

Methaan meten op koe- en op kudde-niveau: technische uitdagingen

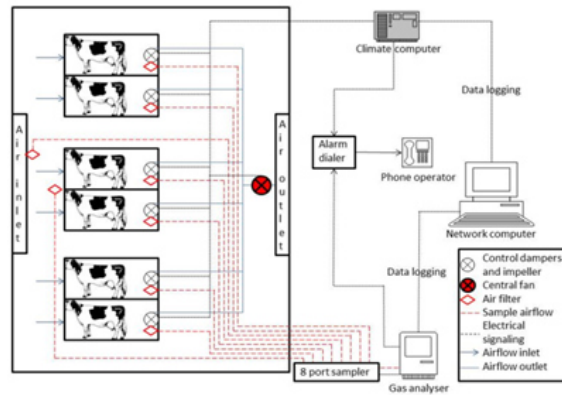
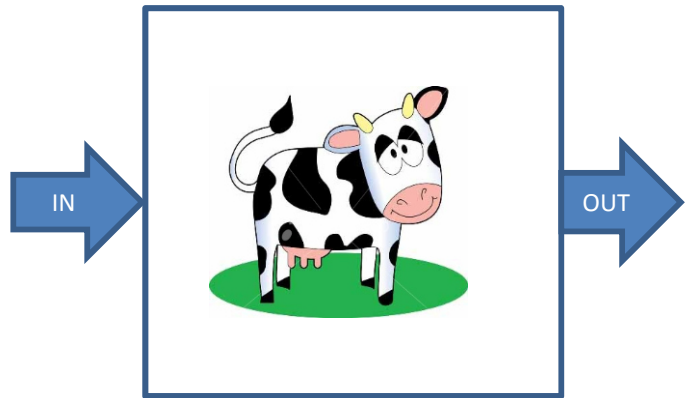
**Methane measurement on cow and herd-level:
technical challenges**



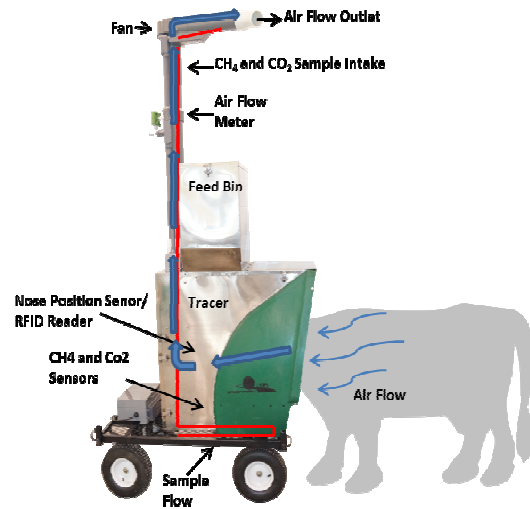
Nico Peiren
Studiedag SMART melken
Melle, October 6th 2016

Measurement techniques ILVO:

- Open-circuit chambers ($\text{CH}_4 + \text{N}$)



- GreenFeed (CH_4)



- Manure containers ($\text{CH}_4 + \text{N}$)



