

LIFE The Tough Get Going



LIFE 16 ENV/IT/000225 - LIFE TTGG

www.lifettgg.eu

Solutions to improve energy efficiency in dairies

Matteo Muscherà
ENERSEM

Webinar – December 10th, 2021





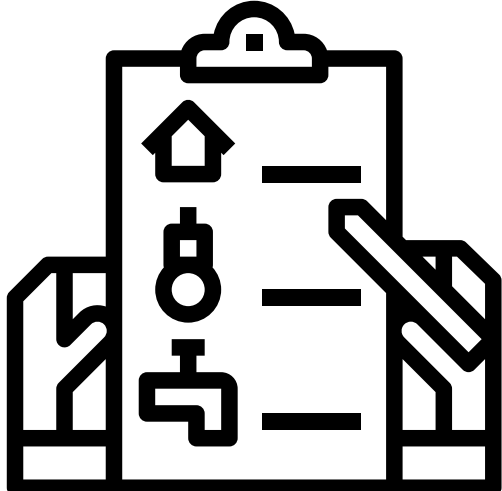
THE APPROACH



TTGG approach

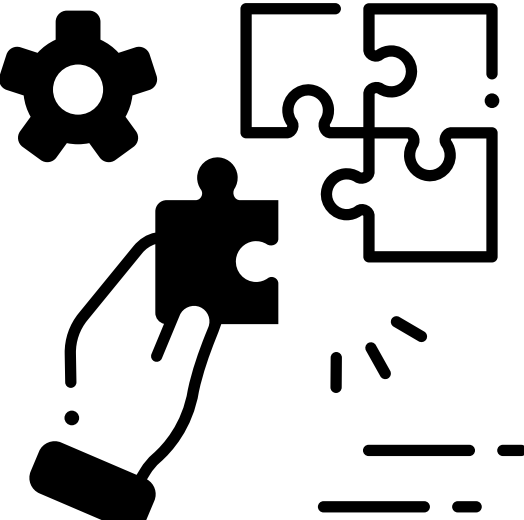
Sample

- Size
- Productions
- Other specificities



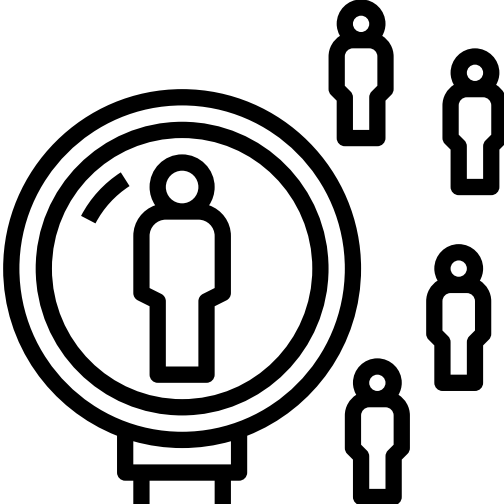
Benchmark

- KPI
- Comparison criteria
- Benchmark definition



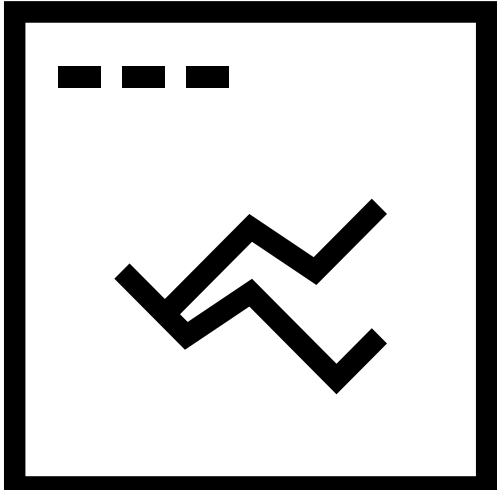
EDSS

- Software implementation
- Test
- Distribution



