CASE STUDY

I4F-WP1-Task 3

Context/Intro:

In the framework of the ICaRE4Farms project, this document aims at reviewing the theoretical inner potential of Feng Tech STE system within the agricultural sector of XXXXX.
The current academic example focus on a holding without on-farm processing and set in XXXXXXX.
The assumptions are that it owns a herd of XXX calves for which it needs around kWh of energy supply per year in order to clean its milking parlours and milk tanks.
After enumerating the main characteristics of this typical and fictional dairy farm, a simulation with the Feng Tech STE system illustrating expected results will be tackled.
This file will be completed and crossed with a real-life case with similar attributes.

!!!!invent for academic/anonymise for field application case!!!!!

PART I: ACADEMIC CASE

- *N°/Nickname:* N°
- *Location (Country/Region):*
- *Type of holding: Greenhouse*
- *Date: 01/02/2022*

1 Initial characteristics of the installation: (Use Market Analysis + Technology Assessment)

- **Size of the surface/number of animals: 1000 m2**
- **Water Use (heating/direct use):**
  - **Frequency: every day by night. In mid-season and winter, also by the day**
  - **Timeframe:**
  - **Quantity:**
- **Version of FT STE system (***ETF 1 / ETF2)*
- **Temperature needed (in °):** between 15-23
- **Standard fossil energy used:** gas or electricity
- **Price of fossil energy per kWh:** 1,63 pences/kWh (gas); 0,13 eur/kWh (electricity)
- **Energy consumption for the activity (in kWh/year):** 9 259 000 kWh/year
  cf.with energy waste and differentiated needs depending on the period of the year, the energy need accounts for XXX kWh/year
- **Expenditure of energy consumption (in EXCL TAX€/year):** 15 092 170 EXCL TAX€/year (gas); 1 203 670 EXCL TAX€/year (electricity)
  cf. XXX EXCL.TAX/€/kWh x XXX kWh/year = XXX EXCL. TAX €/year
- **Available subsidies for STE:** no subsidies
- **Amount of CO2 emission:** 2 129 570 kg CO2/year
  cf. given that 1kWh produces about XXX kg CO2(eq), XXX kg CO2/kWh x XXX kWh/year = XXX kg CO2/year

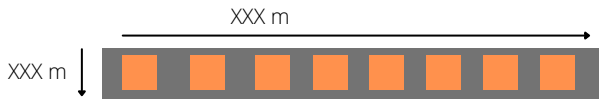
Prerequisites of installation:

- Located on floor or roof
- Preference = South-West facing
- Not far from the holding to avoid additional energy needs for re-heating

Employed Version of the matrix = V10 Lille Study Case

2 Simulation with a Feng Tech STE system:

- **Coverage Rate of the installation (Share of utilisation in %):** 59%
  cf. precising when the farmer wanted willingly a restricted share of power supply + Depending on location and weather + the value is imposed as it is the hypothetical reference we want to check after with the field application case
- **Number of STE units to reach the energy needs:** 5
  cf. potential energy savings = XXX kWh/year
- **Overall front surface of capture:** 20 m2
  cf.1 FT = 4m2 ; 4m2/unit x XXX units = XXX m2
- **Maximum attainable temperature with the current solution (in °):** 100°T (optimal conditions)
- **Power (kW/unit):** 2.5kW/unit
- **Number of sensors needed for remote surveillance and monitoring:**
  Commercial scope = 2 thermometers + 2 flowmeters
- **Surface requirement for the equipment:** 19 m Length/2m Width
  cf. Length of concrete slab = size of panels (2x2m) + space between panels (1m x t panels) / Width = 3 m



- **Solar energy contribution (in kWh/year)**:
  - Yearly Basis: XXX FT STE units' full potential = XXX **kWh/year** *(relating to a specific simulation case)*
    cf. it corresponds to XXX kWh/year useful solar energy (depends on distance, insulation etc. / simulation from an average case)
  - Daily Basis: XXX kWh/year / 365 days = XXX **kWh/day**
- **Savings on energy consumption (in €)**: XXX *€ EXCL. TAX/year*
  cf. Given that, with energy waste and to heat XXX L of water, the energy saving accounts for XXX kWh/year x XXX €/kWh = XXX €/year
- **Remaining share of the standard energy used (per year): XXX** *€/year* (XXX % ; XXX kWh/year)
  - In %: solar thermal energy represents XXX% here so, remaining share of XXX**%**
  - In kWh: X1 - X2 = XXX **kWh/year**
  - In €: XXX kWh/year x XXX €/kWh = XXX **€/year**
- **Remaining emission of CO2:** XXX *kg CO2 (CO2 reduction up to XXX kg CO2)*
  cf. XXX kwh/year x XXX kg CO2 = XXX kg CO2

- **Previsionnal Cost (total - subsidies): XXX** *€*
  cf. cost of equipment & installation + site preparation - potential aids = previsional cost
  - **Cost of the equipment & installation:** XXX *€*
    Notes: 3829€ for one stainless steel unit & 3480€ for one basic unit + installation expenses = 4000€/unit / XXX units x 4000€/unit = XXX €
  - **Cost of the site preparation:** 5000*€*
    cf. *in average if not done personally by the holder*
  - **Aids and subsidies available:** *XXX €*
    cf. average grant = XXX % ; X1 x X2 = XXX € *in the event of approval by regulating authorities*
    OPTIONAL COST: *monitoring = 1200€ (equipment) + 1200€ (installation)+ 38 €/year (RESOL subscription)*

- **Financial Package : XXX** *€/year for 10 years* (in average)
  cf. Total - subsidies ; cash + financial loan (= duration + annuity)
  - Previsionnal cost = financial loan = XXX **€**
  - Duration: **10 years** / Loan rate = XXX**%** (with yearly increase) / STE Durability = **+30 years**
    => XXX € / 10 years = XXX €/year ; taking into account the loan rate: **XXX €/year** (in average)

- **Return on investment (global expense / annual savings):** XXX *years*
  - Global expense = XXX **€**
  - Annual energy savings = XXX **€ per year** during 30 years so in total : XXX €/year x 30 years = XXX **€**
  - ROI = X1 € / X2 € = XXX **years**
  - ROIC = X2 € / X1 € = XXX **%**

- **Yearly Earnings (Annual savings and yearly loan payment): XXX** *€/year* (for 10 years, then XXX €/year)
  cf. good if savings > loan
  - Annual savings = XXX **€**
  - Yearly loan payment = XXX **€**
  - Difference = X1 - X2 = **XXX €/year of earnings during the 10 year-loan period / after = XXX €/year**

- **Network of installers:** Ets LEFORT / Solair3Tech / Elevance (groupe Agriale) / Pineau Thermic System / MAES Ets / Lacta Services / INOVIA (Ancien du Groupe Terrena) / SARL TESSIER / Comptoir machine à traire (CMT) / CES Tardy - EMERAUDE ELEVAGE EQUIPEMENT / Energies libres

- **Legislation for installation/Procedures and precautions:** rural environnment so few restrictions ; when roof, request for work to municipality / when on the floor, nothing needed as long as within property

RELEVANT REMARKS & COMMENTS

NB 1: what about simulating another model where only the service of energy is sold, not the device?

NB 2: is Liqun a subcontractor of the installers or reverse?

NB 3: for each set of case study (academic + field application), making a review of conclusions (approximatively 1p)