Before measurement

$\text{CH}_4 + \text{N}$

- Design
- Ethical commission
- Derogation
- Calibration



GUK

Parameters

Individual CH₄ emission

Individual Roughage intake

Individual Concentrate intake

Individual live weight

Individual faeces collection

Individual urine collection

Technology

NDIR gas analyser + ventilation system

Manual registration

Manual registration

Balance stanchion stall

Manual registration

Manual registration

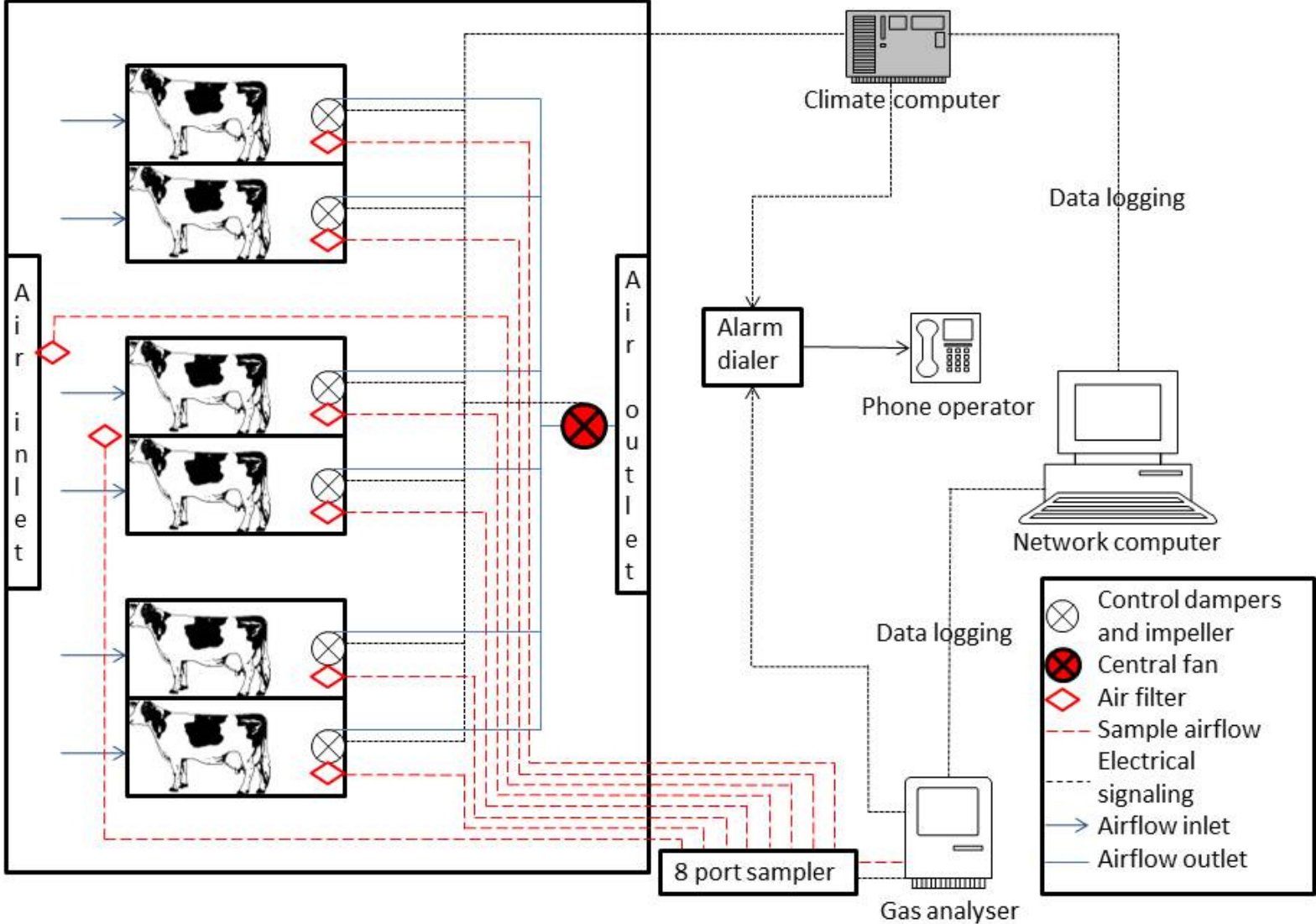




- Six closed ventilated chamber under underpressure
- Online measurement of CH₄ and possibly other gases (CO₂, NH₃, N₂O) with multigasanalyser

GUK

CH₄ + N



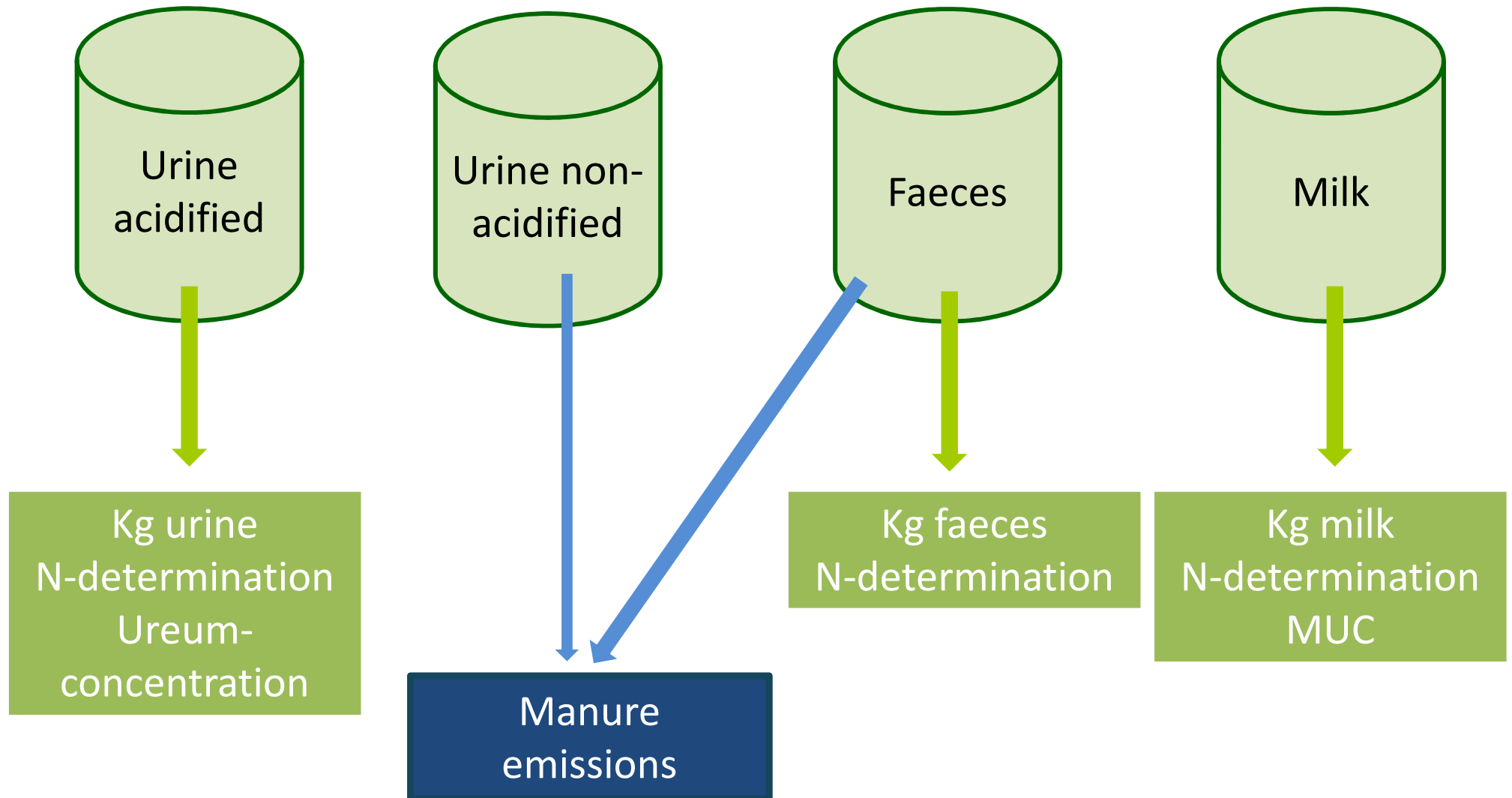
- Spacious dimensions
- Chamber with large windows (visual contact)
- Qualitative lying mat
- Finishing details
- Air conditioning
- Alarm on power supply, T °C and CO₂



