SOAPBOX SESSION
“Difficulties using Energy Performance Indicators to measure impact”

Energy Efficiency in Dairy milk farms

Implementation of 500 standardized energy audits

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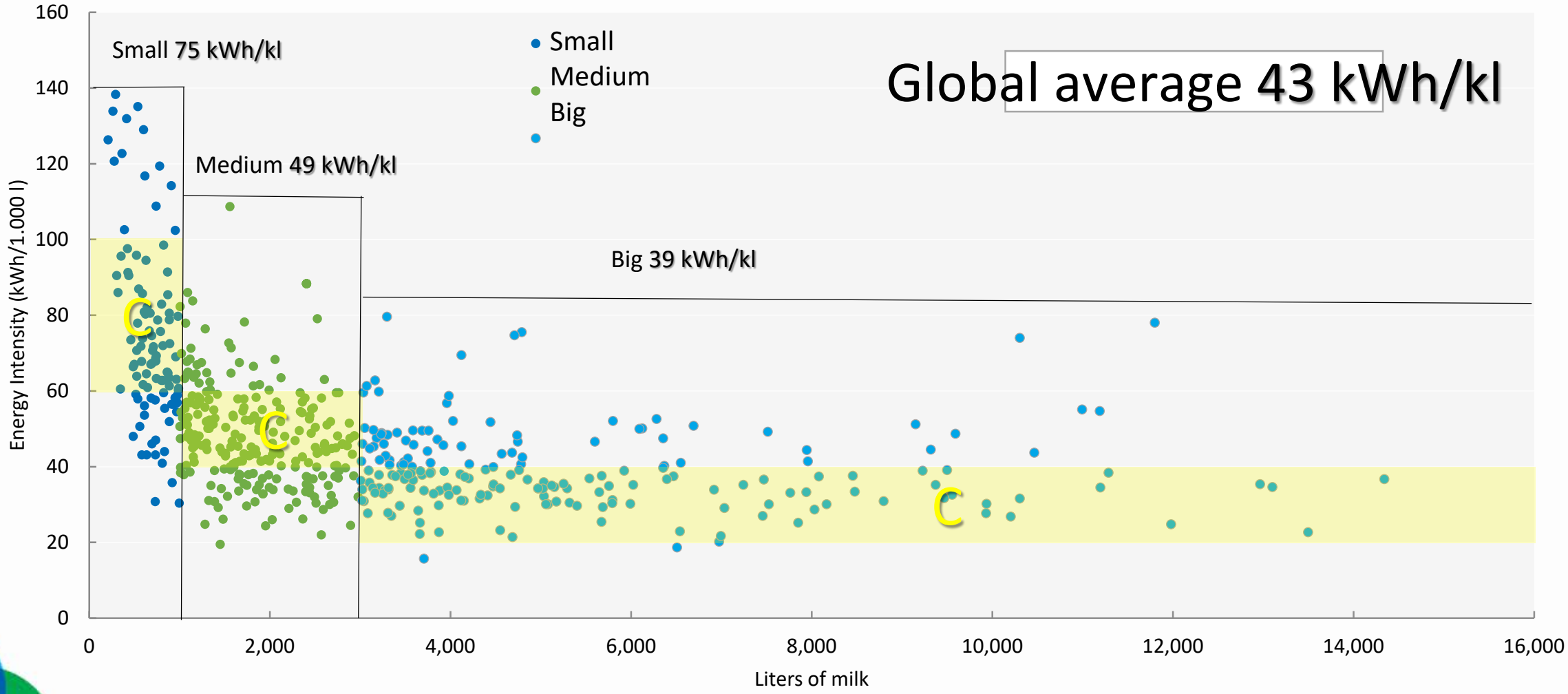
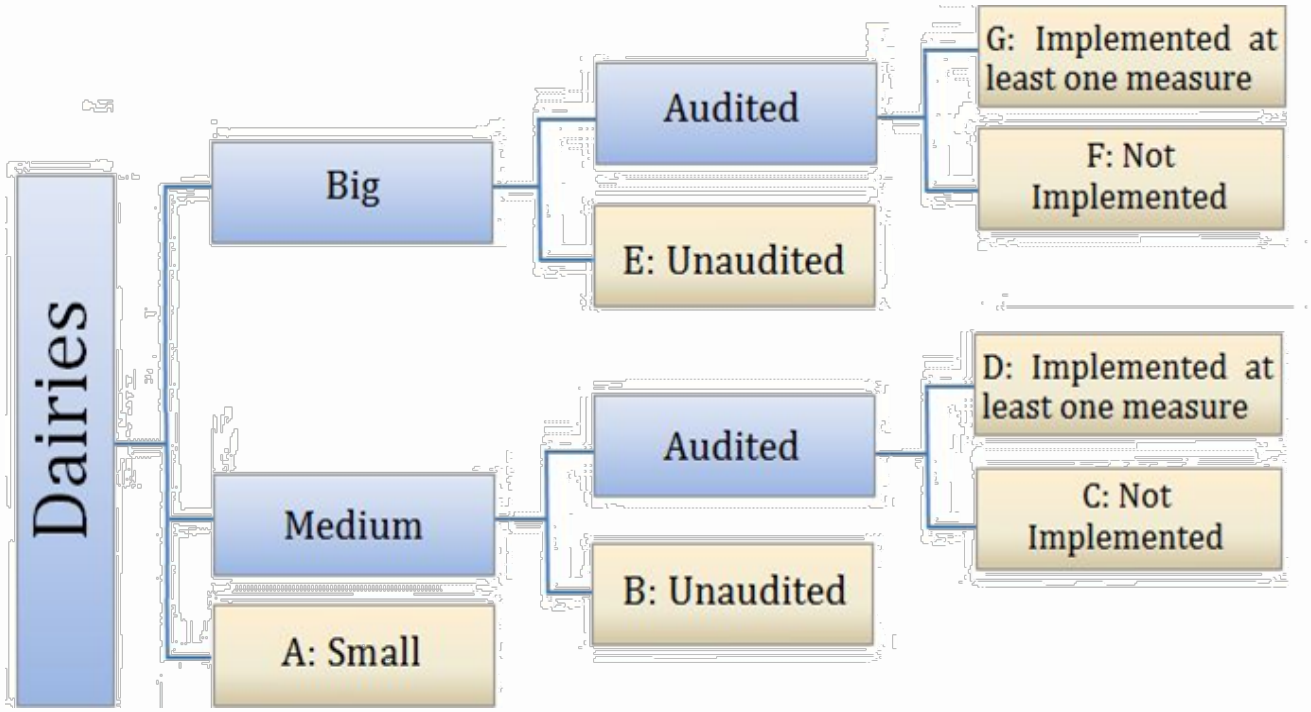
Energy Intensity (kWh/kL)



