Balancing and invoicing issues arrising from biomethane injection in the distribution grid

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GALP ENERGIA NATURAL GAS DISTRIBUTION

A FEW FIGURES

- 8 Distribution Companies
- 80 Counties
- 20 Satellite Plants
- 806 Pressure Reducing stations
- 11,495 Network length (Km)
- 47,207 Valves
- 302,823 Service lines

No biomethane plants connected up to now

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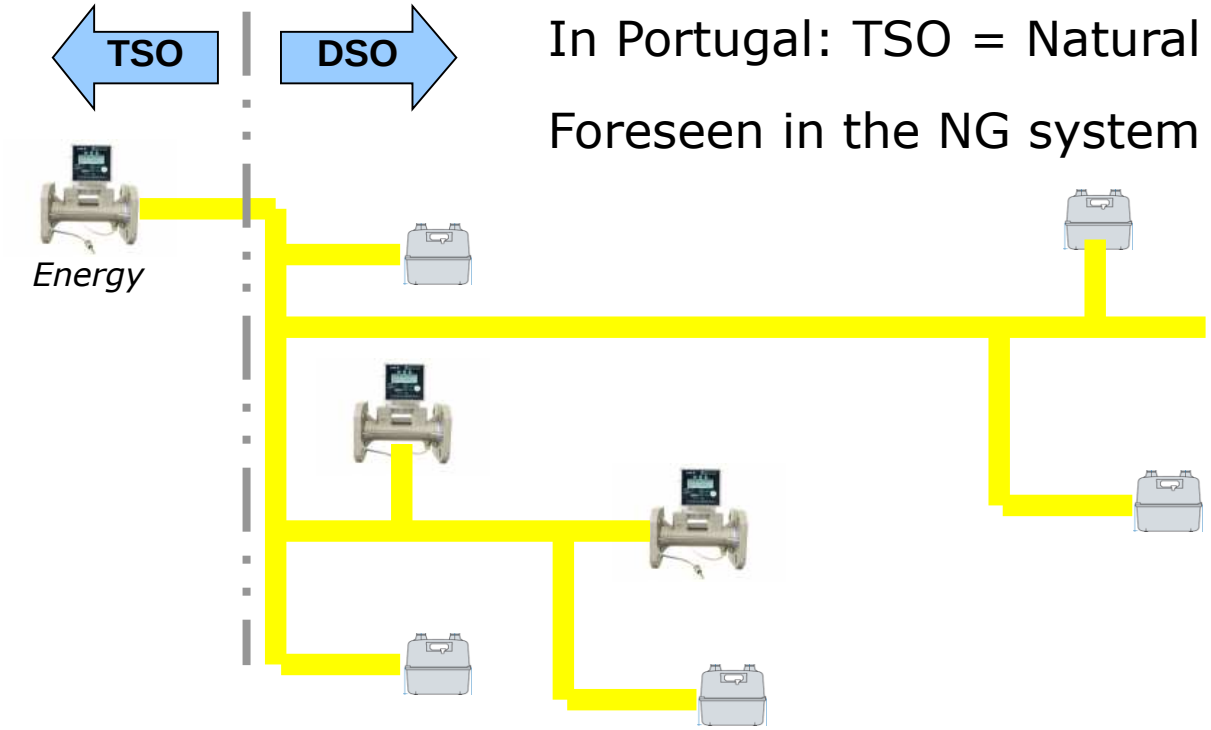
GAS BALANCING AND INVOICING – BALANCING ISSUE



In Portugal: TSO = Natural Gas System Manager

Foreseen in the NG system operations manual

On daily basis:

$$Energy = \sum_{Sup\ 1}^{Sup\ n} Energy\ customers\ supplier\ n + Adjustment$$

$$\sum Energy\ customers\ supplier = \sum Remote\ metered\ customers + \sum Other\ \ customers$$

$$\sum Remote\ metered\ customers = actual\ energy\ supplied$$

$$\sum Other\ Customers = \sum_{Tier\ 1}^{Tier\ 6} Nr\ customers\ tier\ i\ \times standard\ consumption\ customer\ tier\ i$$

