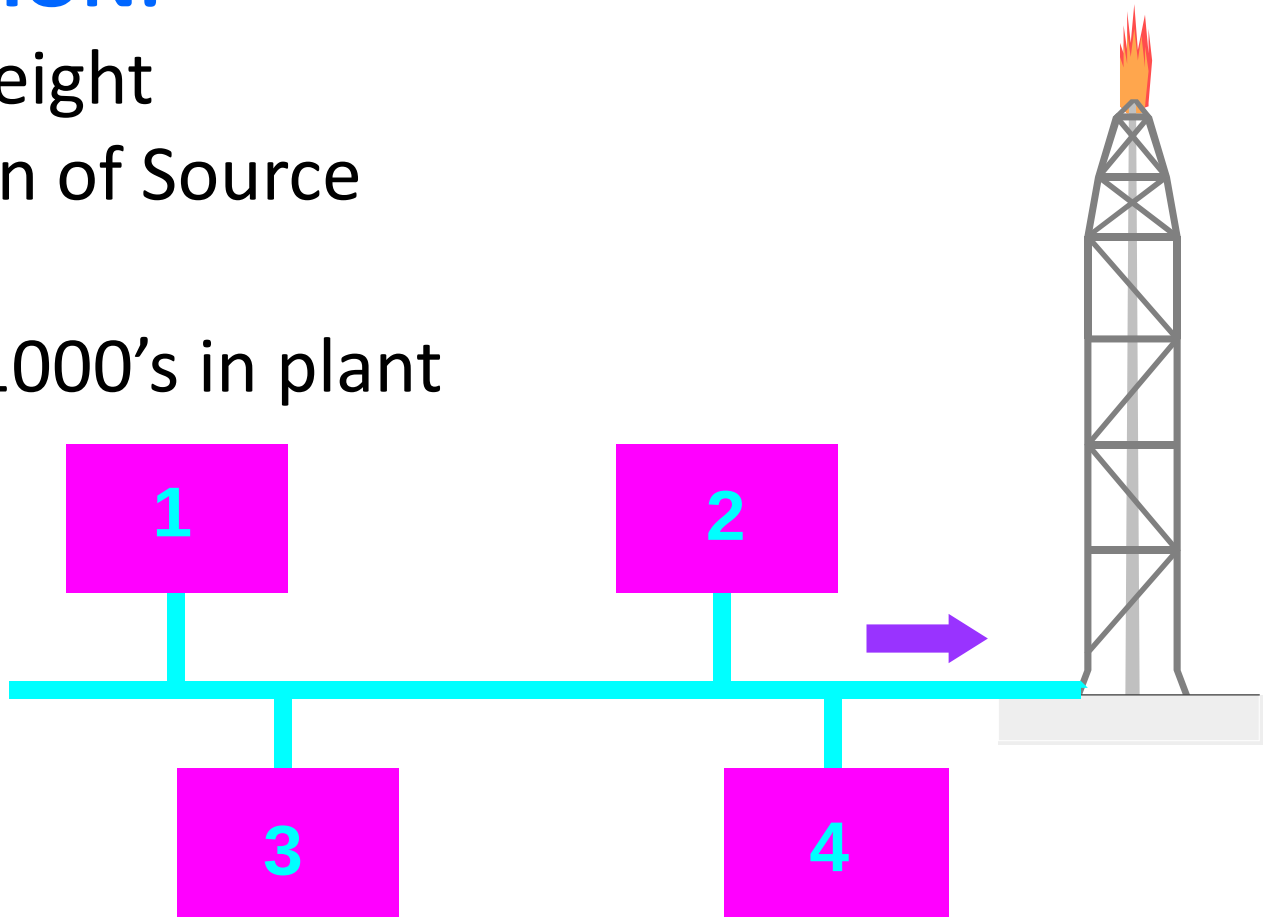
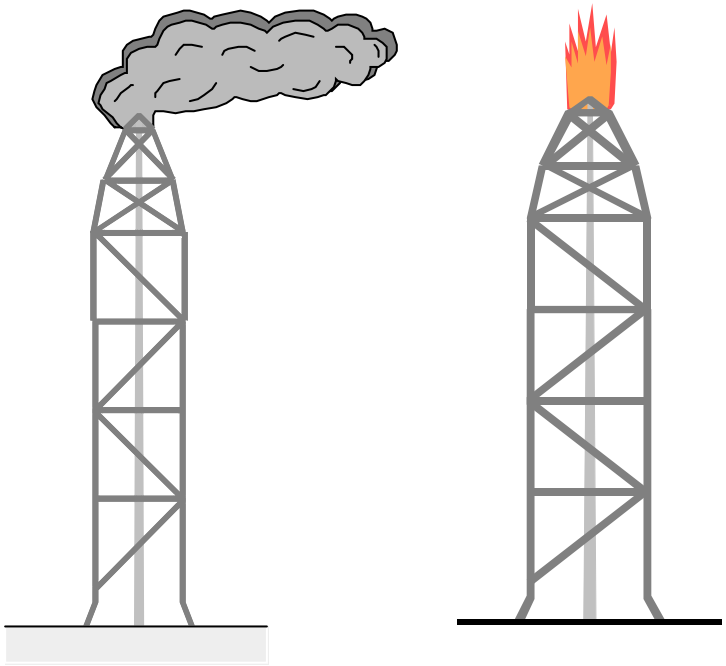
How FLUENTA Helps Industries to Reduce GHG Emission

LEAK DETECTION:

- Molecular Weight
  - •Identification of Source
- Leaky Valves
  - •Potentially 1000's in plant



