

DT 1.3.2

ELECTRONIC VERSION OF THE GUIDE WITH ADDED CALCULATIONS IN EXCELS SHEETS (SOFTWARE TOOL N.1)

31/5/2018



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1 Introduction

In this deliverable are presented all the pages developed inside the TOOL. In particular all the code, and the instructions included in the tool are shown as they are present in the TOOL.

The choose that the project participants takes to develop this guide is to have an interactive session with the user, and provide him the instruction during the use of the TOOL.

2 Home

This is the first page of the TOOL that the user will see when it open it.

In the code below there are some “msgbox” that allow to dialog with the user and help him to follow the correct procedure to use the TOOL.



UserFormHome

```
Private Sub CommandButton1_Click()
```

```
UserFormSubstrate.Show
```

```
End Sub
```

```
Private Sub btn1_Click()
```

```
Dim btn1 As String
```

```
Dim valore As String
```

```
If UserFormSubstrate.CheckBox2 = True Then
```

```
btn1 = MsgBox("Do you want to use hydrolyser to increase the biogas sewage sludge production? Pay  
attention: choosing this technology you will have an increase of non biodegradable COD", vbYesNo)
```

```
If btn1 = vbYes Then
```

```
UserFormhydrolysis.Show
```

```
Else
```

```
Worksheets("UpDateAnaerobicDigestion").Cells(25, 2) = "NO"
```

```
valore = Worksheets("Anaerobic_Digestion").Cells(10, 4)
If valore = "Wet" Then
UserFormSpecificInputADWet.Show
Else
If valore = "Semy-Dry" Then
UserFormSpecificInputADSemyDry.Show
Else
If valore = "Dry" Then
UserFormSpecificInputADDry.Show
Else
MsgBox "Attention: out of the intervals of anaerobic digestion. Try with other values of dry substance!",
vbCritical
UserFormSubstrate.Show
End If
End If
End If
End If
End If
If UserFormSubstrate.CheckBox2 = False Then
Worksheets("UpDateAnaerobicDigestion").Cells(25, 2) = "NO"
valore = Worksheets("Anaerobic_Digestion").Cells(10, 4)
If valore = "Wet" Then
UserFormSpecificInputADWet.Show
Else
If valore = "Semy-Dry" Then
UserFormSpecificInputADSemyDry.Show
Else
If valore = "Dry" Then
UserFormSpecificInputADDry.Show
Else
MsgBox "Attention: out of the intervals of anaerobic digestion. Try with other values of dry substance!",
vbCritical UserFormSubstrate.Show
End If
End If
End If
End If
End Sub
```

```
Private Sub btn2_Click()
UserFormSpecificInputComposting.Show
End Sub

Private Sub btn3_Click()
UserFormSpecificInputGasifica.Show
End Sub

Private Sub btn4_Click()
UserFormSpecificInputHTC.Show
End Sub

Private Sub btn5_Click() 'Module1
If cb6 = False Then 'Anaerobic Digestion and Composting
Worksheets("AD+Composting").Range("F201:G201") = "NA"
Worksheets("AD+Composting").Range("F202:G202") = "NA"
Worksheets("AD+Composting").Range("F203:G203") = "NA"
Worksheets("AD+Composting").Range("F204:G204") = "NA"
If cb6 = True Then
Worksheets("AD+Composting").Range("F201:G201") = Worksheets("AD+Composting").Range("D60")
Worksheets("AD+Composting").Range("F202:G202") = Worksheets("AD+Composting").Range("D66")
Worksheets("AD+Composting").Range("F203:G203") = Worksheets("AD+Composting").Range("D99")
Worksheets("AD+Composting").Range("F204:G204") = Worksheets("AD+Composting").Range("D3")
End If
End If

If cb8 = False Then 'Anaerobic Digestion and HTC
Worksheets("AD+HTC").Range("G208:H208") = "NA"
Worksheets("AD+HTC").Range("G209:H209") = "NA"
Worksheets("AD+HTC").Range("G210:H210") = "NA"
Worksheets("AD+HTC").Range("G211:H211") = "NA"
Else
If cb8 = True Then
Worksheets("AD+HTC").Range("G208:H208") = Worksheets("AD+HTC").Range("C52")
Worksheets("AD+HTC").Range("G209:H209") = Worksheets("AD+HTC").Range("C54")
Worksheets("AD+HTC").Range("G210:H210") = Worksheets("AD+HTC").Range("C61")
Worksheets("AD+HTC").Range("G211:H211") = Worksheets("AD+HTC").Range("C65")
End If
End If

If cb7 = True Then 'Anaerobic Digestion and Gasification
```

Call Newton_example1

Else

End If

If cb7 = False Then

Worksheets("AD+Gasification").Range("G223:H223") = "NA"

Worksheets("AD+Gasification").Range("G224:H224") = "NA"

Worksheets("AD+Gasification").Range("G225:H225") = "NA"

Worksheets("AD+Gasification").Range("G226:H226") = "NA"

Worksheets("AD+Gasification").Range("G227:H227") = "NA"

Worksheets("AD+Gasification").Range("G228:H228") = "NA"

Else

If cb7 = True Then

Worksheets("AD+Gasification").Range("G223:H223") = Worksheets("AD+Gasification").Range("C135")

Worksheets("AD+Gasification").Range("G224:H224") = Worksheets("AD+Gasification").Range("C138")

Worksheets("AD+Gasification").Range("G225:H225") = Worksheets("AD+Gasification").Range("C149")

Worksheets("AD+Gasification").Range("G226:H226") = Worksheets("AD+Gasification").Range("C105")

Worksheets("AD+Gasification").Range("G227:H227") = Worksheets("AD+Gasification").Range("C115")

Worksheets("AD+Gasification").Range("G228:H228") = Worksheets("AD+Gasification").Range("C121")

End If

End If

End Sub

Private Sub btn6_Click()

UserFormWWTP.Show

End Sub

Private Sub CommandButton2_Click()

UserFormWWTPDescription.Show

End Sub

Private Sub CommandButton3_Click()

UserFormUCA.Show

End Sub

Private Sub CommandButton4_Click()

UserFormEconomic.Show

End Sub

Private Sub CommandButton5_Click()

UserFormLCA.Show

End Sub



```
Private Sub CommandButton16_Click()
```

```
Sheets("Front").Select
```

```
Sheets("Front").Range("J2").Select
```

```
UserFormIntro.Show
```

```
End Sub
```

```
Private Sub CommandButton17_Click()
```

```
Dim btn As String
```

```
btn = MsgBox("Use this button when you want to clear all filled data. Do you want to clean this  
workbook?", vbYesNo)
```

```
If btn = vbYes Then
```

```
Worksheets("UpDateAnaerobicDigestion").Cells(25, 2) = "NO"
```

```
Worksheets("UpDateAnaerobicDigestion").Cells(1, 6) = "NO"
```

```
Worksheets("EE_WWTP").Cells(88, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(89, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(90, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(92, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(93, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(94, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(95, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(97, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(98, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(99, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(101, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(102, 3) = 0
```

```
Worksheets("EE_WWTP").Cells(103, 5) = 0
```

```
Worksheets("RES_WWTP").Range("I9") = 0
```

```
Worksheets("RES_WWTP").Range("J9") = 0
```

```
Worksheets("RES_WWTP").Range("I10") = 0
```

```
Worksheets("RES_WWTP").Range("K10") = 0
```

```
Worksheets("RES_WWTP").Range("I11") = 0
```

```
Worksheets("RES_WWTP").Range("J11") = 0
```

```
Worksheets("RES_WWTP").Range("K11") = 0
```

```
Worksheets("RES_WWTP").Range("F22") = 0
```

```
Worksheets("RES_WWTP").Range("F23") = 0
```

```
Worksheets("RES_WWTP").Range("K37") = 0
```



Worksheets("Plant description").Range("C1") = ""

UserFormSubstrate.Remake

UserFormWWTP.Remake

UserFormWWTP1.Remake

UserFormWWTP2.Remake

UserFormBiogas.Remake

UserFormHybrid.Remake

UserFormHydroelectric.Remake

UserFormPV.Remake

UserFormSolarThermal.Remake

UserFormSpecificInputADDry.Remake

UserFormSpecificInputADSemyDry.Remake

UserFormSpecificInputADWet.Remake

UserFormWWTPDescription.Remake

UserFormLCChemicals.Remake

UserFormUCA1.Remake

UserFormEconomic.Remake

End If

End Sub

Private Sub CommandButton1_Click()

UserFormSubstrate.Show

End Sub

Private Sub btn1_Click()

Dim btn1 As String

Dim valore As String

valore = Worksheets("Anaerobic_Digestion").Cells(10, 4)

If UserFormSubstrate.CheckBox2 = True Then

valore = Worksheets("Anaerobic_Digestion").Cells(10, 4)

btn1 = MsgBox("Do you want to use hydrolyser to increase the biogas sewage sludge production? Pay attention: choosing this technology you will have an increase of non biodegradable COD.", vbYesNo)

If btn1 = vbYes Then

UserFormhydrolysis.Show

Else

If valore = "Wet" Then

If UserFormSubstrate.CheckBox8 = False Then

UserFormSpecificInputADWet.TextBox7.Locked = True

```
UserFormSpecificInputADWet.TextBox7.BackColor = vbRed
UserFormSpecificInputADWet.Label18.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox7.Locked = False
UserFormSpecificInputADWet.TextBox7.BackColor = vbGreen
UserFormSpecificInputADWet.Label18.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox1 = False Then
UserFormSpecificInputADWet.TextBox1.Locked = True
UserFormSpecificInputADWet.TextBox1.BackColor = vbRed
UserFormSpecificInputADWet.Label11.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox1.Locked = False
UserFormSpecificInputADWet.TextBox1.BackColor = vbGreen
UserFormSpecificInputADWet.Label11.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox2 = False Then
UserFormSpecificInputADWet.TextBox2.Locked = True
UserFormSpecificInputADWet.TextBox2.BackColor = vbRed
UserFormSpecificInputADWet.Label12.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox2.Locked = False
UserFormSpecificInputADWet.TextBox2.BackColor = vbGreen
UserFormSpecificInputADWet.Label12.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox3 = False Then
UserFormSpecificInputADWet.TextBox3.Locked = True
UserFormSpecificInputADWet.TextBox3.BackColor = vbRed
UserFormSpecificInputADWet.Label13.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox3.Locked = False
UserFormSpecificInputADWet.TextBox3.BackColor = vbGreen
UserFormSpecificInputADWet.Label13.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox5 = False Then
UserFormSpecificInputADWet.TextBox4.Locked = True
```

```
UserFormSpecificInputADWet.TextBox4.BackColor = vbRed
UserFormSpecificInputADWet.Label15.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox4.Locked = False
UserFormSpecificInputADWet.TextBox4.BackColor = vbGreen
UserFormSpecificInputADWet.Label15.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox6 = False Then
UserFormSpecificInputADWet.TextBox5.Locked = True
UserFormSpecificInputADWet.TextBox5.BackColor = vbRed
UserFormSpecificInputADWet.Label16.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox5.Locked = False
UserFormSpecificInputADWet.TextBox5.BackColor = vbGreen
UserFormSpecificInputADWet.Label16.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox7 = False Then
UserFormSpecificInputADWet.TextBox6.Locked = True
UserFormSpecificInputADWet.TextBox6.BackColor = vbRed
UserFormSpecificInputADWet.Label17.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox6.Locked = False
UserFormSpecificInputADWet.TextBox6.BackColor = vbGreen
UserFormSpecificInputADWet.Label17.BackColor = vbGreen
End If
UserFormSpecificInputADWet.Show
UserFormhydrolysis.Hide
Else
If valore = "Semy-Dry" Then
If UserFormSubstrate.CheckBox8 = False Then
UserFormSpecificInputADSemyDry.TextBox7.Locked = True
UserFormSpecificInputADSemyDry.TextBox7.BackColor = vbRed
UserFormSpecificInputADSemyDry.Label18.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox7.Locked = False
UserFormSpecificInputADSemyDry.TextBox7.BackColor = vbGreen
```