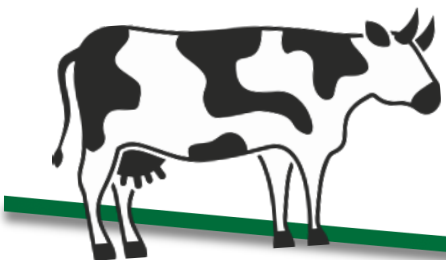
Audit

- On site visit
- Monitoring campaign
- Data analysis

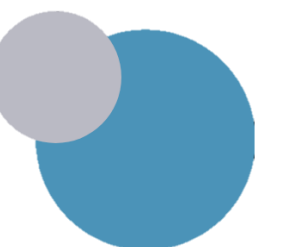
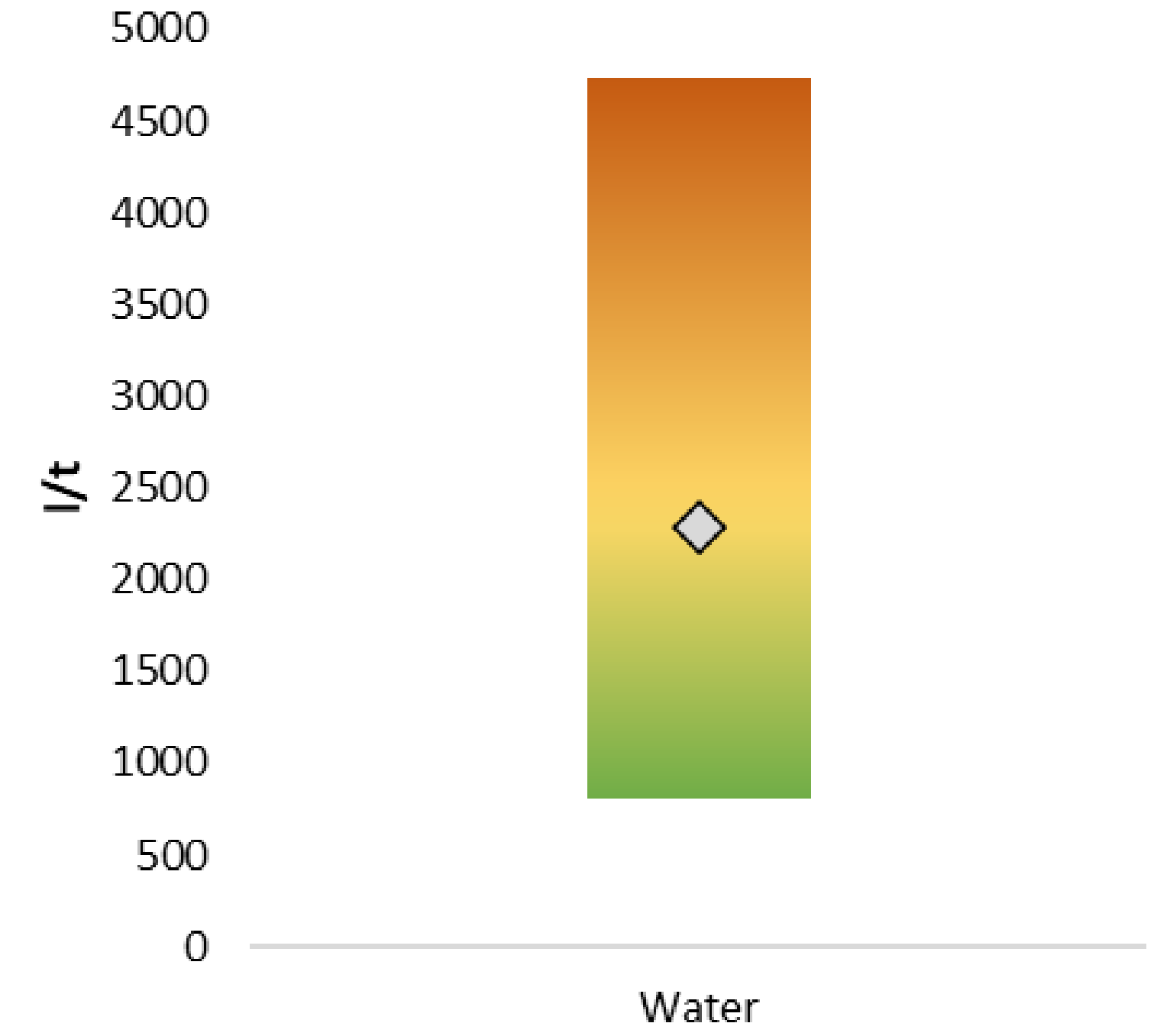
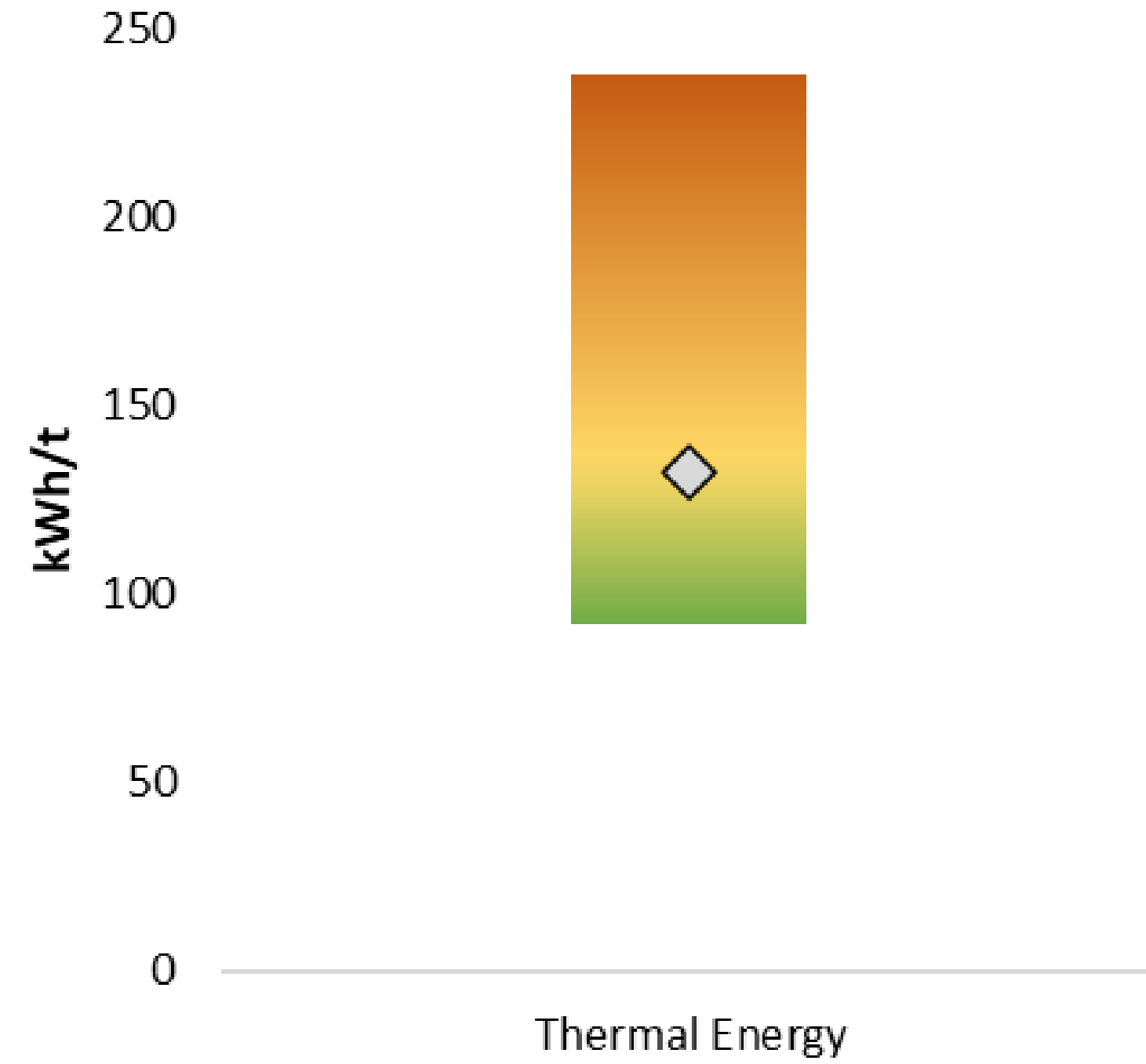
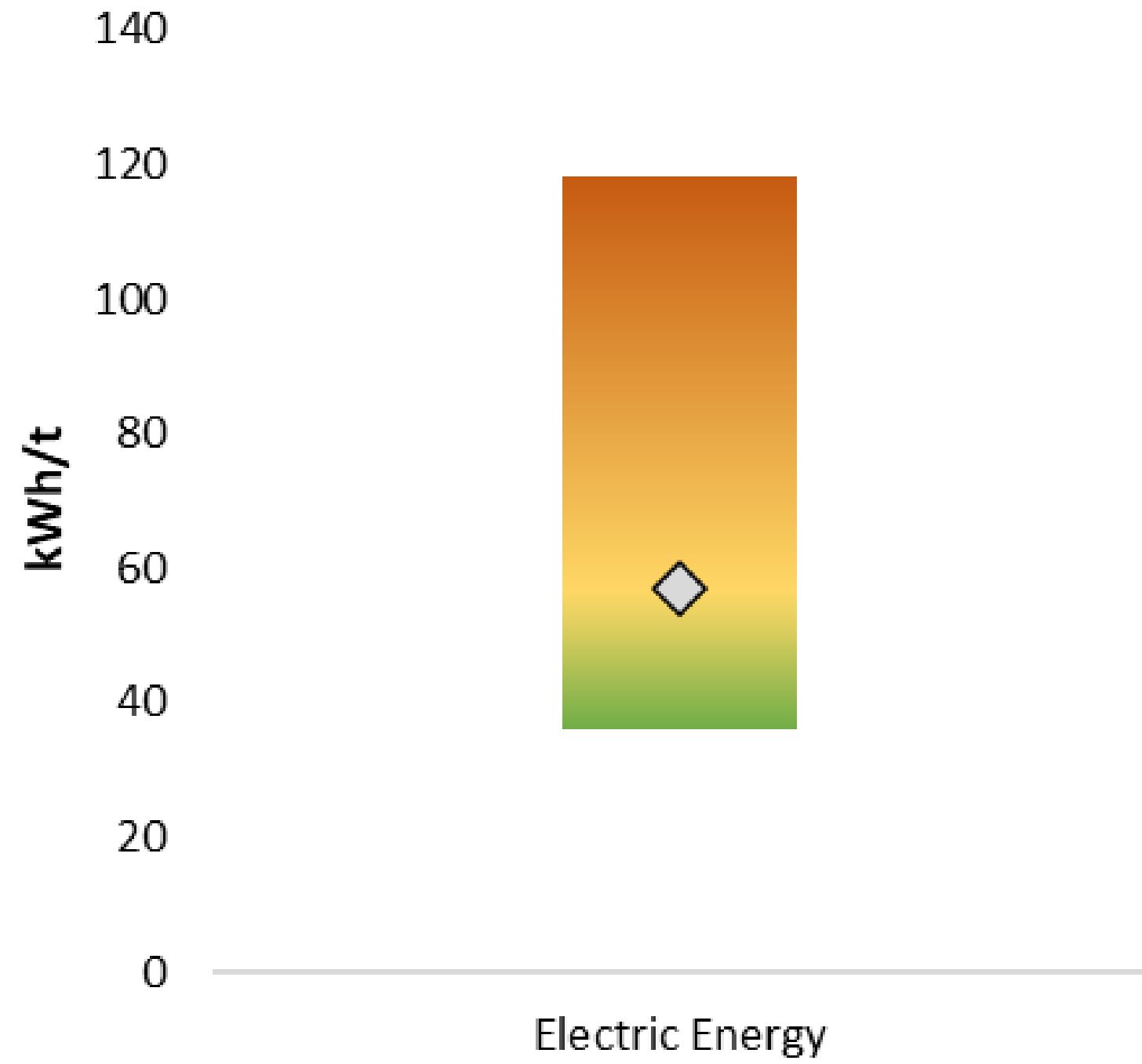