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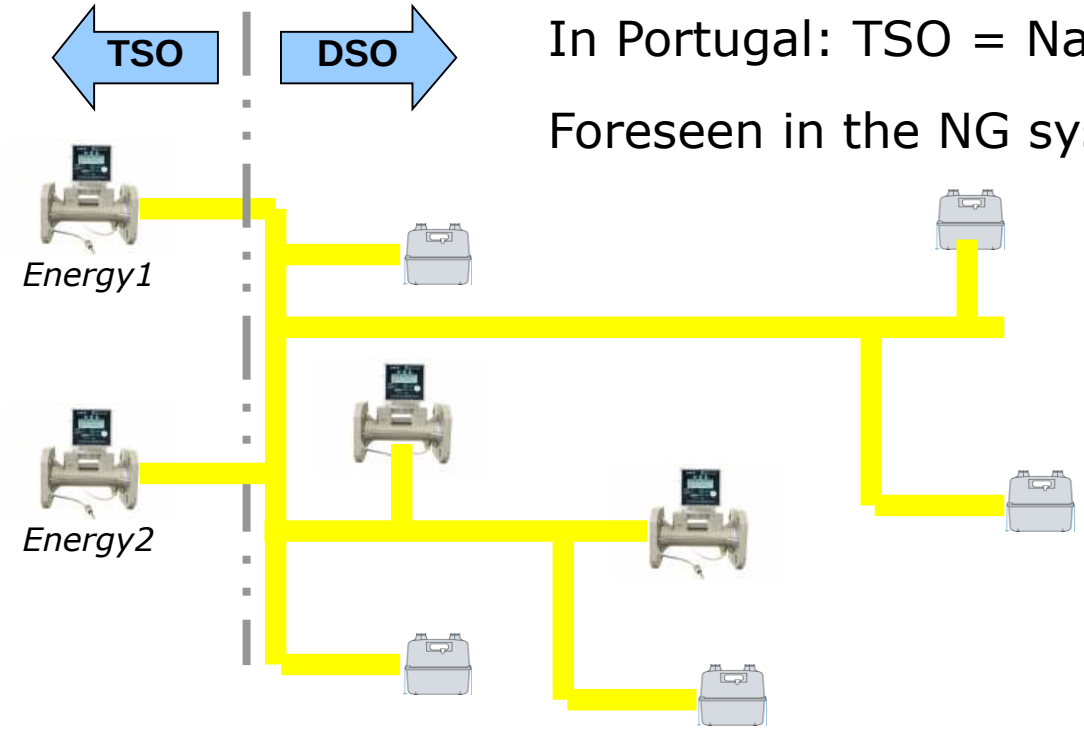

In Portugal: TSO = Natural Gas System Manager

Foreseen in the NG system operations manual

If there are several injection points the NG system operations manual establishes that:

$$Energy = Enegry\ 1 + Energy\ 2$$

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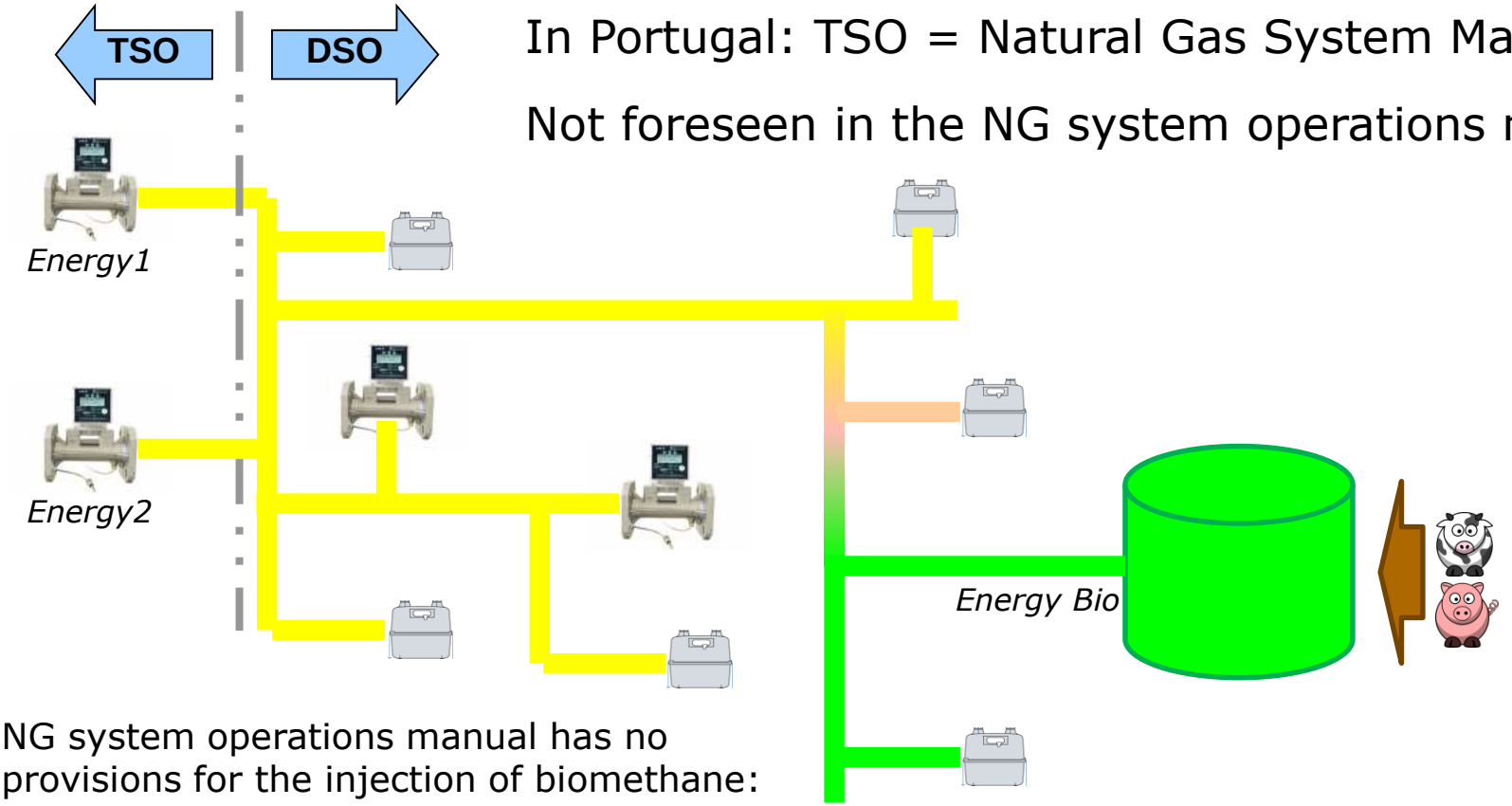

In Portugal: TSO = Natural Gas System Manager

Not foreseen in the NG system operations manual

NG system operations manual has no provisions for the injection of biomethane:

DSO point of view

$$Energy = Enegry\ 1 + Energy\ 2 + Energy\ Bio$$

TSO point of view

$$Energy = Enegry\ 1 + Energy\ 2$$

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GAS BALANCING AND INVOICING – BALANCING ISSUE

The TSO point of view

- Allocation of Energy transported by TSO
- Balancing of the high pressure network

The DSO point of view

- Allocation of all Energy distributed
- Mitigation of unaccounted for gas
- Matching between allocated and measured energy for each supplier on the long term
- Accuracy of volume and calorific value metering from the biomethane plant

Questions

- Who will dispatch the biomethane plant? DSO or TSO
- Who will monitor the biomethane production?
- Who will control the biomethane injection (interruption when out of spec)?