UserFormSpecificInputADSemyDry.Label18.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox1 = False Then

UserFormSpecificInputADSemyDry.TextBox1.Locked = True

UserFormSpecificInputADSemyDry.TextBox1.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label11.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox1.Locked = False

UserFormSpecificInputADSemyDry.TextBox1.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label11.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox2 = False Then

UserFormSpecificInputADSemyDry.TextBox2.Locked = True

UserFormSpecificInputADSemyDry.TextBox2.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label12.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox2.Locked = False

UserFormSpecificInputADSemyDry.TextBox2.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label12.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox3 = False Then

UserFormSpecificInputADSemyDry.TextBox3.Locked = True

UserFormSpecificInputADSemyDry.TextBox3.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label13.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox3.Locked = False

UserFormSpecificInputADSemyDry.TextBox3.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label13.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox5 = False Then

UserFormSpecificInputADSemyDry.TextBox4.Locked = True

UserFormSpecificInputADSemyDry.TextBox4.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label15.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox4.Locked = False

UserFormSpecificInputADSemyDry.TextBox4.BackColor = vbGreen

```
UserFormSpecificInputADSemyDry.Label15.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox6 = False Then
```

```
UserFormSpecificInputADSemyDry.TextBox5.Locked = True
```

```
UserFormSpecificInputADSemyDry.TextBox5.BackColor = vbRed
```

```
UserFormSpecificInputADSemyDry.Label16.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox5.Locked = False
```

```
UserFormSpecificInputADSemyDry.TextBox5.BackColor = vbGreen
```

```
UserFormSpecificInputADSemyDry.Label16.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox7 = False Then
```

```
UserFormSpecificInputADSemyDry.TextBox6.Locked = True
```

```
UserFormSpecificInputADSemyDry.TextBox6.BackColor = vbRed
```

```
UserFormSpecificInputADSemyDry.Label17.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox6.Locked = False
```

```
UserFormSpecificInputADSemyDry.TextBox6.BackColor = vbGreen
```

```
UserFormSpecificInputADSemyDry.Label17.BackColor = vbGreen
```

```
End If
```

```
UserFormSpecificInputADSemyDry.Show
```

```
UserFormhydrolysis.Hide
```

```
Else
```

```
If valore = "Dry" Then
```

```
If UserFormSubstrate.CheckBox8 = False Then
```

```
UserFormSpecificInputADDry.TextBox7.Locked = True
```

```
UserFormSpecificInputADDry.TextBox7.BackColor = vbRed
```

```
UserFormSpecificInputADDry.Label18.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox7.Locked = False
```

```
UserFormSpecificInputADDrye.TextBox7.BackColor = vbGreen
```

```
UserFormSpecificInputADDry.Label18.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox1 = False Then
```

```
UserFormSpecificInputADDry.TextBox1.Locked = True
```

```
UserFormSpecificInputADDry.TextBox1.BackColor = vbRed
UserFormSpecificInputADDry.Label11.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox1.Locked = False
UserFormSpecificInputADDry.TextBox1.BackColor = vbGreen
UserFormSpecificInputADDry.Label11.BackColor = vbGreen
End If
```

```
If UserFormSubstrate.CheckBox2 = False Then
UserFormSpecificInputADDry.TextBox2.Locked = True
UserFormSpecificInputADDry.TextBox2.BackColor = vbRed
UserFormSpecificInputADDry.Label12.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox2.Locked = False
UserFormSpecificInputADDry.TextBox2.BackColor = vbGreen
UserFormSpecificInputADDry.Label12.BackColor = vbGreen
End If
```

```
If UserFormSubstrate.CheckBox3 = False Then
UserFormSpecificInputADDry.TextBox3.Locked = True
UserFormSpecificInputADDry.TextBox3.BackColor = vbRed
UserFormSpecificInputADDry.Label13.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox3.Locked = False
UserFormSpecificInputADDry.TextBox3.BackColor = vbGreen
UserFormSpecificInputADDry.Label13.BackColor = vbGreen
End If
```

```
If UserFormSubstrate.CheckBox5 = False Then
UserFormSpecificInputADDry.TextBox4.Locked = True
UserFormSpecificInputADDry.TextBox4.BackColor = vbRed
UserFormSpecificInputADDry.Label15.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox4.Locked = False
UserFormSpecificInputADDry.TextBox4.BackColor = vbGreen
UserFormSpecificInputADDry.Label15.BackColor = vbGreen
End If
```

```
If UserFormSubstrate.CheckBox6 = False Then
```

```
UserFormSpecificInputADDry.TextBox5.Locked = True
UserFormSpecificInputADDry.TextBox5.BackColor = vbRed
UserFormSpecificInputADDry.Label16.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox5.Locked = False
UserFormSpecificInputADDry.TextBox5.BackColor = vbGreen
UserFormSpecificInputADDry.Label16.BackColor = vbGreen
End If

If UserFormSubstrate.CheckBox7 = False Then
UserFormSpecificInputADDry.TextBox6.Locked = True
UserFormSpecificInputADDry.TextBox6.BackColor = vbRed
UserFormSpecificInputADDry.Label17.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox6.Locked = False
UserFormSpecificInputADDry.TextBox6.BackColor = vbGreen
UserFormSpecificInputADDry.Label17.BackColor = vbGreen
End If

UserFormSpecificInputADDry.Show
UserFormhydrolysis.Hide

Else

MsgBox "Attention: out of the intervals of anaerobic digestion. Try with other values of dry substance!",
vbCritical

UserFormSubstrate.Show
UserFormhydrolysis.Hide

End If
End If
End If
End If
End If

If UserFormSubstrate.CheckBox2 = False Then
Worksheets("UpDateAnaerobicDigestion").Cells(25, 2) = "NO"
valore = Worksheets("Anaerobic_Digestion").Cells(10, 4)

If valore = "Wet" Then
If UserFormSubstrate.CheckBox8 = False Then
UserFormSpecificInputADWet.TextBox7.Locked = True
```

```
UserFormSpecificInputADWet.TextBox7.BackColor = vbRed
UserFormSpecificInputADWet.Label18.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox7.Locked = False
UserFormSpecificInputADWet.TextBox7.BackColor = vbGreen
UserFormSpecificInputADWet.Label18.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox1 = False Then
UserFormSpecificInputADWet.TextBox1.Locked = True
UserFormSpecificInputADWet.TextBox1.BackColor = vbRed
UserFormSpecificInputADWet.Label11.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox1.Locked = False
UserFormSpecificInputADWet.TextBox1.BackColor = vbGreen
UserFormSpecificInputADWet.Label11.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox2 = False Then
UserFormSpecificInputADWet.TextBox2.Locked = True
UserFormSpecificInputADWet.TextBox2.BackColor = vbRed
UserFormSpecificInputADWet.Label12.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox2.Locked = False
UserFormSpecificInputADWet.TextBox2.BackColor = vbGreen
UserFormSpecificInputADWet.Label12.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox3 = False Then
UserFormSpecificInputADWet.TextBox3.Locked = True
UserFormSpecificInputADWet.TextBox3.BackColor = vbRed
UserFormSpecificInputADWet.Label13.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox3.Locked = False
UserFormSpecificInputADWet.TextBox3.BackColor = vbGreen
UserFormSpecificInputADWet.Label13.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox5 = False Then
UserFormSpecificInputADWet.TextBox4.Locked = True
```

```
UserFormSpecificInputADWet.TextBox4.BackColor = vbRed
UserFormSpecificInputADWet.Label15.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox4.Locked = False
UserFormSpecificInputADWet.TextBox4.BackColor = vbGreen
UserFormSpecificInputADWet.Label15.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox6 = False Then
UserFormSpecificInputADWet.TextBox5.Locked = True
UserFormSpecificInputADWet.TextBox5.BackColor = vbRed
UserFormSpecificInputADWet.Label16.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox5.Locked = False
UserFormSpecificInputADWet.TextBox5.BackColor = vbGreen
UserFormSpecificInputADWet.Label16.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox7 = False Then
UserFormSpecificInputADWet.TextBox6.Locked = True
UserFormSpecificInputADWet.TextBox6.BackColor = vbRed
UserFormSpecificInputADWet.Label17.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox6.Locked = False
UserFormSpecificInputADWet.TextBox6.BackColor = vbGreen
UserFormSpecificInputADWet.Label17.BackColor = vbGreen
End If
UserFormSpecificInputADWet.Show
UserFormhydrolysis.Hide
Else
If valore = "Semy-Dry" Then
If UserFormSubstrate.CheckBox8 = False Then
UserFormSpecificInputADSemyDry.TextBox7.Locked = True
UserFormSpecificInputADSemyDry.TextBox7.BackColor = vbRed
UserFormSpecificInputADSemyDry.Label18.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox7.Locked = False
UserFormSpecificInputADSemyDry.TextBox7.BackColor = vbGreen
```

UserFormSpecificInputADSemyDry.Label18.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox1 = False Then

UserFormSpecificInputADSemyDry.TextBox1.Locked = True

UserFormSpecificInputADSemyDry.TextBox1.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label11.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox1.Locked = False

UserFormSpecificInputADSemyDry.TextBox1.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label11.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox2 = False Then

UserFormSpecificInputADSemyDry.TextBox2.Locked = True

UserFormSpecificInputADSemyDry.TextBox2.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label12.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox2.Locked = False

UserFormSpecificInputADSemyDry.TextBox2.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label12.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox3 = False Then

UserFormSpecificInputADSemyDry.TextBox3.Locked = True

UserFormSpecificInputADSemyDry.TextBox3.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label13.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox3.Locked = False

UserFormSpecificInputADSemyDry.TextBox3.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label13.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox5 = False Then

UserFormSpecificInputADSemyDry.TextBox4.Locked = True

UserFormSpecificInputADSemyDry.TextBox4.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label15.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox4.Locked = False