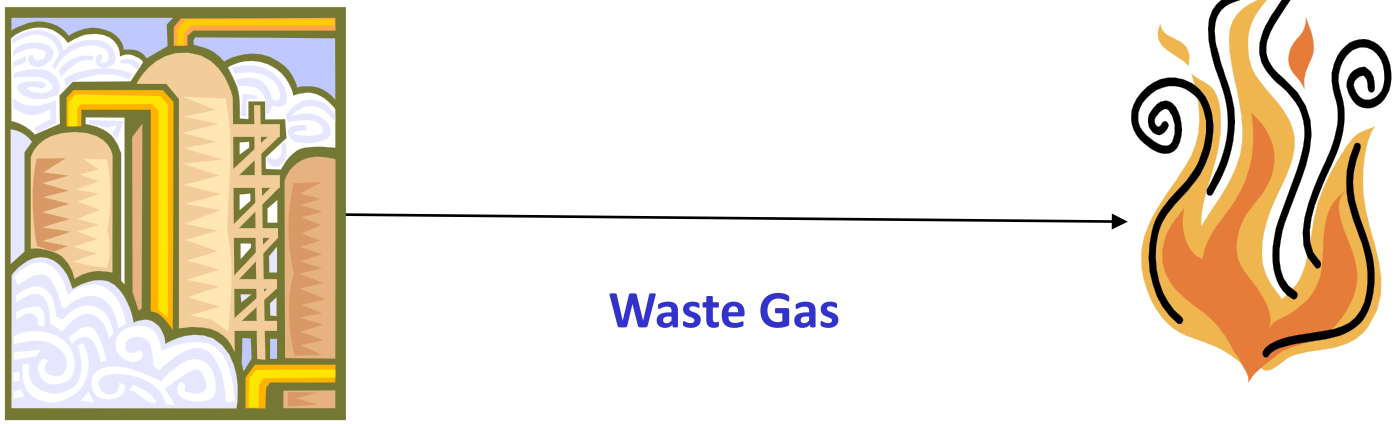
How FLUENTA Helps Industries to Reduce GHG Emission



STEAM CONTROL

- Steam Injection
  - Complete burning
  - Smokeless operation
- Steam Consumption
  - Expensive
  - Flow rate controlled
  - Molecular weight
    - proportion steam

How FLUENTA Helps Industries to Reduce GHG Emission



Recovery Compression

- Flare Gas as fuel

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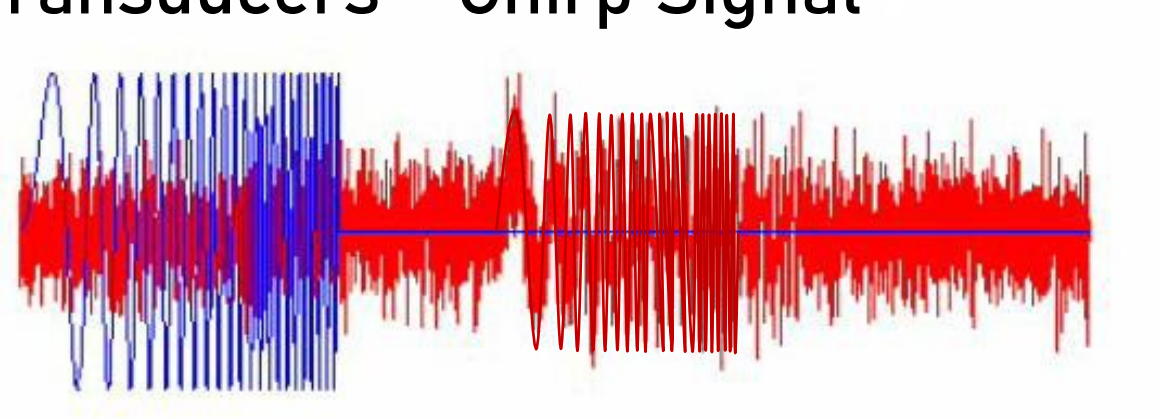
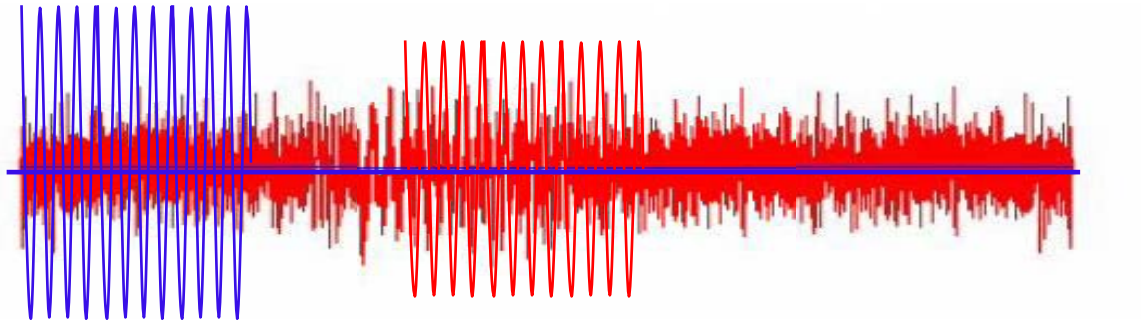
FGM160 – Differentiations