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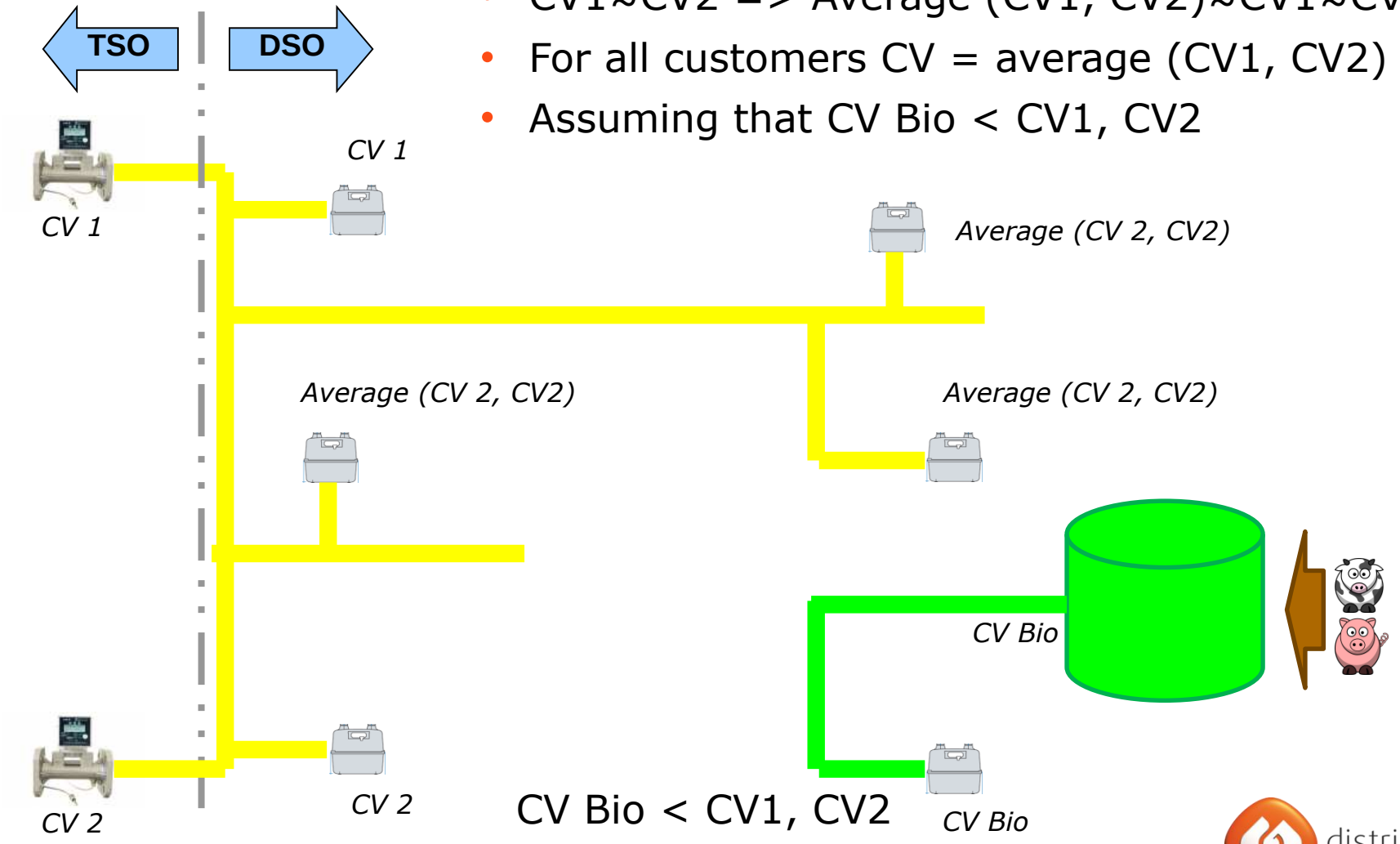
GAS BALANCING AND INVOICING – INVOICING ISSUE

In Portugal:

- CV1≈CV2 => Average (CV1, CV2)≈CV1≈CV2
- For all customers CV = average (CV1, CV2)
- Assuming that CV Bio < CV1, CV2