Efficiency strategies

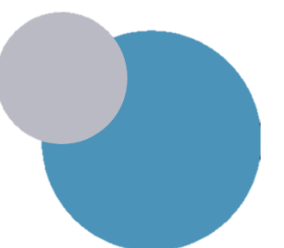
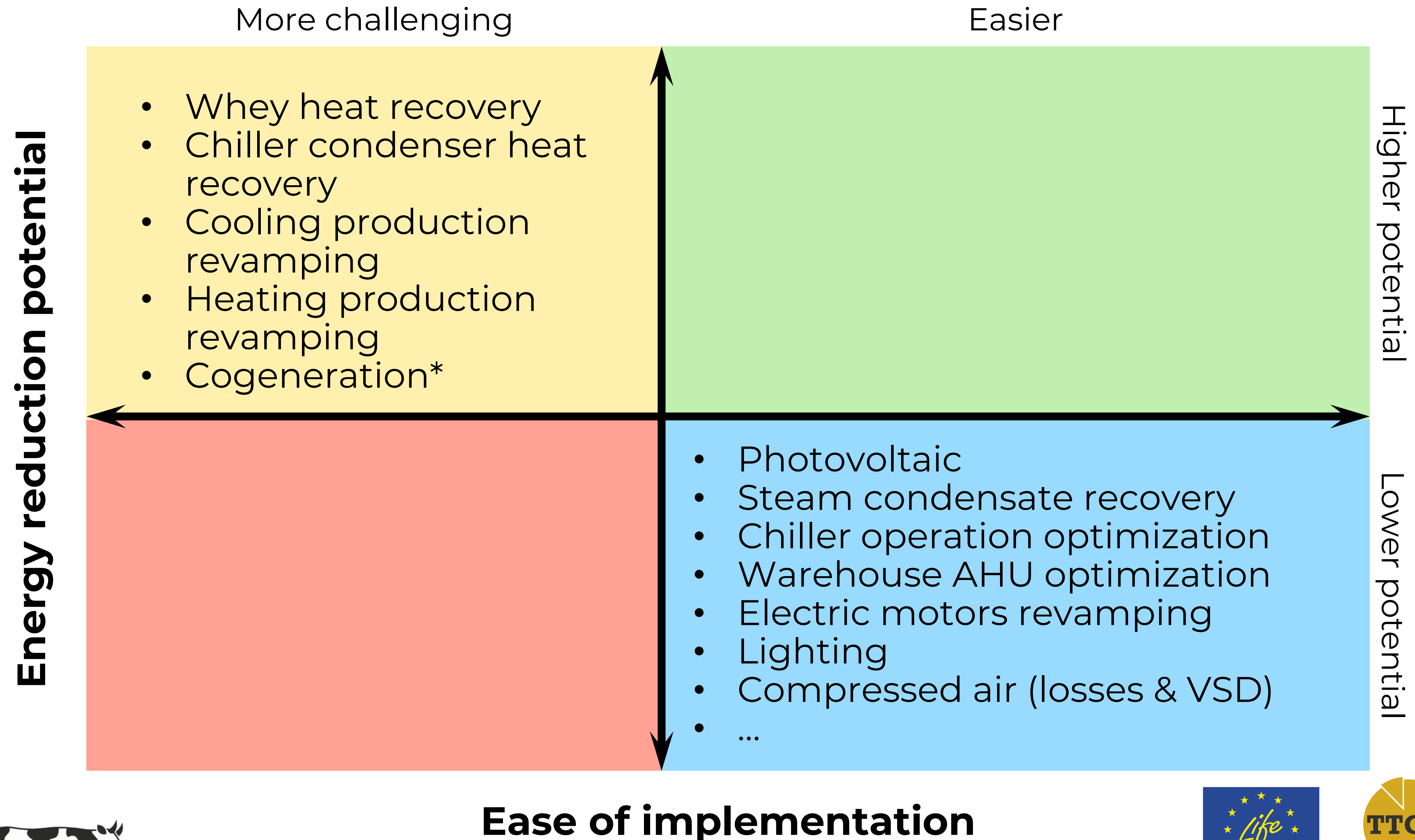
- Feasibility
- Reduction potential estimation