UserFormSpecificInputADSemyDry.TextBox4.BackColor = vbGreen

```
UserFormSpecificInputADSemyDry.Label15.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox6 = False Then
```

```
UserFormSpecificInputADSemyDry.TextBox5.Locked = True
```

```
UserFormSpecificInputADSemyDry.TextBox5.BackColor = vbRed
```

```
UserFormSpecificInputADSemyDry.Label16.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox5.Locked = False
```

```
UserFormSpecificInputADSemyDry.TextBox5.BackColor = vbGreen
```

```
UserFormSpecificInputADSemyDry.Label16.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox7 = False Then
```

```
UserFormSpecificInputADSemyDry.TextBox6.Locked = True
```

```
UserFormSpecificInputADSemyDry.TextBox6.BackColor = vbRed
```

```
UserFormSpecificInputADSemyDry.Label17.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox6.Locked = False
```

```
UserFormSpecificInputADSemyDry.TextBox6.BackColor = vbGreen
```

```
UserFormSpecificInputADSemyDry.Label17.BackColor = vbGreen
```

```
End If
```

```
UserFormSpecificInputADSemyDry.Show
```

```
UserFormhydrolysis.Hide
```

```
Else
```

```
If valore = "Dry" Then
```

```
If UserFormSubstrate.CheckBox8 = False Then
```

```
UserFormSpecificInputADDry.TextBox7.Locked = True
```

```
UserFormSpecificInputADDry.TextBox7.BackColor = vbRed
```

```
UserFormSpecificInputADDry.Label18.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox7.Locked = False
```

```
UserFormSpecificInputADDrye.TextBox7.BackColor = vbGreen
```

```
UserFormSpecificInputADDry.Label18.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox1 = False Then
```

```
UserFormSpecificInputADDry.TextBox1.Locked = True
```

```
UserFormSpecificInputADDry.TextBox1.BackColor = vbRed
```

```
UserFormSpecificInputADDry.Label11.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox1.Locked = False
```

```
UserFormSpecificInputADDry.TextBox1.BackColor = vbGreen
```

```
UserFormSpecificInputADDry.Label11.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox2 = False Then
```

```
UserFormSpecificInputADDry.TextBox2.Locked = True
```

```
UserFormSpecificInputADDry.TextBox2.BackColor = vbRed
```

```
UserFormSpecificInputADDry.Label12.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox2.Locked = False
```

```
UserFormSpecificInputADDry.TextBox2.BackColor = vbGreen
```

```
UserFormSpecificInputADDry.Label12.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox3 = False Then
```

```
UserFormSpecificInputADDry.TextBox3.Locked = True
```

```
UserFormSpecificInputADDry.TextBox3.BackColor = vbRed
```

```
UserFormSpecificInputADDry.Label13.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox3.Locked = False
```

```
UserFormSpecificInputADDry.TextBox3.BackColor = vbGreen
```

```
UserFormSpecificInputADDry.Label13.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox5 = False Then
```

```
UserFormSpecificInputADDry.TextBox4.Locked = True
```

```
UserFormSpecificInputADDry.TextBox4.BackColor = vbRed
```

```
UserFormSpecificInputADDry.Label15.BackColor = vbRed
```

```
Else
```

```
UserFormSpecificInputADWet.TextBox4.Locked = False
```

```
UserFormSpecificInputADDry.TextBox4.BackColor = vbGreen
```

```
UserFormSpecificInputADDry.Label15.BackColor = vbGreen
```

```
End If
```

```
If UserFormSubstrate.CheckBox6 = False Then
```

```
UserFormSpecificInputADDry.TextBox5.Locked = True
```



```
UserFormSpecificInputADDry.TextBox5.BackColor = vbRed
UserFormSpecificInputADDry.Label16.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox5.Locked = False
UserFormSpecificInputADDry.TextBox5.BackColor = vbGreen
UserFormSpecificInputADDry.Label16.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox7 = False Then
UserFormSpecificInputADDry.TextBox6.Locked = True
UserFormSpecificInputADDry.TextBox6.BackColor = vbRed
UserFormSpecificInputADDry.Label17.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox6.Locked = False
UserFormSpecificInputADDry.TextBox6.BackColor = vbGreen
UserFormSpecificInputADDry.Label17.BackColor = vbGreen
End If
UserFormSpecificInputADDry.Show
UserFormhydrolysis.Hide
Else
MsgBox "Attention: out of the intervals of anaerobic digestion. Try with other values of dry substance!",
vbCritical
UserFormSubstrate.Show
UserFormhydrolysis.Hide
End If
End If
End If
End If
End Sub
```

```
Worksheets("AD+Composting").Range("F201") = "NA"
```

Worksheets("AD+Composting").Range("F202") = "NA"

Worksheets("AD+Composting").Range("F203") = "NA"

Worksheets("AD+Composting").Range("F204") = "NA"

Else

If cb6 = True Then

Worksheets("AD+Composting").Range("F201") = Worksheets("AD+Composting").Range("D60")

Worksheets("AD+Composting").Range("F202") = Worksheets("AD+Composting").Range("D66")

Worksheets("AD+Composting").Range("F203") = Worksheets("AD+Composting").Range("D99")

Worksheets("AD+Composting").Range("F204") = Worksheets("AD+Composting").Range("D3")

End If

End If

If cb8 = False Then 'Anaerobic Digestion and HTC

Worksheets("AD+HTC").Range("G208") = "NA"

Worksheets("AD+HTC").Range("G209") = "NA"

Worksheets("AD+HTC").Range("G210") = "NA"

Worksheets("AD+HTC").Range("G211") = "NA"

Else

If cb8 = True Then

Worksheets("AD+HTC").Range("G208") = Worksheets("AD+HTC").Range("C52")

Worksheets("AD+HTC").Range("G209") = Worksheets("AD+HTC").Range("C54")

Worksheets("AD+HTC").Range("G210") = Worksheets("AD+HTC").Range("C61")

Worksheets("AD+HTC").Range("G211") = Worksheets("AD+HTC").Range("C65")

End If

End If

If cb7 = True Then 'Anaerobic Digestion and Gasification

Call Newton_example1

Worksheets("AD+Gasification").Range("G223") = Worksheets("AD+Gasification").Range("C135")

Worksheets("AD+Gasification").Range("G224") = Worksheets("AD+Gasification").Range("C138")

Worksheets("AD+Gasification").Range("G225") = Worksheets("AD+Gasification").Range("C149")

Worksheets("AD+Gasification").Range("G226") = Worksheets("AD+Gasification").Range("C105")

Worksheets("AD+Gasification").Range("G227") = Worksheets("AD+Gasification").Range("C115")

Worksheets("AD+Gasification").Range("G228") = Worksheets("AD+Gasification").Range("C121")

Else

If cb7 = False Then

Worksheets("AD+Gasification").Range("G223") = "NA"

Worksheets("AD+Gasification").Range("G224") = "NA"

```
Worksheets("AD+Gasification").Range("G225") = "NA"
Worksheets("AD+Gasification").Range("G226") = "NA"
Worksheets("AD+Gasification").Range("G227") = "NA"
Worksheets("AD+Gasification").Range("G228") = "NA"
End If
End If
Result
End Sub

Private Sub btn6_Click()
UserFormWWTP.Show
End Sub

Private Sub CommandButton2_Click()
UserFormWWTPDescription.Show
End Sub

Private Sub CommandButton3_Click()
UserFormUCA.Show
End Sub

Private Sub CommandButton4_Click()
UserFormEconomic.Show
End Sub

Private Sub CommandButton5_Click()
Dim btn As String

btn = MsgBox("Do you know the data for the following chemical reagents expressed in kg / year: Acetic
acid, Methanol, Ferric chloride, Polyaluminiumchlorid and Polymer?", vbYesNo)

Set Foglio = ThisWorkbook.Sheets("Input")

If btn = vbYes Then
UserFormLCAchemicals.Show
Else
UserFormLCA.Show
Foglio.Range("C68") = 0
Foglio.Range("C69") = 0
Foglio.Range("C70") = 0
Foglio.Range("C71") = 0
Foglio.Range("C72") = 0
Foglio.Range("E68") = 0
Foglio.Range("E69") = 0
```



Foglio.Range("E70") = 0

Foglio.Range("E71") = 0

Foglio.Range("E72") = 0

End If

End Sub

3.3 WWTP

In this part of the Tool the user have to fill the dialog box with the descriptive information of the treatment platform.

WWTP Description

×

Name of WWTP/Operator

Address of WWTP

Country

Contact person

Year of commissioning of the last expansion stage

Treatment capacity

PE (*)

Connected population

PE (*)

(*) Equivalent Population

Save and Exit

UserformWWTPDescription

```
Private Sub ComboBox1_Change()
```

```
End Sub
```

```
Private Sub UserForm_Activate()
```

```
MsgBox "Insert requested information about the Waste Water Treatment Plant. Press -  
Exit- To exit.", vbOKOnly
```

```
End Sub
```

```
Function Remake()
```

```
Me.TextBox1 = ""
```

```
Me.TextBox2 = ""
```

```
'Me.TextBox3 = ""
```

```
Me.TextBox4 = ""
```

```
Me.TextBox5 = ""
```

```
Me.TextBox7 = ""
```

```
Me.TextBox8 = ""
```

```
Me.ComboBox1 = ""
```

End Function

Private Sub CommandButton1_Click()

Dim valore As String

Dim Ssheet As Worksheet

Set Ssheet = ThisWorkbook.Sheets("Plant description")

Ssheet.Cells(2, 3) = TextBox1

Ssheet.Cells(3, 3) = TextBox2

Ssheet.Cells(4, 3) = TextBox3

Ssheet.Cells(5, 3) = TextBox4

Ssheet.Cells(6, 3) = TextBox5

Ssheet.Cells(7, 3) = TextBox6

Ssheet.Cells(8, 3) = TextBox7

Ssheet.Cells(9, 3) = TextBox8

Ssheet.Cells(1, 3) = ComboBox1

valore = Worksheets("Plant description").Cells(1, 3)

If valore = "European Union" Then

Worksheets("LCA").Cells(7, 10) = "Electricity mix for EU"

Worksheets("LCA").Cells(7, 11) = "Electricity mix for EU"

Else

If valore = "Germany" Then

Worksheets("LCA").Cells(7, 10) = "Electricity mix for DE"

Worksheets("LCA").Cells(7, 11) = "Electricity mix for DE"

Else

If valore = "Austria" Then

Worksheets("LCA").Cells(7, 10) = "Electricity mix for AT"

Worksheets("LCA").Cells(7, 11) = "Electricity mix for AT"

Else

If valore = "Italy" Then

Worksheets("LCA").Cells(7, 10) = "Electricity mix for IT"

Worksheets("LCA").Cells(7, 11) = "Electricity mix for IT"

Else

If valore = "Croatia" Then



Worksheets("LCA").Cells(7, 10) = "Electricity mix for HR"

Worksheets("LCA").Cells(7, 11) = "Electricity mix for HR"

Else

If valore = "Czech Republic" Then

Worksheets("LCA").Cells(7, 10) = "Electricity mix for CZ"

Worksheets("LCA").Cells(7, 11) = "Electricity mix for CZ"

Else

If valore = "Sweden" Then

Worksheets("LCA").Cells(7, 10) = "Electricity mix for SE"

Worksheets("LCA").Cells(7, 11) = "Electricity mix for SE"

End If

End If

End If

End If

End If

End If

End If

UserFormWWTPDescription.Hide

End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit

If CloseMode = vbFormControlMenu Then

Cancel = 1

End If

End Sub

3.2 Substrates

In this dialog box the user will provide the information on the available substrates their composition and costs. If some information is unknown it is possible to ask for default values that will be provided by the software.

Substrates Database

Substrate to select	Tons (*) [t a.r./year]	Total Solid (%)	C (%)	H (%)	O (%)	N (%)	Ash (%)	Volatile Matter (%)	Fixed Carbon (%)	Income Price [€/ton]
Primary Sludge <input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Secondary Sludge <input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other substrates										
OFMSW (**) <input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Digestate (***) <input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Food industry waste <input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Animal Blood <input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Animal Fat <input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other <input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(*) As received. (**) Organic Fraction of Municipal Solid Waste.
 (***) If you want to observe the combination among Anaerobic Digestion and Composting, Gasification and HTC, at point 2 of this tool, you have to enter digestate' data. If you have the data on the tons, enter it, otherwise type zero and it will be calculated by the process of anaerobic digestion. The same applies to other data.