TFS Transducers - Chirp Signal



Reference Pulse
Received Signal
SNR 0dB

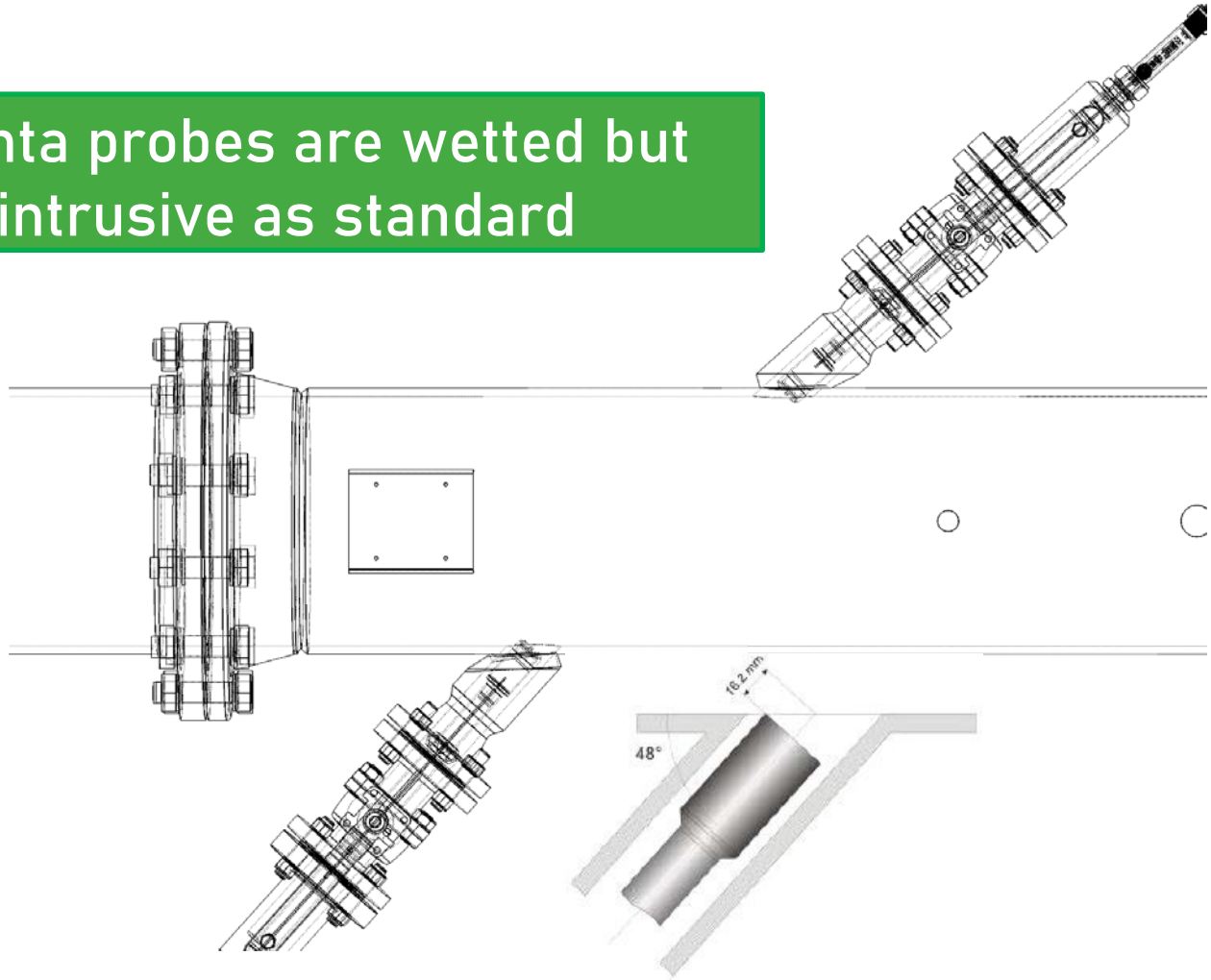
TFS Transducers – Continuous Wave (CW) Signal