- N-balance studies



- Urea excretion (N-excretion)
=> N-balance studies



Manure containers

$\text{CH}_4 + \text{NH}_3$



Free stall

Parameters

Individual CH₄ emission

Individual Roughage intake

Individual Concentrate intake

Individual milk production

Individual live weight

Technology

GreenFeed

Roughage Intake Control (RIC) system

Concentrate feeder + Milk parlor + GreenFeed

Milk parlor

Balance integrated in milk parlor



GreenFeed

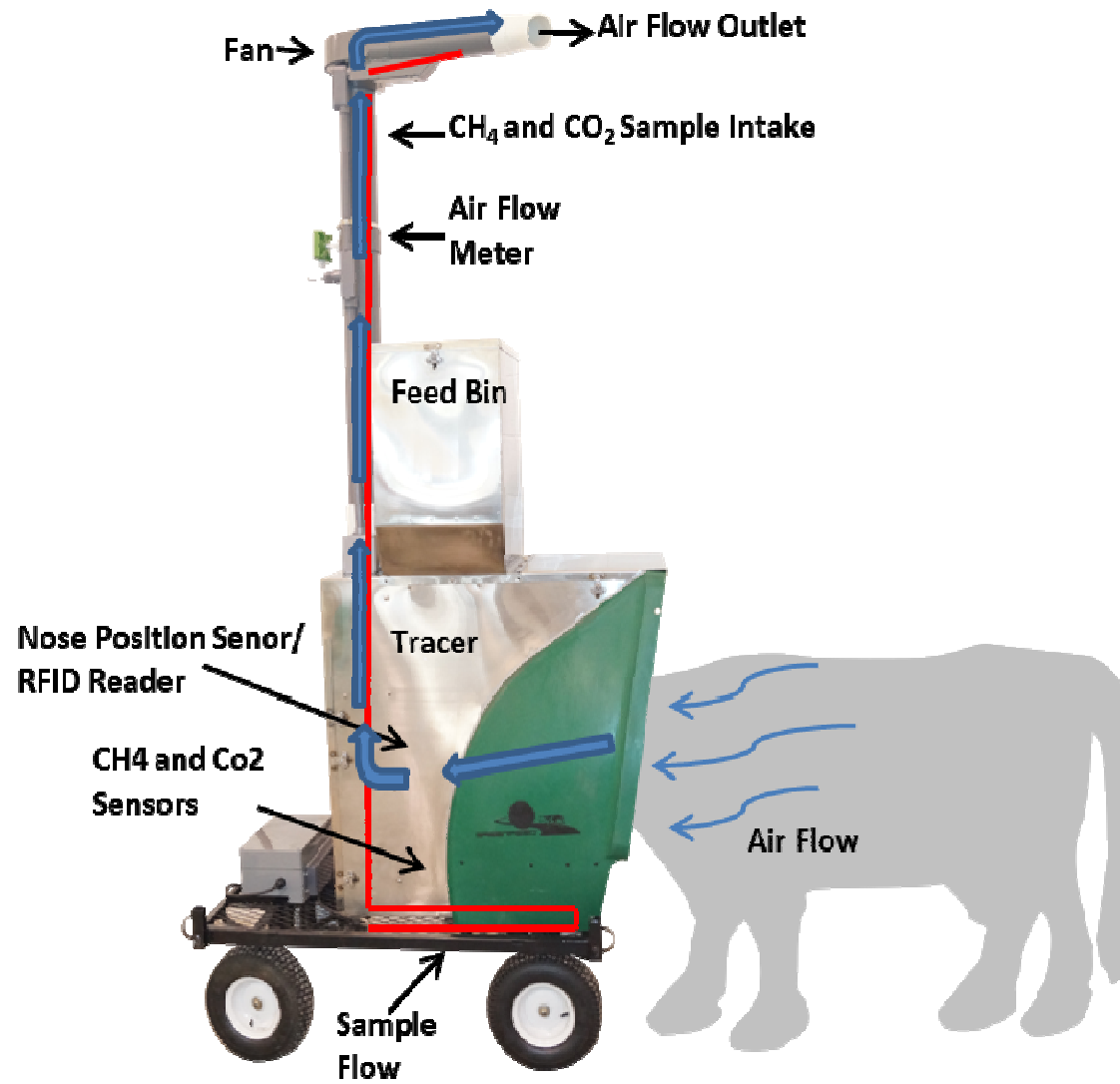
CH₄

2 GreenFeed units



GreenFeed

CH₄



GreenFeed

CH₄



GreenFeed

CH₄



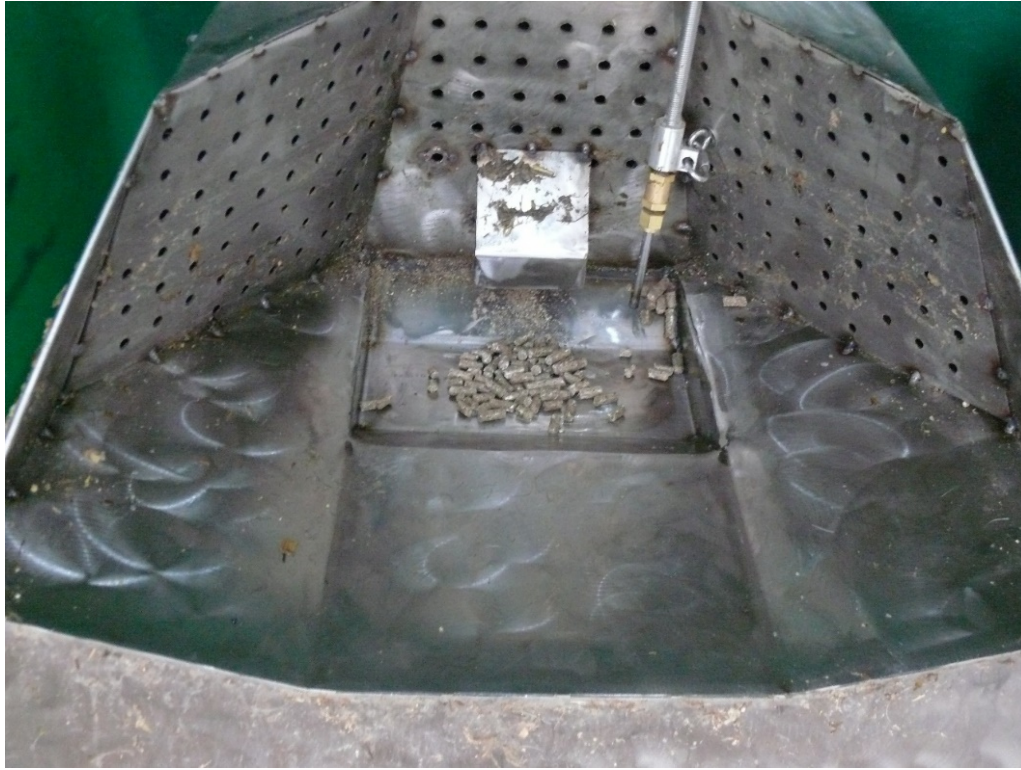
GreenFeed

CH₄



GreenFeed

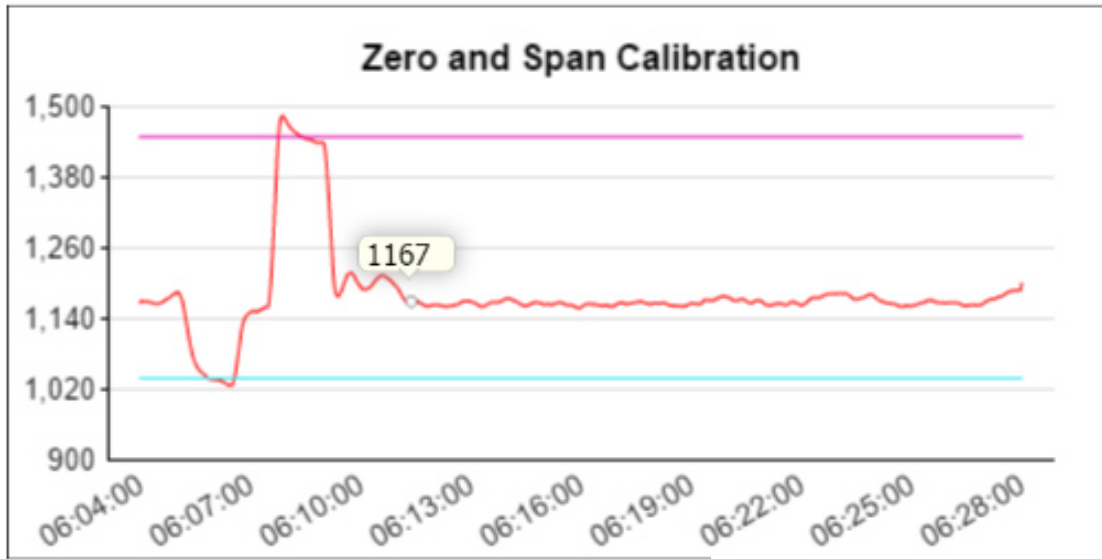