Results: benchmark



Results: efficiency strategies

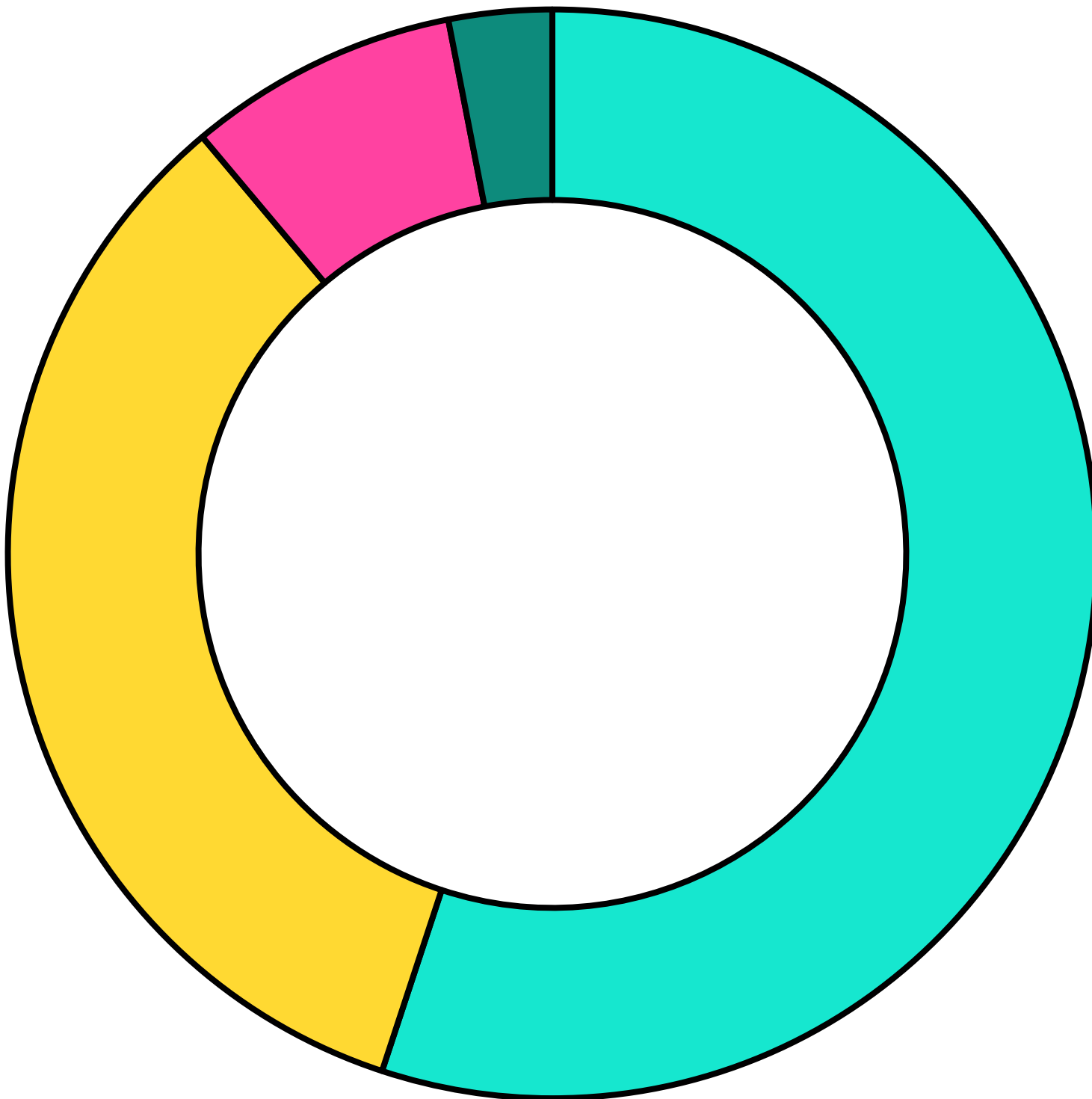




ENERGY EFFICIENCY IN DAIRIES



Some examples



- Heat recovery
- Generation utilities revamping
- Control strategy
- Electric motors revamping

Heat recovery

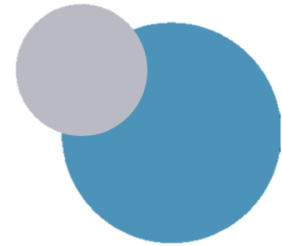
Whey heat recovery and reuse in milk processing and other auxiliary processes

Chiller condenser heat recovery and reuse in warehouse AHU

Generation utility revamping

Chiller replacement and integration with existing ice bank tank

Chiller replacement and ice bank tank removal (direct cooling production)