Reference Pulse
Received Signal
SNR 0dB

FGM160 – Differentiations

Fluenta probes are wetted but non-intrusive as standard

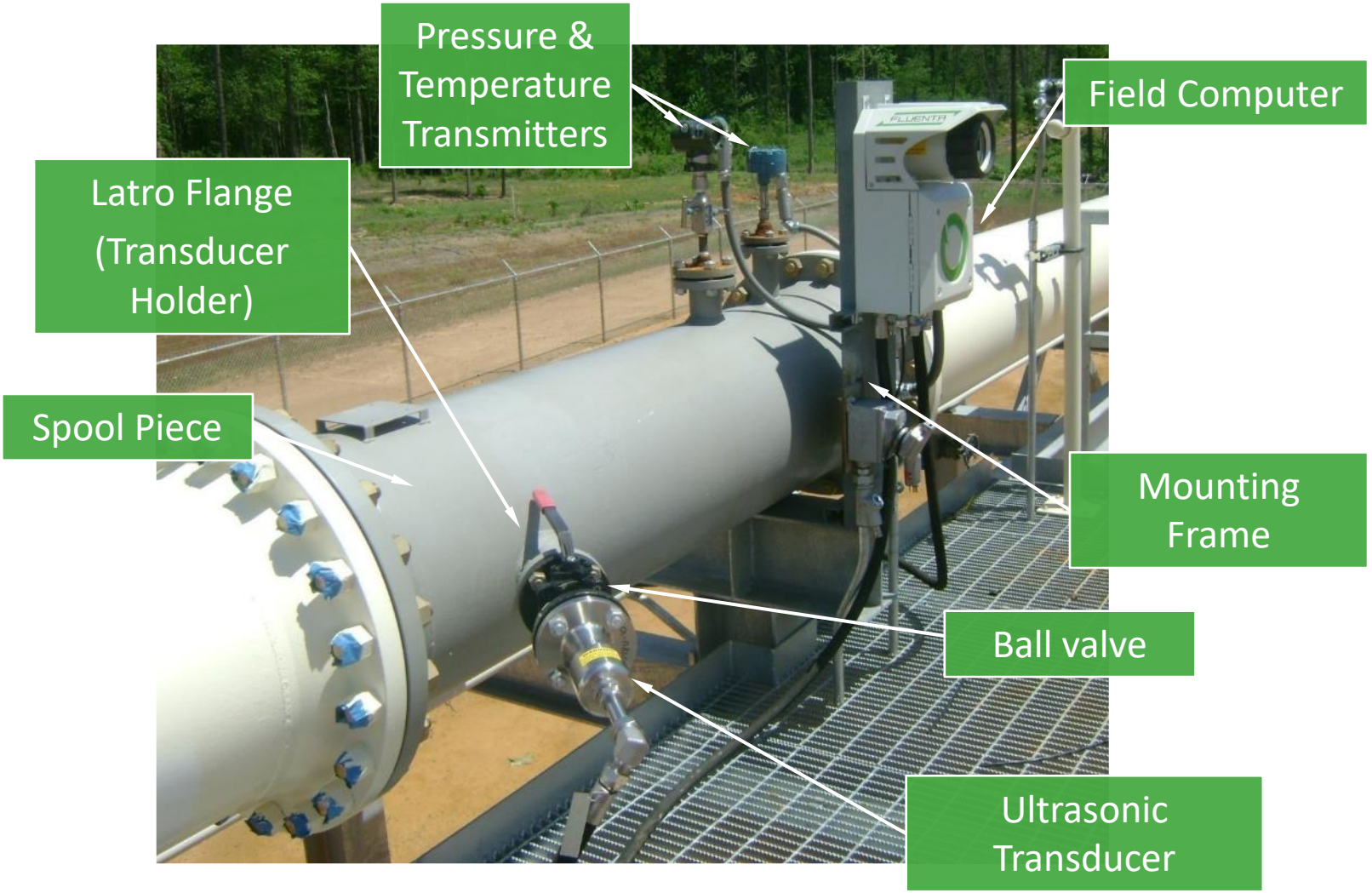


FGM160 – Differentiations

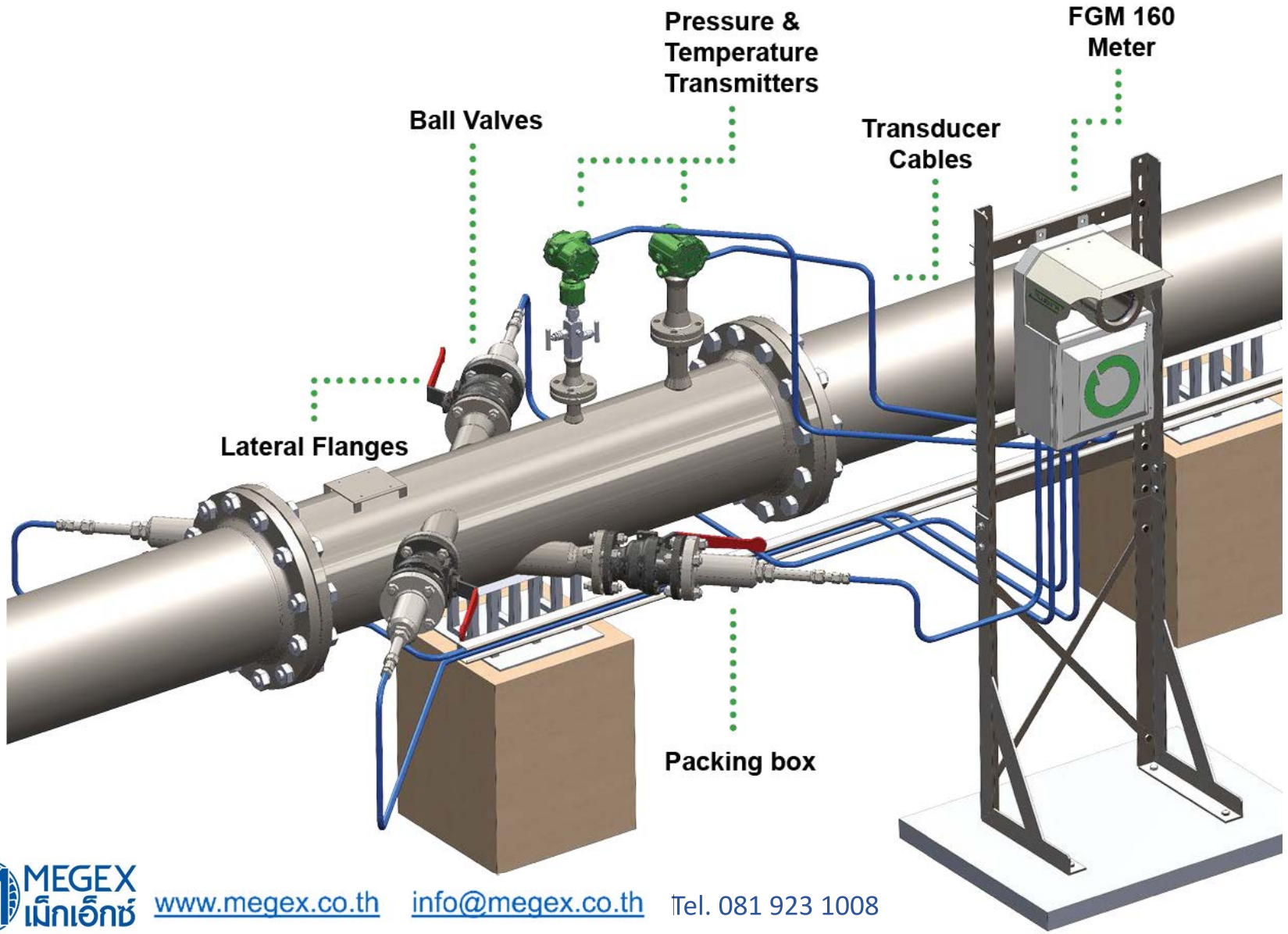
Fluenta FlarePhase Transducers

FlarePhase™ Cryo (-200 C)
FlarePhase™ 250
FlarePhase™ 350

FGM160 – Single Path



FGM160 – Dual Path



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FLEXIM

Clamp-on Ultrasonic Flow Meter

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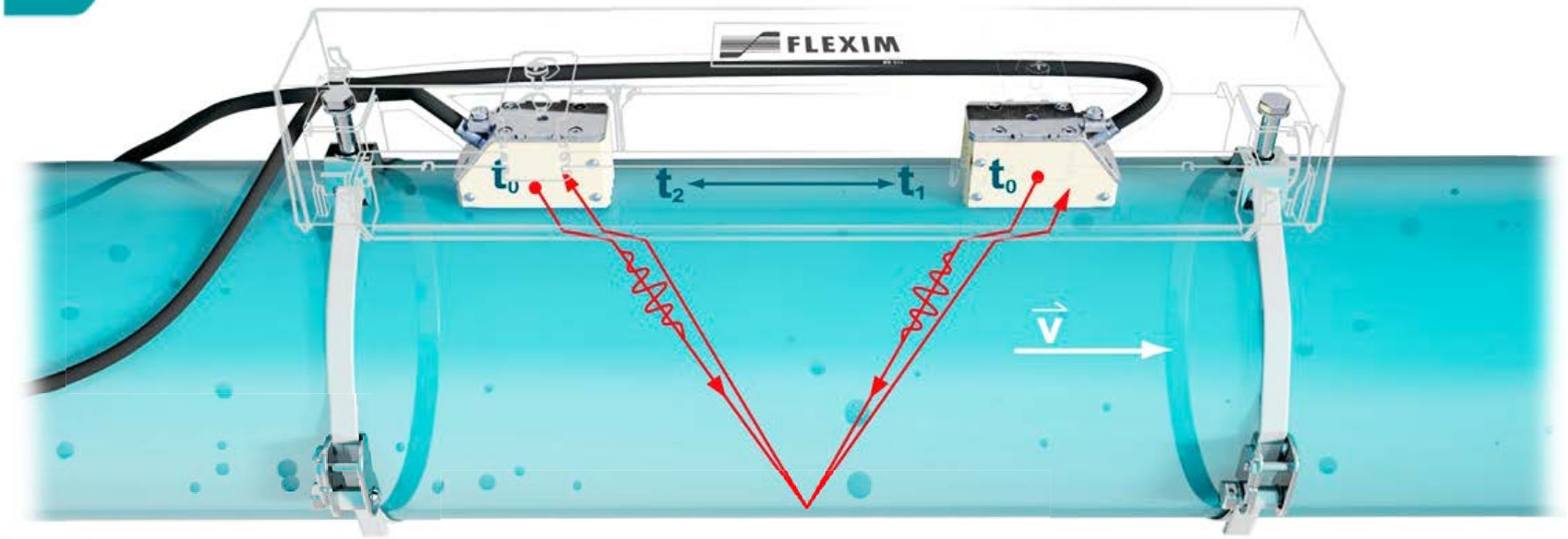
Clamp-on Ultrasonic Flow Meter



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Advantages of COUF

- Increased Safety for operators and plant equipment!