CH₄



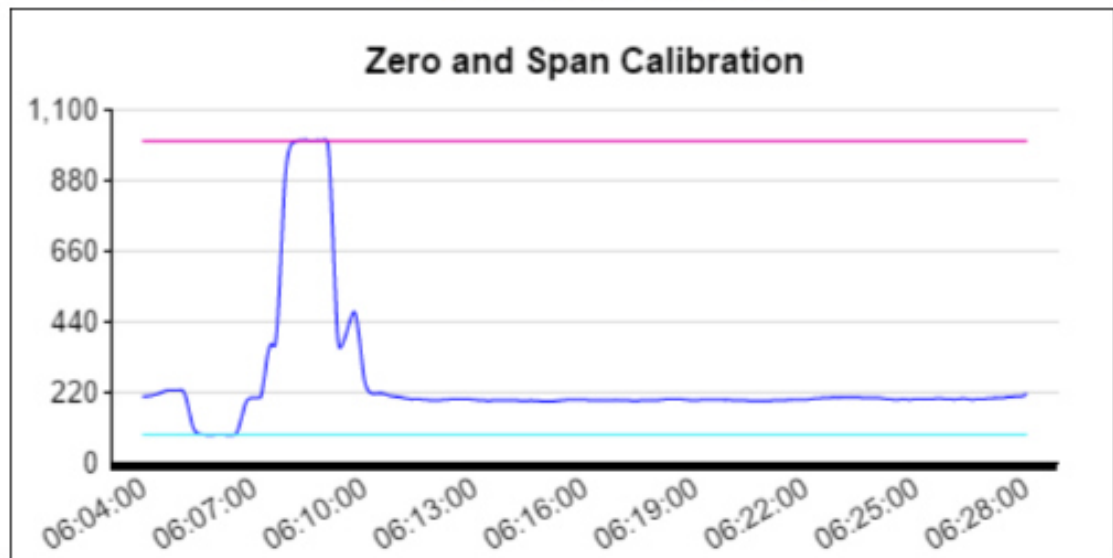
GreenFeed

CH₄

CH₄ Standard Calibration

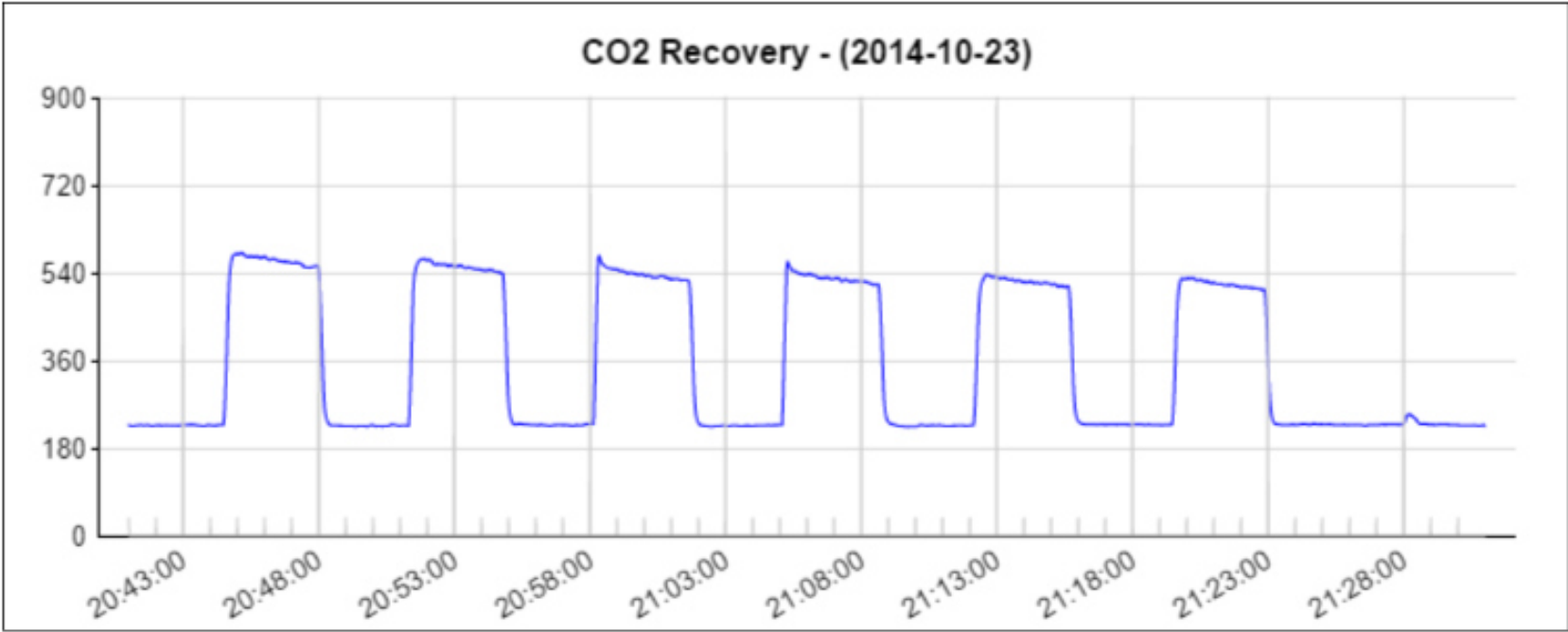


CO₂ Standard Calibration



GreenFeed

CH₄



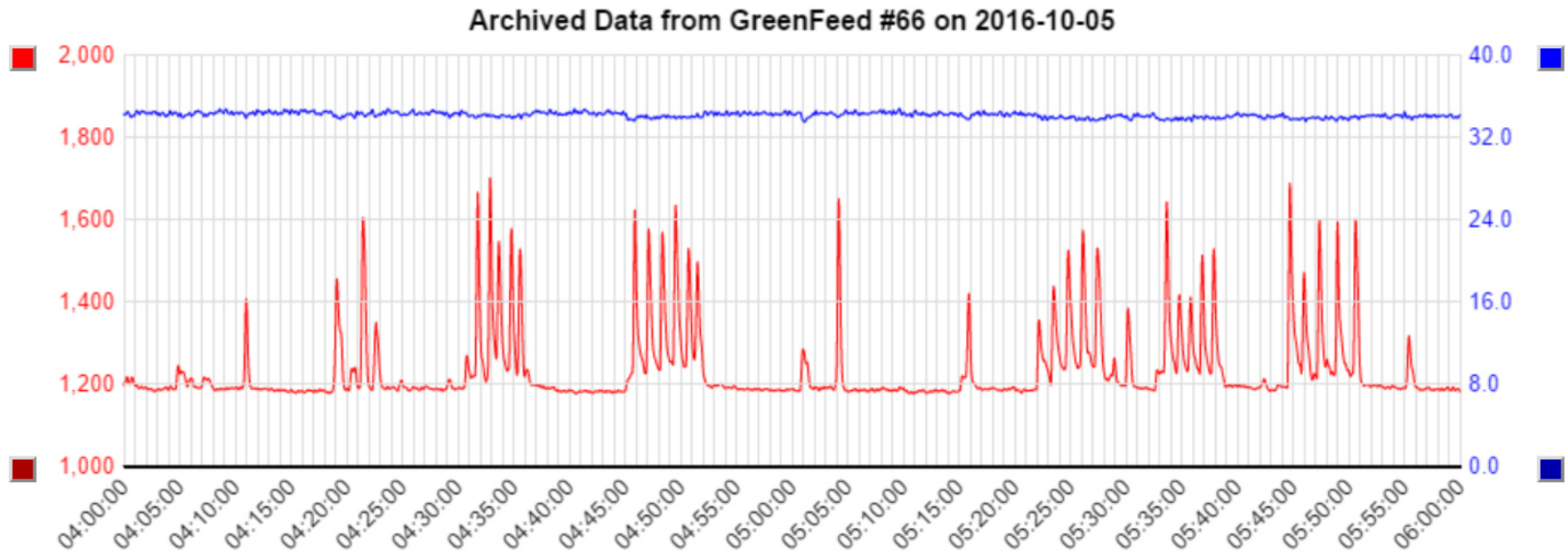
GreenFeed

CH₄

Animal Name	Animal Tag (0-9 & A-F only)	Food Type (What's This?)	Drop Dispense Interval (sec)	Min Time Between Feeding Periods (sec)	Max Drops Per Feeding Period (drops)
291	000000000000000008213437	Bin 1 ▼	35	14400	8
121	000000000000000008213419	Bin 1 ▼	35	14400	8
107_473	000000000000000008214033	Bin 1 ▼	35	14400	8
403	000000000000000008213881	Bin 1 ▼	35	14400	8
485	000000000000000013863755	Bin 1 ▼	35	14400	8
493	000000000000000013863735	Bin 1 ▼	35	14400	8
468	000000000000000013863750	Bin 1 ▼	30	14400	8
B399_446	000000000000000008213901	Bin 1 ▼	35	14400	8
492	000000000000000013863758	Bin 1 ▼	35	14400	8
352	000000000000000013443897	Bin 1 ▼	35	14400	8
349	000000000000000008213875	Bin 1 ▼	35	14400	8
344	000000000000000008213902	Bin 1 ▼	35	14400	8
393	000000000000000008213864	Bin 1 ▼	35	14400	8
478	000000000000000008213895	Bin 1 ▼	35	14400	8
284	000000000000000008213451	Bin 1 ▼	35	14400	8
174_483	000000000000000008213452	Bin 1 ▼	35	14400	8
377	000000000000000008214039	Bin 1 ▼	35	14400	8
B391_443	000000000000000008213882	Bin 1 ▼	35	14400	8
296	000000000000000008213445	Bin 1 ▼	35	14400	8
390	000000000000000008213411	Bin 1 ▼	35	14400	8

