

# LIFE The Tough Get Going

---

## (LIFE TTGG) PROJECT

LIFE 16 ENV/IT/000225 – LIFE TTGG  
ENVIRONMENT - RESOURCE EFFICIENCY

---

LIFE TTGG: Action B4 - PEF reduction measures

---

Antoine Frein  
Enersem

---

Desenzano del Garda (BS) – 19 February 2019



POLITECNICO  
MILANO 1863



## Objective:

- Identification and description of the different processes of EU PDO hard and semi hard cheese production
- Define reference energy and water consumption for the sector
- Define PEF measures for energy and water savings in dairies

## How ?

- Large set of dairies analysed: **27 dairies**

Partners:



Test Phase:

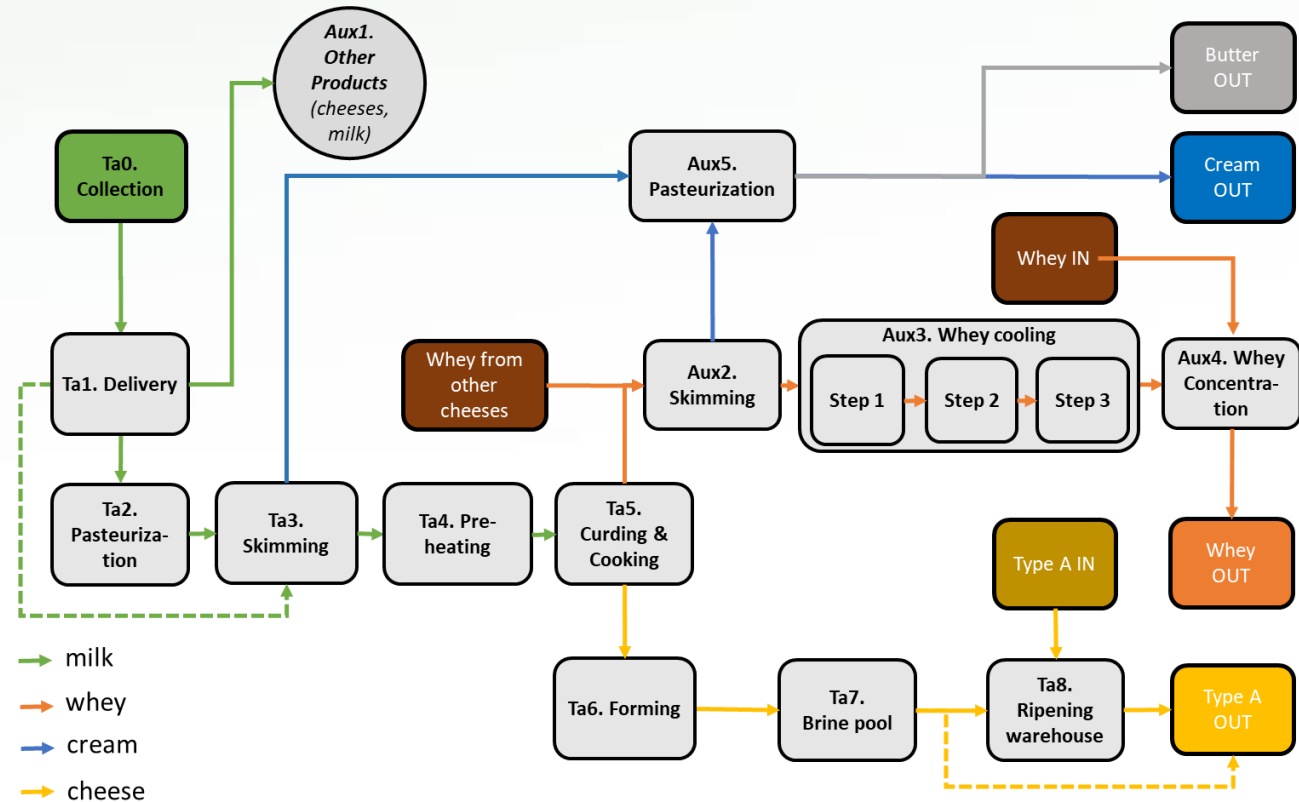


- Develop **standard** approach
- **Monitoring campaign** in the field
- Detailed analysis for optimized measures (Pinch Analysis, dynamical simulation of productive process)



## Description EU PDO hard and semi hard cheese production

- General scheme applicable for hard and semi-hard cheese
- For each dairy, the various blocks are enabled / disabled
- Once the block is enabled a list of questions should be fulfilled for this specific block