CV Bio < CV1, CV2

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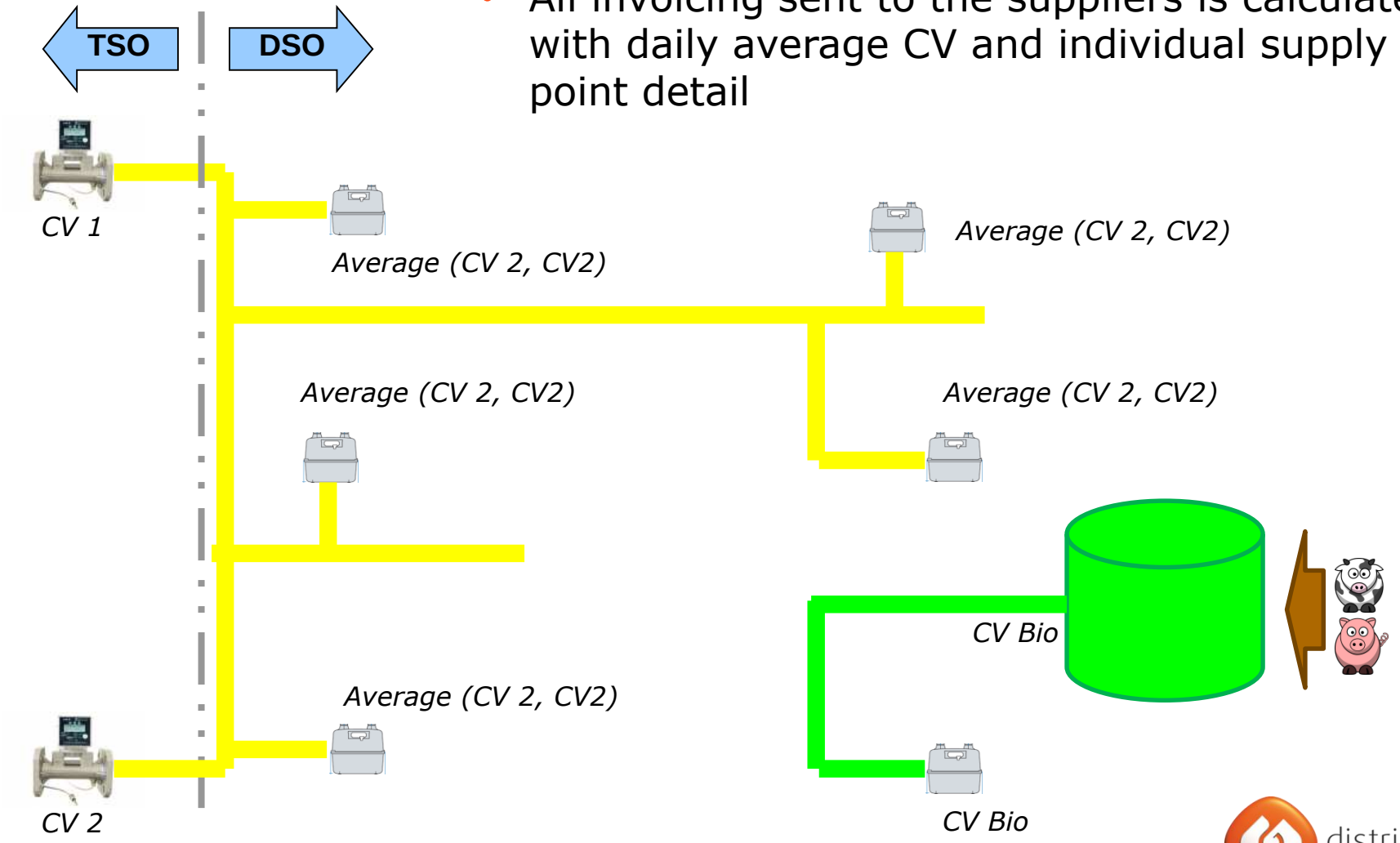
GAS BALANCING AND INVOICING – INVOICING ISSUE

In Portugal:

- All invoicing sent to the suppliers is calculated with daily average CV and individual supply point detail