Whey heat recovery

Source

Whey cooling process

Users

- Milk heating
- Osmosis plant cleaning
- CIP
- Floor cleaning and DHW
- Milk activation

- Low temperature heat, suitable for many process users
- Source and users are not in phase: storage tank required

Electric energy

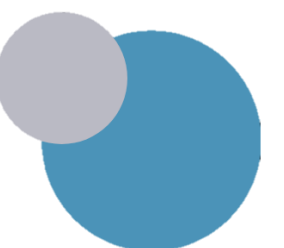
1% - 5%

Gas/diesel

7% - 28%

Bill savings

€ 54'000 average



Chiller condenser heat recovery

Source

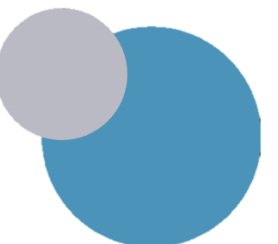
Chiller condenser heat removal

User

- Cheese warehouse air handling unit (AHU)

- Low temperature heat, suitable for warehouse air post-heating
- AHU heating coil sizing is crucial (sizing at low water temperatures)

Electric energy	-
Gas/diesel	9% - 43%
Bill savings	€ 57'000 average



Cooling production revamping

Ice production

Chiller replacement Keeping existing ice storage	Lower investment costs Lower savings
---	---

- Chiller EER enhancement

Electric energy	5% - 27%
Gas/diesel	-
Bill savings	€ 46'000 average

Direct cooling production

Chiller replacement Ice storage removal	Higher investment costs (bigger chiller) Higher savings
--	--

- Chiller EER enhancement
- Cooling production T increasing

Electric energy	7% - 37%
Gas/diesel	-
Bill savings	€ 64'000 average





THE SOFTWARE

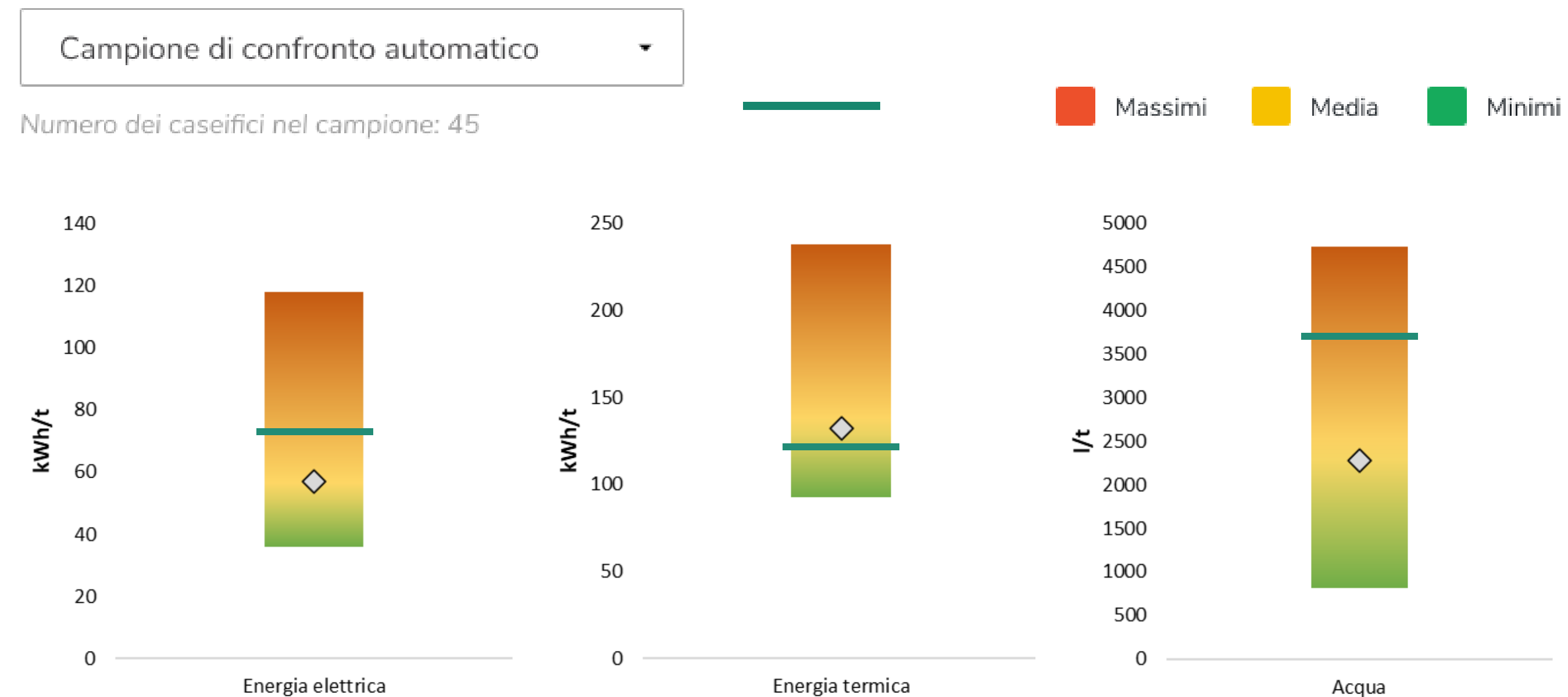


EDSS software

Energy and water consumption comparison: compare my dairy consumption with other Consortium dairies