Save and Exit

UserFormSubstratesDatabase

Private MyTextBox(81) As Variant

Private Sub TextBox_Change()

For i = 1 To 81

TextBox(i).Value = CheckTextBoxValue(i)

Next i

End Sub

Private Sub UserForm_Activate()

Me.TextBox64.Visible = False

Me.TextBox65.Visible = False

Me.TextBox66.Visible = False

Me.TextBox67.Visible = False



Me.TextBox68.Visible = False

Me.TextBox69.Visible = False

Me.TextBox70.Visible = False

Me.TextBox71.Visible = False

Me.TextBox72.Visible = False

Me.TextBox73.Visible = False

Me.TextBox81.Visible = False

Me.Label19.Visible = False

MsgBox "Select the CheckBox on the right of the substrate label available. Type the amount of each substrate selected. Change suggested values in the TextBox if you want. Press -Exit- to save data!", vbOKOnly

End Sub

Function Remake()

Dim Ssheet As Worksheet

Dim sett As Worksheet

Set Ssheet = ThisWorkbook.Sheets("Feedstock_Database")

Set sett = ThisWorkbook.Sheets("Input")

Ssheet.Range("G5") = 0

Ssheet.Range("H5") = 0

Ssheet.Range("I5") = 0

Ssheet.Range("J5") = 0

Ssheet.Range("K5") = 0

Ssheet.Range("L5") = 0

Ssheet.Range("M5") = 0

Ssheet.Range("N5") = 0

Ssheet.Range("G7") = 0

Ssheet.Range("H7") = 0

Ssheet.Range("I7") = 0

Ssheet.Range("J7") = 0

Ssheet.Range("K7") = 0

Ssheet.Range("L7") = 0

Ssheet.Range("M7") = 0



Ssheet.Range("N7") = 0
Ssheet.Range("G9") = 0
Ssheet.Range("H9") = 0
Ssheet.Range("I9") = 0
Ssheet.Range("J9") = 0
Ssheet.Range("K9") = 0
Ssheet.Range("L9") = 0
Ssheet.Range("M9") = 0
Ssheet.Range("N9") = 0
Ssheet.Range("G11") = 0
Ssheet.Range("H11") = 0
Ssheet.Range("I11") = 0
Ssheet.Range("J11") = 0
Ssheet.Range("K11") = 0
Ssheet.Range("L11") = 0
Ssheet.Range("M11") = 0
Ssheet.Range("N11") = 0
Ssheet.Range("G13") = 0
Ssheet.Range("H13") = 0
Ssheet.Range("I13") = 0
Ssheet.Range("J13") = 0
Ssheet.Range("K13") = 0
Ssheet.Range("L13") = 0
Ssheet.Range("M13") = 0
Ssheet.Range("N13") = 0
Ssheet.Range("G15") = 0
Ssheet.Range("H15") = 0
Ssheet.Range("I15") = 0
Ssheet.Range("J15") = 0
Ssheet.Range("K15") = 0
Ssheet.Range("L15") = 0
Ssheet.Range("M15") = 0



Ssheet.Range("N15") = 0
Ssheet.Range("G17") = 0
Ssheet.Range("H17") = 0
Ssheet.Range("I17") = 0
Ssheet.Range("J17") = 0
Ssheet.Range("K17") = 0
Ssheet.Range("L17") = 0
Ssheet.Range("M17") = 0
Ssheet.Range("N17") = 0
Ssheet.Range("G19") = 0
Ssheet.Range("H19") = 0
Ssheet.Range("I19") = 0
Ssheet.Range("J19") = 0
Ssheet.Range("K19") = 0
Ssheet.Range("L19") = 0
Ssheet.Range("M19") = 0
Ssheet.Range("N19") = 0
sett.Range("I104") = 0
sett.Range("I105") = 0
sett.Range("I106") = 0
sett.Range("I107") = 0
sett.Range("I108") = 0
sett.Range("I109") = 0
sett.Range("I110") = 0
sett.Range("J104") = 0
sett.Range("J105") = 0
sett.Range("J106") = 0
sett.Range("J107") = 0
sett.Range("J108") = 0
sett.Range("J109") = 0
sett.Range("J110") = 0
sett.Range("K104") = 0



sett.Range("K105") = 0
sett.Range("K106") = 0
sett.Range("K107") = 0
sett.Range("K108") = 0
sett.Range("K109") = 0
sett.Range("K110") = 0
sett.Range("L104") = 0
sett.Range("L105") = 0
sett.Range("L106") = 0
sett.Range("L107") = 0
sett.Range("L108") = 0
sett.Range("L109") = 0
sett.Range("L110") = 0
sett.Range("M104") = 0
sett.Range("M105") = 0
sett.Range("M106") = 0
sett.Range("M107") = 0
sett.Range("M108") = 0
sett.Range("M109") = 0
sett.Range("M110") = 0
sett.Range("N104") = 0
sett.Range("N105") = 0
sett.Range("N106") = 0
sett.Range("N107") = 0
sett.Range("N108") = 0
sett.Range("N109") = 0
sett.Range("N110") = 0
sett.Range("O104") = 0
sett.Range("O105") = 0
sett.Range("O106") = 0
sett.Range("O107") = 0
sett.Range("O108") = 0



sett.Range("O109") = 0

sett.Range("O110") = 0

sett.Range("P104") = 0

sett.Range("P105") = 0

sett.Range("P106") = 0

sett.Range("P107") = 0

sett.Range("P108") = 0

sett.Range("P109") = 0

sett.Range("P110") = 0

CheckBox1 = False

CheckBox2 = False

CheckBox3 = False

CheckBox4 = False

CheckBox5 = False

CheckBox6 = False

CheckBox7 = False

CheckBox8 = False

Me.TextBox64.Visible = False

Me.TextBox65.Visible = False

Me.TextBox66.Visible = False

Me.TextBox67.Visible = False

Me.TextBox68.Visible = False

Me.TextBox69.Visible = False

Me.TextBox70.Visible = False

Me.TextBox71.Visible = False

Me.TextBox72.Visible = False

Me.TextBox73.Visible = False

Me.TextBox81.Visible = False

Me.Label19.Visible = False

End Function

Private Sub UserForm_Initialize() 'initializing useform start from totalsolid

TextBox1 = tons



Set MyTextBox(1) = Me.TextBox1
Set MyTextBox(2) = Me.TextBox2
Set MyTextBox(3) = Me.TextBox3
Set MyTextBox(4) = Me.TextBox4
Set MyTextBox(5) = Me.TextBox5
Set MyTextBox(6) = Me.TextBox6
Set MyTextBox(7) = Me.TextBox7
Set MyTextBox(8) = Me.TextBox8
Set MyTextBox(9) = Me.TextBox9
Set MyTextBox(10) = Me.TextBox10
Set MyTextBox(11) = Me.TextBox11
Set MyTextBox(12) = Me.TextBox12
Set MyTextBox(13) = Me.TextBox13
Set MyTextBox(14) = Me.TextBox14
Set MyTextBox(15) = Me.TextBox15
Set MyTextBox(16) = Me.TextBox16
Set MyTextBox(17) = Me.TextBox17
Set MyTextBox(18) = Me.TextBox18
Set MyTextBox(19) = Me.TextBox19
Set MyTextBox(20) = Me.TextBox20
Set MyTextBox(21) = Me.TextBox21
Set MyTextBox(22) = Me.TextBox22
Set MyTextBox(23) = Me.TextBox23
Set MyTextBox(24) = Me.TextBox24
Set MyTextBox(25) = Me.TextBox25
Set MyTextBox(26) = Me.TextBox26
Set MyTextBox(27) = Me.TextBox27
Set MyTextBox(28) = Me.TextBox28
Set MyTextBox(29) = Me.TextBox29
Set MyTextBox(30) = Me.TextBox30
Set MyTextBox(31) = Me.TextBox31
Set MyTextBox(32) = Me.TextBox32



Set MyTextBox(33) = Me.TextBox33
Set MyTextBox(34) = Me.TextBox34
Set MyTextBox(35) = Me.TextBox35
Set MyTextBox(36) = Me.TextBox36
Set MyTextBox(37) = Me.TextBox37
Set MyTextBox(38) = Me.TextBox38
Set MyTextBox(39) = Me.TextBox39
Set MyTextBox(40) = Me.TextBox40
Set MyTextBox(41) = Me.TextBox41
Set MyTextBox(42) = Me.TextBox42
Set MyTextBox(43) = Me.TextBox43
Set MyTextBox(44) = Me.TextBox44
Set MyTextBox(45) = Me.TextBox45
Set MyTextBox(46) = Me.TextBox46
Set MyTextBox(47) = Me.TextBox47
Set MyTextBox(48) = Me.TextBox48
Set MyTextBox(49) = Me.TextBox49
Set MyTextBox(50) = Me.TextBox50
Set MyTextBox(51) = Me.TextBox51
Set MyTextBox(52) = Me.TextBox52
Set MyTextBox(53) = Me.TextBox53
Set MyTextBox(54) = Me.TextBox54
Set MyTextBox(55) = Me.TextBox55
Set MyTextBox(56) = Me.TextBox56
Set MyTextBox(57) = Me.TextBox57
Set MyTextBox(58) = Me.TextBox58
Set MyTextBox(59) = Me.TextBox59
Set MyTextBox(60) = Me.TextBox60
Set MyTextBox(61) = Me.TextBox61
Set MyTextBox(62) = Me.TextBox62
Set MyTextBox(63) = Me.TextBox63
Set MyTextBox(65) = Me.TextBox65



```
Set MyTextBox(66) = Me.TextBox66
Set MyTextBox(67) = Me.TextBox67
Set MyTextBox(68) = Me.TextBox68
Set MyTextBox(69) = Me.TextBox69
Set MyTextBox(70) = Me.TextBox70
Set MyTextBox(71) = Me.TextBox71
Set MyTextBox(72) = Me.TextBox72
Set MyTextBox(73) = Me.TextBox73
Set MyTextBox(74) = Me.TextBox74
Set MyTextBox(75) = Me.TextBox75
Set MyTextBox(76) = Me.TextBox76
Set MyTextBox(77) = Me.TextBox77
Set MyTextBox(78) = Me.TextBox78
Set MyTextBox(79) = Me.TextBox79
Set MyTextBox(80) = Me.TextBox80
Set MyTextBox(81) = Me.TextBox81
End Sub

Private Sub CheckBox8_Click()
If CheckBox8 = True Then
Me.TextBox64.Visible = True
Me.TextBox65.Visible = True
Me.TextBox66.Visible = True
Me.TextBox67.Visible = True
Me.TextBox68.Visible = True
Me.TextBox69.Visible = True
Me.TextBox70.Visible = True
Me.TextBox71.Visible = True
Me.TextBox72.Visible = True
Me.TextBox73.Visible = True
Me.TextBox81.Visible = True
Me.Label19.Visible = True
Me.TextBox64.Value = ""
```



Me.TextBox65.Value = ""

Me.TextBox66.Value = ""

Me.TextBox67.Value = ""

Me.TextBox68.Value = ""

Me.TextBox69.Value = ""

Me.TextBox70.Value = ""

Me.TextBox71.Value = ""

Me.TextBox72.Value = ""

Me.TextBox73.Value = ""

Me.TextBox81.Value = ""

Else

Me.TextBox64.Visible = False

Me.TextBox65.Visible = False

Me.TextBox66.Visible = False

Me.TextBox67.Visible = False

Me.TextBox68.Visible = False

Me.TextBox69.Visible = False

Me.TextBox70.Visible = False

Me.TextBox71.Visible = False

Me.TextBox72.Visible = False

Me.TextBox73.Visible = False

Me.TextBox81.Visible = False

Me.Label19.Visible = False

End If

End Sub

Private Sub CheckBox1_Click() 'default data

Dim Ssheet As Worksheet

Dim sett As Worksheet

Dim valore As String

Set sett = ThisWorkbook.Sheets("Input")

Set Ssheet = ThisWorkbook.Sheets("Feedstock_Database")

valore = Worksheets("Plant description").Cells(1, 3)

If CheckBox1 = True Then

Me.TextBox2.Value = Ssheet.Range("G6")

Me.TextBox3.Value = Ssheet.Range("H6")

Me.TextBox4.Value = Ssheet.Range("I6")

Me.TextBox5.Value = Ssheet.Range("J6")

Me.TextBox6.Value = Ssheet.Range("K6")

Me.TextBox7.Value = Ssheet.Range("L6")

Me.TextBox8.Value = Ssheet.Range("M6")

Me.TextBox9.Value = Ssheet.Range("N6")

If valore = "European Union" Then

Me.TextBox74.Value = sett.Range("I113")

Else

If valore = "Germany" Then

Me.TextBox74.Value = sett.Range("I114")

Else

If valore = "Austria" Then

Me.TextBox74.Value = sett.Range("I115")

Else

If valore = "Croatia" Then

Me.TextBox74.Value = sett.Range("I116")

Else

If valore = "Italy" Then

Me.TextBox74.Value = sett.Range("I117")

Else

If valore = "Czech Republic" Then

Me.TextBox74.Value = sett.Range("I118")

Else

If valore = "Sweden" Then

Me.TextBox74.Value = sett.Range("I119")

End If

End If



End If

End If

End If

End If

End If

Else

If CheckBox1 = False Then

Me.TextBox1.Value = ""

Me.TextBox2.Value = ""

Me.TextBox3.Value = ""

Me.TextBox4.Value = ""

Me.TextBox5.Value = ""

Me.TextBox6.Value = ""

Me.TextBox7.Value = ""

Me.TextBox8.Value = ""

Me.TextBox9.Value = ""

Me.TextBox74.Value = ""

End If

End If

End Sub

Private Sub CheckBox2_Click()