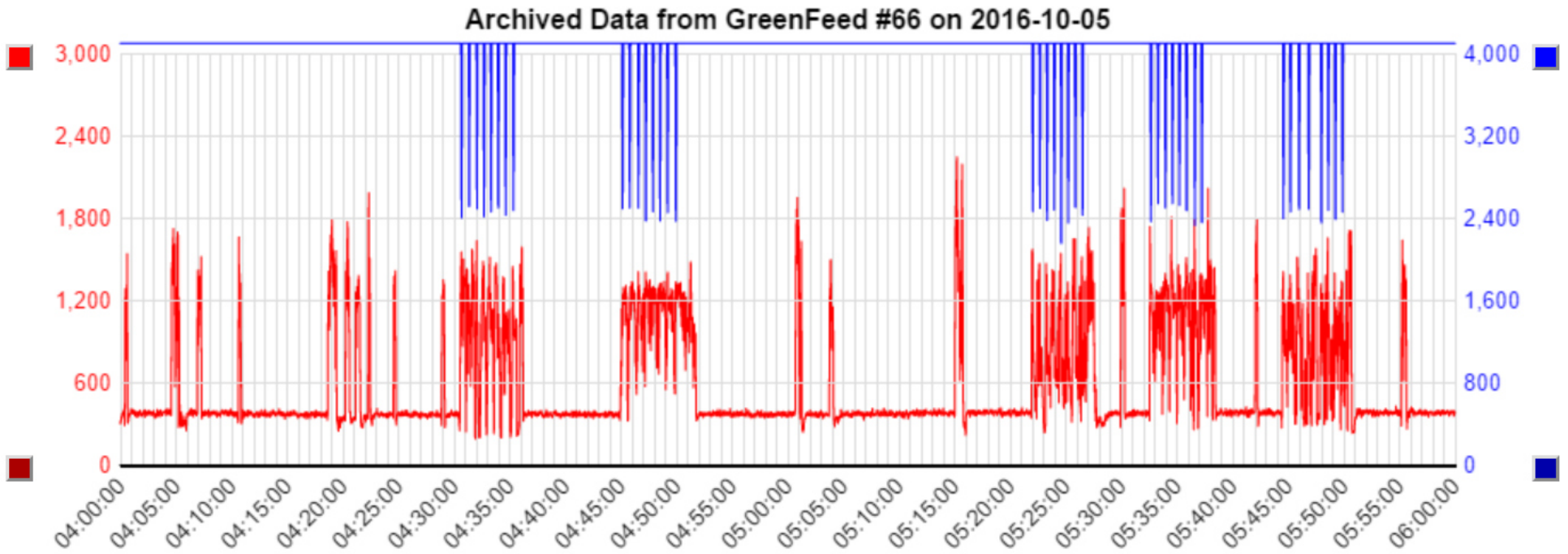
GreenFeed

CH₄



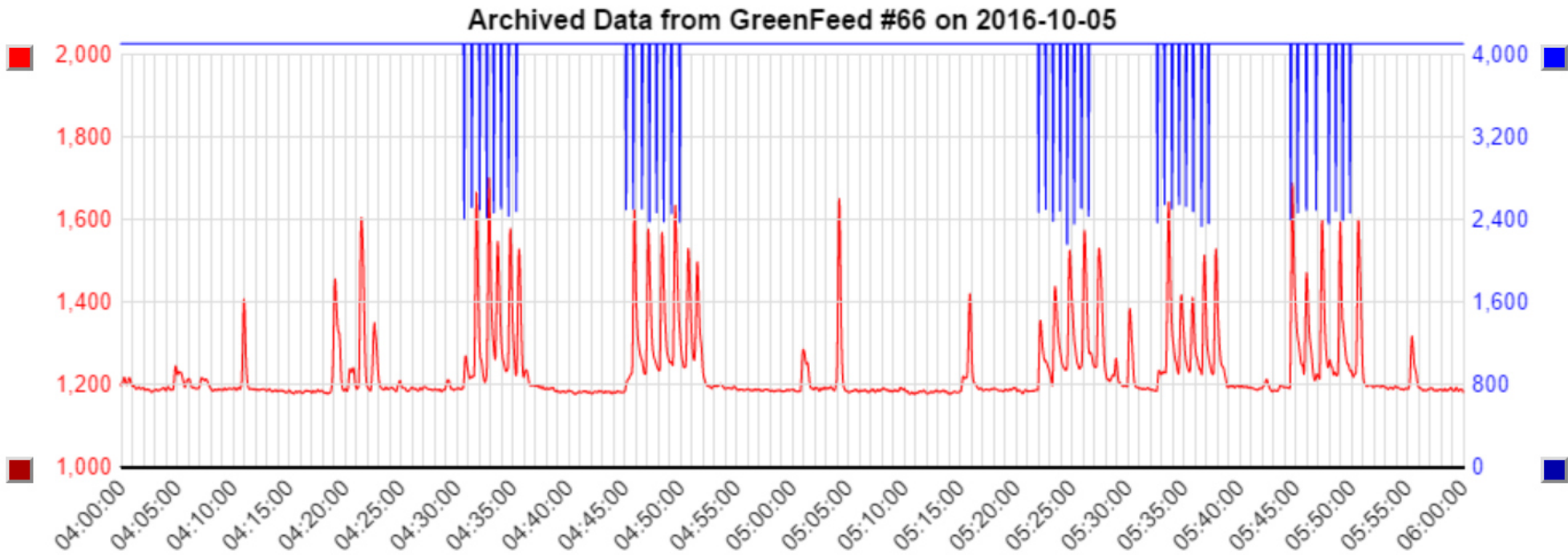
GreenFeed

CH₄



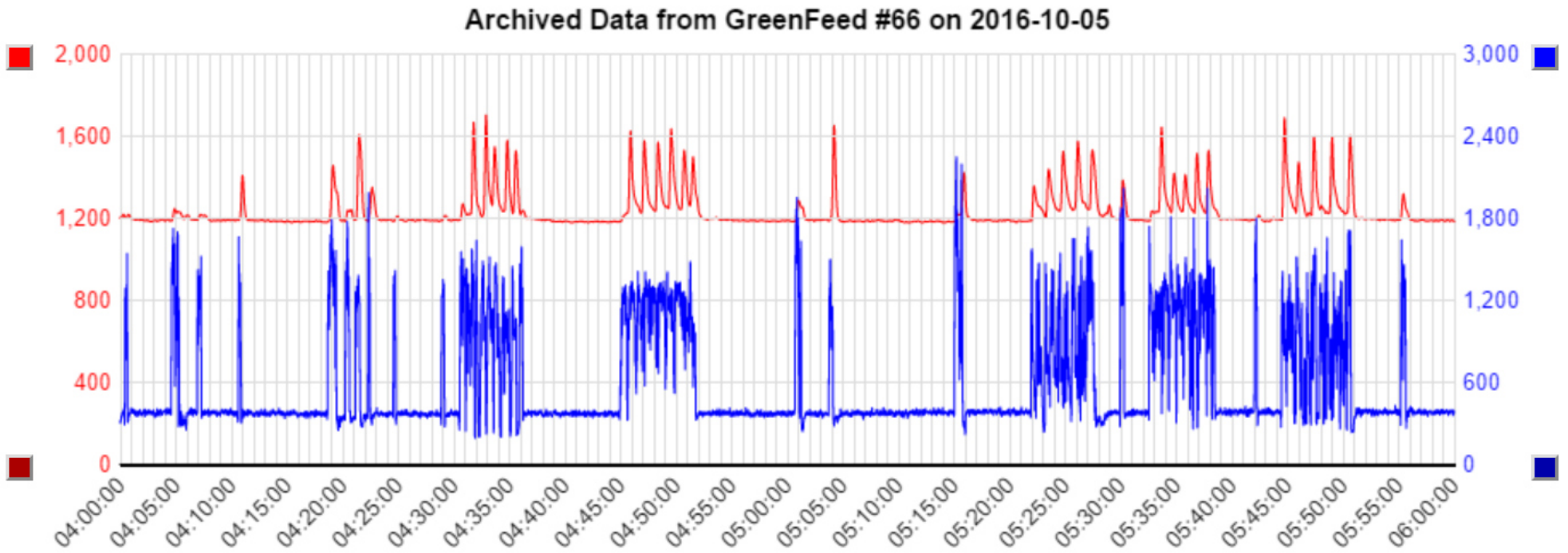
GreenFeed

CH₄



GreenFeed

CH₄

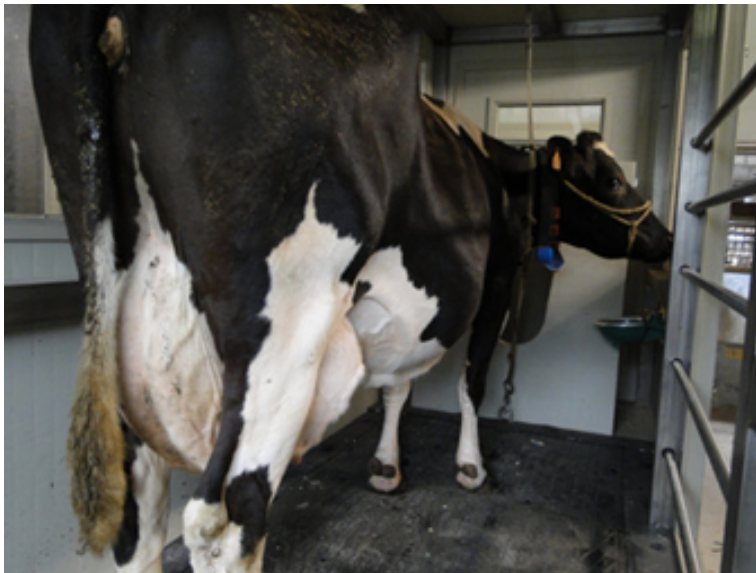


GreenFeed

CH₄

	A	B	C	D	E	F	G	H	I	J	K
1	RFID Numb	Farm Numb	Unit ID	Start Time	End Time	Total Time with Good Data	Hour of the Day	Time of day bi	CO2 (g/	CH4 (g/	Airflow (L/s)
2	GF_213409	133	66	7/9/15 15:58	7/9/15 16:08	0:06:07	16,0		12660	432	36,6
3	GF_213409	133	66	7/10/15 3:43	7/10/15 3:49	0:06:08	3,7		11695	432	35,3
4	GF_213409	133	66	7/10/15 10:53	7/10/15 10:59	0:05:38	10,9		13404	509	36,5
5	GF_213409	133	66	7/10/15 15:13	7/10/15 15:18	0:05:12	15,2		11859	455	36,7
6	GF_213409	133	66	7/10/15 19:57	7/10/15 20:04	0:05:43	20,0		13321	629	36,4
7	GF_213409	133	66	7/11/15 9:15	7/11/15 9:18	0:03:20	9,3		13302	518	35,3