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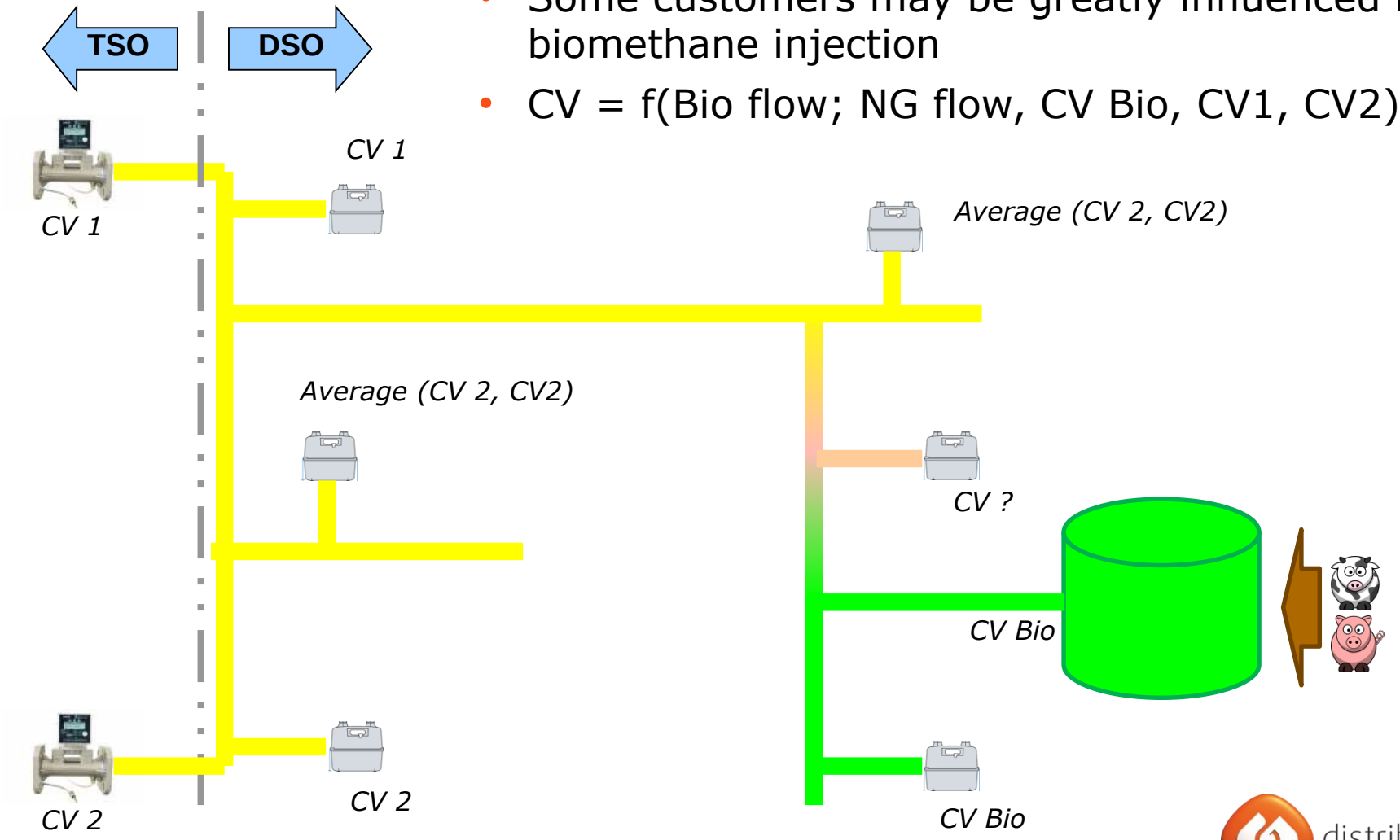
GAS BALANCING AND INVOICING – INVOICING ISSUE

Issue:

- Some customers may be greatly influenced by biomethane injection
- CV = f(Bio flow; NG flow, CV Bio, CV1, CV2)



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GAS BALANCING AND INVOICING – INVOICING ISSUE

The TSO point of view

- Not involved!...

The DSO point of view

- Difficulty in calculating CV and energy supplied to customers near the biomethane plant
- The rule of using average CV may be systematically detrimental to some customers
- Suppliers will address any customer complaints on the subject to the DSO
- CV variation, resulting from instability in the biomethane plant (either gas quality, or gas quantity issues) may be detrimental to more demanding applications, such as cogeneration motors

Questions

- How are these issues address in practice?
- Were the solutions adopted supported by regulation changes?

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