Dim Ssheet As Worksheet

Dim sett As Worksheet

Dim valore As String

Set sett = ThisWorkbook.Sheets("Input")

Set Ssheet = ThisWorkbook.Sheets("Feedstock_Database")

valore = Worksheets("Plant description").Cells(1, 3)

If CheckBox2 = True Then

Me.TextBox11.Value = Ssheet.Range("G8")

Me.TextBox12.Value = Ssheet.Range("H8")

Me.TextBox13.Value = Ssheet.Range("I8")

Me.TextBox14.Value = Ssheet.Range("J8")

```
Me.TextBox15.Value = Ssheet.Range("K8")
Me.TextBox16.Value = Ssheet.Range("L8")
Me.TextBox17.Value = Ssheet.Range("M8")
Me.TextBox18.Value = Ssheet.Range("N8")
If valore = "European Union" Then
Me.TextBox75.Value = sett.Range("J113")
Else
If valore = "Germany" Then
Me.TextBox75.Value = sett.Range("J114")
Else
If valore = "Austria" Then
Me.TextBox75.Value = sett.Range("J115")
Else
If valore = "Croatia" Then
Me.TextBox75.Value = sett.Range("J116")
Else
If valore = "Italy" Then
Me.TextBox75.Value = sett.Range("J117")
Else
If valore = "Czech Republic" Then
Me.TextBox75.Value = sett.Range("J118")
Else
If valore = "Sweden" Then
Me.TextBox75.Value = sett.Range("J119")
End If
End If
End If
End If
End If
End If
End If
Else
```



If CheckBox2 = False Then

Me.TextBox10.Value = ""

Me.TextBox11.Value = ""

Me.TextBox12.Value = ""

Me.TextBox13.Value = ""

Me.TextBox14.Value = ""

Me.TextBox15.Value = ""

Me.TextBox16.Value = ""

Me.TextBox17.Value = ""

Me.TextBox18.Value = ""

Me.TextBox75.Value = ""

End If

End If

End Sub

Private Sub CheckBox3_Click()

Dim Ssheet As Worksheet

Dim sett As Worksheet

Dim valore As String

Set sett = ThisWorkbook.Sheets("Input")

Set Ssheet = ThisWorkbook.Sheets("Feedstock_Database")

valore = Worksheets("Plant description").Cells(1, 3)

If CheckBox3 = True Then

Me.TextBox20.Value = Ssheet.Range("G10")

Me.TextBox21.Value = Ssheet.Range("H10")

Me.TextBox22.Value = Ssheet.Range("I10")

Me.TextBox23.Value = Ssheet.Range("J10")

Me.TextBox24.Value = Ssheet.Range("K10")

Me.TextBox25.Value = Ssheet.Range("L10")

Me.TextBox26.Value = Ssheet.Range("M10")

Me.TextBox27.Value = Ssheet.Range("N10")

If valore = "European Union" Then



Me.TextBox76.Value = sett.Range("K113")

Else

If valore = "Germany" Then

Me.TextBox76.Value = sett.Range("K114")

Else

If valore = "Austria" Then

Me.TextBox76.Value = sett.Range("K115")

Else

If valore = "Croatia" Then

Me.TextBox76.Value = sett.Range("K116")

Else

If valore = "Italy" Then

Me.TextBox76.Value = sett.Range("K117")

Else

If valore = "Czech Republic" Then

Me.TextBox76.Value = sett.Range("K118")

Else

If valore = "Sweden" Then

Me.TextBox76.Value = sett.Range("K119")

End If

End If

End If

End If

End If

End If

End If

Else

If CheckBox3 = False Then

Me.TextBox19.Value = ""

Me.TextBox20.Value = ""

Me.TextBox21.Value = ""

Me.TextBox22.Value = ""



```
Me.TextBox23.Value = ""
Me.TextBox24.Value = ""
Me.TextBox25.Value = ""
Me.TextBox26.Value = ""
Me.TextBox27.Value = ""
Me.TextBox76.Value = ""
End If
End If
End Sub
Private Sub CheckBox4_Click()
Dim Ssheet As Worksheet
Dim sett As Worksheet
Dim valore As String
Set sett = ThisWorkbook.Sheets("Input")
Set Ssheet = ThisWorkbook.Sheets("Feedstock_Database")
valore = Worksheets("Plant description").Cells(1, 3)
If CheckBox4 = True Then
Me.TextBox29.Value = Ssheet.Range("G12")
Me.TextBox30.Value = Ssheet.Range("H12")
Me.TextBox31.Value = Ssheet.Range("I12")
Me.TextBox32.Value = Ssheet.Range("J12")
Me.TextBox33.Value = Ssheet.Range("K12")
Me.TextBox34.Value = Ssheet.Range("L12")
Me.TextBox35.Value = Ssheet.Range("M12")
Me.TextBox36.Value = Ssheet.Range("N12")
If valore = "European Union" Then
Me.TextBox77.Value = sett.Range("L113")
Else
If valore = "Germany" Then
Me.TextBox77.Value = sett.Range("L114")
Else
If valore = "Austria" Then
```



Me.TextBox77.Value = sett.Range("L115")

Else

If valore = "Croatia" Then

Me.TextBox77.Value = sett.Range("L116")

Else

If valore = "Italy" Then

Me.TextBox77.Value = sett.Range("L117")

Else

If valore = "Czech Republic" Then

Me.TextBox77.Value = sett.Range("L118")

Else

If valore = "Sweden" Then

Me.TextBox77.Value = sett.Range("L119")

End If

End If

End If

End If

End If

End If

End If

Else

If CheckBox4 = False Then

Me.TextBox28.Value = ""

Me.TextBox29.Value = ""

Me.TextBox30.Value = ""

Me.TextBox31.Value = ""

Me.TextBox32.Value = ""

Me.TextBox33.Value = ""

Me.TextBox34.Value = ""

Me.TextBox35.Value = ""

Me.TextBox36.Value = ""

Me.TextBox77.Value = ""

```
End If
End If
End Sub
Private Sub CheckBox5_Click()
Dim Ssheet As Worksheet
Dim sett As Worksheet
Dim valore As String
Set sett = ThisWorkbook.Sheets("Input")
Set Ssheet = ThisWorkbook.Sheets("Feedstock_Database")
valore = Worksheets("Plant description").Cells(1, 3)
If CheckBox5 = True Then
Me.TextBox38.Value = Ssheet.Range("G14")
Me.TextBox39.Value = Ssheet.Range("H14")
Me.TextBox40.Value = Ssheet.Range("I14")
Me.TextBox41.Value = Ssheet.Range("J14")
Me.TextBox42.Value = Ssheet.Range("K14")
Me.TextBox43.Value = Ssheet.Range("L14")
Me.TextBox44.Value = Ssheet.Range("M14")
Me.TextBox45.Value = Ssheet.Range("N14")
If valore = "European Union" Then
Me.TextBox78.Value = sett.Range("M113")
Else
If valore = "Germany" Then
Me.TextBox78.Value = sett.Range("M114")
Else
If valore = "Austria" Then
Me.TextBox78.Value = sett.Range("M115")
Else
If valore = "Croatia" Then
Me.TextBox78.Value = sett.Range("M116")
Else
If valore = "Italy" Then
```



Me.TextBox78.Value = sett.Range("M117")

Else

If valore = "Czech Republic" Then

Me.TextBox78.Value = sett.Range("M118")

Else

If valore = "Sweden" Then

Me.TextBox78.Value = sett.Range("M119")

End If

End If

End If

End If

End If

End If

End If

Else

If CheckBox5 = False Then

Me.TextBox37.Value = ""

Me.TextBox38.Value = ""

Me.TextBox39.Value = ""

Me.TextBox40.Value = ""

Me.TextBox41.Value = ""

Me.TextBox42.Value = ""

Me.TextBox43.Value = ""

Me.TextBox44.Value = ""

Me.TextBox45.Value = ""

Me.TextBox78.Value = ""

End If

End If

End Sub

Private Sub CheckBox6_Click()

Dim Ssheet As Worksheet

Dim sett As Worksheet

Dim valore As String

Set sett = ThisWorkbook.Sheets("Input")

Set Ssheet = ThisWorkbook.Sheets("Feedstock_Database")

valore = Worksheets("Plant description").Cells(1, 3)

If CheckBox6 = True Then

Me.TextBox47.Value = Ssheet.Range("G16")

Me.TextBox48.Value = Ssheet.Range("H16")

Me.TextBox49.Value = Ssheet.Range("I16")

Me.TextBox50.Value = Ssheet.Range("J16")

Me.TextBox51.Value = Ssheet.Range("K16")

Me.TextBox52.Value = Ssheet.Range("L16")

Me.TextBox53.Value = Ssheet.Range("M16")

Me.TextBox54.Value = Ssheet.Range("N16")

If valore = "European Union" Then

Me.TextBox79.Value = sett.Range("N113")

Else

If valore = "Germany" Then

Me.TextBox79.Value = sett.Range("N114")

Else

If valore = "Austria" Then

Me.TextBox79.Value = sett.Range("N115")

Else

If valore = "Croatia" Then

Me.TextBox79.Value = sett.Range("N116")

Else

If valore = "Italy" Then

Me.TextBox79.Value = sett.Range("N117")

Else

If valore = "Czech Republic" Then

Me.TextBox79.Value = sett.Range("N118")



Else

If valore = "Sweden" Then

Me.TextBox79.Value = sett.Range("N119")

End If

End If

End If

End If

End If

End If

End If

Else

If CheckBox6 = False Then

Me.TextBox46.Value = ""

Me.TextBox47.Value = ""

Me.TextBox48.Value = ""

Me.TextBox49.Value = ""

Me.TextBox50.Value = ""

Me.TextBox51.Value = ""

Me.TextBox52.Value = ""

Me.TextBox53.Value = ""

Me.TextBox54.Value = ""

Me.TextBox79.Value = ""

End If

End If

End Sub

Private Sub CheckBox7_Click()

Dim Ssheet As Worksheet

Dim sett As Worksheet

Dim valore As String

Set sett = ThisWorkbook.Sheets("Input")

Set Ssheet = ThisWorkbook.Sheets("Feedstock_Database")

valore = Worksheets("Plant description").Cells(1, 3)

If CheckBox7 = True Then

Me.TextBox56.Value = Ssheet.Range("G18")

Me.TextBox57.Value = Ssheet.Range("H18")

Me.TextBox58.Value = Ssheet.Range("I18")

Me.TextBox59.Value = Ssheet.Range("J18")

Me.TextBox60.Value = Ssheet.Range("K18")

Me.TextBox61.Value = Ssheet.Range("L18")

Me.TextBox62.Value = Ssheet.Range("M18")

Me.TextBox63.Value = Ssheet.Range("N18")

If valore = "European Union" Then

Me.TextBox80.Value = sett.Range("O113")

Else

If valore = "Germany" Then

Me.TextBox80.Value = sett.Range("O114")

Else

If valore = "Austria" Then

Me.TextBox80.Value = sett.Range("O115")

Else

If valore = "Croatia" Then

Me.TextBox80.Value = sett.Range("O116")

Else

If valore = "Italy" Then

Me.TextBox80.Value = sett.Range("O117")

Else

If valore = "Czech Republic" Then

Me.TextBox80.Value = sett.Range("O118")

Else

If valore = "Sweden" Then

Me.TextBox80.Value = sett.Range("O119")

End If

End If

End If



```
End If
End If
End If
End If
Else
If CheckBox7 = False Then
Me.TextBox55.Value = ""
Me.TextBox56.Value = ""
Me.TextBox57.Value = ""
Me.TextBox58.Value = ""
Me.TextBox59.Value = ""
Me.TextBox60.Value = ""
Me.TextBox61.Value = ""
Me.TextBox62.Value = ""
Me.TextBox63.Value = ""
Me.TextBox80.Value = ""
End If
End If
End Sub
Private Sub CommandButton1_Click() 'exit
Dim Ssheet As Worksheet
Dim sett As Worksheet
Dim valore As String
Set Ssheet = ThisWorkbook.Sheets("Feedstock_Database")
Set sett = ThisWorkbook.Sheets("Input")
valore = Worksheets("Plant description").Cells(1, 3)
If CheckBox1 = True Then
If valore = "European Union" Then
sett.Range("I104") = TextBox74
Else
If valore = "Germany" Then
sett.Range("I105") = TextBox74
```