8	GF_213409	133	66	7/11/15 15:48	7/11/15 15:54	0:05:25	15,8		13974	623	35,6
9	GF_213409	133	66	7/11/15 20:56	7/11/15 21:03	0:06:45	20,9		13817	625	34,8
10	GF_213409	133	66	7/12/15 6:05	7/12/15 6:10	0:05:24	6,1		11277	370	33,7
11	GF_213409	133	66	7/12/15 12:00	7/12/15 12:05	0:05:05	12,0		14484	631	34,2
12	GF_213409	133	66	7/12/15 16:18	7/12/15 16:23	0:05:03	16,3		12369	438	34,2
13	GF_213409	133	66	7/12/15 21:05	7/12/15 21:10	0:05:14	21,1		14871	618	34,1
14	GF_213409	133	66	7/13/15 5:55	7/13/15 5:59	0:04:26	5,9		12337	475	32,3
15	GF_213409	133	66	7/13/15 16:42	7/13/15 16:48	0:05:54	16,7		15337	663	41,0
16	GF_213409	133	66	7/14/15 4:44	7/14/15 4:49	0:05:16	4,7		15087	557	40,6
17	GF_213409	133	66	7/14/15 11:59	7/14/15 12:04	0:05:07	12,0		11425	350	40,6
18	GF_213409	133	66	7/14/15 16:58	7/14/15 17:04	0:05:54	17,0		13055	506	40,9

Thank you



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