High temperature or cryogenic media

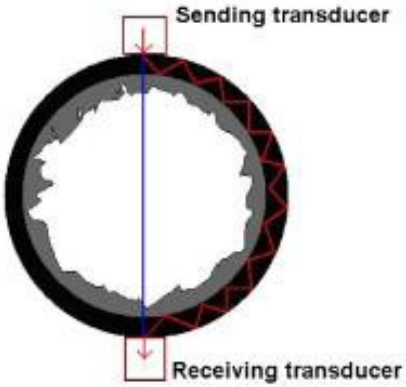
-200 C to 630 C

High pressure media

Abrasive or hazardous media

FLEXIM
when measuring matters

FLEXIM for High Temp



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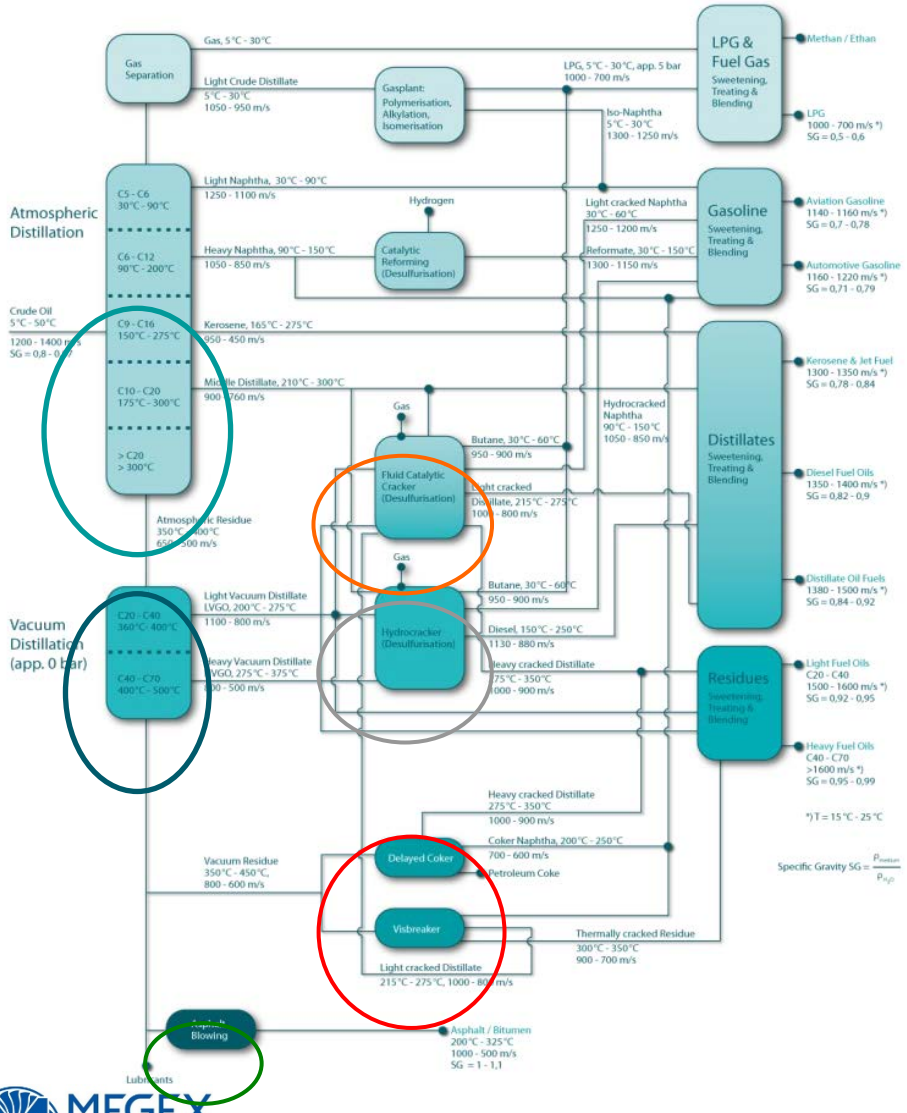
High Temperature Refinery Applications



- **Atmospheric Distillation (ADU)**
  - Middle Distillates and Residues
- **Vacuum Distillation (VDU)**
  - Vacuum distillates and Residues
- **Coking and Visbreaking (DCU)**
  - Furnaces pass
- **Hydro Cracking (HCU)**
  - Cycle Measurement to control the HCU
- **Fluid Catalytic Cracking (FCC)**
  - Flow control
- **Asphalt blowing**
  - Bitumen and blending