Else

If valore = "Austria" Then

sett.Range("I106") = TextBox74

Else

If valore = "Croatia" Then

sett.Range("I107") = TextBox74

Else

If valore = "Italy" Then

sett.Range("I108") = TextBox74

Else

If valore = "Czech Republic" Then

sett.Range("I109") = TextBox74

Else

If valore = "Sweden" Then

sett.Range("I110") = TextBox74

End If

End If

End If

End If

End If

End If

End If

For i = 1 To 9

Ssheet.Cells(5, 5 + i) = (MyTextBox(i).Value)

Next i

Else

If CheckBox1 = False Then

Ssheet.Range("F5") = 0

Ssheet.Range("G5") = 0

Ssheet.Range("H5") = 0

Ssheet.Range("I5") = 0

Ssheet.Range("J5") = 0



```
Ssheet.Range("K5") = 0
Ssheet.Range("L5") = 0
Ssheet.Range("M5") = 0
Ssheet.Range("N5") = 0
sett.Range("I104") = 0
sett.Range("I105") = 0
sett.Range("I106") = 0
sett.Range("I107") = 0
sett.Range("I108") = 0
sett.Range("I109") = 0
sett.Range("I110") = 0
End If
End If
If CheckBox2 = True Then
If valore = "European Union" Then
sett.Range("J104") = TextBox75
Else
If valore = "Germany" Then
sett.Range("J105") = TextBox75
Else
If valore = "Austria" Then
sett.Range("J106") = TextBox75
Else
If valore = "Croatia" Then
sett.Range("J107") = TextBox75
Else
If valore = "Italy" Then
sett.Range("J108") = TextBox75
Else
If valore = "Czech Republic" Then
sett.Range("J109") = TextBox75
Else
```

If valore = "Sweden" Then

sett.Range("J110") = TextBox75

End If

End If

End If

End If

End If

End If

End If

For i = 10 To 18

Ssheet.Cells(7, -4 + i) = (MyTextBox(i).Value)

Next i

Else

If CheckBox2 = False Then

Ssheet.Range("F7") = 0

Ssheet.Range("G7") = 0

Ssheet.Range("H7") = 0

Ssheet.Range("I7") = 0

Ssheet.Range("J7") = 0

Ssheet.Range("K7") = 0

Ssheet.Range("L7") = 0

Ssheet.Range("M7") = 0

Ssheet.Range("N7") = 0

sett.Range("J104") = 0

sett.Range("J105") = 0

sett.Range("J106") = 0

sett.Range("J107") = 0

sett.Range("J108") = 0

sett.Range("J109") = 0

sett.Range("J110") = 0

End If



```
End If
If CheckBox3 = True Then
If valore = "European Union" Then
sett.Range("K104") = TextBox76
Else
If valore = "Germany" Then
sett.Range("K105") = TextBox76
Else
If valore = "Austria" Then
sett.Range("K106") = TextBox76
Else
If valore = "Croatia" Then
sett.Range("K107") = TextBox76
Else
If valore = "Italy" Then
sett.Range("K108") = TextBox76
Else
If valore = "Czech Republic" Then
sett.Range("K109") = TextBox76
Else
If valore = "Sweden" Then
sett.Range("K110") = TextBox76
End If
End If
End If
End If
End If
End If
End If
End If
For i = 19 To 27
Ssheet.Cells(9, -13 + i) = (MyTextBox(i).Value)
Next i
```

Else

If CheckBox2 = False Then

Ssheet.Range("F9") = 0

Ssheet.Range("G9") = 0

Ssheet.Range("H9") = 0

Ssheet.Range("I9") = 0

Ssheet.Range("J9") = 0

Ssheet.Range("K9") = 0

Ssheet.Range("L9") = 0

Ssheet.Range("M9") = 0

Ssheet.Range("N9") = 0

sett.Range("K104") = 0

sett.Range("K105") = 0

sett.Range("K106") = 0

sett.Range("K107") = 0

sett.Range("K108") = 0

sett.Range("K109") = 0

sett.Range("K110") = 0

End If

End If

If CheckBox4 = True Then

If valore = "European Union" Then

sett.Range("L104") = TextBox77

Else

If valore = "Germany" Then

sett.Range("L105") = TextBox77

Else

If valore = "Austria" Then

sett.Range("L106") = TextBox77

Else

If valore = "Croatia" Then

sett.Range("L107") = TextBox77



Else

If valore = "Italy" Then

sett.Range("L108") = TextBox77

Else

If valore = "Czech Republic" Then

sett.Range("L109") = TextBox77

Else

If valore = "Sweden" Then

sett.Range("L110") = TextBox77

End If

End If

End If

End If

End If

End If

End If

For i = 28 To 36

Ssheet.Cells(11, -22 + i) = (MyTextBox(i).Value)

Next i

Else

If CheckBox2 = False Then

Ssheet.Range("F11") = 0

Ssheet.Range("G11") = 0

Ssheet.Range("H11") = 0

Ssheet.Range("I11") = 0

Ssheet.Range("J11") = 0

Ssheet.Range("K11") = 0

Ssheet.Range("L11") = 0

Ssheet.Range("M11") = 0

Ssheet.Range("N11") = 0

sett.Range("L104") = 0

sett.Range("L105") = 0

```
sett.Range("L106") = 0
sett.Range("L107") = 0
sett.Range("L108") = 0
sett.Range("L109") = 0
sett.Range("L110") = 0
End If
End If
If CheckBox5 = True Then
If valore = "European Union" Then
sett.Range("M104") = TextBox78
Else
If valore = "Germany" Then
sett.Range("M105") = TextBox78
Else
If valore = "Austria" Then
sett.Range("M106") = TextBox78
Else
If valore = "Croatia" Then
sett.Range("M107") = TextBox78
Else
If valore = "Italy" Then
sett.Range("M108") = TextBox78
Else
If valore = "Czech Republic" Then
sett.Range("M109") = TextBox78
Else
If valore = "Sweden" Then
sett.Range("M110") = TextBox78
End If
End If
End If
End If
```



```
End If
End If
End If
For i = 37 To 45
    Ssheet.Cells(13, -31 + i) = (MyTextBox(i).Value)
Next i
Else
    If CheckBox2 = False Then
        Ssheet.Range("F13") = 0
        Ssheet.Range("G13") = 0
        Ssheet.Range("H13") = 0
        Ssheet.Range("I13") = 0
        Ssheet.Range("J13") = 0
        Ssheet.Range("K13") = 0
        Ssheet.Range("L13") = 0
        Ssheet.Range("M13") = 0
        Ssheet.Range("N13") = 0
        sett.Range("M104") = 0
        sett.Range("M105") = 0
        sett.Range("M106") = 0
        sett.Range("M107") = 0
        sett.Range("M108") = 0
        sett.Range("M109") = 0
        sett.Range("M110") = 0
    End If
End If
If CheckBox6 = True Then
    If valore = "European Union" Then
        sett.Range("N104") = TextBox79
    Else
        If valore = "Germany" Then
            sett.Range("N105") = TextBox79
```



Else

If valore = "Austria" Then

sett.Range("N106") = TextBox79

Else

If valore = "Croatia" Then

sett.Range("N107") = TextBox79

Else

If valore = "Italy" Then

sett.Range("N108") = TextBox79

Else

If valore = "Czech Republic" Then

sett.Range("N109") = TextBox79

Else

If valore = "Sweden" Then

sett.Range("N110") = TextBox79

End If

End If

End If

End If

End If

End If

End If

For i = 46 To 54

Ssheet.Cells(15, -40 + i) = (MyTextBox(i).Value)

Next i

Else

If CheckBox2 = False Then

Ssheet.Range("F15") = 0

Ssheet.Range("G15") = 0

Ssheet.Range("H15") = 0

Ssheet.Range("I15") = 0

Ssheet.Range("J15") = 0



```
Ssheet.Range("K15") = 0
Ssheet.Range("L15") = 0
Ssheet.Range("M15") = 0
Ssheet.Range("N15") = 0
sett.Range("N104") = 0
sett.Range("N105") = 0
sett.Range("N106") = 0
sett.Range("N107") = 0
sett.Range("N108") = 0
sett.Range("N109") = 0
sett.Range("N110") = 0
End If
End If
If CheckBox7 = True Then
If valore = "European Union" Then
sett.Range("O104") = TextBox80
Else
If valore = "Germany" Then
sett.Range("O105") = TextBox80
Else
If valore = "Austria" Then
sett.Range("O106") = TextBox80
Else
If valore = "Croatia" Then
sett.Range("O107") = TextBox80
Else
If valore = "Italy" Then
sett.Range("O108") = TextBox80
Else
If valore = "Czech Republic" Then
sett.Range("O109") = TextBox80
Else
```



```
If valore = "Sweden" Then
sett.Range("O110") = TextBox80
End If
End If
End If
End If
End If
End If
End If
End If
For i = 55 To 63
Ssheet.Cells(17, -49 + i) = (MyTextBox(i).Value)
Next i
Else
If CheckBox2 = False Then
Ssheet.Range("F17") = 0
Ssheet.Range("G17") = 0
Ssheet.Range("H17") = 0
Ssheet.Range("I17") = 0
Ssheet.Range("J17") = 0
Ssheet.Range("K17") = 0
Ssheet.Range("L17") = 0
Ssheet.Range("M17") = 0
Ssheet.Range("N17") = 0
sett.Range("O104") = 0
sett.Range("O105") = 0
sett.Range("O106") = 0
sett.Range("O107") = 0
sett.Range("O108") = 0
sett.Range("O109") = 0
sett.Range("O110") = 0
End If
End If
```



```
If CheckBox8 = True Then
Ssheet.Range("E19") = TextBox64
Ssheet.Range("F19") = TextBox65
Ssheet.Range("G19") = TextBox66
Ssheet.Range("H19") = TextBox67
Ssheet.Range("I19") = TextBox68
Ssheet.Range("J19") = TextBox69
Ssheet.Range("K19") = TextBox70
Ssheet.Range("L19") = TextBox71
Ssheet.Range("M19") = TextBox72
Ssheet.Range("N19") = TextBox73
If valore = "European Union" Then
sett.Range("P104") = TextBox81
Else
If valore = "Germany" Then
sett.Range("P105") = TextBox81
Else
If valore = "Austria" Then
sett.Range("P106") = TextBox81
Else
If valore = "Croatia" Then
sett.Range("P107") = TextBox81
Else
If valore = "Italy" Then
sett.Range("P108") = TextBox81
Else
If valore = "Czech Republic" Then
sett.Range("P109") = TextBox81
Else
If valore = "Sweden" Then
sett.Range("P110") = TextBox81
```




End If

End If

End If

End If

End If

End If

End If

Else

Ssheet.Range("E19") = 0

Ssheet.Range("F19") = 0

Ssheet.Range("G19") = 0

Ssheet.Range("H19") = 0

Ssheet.Range("I19") = 0

Ssheet.Range("J19") = 0

Ssheet.Range("K19") = 0

Ssheet.Range("L19") = 0

Ssheet.Range("M19") = 0

Ssheet.Range("N19") = 0

sett.Range("P104") = 0

sett.Range("P105") = 0

sett.Range("P106") = 0

sett.Range("P107") = 0

sett.Range("P108") = 0

sett.Range("P109") = 0

sett.Range("P110") = 0

End If

UserFormSubstrate.Hide

End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit

If CloseMode = vbFormControlMenu Then

Cancel = 1



End If

End Sub

3.3 Wastewater Treatment Plant EE/RES

In this dialog box will be provided by the user more deep information necessary to calculate the recoverable energy from wastewater, but also from other available RES sources that could be installed at the platform service, as Photovoltaic panels, solar panels. Furthermore some information on the fate of the biogas is asked too to have a better frame of the scenario requested.