Sample methodology



68 farms

Group	Dairies (sample)
A: Small **(No statistical validity)**	12
B: Medium (Unaudited)	13
C: Medium (Audited – No implemented)	14
D: Medium (Audited – Implemented)	8
E: Big (Unaudited)	11
F: Big (Audited – No implemented)	13
G: Big (Audited – Implemented)	9

(confidence level: 90%, confidence interval: 10%)

Problems in Sample methodology

Group	Planned sample distribution	Actual sample distribution
A: Small (No statistical validity)	12	12
B: Medium (Unaudited)	13	13
C: Medium (Audited – No implemented)	14 →	5
D: Medium (Audited – Implemented)	8	17
E: Big (Unaudited)	11	10
F: Big (Audited – No implemented)	13 →	3
G: Big (Audited – Implemented)	9	19

It was verified that a significant proportion of dairies that had been classified as "No implemented" had implemented some measure but it had not been registered.

Work strategy

- Telephone survey
  - I. Socio – economic data
  - II. Energy conservation measures implemented
  - III. Level of satisfaction
- Data análisis
  - I. Historic electric energy consumption (before and after measures implementation)
  - II. Historic milk production level (before and after measures implementation)
  - III. Analisis of telephone survey results.

Impact evaluation – Medium farms

Group	**Milk production variation (%)**	kWh/kL (After)	kWh/kL (Before)	**kWh/kL variation (%)**	$/kL (after)	$/kL (before)	**$/kL variation (%)**	$/kWh (after)	$/kWh (before)	**$/kWh variation (%)**	Nº farms
Unaudited	-8%	50	48	**4%**	280	256	**9%**	5,17	5,33	**-3%**	13
Audited – No implemented	-1%	64	57	**13%**	321	283	**12%**	4,87	4,88	**0%**	5
Audited – implemented	5%	45	44	**3%**	214	259	**-21%**	4,81	5,58	**-14%**	17

Unexpected results.
Clear impact in **$/kL** but not clear results in **kWh/kL**

Note: Only 5 farms had not implemented anything (when the sample assumed that 14 had not implemented anything).

Impact evaluation – Big farms

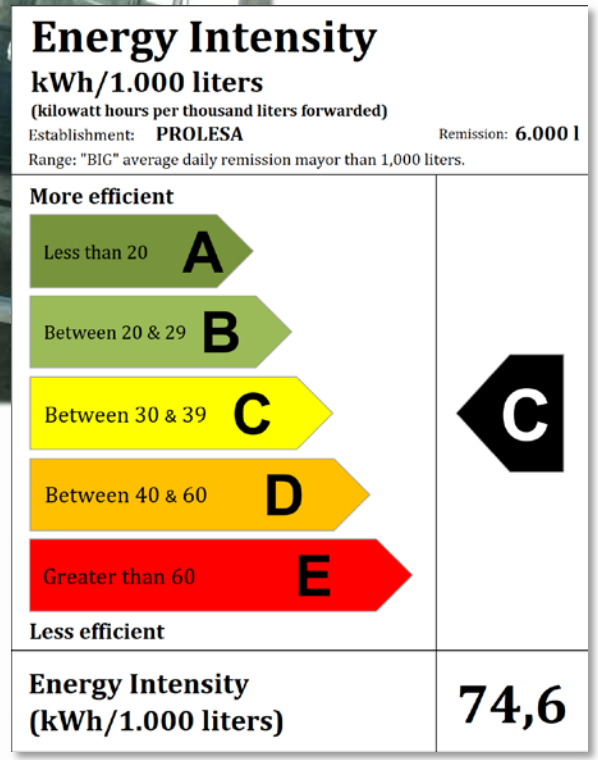
Group	**Milk production variation (%)**	kWh/kL (After)	kWh/kL (Before)	**kWh/kL variation (%)**	$/kL (after)	$/kL (before)	**$/kL variation (%)**	$/kWh (after)	$/kWh (before)	**$/kWh variation (%)**	Nº farms
Unaudited	-1%	32	35	**-8%**	179	184	**-3%**	5,17	5,15	**0,4%**	10
Audited – No implemented	-1%	37	38	**-2%**	235	178	**24%**	5,78	5,47	**6%**	3
Audited – implemented	-2%	41	39	**6%**	185	198	**-7%**	4,84	5,14	**-5,9%**	19

Unexpected results.
Clear impact in **$/kL** but not clear results in **kWh/kL**

Note: Only 3 farms had not implemented anything (when the sample assumed that 13 had not implemented anything).

Lack of success using EPI kWh/kL (Possible causes)

- Problems with sample methodology
- Milk production level influence in energy intensity (kWh/kL)
- Weather influence in energy intensity (kWh/kL) difficult to determine
- Improvement of milk cooling
- Others



Thank you!

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