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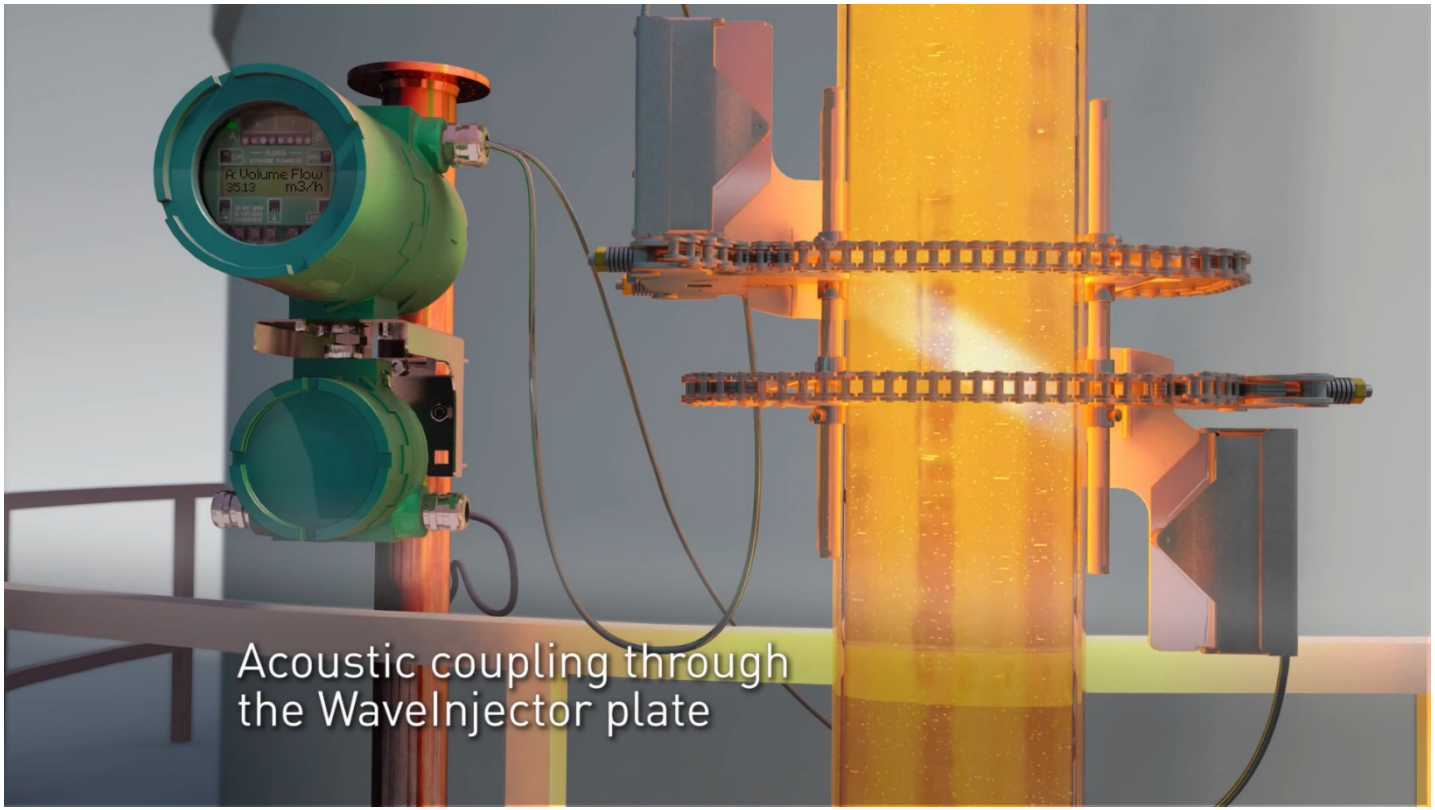
DP Assembly Removed (Left) and Impulse Lines Blocked (Right)

- ✓ **Cheap, standardized**
- ✓ **0.5% accuracy (at defined viscosity, T, p)**

FLEXIM
when measuring matters

Wave Injector



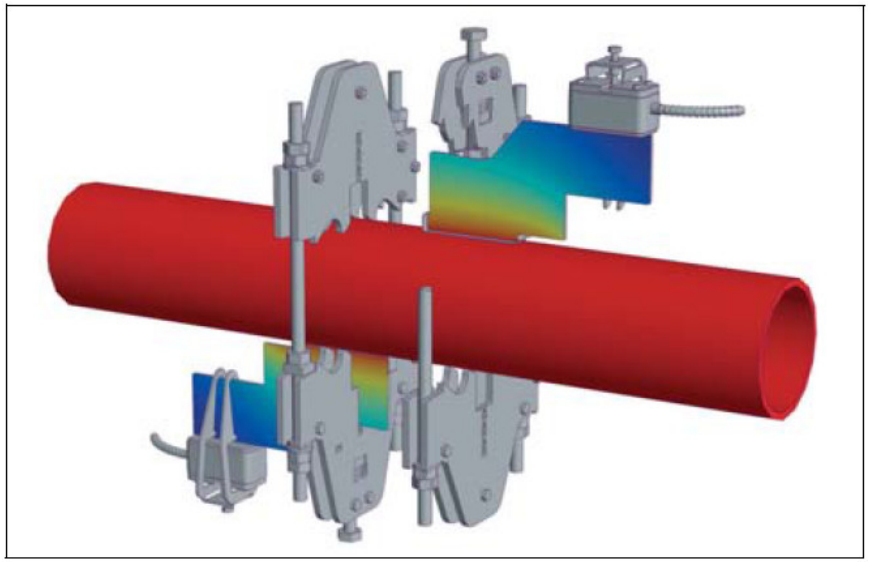
- Non-invasive, no pipe works
- No process Shutdown for installation
- Maintenance Free

FLEXIM for High Temp

Vacuum Residue to heaters

- **Wedgemeters**
- **Reliability engineering 2oo3 system (2 Out Of 3 system)**
  (failures caused by system downtime)
- **Clogging, pressure drop, leakage caused by inline probes**

- **Ultrasonic flow measurement at high temperatures (max. 630°C) or very low temperatures (-200°C)**
- **Installation without process stop**
- **Contact-free operation: less affected by build-up than any other measurement principle**
- **Maintenance free**
- **No leakage risk**
- **Turndown 1...400 typ., good low-flow resolution**
- **One type fits many pipe sizes**



Temperature profile of WI-400

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FLEXIM vs DP Flow

DP – orifice or wedge meter

Benefits:

- ✓ Cheap, standardized
- ✓ 0.5% accuracy (at defined viscosity, T, p)

Disadvantages:

- ✗ Frequent maintenance
- ✗ Multiple leak points
- ✗ Turndown, poor low-end resolution
- ✗ Wear & plugging issues
- ✗ Pressure drop
- ✗ Pipe shut down for installation

Clamp-on ultrasonic

Benefits:

- ✓ No wear & plugging issues
- ✓ No leakage risk
- ✓ Maintenance free
- ✓ Turndown 1…400 typ., good low-flow resolution
- ✓ One type fits many pipe sizes
- ✓ No process stop for installation
- ✓ No pressure drop

Disadvantages:

- ✗ 1.2% to 2% accuracy
- ✗ Installation by trained staff necessary

FLEXIM vs Inline UFM

Inline Ultrasonic Meter

Benefits:

- ✓ No wear & plugging issues
- ✓ Turndown; good low-flow resolution
- ✓ No pressure drop

Disadvantages:

- ✗ Multiple leak points
- ✗ Pipe shutdown for installation

Clamp-on Ultrasonic

Benefits:

- ✓ No wear & plugging issues
- ✓ Turndown; good low-flow resolution
- ✓ No pressure drop
- ✓ No leakage risk
- ✓ Maintenance free
- ✓ One type fits many pipe sizes
- ✓ No process stop for installation

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FLEXIM vs Coriolis

CORIOLIS

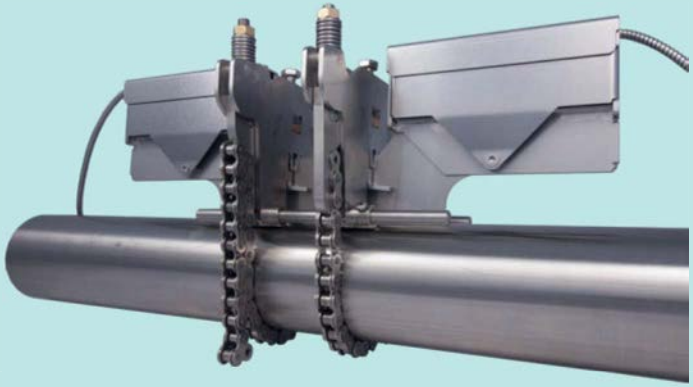
Benefits:

- ✓ 0.1% Mass flow
- ✓ Unaffected by changes in process fluid characteristics (e.g. viscosity)
- ✓ Turndown

Disadvantages:

- ✗ Sensitive to fouling and sedimentation of solids
- ✗ Abrasion causes drift
- ✗ Costly for large pipe diameters or high pressure
- ✗ Pressure drop due to small diameter tubes
- ✗ Leakage risk due to chemical and mechanical stress on thin tube walls

Clamp-on Ultrasonic



Benefits:

- ✓ Not sensitive to abrasion
- ✓ Not sensitive to fouling
- ✓ Turndown
- ✓ No cost adder for large pipes or high pressure
- ✓ Wide turndown
- ✓ Zero pressure drop
- ✓ Zero leakage risk

Disadvantages:

- ✗ 1.2% to 2% accuracy
- ✗ Installation by trained staff necessary

Refinery Customers

GC

Thaioil

FLEXIM

when measuring matters

FLEXIM for High Pressure

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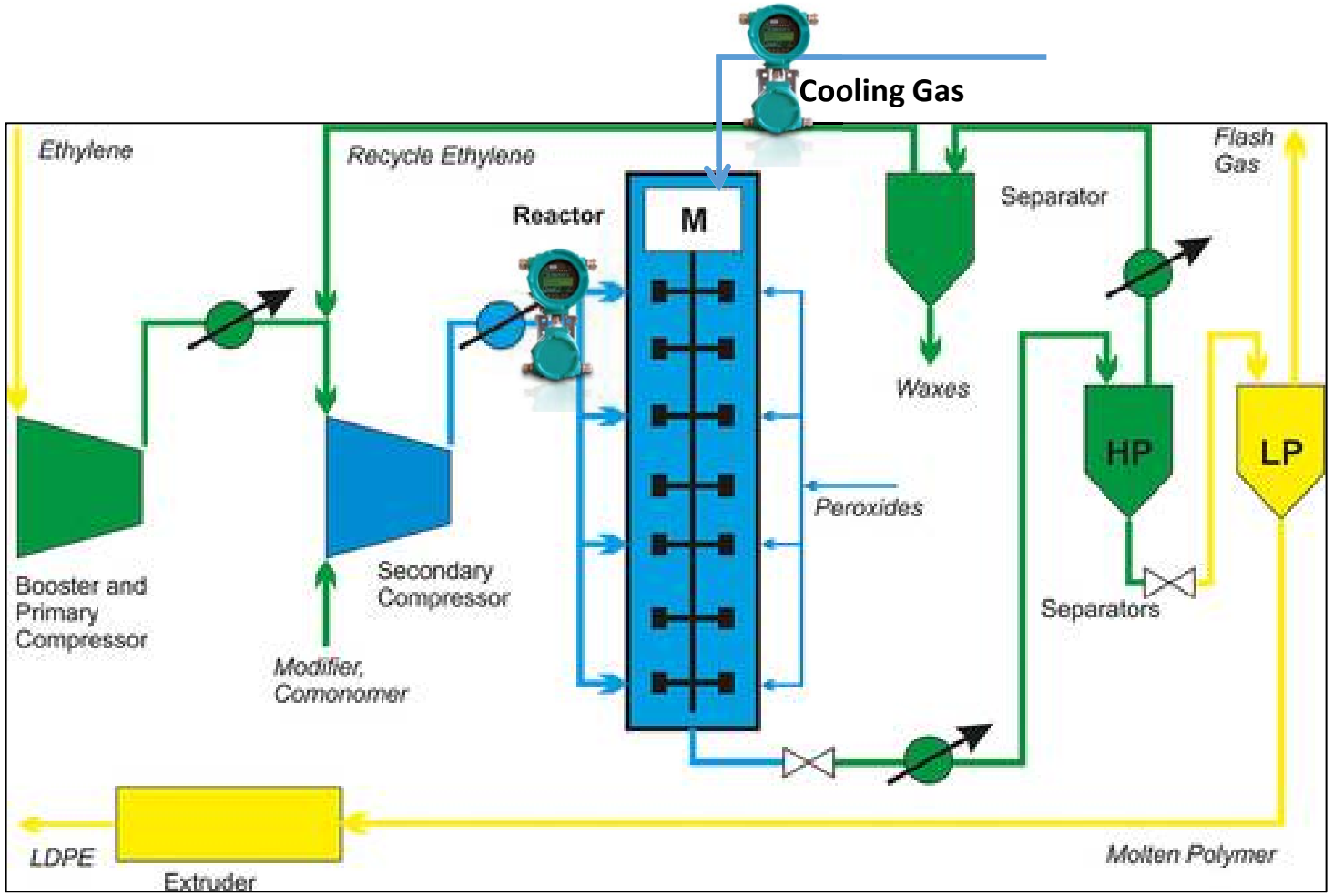
High Pressure: LDPE Applications