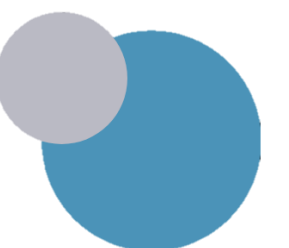
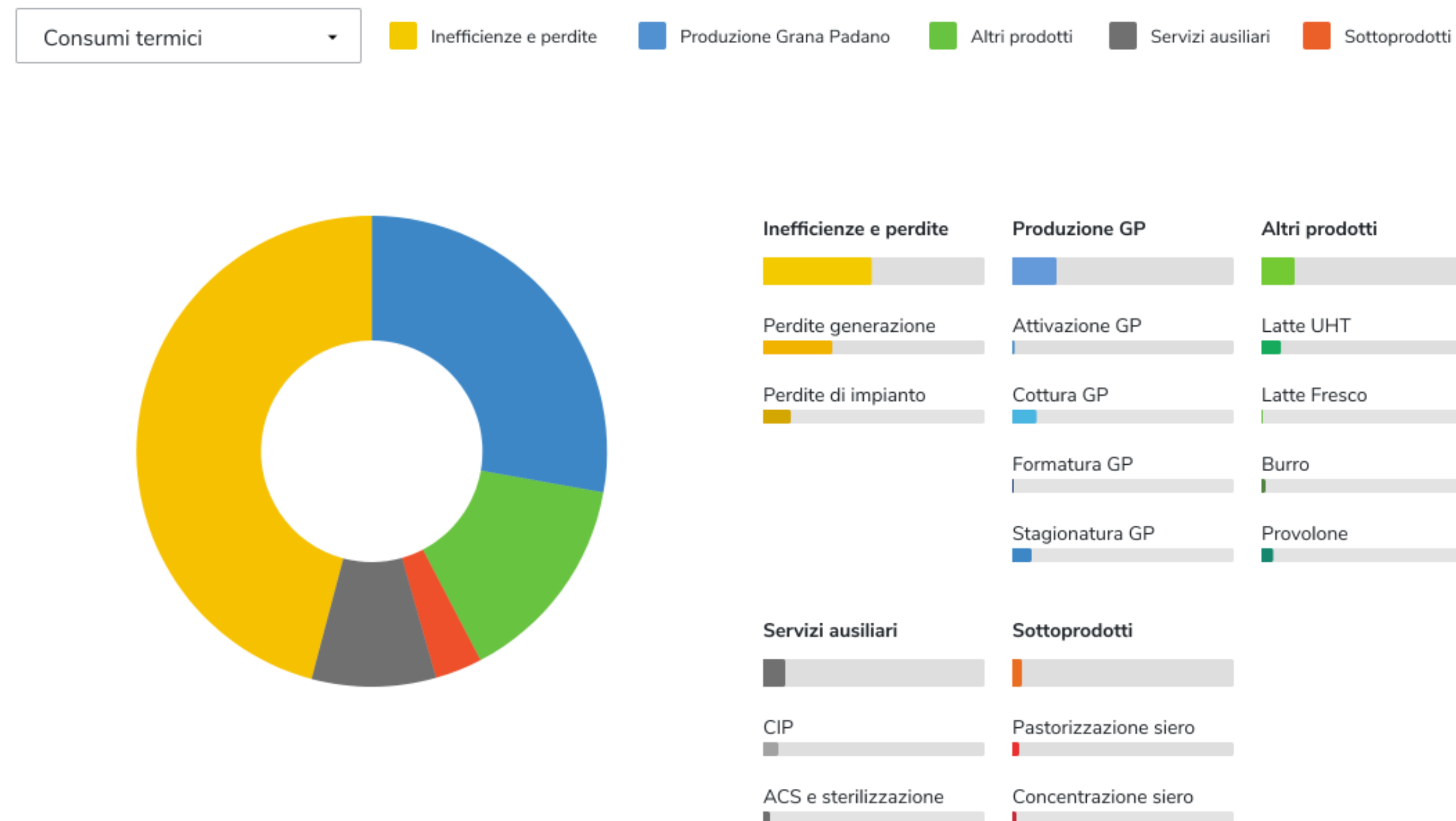
Fabbisogno processo produttivo - Confronto con i valori di riferimento

I dati di consumo elettrico, termico e idrico sono confrontati con i valori di riferimento. I risultati sono accompagnati da



EDSS software

Energy consumption allocation: detect most energy consuming areas



EDSS software

Energy efficiency strategies: discover the energy reduction potential

Misure di efficienza energetica

Sono state individuate 2 macro ipotesi di intervento volte a massimizzare l'efficienza energetica del caseificio. La spiegazione di ogni soluzione e la stima di risparmio economico vengono indicati nella pagina di dettaglio della ciascuna soluzione. Per ogni

1. Recupero termico

Esiste possibilità di diverse soluzioni di recupero termico, a livello ausiliare o di processo. Alcune delle soluzioni possibili: Riscaldamento latte in attivazione, Preriscaldamento del latte in ingresso ai doppi fondi etc.