WWTP Specific Input

WWTP Properties_Energy Efficiency

Daily average of wastewater flow [m3/d]

0

Daily average of COD inflow concentration [mg/l]

0

Digestion tower temperature [°C]

0

(30-60 °C)

Ambient air temperature [°C]

0

Total heated surface area [m2]

0

Building heat demand [kWh/(y*m2)]
(depending on the age of the building)

0

(50-150 kWh/(y*m2))

Electric energy consumption [kWh/d]

Click

WWTP Properties_Renewable Energy Sources

Solar power

Photovoltaics

Solar thermal

Hybrid collectors

Hydro power

Hydroelectric

Energy from wastewater

Heat pump

Energy from biogas (*)

Biogas

(*) If you want to include the biogas upgrading you need to choose the amount of biogas to fed into the grid or into the CHP.

Save and Exit

UserformWWTP

Private MyTextBox(6) As Variant

Private Sub tbWWTP1_Change()

tbWWTP1.Value = CheckTextBoxValue(1)

End Sub

Private Sub tbWWTP2_Change()

tbWWTP2.Value = CheckTextBoxValue(2)

End Sub

Private Sub TextBox1_Change()

TextBox1.Value = CheckTextBoxValue(3)

End Sub

Private Sub TextBox2_Change()

```
TextBox2.Value = CheckTextBoxValue(4)
End Sub

Private Sub TextBox3_Change()
TextBox3.Value = CheckTextBoxValue(5)
End Sub

Private Sub TextBox4_Change()
TextBox4.Value = CheckTextBoxValue(6)
End Sub

Function CheckTextBoxValue(NTextBox As Integer)
If MyTextBox(NTextBox).Value < 0 Then
MsgBox "Error: Number minor than zero!", vbCritical
CheckTextBoxValue = "0"
Else
CheckTextBoxValue = MyTextBox(NTextBox).Value
End If
End Function

Private Sub UserForm_Initialize() 'initializing useform
Me.tbWWTP1 = Qww
Set MyTextBox(1) = Me.tbWWTP1
Set MyTextBox(2) = Me.tbWWTP2
Set MyTextBox(3) = Me.TextBox1
Set MyTextBox(4) = Me.TextBox2
Set MyTextBox(5) = Me.TextBox3
Set MyTextBox(6) = Me.TextBox4
End Sub

Function Remake()
Me.tbWWTP1.Value = 0
Me.tbWWTP2.Value = 0
Me.TextBox1.Value = 0
Me.TextBox2.Value = 0
Me.TextBox3.Value = 0
Me.TextBox4.Value = 0
```

End Function

Private Sub btnWWTP1_Click()

Worksheets("EE_WWTP").Cells(23, 4) = Me.tbWWTP1.Value

Worksheets("EE_WWTP").Cells(26, 4) = Me.tbWWTP2.Value

Worksheets("EE_WWTP").Cells(47, 4) = Me.TextBox1.Value

Worksheets("EE_WWTP").Cells(55, 4) = Me.TextBox2.Value

Worksheets("EE_WWTP").Cells(56, 4) = Me.TextBox3.Value

Worksheets("EE_WWTP").Cells(57, 4) = Me.TextBox4.Value

UserFormWWTP.Hide

End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit

If CloseMode = vbFormControlMenu Then

Cancel = 1

End If

End Sub

Private Sub CommandButton1_Click()

Dim btnData As String

btnData = MsgBox("Do you know the daily energy consumption for: inflow pumping station and mechanical pre-treatment, mechanical-biological treatment, sludge treatment and infrastructure? Press -yes- to enter each data, -no- to enter the total energy consumption value of the system", vbYesNo)

If btnData = vbYes Then

UserFormWWTP1.Show

Else

If btnData = vbNo Then

UserFormWWTP2.Show

End If

End If

End Sub

Private Sub CommandButton2_Click()

UserFormPV.Show

End Sub



```
Private Sub CommandButton3_Click()  
    UserFormSolarThermal.Show  
End Sub  
  
Private Sub CommandButton4_Click()  
    UserFormHybrid.Show  
End Sub  
  
Private Sub CommandButton5_Click()  
    UserFormHydroelectric.Show  
End Sub  
  
Private Sub CommandButton7_Click()  
    UserFormHeatPumpYesORno.Show  
End Sub  
  
Private Sub CommandButton6_Click()  
    UserFormBiogas.Show  
End Sub
```

3.3.1 Energy Consumption Click Button (YES)

More information here are requested to identify the electrical and heat consumption of the wastewater treatment site. In this way it is possible to correlate the specific consumption of the different processing stations to some local benchmarks provided for each country involved in the project.

Specific Energy Consumption

×

Inflow pumping station and mechanical pre-treatment

Pumping station [kWh/d]

Screen [kWh/d]

Sand trap and primary clarifier [kWh/d]

Sludge treatment

Thickening [kWh/d]

Digestion [kWh/d]

Dewatering [kWh/d]

Mechanical-biological treatment

Aeration [kWh/d]

Stirrers [kWh/d]

Return sludge pumps [kWh/d]

Miscellaneous (sec. clarifier) [kWh/d]

Infrastructure

Heating [kWh/d]

Misc. infrastructure [kWh/d]

Go To
Save and Exit

UserFormWWTP1

Private MyTextBox(12) As Variant

Private Sub CommandButton1_Click()

UserFormWWTP1.Hide

UserFormWWTP2.Show

End Sub

Private Sub tbEC1_Change()

tbEC1.Value = CheckTextBoxValue(1)

End Sub



```
Private Sub tbEC2_Change()  
tbEC2.Value = CheckTextBoxValue(2)  
End Sub  
  
Private Sub tbEC3_Change()  
tbEC3.Value = CheckTextBoxValue(3)  
End Sub  
  
Private Sub tbEC4_Change()  
tbEC4.Value = CheckTextBoxValue(4)  
End Sub  
  
Private Sub tbEC5_Change()  
tbEC5.Value = CheckTextBoxValue(5)  
End Sub  
  
Private Sub tbEC6_Change()  
tbEC6.Value = CheckTextBoxValue(6)  
End Sub  
  
Private Sub tbEC7_Change()  
tbEC7.Value = CheckTextBoxValue(7)  
End Sub  
  
Private Sub tbEC8_Change()  
tbEC8.Value = CheckTextBoxValue(8)  
End Sub  
  
Private Sub tbEC9_Change()  
tbEC9.Value = CheckTextBoxValue(9)  
End Sub  
  
Private Sub tbEC10_Change()  
tbEC10.Value = CheckTextBoxValue(10)  
End Sub  
  
Private Sub tbEC11_Change()  
tbEC11.Value = CheckTextBoxValue(11)  
End Sub  
  
Private Sub tbEC12_Change()  
tbEC12.Value = CheckTextBoxValue(12)  
End Sub  
  
Function CheckTextBoxValue(NTextBox As Integer)  
If MyTextBox(NTextBox).Value < 0 Then 'no put number minor 0  
MsgBox "Error: Number minor than zero!", vbCritical
```

```
CheckBoxValue = "0"
```

```
Else
```

```
CheckBoxValue = MyTextBox(NTextBox).Value
```

```
End If
```

```
End Function
```

```
Private Sub UserForm_Activate()
```

```
MsgBox "Before to fill check if you have all the requested values. If not, click -Go To- button to insert the  
total daily electric energy consumption.", vbOKOnly
```

```
End Sub
```

```
Function Remake()
```

```
Me.tbEC1.Value = 0
```

```
Me.tbEC2.Value = 0
```

```
Me.tbEC3.Value = 0
```

```
Me.tbEC4.Value = 0
```

```
Me.tbEC5.Value = 0
```

```
Me.tbEC6.Value = 0
```

```
Me.tbEC7.Value = 0
```

```
Me.tbEC8.Value = 0
```

```
Me.tbEC9.Value = 0
```

```
Me.tbEC10.Value = 0
```

```
Me.tbEC11.Value = 0
```

```
Me.tbEC12.Value = 0
```

```
End Function
```

```
Private Sub UserForm_Initialize() 'initializing useform
```

```
Me.tbEC1 = pumping
```

```
Set MyTextBox(1) = Me.tbEC
```

```
Set MyTextBox(2) = Me.tbEC2
```

```
Set MyTextBox(3) = Me.tbEC3
```

```
Set MyTextBox(4) = Me.tbEC4
```

```
Set MyTextBox(5) = Me.tbEC5
```

```
Set MyTextBox(6) = Me.tbEC6
```

```
Set MyTextBox(7) = Me.tbEC7
```

```
Set MyTextBox(8) = Me.tbEC8
```

```
Set MyTextBox(9) = Me.tbEC9
```

```
Set MyTextBox(10) = Me.tbEC10
```

```
Set MyTextBox(11) = Me.tbEC11
```

```
Set MyTextBox(12) = Me.tbEC12
```

```
End Sub
```

```
Private Sub btnWWTP2_Click()
```

```
Worksheets("EE_WWTP").Cells(88, 3) = Me.tbEC1.Value
```

```
Worksheets("EE_WWTP").Cells(89, 3) = Me.tbEC2.Value
```

```
Worksheets("EE_WWTP").Cells(90, 3) = Me.tbEC3.Value
```

```
Worksheets("EE_WWTP").Cells(92, 3) = Me.tbEC4.Value
```

```
Worksheets("EE_WWTP").Cells(93, 3) = Me.tbEC5.Value
```

```
Worksheets("EE_WWTP").Cells(94, 3) = Me.tbEC6.Value
```

```
Worksheets("EE_WWTP").Cells(95, 3) = Me.tbEC7.Value
```

```
Worksheets("EE_WWTP").Cells(97, 3) = Me.tbEC8.Value
```

```
Worksheets("EE_WWTP").Cells(98, 3) = Me.tbEC9.Value
```

```
Worksheets("EE_WWTP").Cells(99, 3) = Me.tbEC10.Value
```

```
Worksheets("EE_WWTP").Cells(101, 3) = Me.tbEC11.Value
```

```
Worksheets("EE_WWTP").Cells(102, 3) = Me.tbEC12.Value
```

```
Worksheets("EE_WWTP").Cells(103, 5) = 0
```

```
UserFormWWTP1.Hide
```

```
End Sub
```

```
Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit
```

```
If CloseMode = vbFormControlMenu Then
```

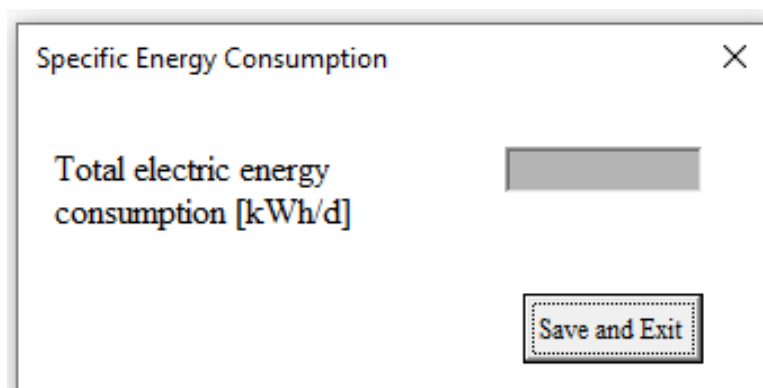
```
Cancel = 1
```

```
End If
```

```
End Sub
```

3.3.2 Energy Consumption Click Button (NO)

If the user doesn't have the detailed information on the different treatment stations of the plant it is possible provide only a general value of the electric consumption of the treatment platform and compare it with other benchmarks. In this case of course the analysis will be less detailed.