LDPE Autoclave reactor process



High Pressure: LDPE Applications

Flow Measurement Challenges

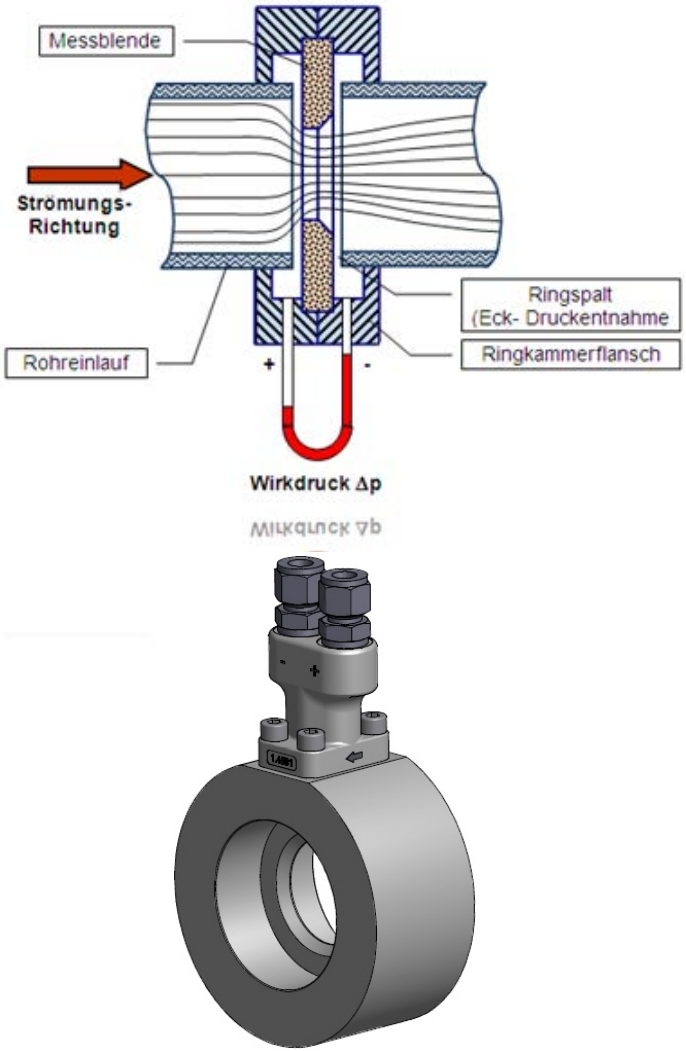
- Ultra-high pressure
- High wall thickness
- Fluid in super critical phase
- Vibrations
- Wax formation (only in ethylene recycle line)

High Pressure: LDPE Applications

Process Conditions

- Pipe Material: Stainless Steel: 1.6580
- Pipe Outer Diameter: 6.378“ (162mm)
- Wall Thickness: 1.851“ (47mm)
- Medium: Ethylene Gas
- Pressure: 1500-2400 bar
- Min-Temperature: 5°C (41°F)
- Max-Temperature: 160°C (320°F)
- Measuring Span: 50-120t/h

High Pressure: LDPE Applications



DP Flow

- High Pressure Drop 30 - 50bar
- Leak Points
- Wax Plugging

LEAK

Bigger plants produce up to 400,000 mta;
With an average shutdown of 4 hours such a plant has a lost of 190t PE production.

Plugging

With actual costs of 1,300 Euro/t
this means 57,000 Euro for a
plugged orifice or a leaking valve.

FLEXIM Clamp-on Solutions

MEGEX เม็กเอ็กซ์ www.megex.co.th info@megex.co.th Tel. 081 923 1008

FLEXIM Clamp-on Solutions

- **Advantages:**
  - Huge Measuring Range: 1:160 (ab V: 15cm/s)
  - High dynamic range
  - bidirectional
  - NO pressure drop
  - NO wear – NO corrosion – NO drift
  - NO shutdowns for maintenance
  - NO leakage risk
  - NO pressure limitations

- **Customer Benefits:**
  - Pressure drop per orifice 30-50 bar →
  - Bigger plants produce up to 400.000 mta; With an average shutdown of 4 hours such a plant has a lost of 190t PE production.

    With actual costs of 1.300 Euro/t this means 57.000 Euro for a plugged orifice or a leaking valve.

    The ROI for one Flexim unit is latest after one unplanned shutdown period.

FLEXIMs Successful Measurements

- TPI Polene
- DOW
- ExxonMobil
- QAPCO
- Sinopex
- Innovene
- Chevron Phillips
- LyondellBasell
- Borealis
- Total
- Formosa Plastics
- NOVA Chemicals
- Polimeri Europe
- Petkim
- Ineos
- BASF

Advantages of COUF

Cost Reduction

- Reduce plant energy use – Zero pressure drop compared to insertion flow devices
- No additional cost for exotic wetted alloys
- Zero Maintenance

Advantages of COUF

Reliability

- No wetted parts / no build up or fouling to flow meter
- No blocking of impulse lines & capilarry tubes

Advantages of COUF

Plant availability

- No process interruption during installation
- Portable flow metering during start-up or for flow checks across the plant
- Easy retrofit to existing plant

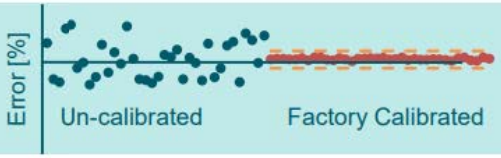
FLEXIM Differentiator

1 Zero Maintenance

No gels, greases or coupling compounds – 10 year "fit and forget" convenience and reliability.

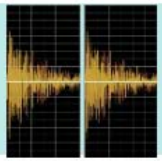
2 Factory calibration

All transmitters and transducers are factory calibrated. Traceable to National Standards.



3 Matched pairs

Matched, paired transducers = best in class low flow



4 Robust cables and mounting rail

Robust mounting system & cable protection

Typical protection systems:

- Unprotected cables
- Weak BNC connectors
- No protective shrouds

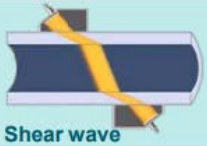
FLEXIM:

- Stainless steel armoured cables
- No connectors on sensors
- Heavy duty rails & protective shrouds

5 Shear Wave & Lamb Wave

Transducers – two available propagation techniques:

- Shear Wave for standard liquids
- Lamb Wave for Gas and heavily aerated or sedimented liquids



6 Temperature compensation

Temperature compensated transducers (Meets the ASME MFC-5M-1985 Standard)