Stima risparmio

-€ ____/anno

[Completa soluzione >](#)

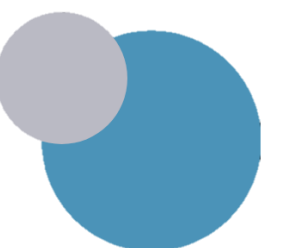
2. Strategia controllo UTA

Implementazione del freecooling per la UTA del magazzino di stagionatura

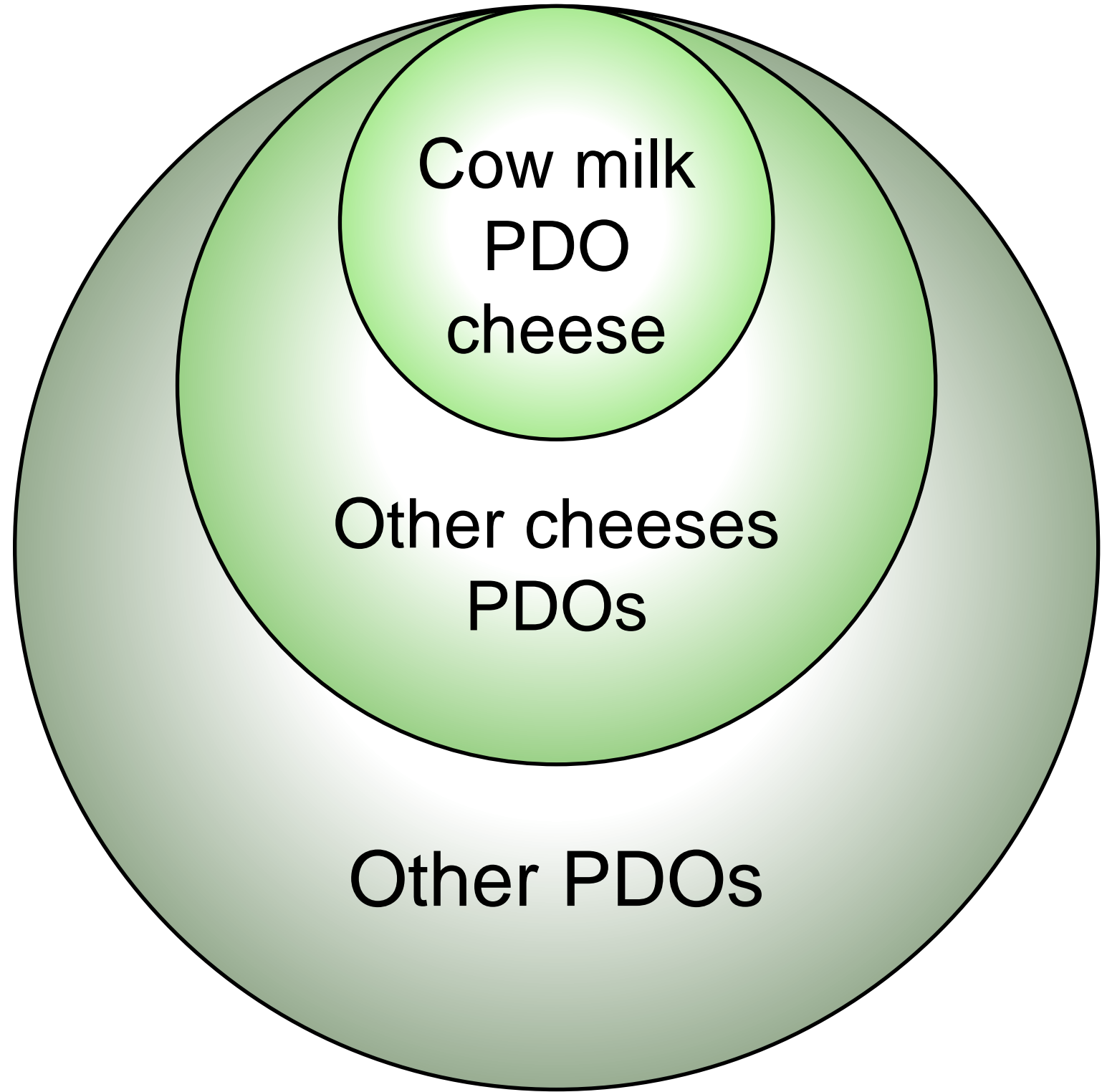
Stima risparmio

-€ 20.000/anno

[Dettagli soluzione](#)



Other PDOs



Approaches and tools suitable and transferable to other PDOs

Tested on:



Expression of interest also by other non-cheese PDOs





THANK YOU

LIFE
The
Tough
Get
Going