## Energy Audit in dairies

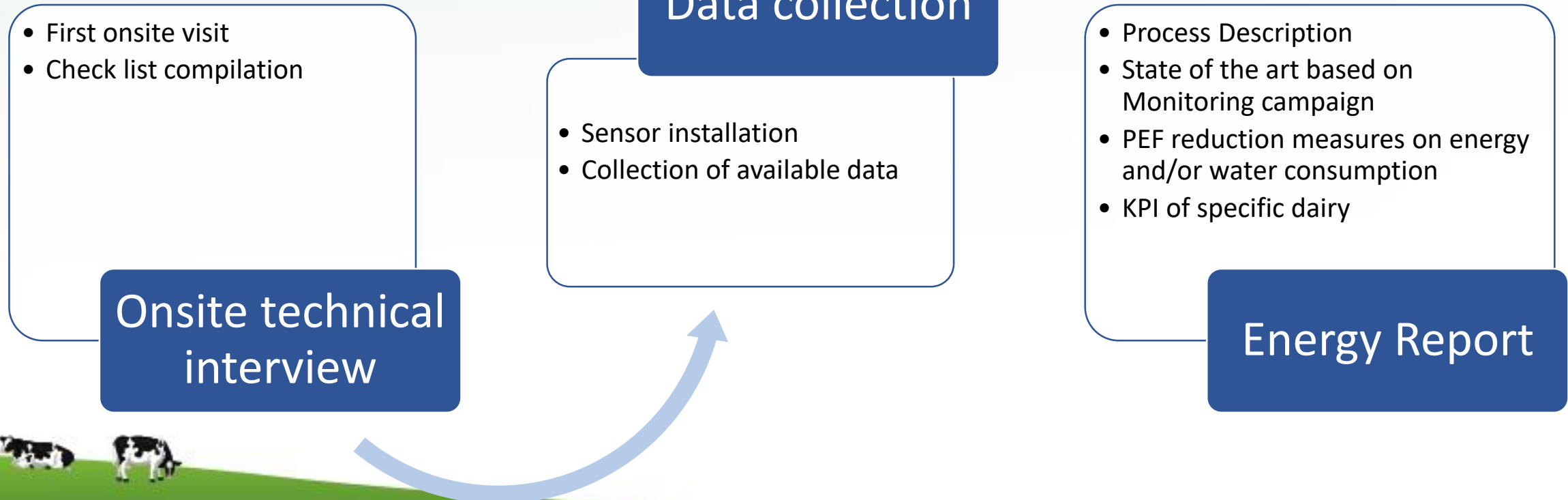
Characterize the hot and cold streams and the electrical consumption on a significant period by using portable monitoring sensors.

**Objective:** characterize the state of the art and describe PEF measures to reduce energy and water consumption for the dairy and ripening warehouse.





## Audit Phase



# LIFE The Tough Get Going



## Progress:

- 8 dairies of EU PDO different from Grana Padano and Comte
- 16 out of 19 dairies of the Grana Padano are initiated:
  - ✓ Level 3, energy report : 12
  - ✓ Level 2, data collection completed = 6
  - ✓ Level 1, first onsite visit = 6
  - ✓ Level 0: 4

<b>Grana Padano</b>	A	█	█	█	█				
	B	█							
	C - D	█	█	█	█	█			
	E-F-G	█	█	█	█	█	█		
<b>Test PDO</b>	Mahon	█	█						
	Beaufort	█	█						
	Abondance	█	█						
	Stilton	█	█						



## PEF reduction measures

### At process level:

- Optimisation of the whey cooling
- Preheating milk at the inlet of the kettle
- Optimization of the warehouse control strategy
- Recover the condensate from curdling phase
- Pre-heating of the milk before pasteurization

### At utility level:

- Optimization of chiller efficiency
- Highlight low generation efficiency
- Opportunity for combined heat and power plants
- Optimize cooling tower

### At auxiliary service level:

- Preheating for DHW
- Preheating for CIP
- Water recovering for CIP cycle
- Water recovering for manual washing





ENERSEM

# ENERSEM: spin off del Politecnico di Milano



**Matteo Zanchi (co-fondatore)**, ricercatore al Polimi, 15 anni di esperienza in aziende pubbliche e private in progetti di efficienza energetica



**Matteo Muscherà** – ricercatore, esperto in monitoraggio e diagnosi energetica e nei sistemi HVAC



**Antoine Frein**, ricercatore PhD, analisi di processo, Pinch analisi



**Silvia Garone**, ricercatrice, PhD in energetica, esperta di impianti HVAC



**Emanuele Mason**, ricercatore – PhD in ingegneria dell'informazione, esperto in modellistica e analisi dei dati



**Mauro Pozzi**, PhD in ingegneria elettrica, esperto di affidabilità dei sistemi elettrici



**Amin Fathi, Fabio Barbieri, Andrea Danese, Valerio Maretti**: gruppo di sviluppo software



**Noemi Barrera**, PhD in ingegneria matematica, consulente algoritmi



**Maurizio Delfanti (co-fondatore)**, Professore ordinario di sistemi elettrici al Politecnico di Milano. Coordina diversi tavoli regolatori nel settore elettrico a livello nazionale ed europeo

## *Coordinamento scientifico*



**Mario Motta (co-fondatore)**, Professore al Politecnico di Milano, contribuisce a numerosi tavoli IEA e a gruppi di lavoro nazionali sulle energie rinnovabili e sulla “decarbonizzazione” dell'economia



**Gianpaolo Cugola**, Professore ordinario di ingegneria del software al Polimi: esperto di architetture software distribuite

ENERSEM

[www.enersem.eu](http://www.enersem.eu) [info@enersem.eu](mailto:info@enersem.eu)  
Pza Leonardo da Vinci, 32 - 20133 Milano







# ENERSEM

le soluzioni che gli altri non vedono



Per ulteriori informazioni,  
contattare:

[zanchi@enersem.eu](mailto:zanchi@enersem.eu)

+ 39. 335.5478679

credit: NASA's Scientific Visualization Studio