Specific Energy Consumption

Total electric energy consumption [kWh/d]

Save and Exit

UserformWWTP1

```
Private MyTextBox(1) As Variant
Private Sub tbWWTPEC_Change()
tbWWTPEC.Value = CheckTextBoxValue(1)
End Sub
Function CheckTextBoxValue(NTextBox As Integer)
If MyTextBox(NTextBox).Value < 0 Then 'no put number minor 0
MsgBox "Error: Number minor than zero!", vbCritical
CheckTextBoxValue = "0"
Else
CheckTextBoxValue = MyTextBox(NTextBox).Value
End If
End Function
Function Remake()
Me.tbWWTPEC.Value = 0
End Function
Private Sub UserForm_Initialize()
Me.tbWWTPEC = EC
Set MyTextBox(1) = Me.tbWWTPEC
End Sub
Private Sub btnWWTPEC_Click()
Worksheets("EE_WWTP").Cells(103, 5) = Me.tbWWTPEC.Value
Worksheets("EE_WWTP").Cells(88, 3) = 0
Worksheets("EE_WWTP").Cells(89, 3) = 0
Worksheets("EE_WWTP").Cells(90, 3) = 0
Worksheets("EE_WWTP").Cells(92, 3) = 0
Worksheets("EE_WWTP").Cells(93, 3) = 0
Worksheets("EE_WWTP").Cells(94, 3) = 0
Worksheets("EE_WWTP").Cells(95, 3) = 0
Worksheets("EE_WWTP").Cells(97, 3) = 0
Worksheets("EE_WWTP").Cells(98, 3) = 0
Worksheets("EE_WWTP").Cells(99, 3) = 0
Worksheets("EE_WWTP").Cells(101, 3) = 0
Worksheets("EE_WWTP").Cells(102, 3) = 0
```



UserFormWWTP2.Hide

End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit

If CloseMode = vbFormControlMenu Then

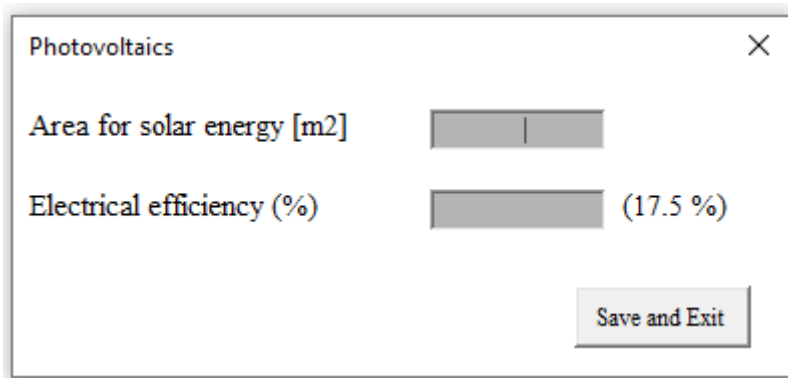
Cancel = 1

End If

End Sub

3.3.3 Photovoltaics

In this section values of the available surface of photovoltaics panels and their efficiency is asked at the user to evaluate the potential electricity recoverable from this RES.



The screenshot shows a Windows-style dialog box titled "Photovoltaics" with a close button (X) in the top right corner. Inside the dialog, there are two input fields. The first is labeled "Area for solar energy [m2]" and contains a single vertical line character "|". The second is labeled "Electrical efficiency (%)" and contains the text "(17.5 %)". At the bottom right of the dialog is a button labeled "Save and Exit".

UserformPV

```

Private MyTextBox(2) As Variant
Private Sub TextBox1_Change()
  TextBox1.Value = CheckTextBoxValue(1)
End Sub
Private Sub TextBox2_Change()
  TextBox2.Value = CheckTextBoxValue(2)
End Sub
Function CheckTextBoxValue(NTextBox As Integer)
  If MyTextBox(NTextBox).Value < 0 Then
    MsgBox "Error: Number minor than zero!", vbCritical
    CheckTextBoxValue = "0"
  Else
    CheckTextBoxValue = MyTextBox(NTextBox).Value
  End If
End Function
Function Remake()
  Me.TextBox1.Value = 0
  Me.TextBox2.Value = 0
End Function
Private Sub UserForm_Initialize()
  Me.TextBox1 = Area
  Set MyTextBox(1) = Me.TextBox1
  
```



```
Set MyTextBox(2) = Me.TextBox2
```

```
End Sub
```

```
Private Sub CommandButton1_Click()
```

```
Dim Ssheet As Worksheet
```

```
Set Ssheet = ThisWorkbook.Sheets("RES_WWTP")
```

```
Ssheet.Cells(9, 9) = TextBox1
```

```
Ssheet.Cells(9, 10) = TextBox2
```

```
UserFormPV.Hide
```

```
End Sub
```

```
Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit
```

```
If CloseMode = vbFormControlMenu Then
```

```
Cancel = 1
```

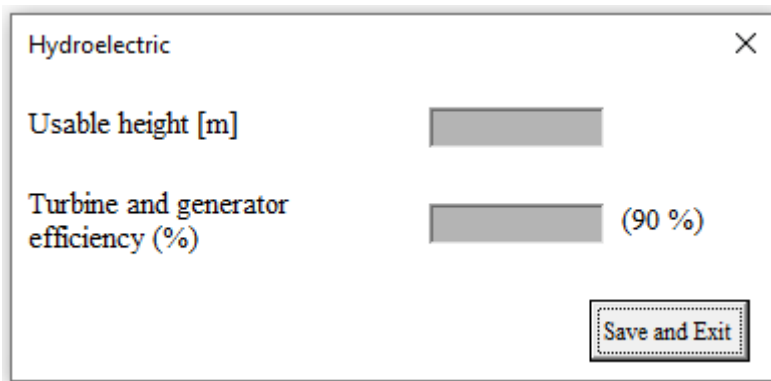
```
End If
```

```
End Sub
```

3.3.4 Hydroelectric

One of the possible RES that can be installed in the treatment plant is a water turbine. With this technology it is possible to recovery further energy, if it is available a fall even if small.

With this dialog box the TOOL ask some of the possible characteristics of the site to calculate the recoverable energy.



The dialog box titled "Hydroelectric" contains two input fields. The first field is labeled "Usable height [m]" and is currently empty. The second field is labeled "Turbine and generator efficiency (%)" and contains the value "90 %". A "Save and Exit" button is located at the bottom right of the dialog box.

UserformHydroelectric

```

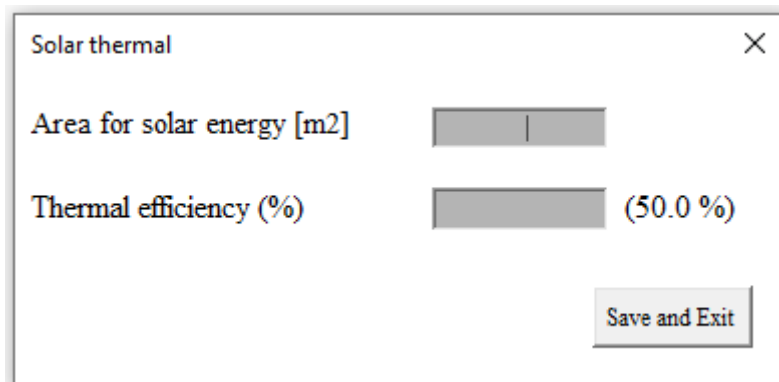
Private MyTextBox(2) As Variant
Private Sub TextBox1_Change()
  TextBox1.Value = CheckTextBoxValue(1)
End Sub
Private Sub TextBox2_Change()
  TextBox2.Value = CheckTextBoxValue(2)
End Sub
Function CheckTextBoxValue(NTextBox As Integer)
  If MyTextBox(NTextBox).Value < 0 Then
    MsgBox "Error: Number minor than zero!", vbCritical
    CheckTextBoxValue = "0"
  Else
    CheckTextBoxValue = MyTextBox(NTextBox).Value
  End If
End Function
Function Remake()
  Me.TextBox1.Value = 0
  Me.TextBox2.Value = 0
End Function
  
```



```
Private Sub UserForm_Initialize()  
Me.TextBox1 = Area  
Set MyTextBox(1) = Me.TextBox1  
Set MyTextBox(2) = Me.TextBox2  
End Sub  
  
Private Sub CommandButton1_Click()  
Dim Ssheet As Worksheet  
Set Ssheet = ThisWorkbook.Sheets("RES_WWTP")  
Ssheet.Cells(22, 6) = TextBox1  
Ssheet.Cells(23, 6) = TextBox2  
UserFormHydroelectric.Hide  
End Sub  
  
Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit  
If CloseMode = vbFormControlMenu Then  
Cancel = 1  
End If  
End Sub
```


3.3.5 Solar thermal

Here similar information asked for the photovoltaic panel are asked for the solar thermal panels. The heat recoverable could be used to heat offices, or to help the drying sludge stations



Solar thermal [X]

Area for solar energy [m2]

Thermal efficiency (%)

UserformSolarthermal

```

Private MyTextBox(2) As Variant
Private Sub TextBox1_Change()
  TextBox1.Value = CheckTextBoxValue(1)
End Sub
Private Sub TextBox2_Change()
  TextBox2.Value = CheckTextBoxValue(2)
End Sub
Function CheckTextBoxValue(NTextBox As Integer)
  If MyTextBox(NTextBox).Value < 0 Then
    MsgBox "Error: Number minor than zero!", vbCritical
    CheckTextBoxValue = "0"
  Else
    CheckTextBoxValue = MyTextBox(NTextBox).Value
  End If
End Function
Function Remake()
  Me.TextBox1.Value = 0
  Me.TextBox2.Value = 0
End Function
Private Sub UserForm_Initialize()
  Me.TextBox1 = Area
  Set MyTextBox(1) = Me.TextBox1
  
```



```
Set MyTextBox(2) = Me.TextBox2
```

```
End Sub
```

```
Private Sub CommandButton1_Click()
```

```
Dim Ssheet As Worksheet
```

```
Set Ssheet = ThisWorkbook.Sheets("RES_WWTP")
```

```
Ssheet.Cells(10, 9) = TextBox1
```

```
Ssheet.Cells(10, 11) = TextBox2
```

```
UserFormSolarThermal.Hide
```

```
End Sub
```

```
Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit
```

```
If CloseMode = vbFormControlMenu Then
```

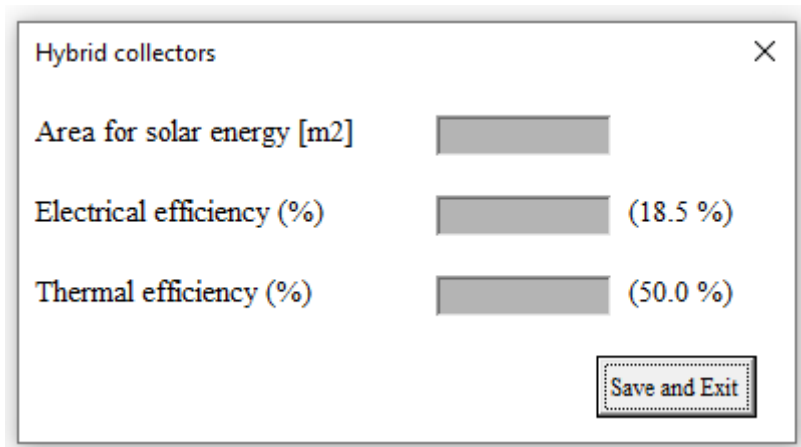
```
Cancel = 1
```

```
End If
```

```
End Sub
```

3.3.6 Hybrid collectors

Also hybrid collectors have been considered to increase the energy efficiency of the solar energy harvesting.



Hybrid collectors

Area for solar energy [m2]

Electrical efficiency (%) (18.5 %)

Thermal efficiency (%) (50.0 %)

Save and Exit

UserFormHybridcollectors

Function Remake()

Me.TextBox1.Value = 0

Me.TextBox2.Value = 0

Me.TextBox3.Value = 0

End Function

Private Sub UserForm_Initialize()

Me.TextBox1 = Area

End Sub

Private Sub CommandButton1_Click()

Dim Ssheet As Worksheet

Set Ssheet = ThisWorkbook.Sheets("RES_WWTP")

Ssheet.Cells(11, 9) = TextBox1

Ssheet.Cells(11, 10) = TextBox2

Ssheet.Cells(11, 11) = TextBox3

UserFormHybrid.Hide

End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer)

If CloseMode = vbFormControlMenu Then

Cancel = 1

End If

End Sub



3.3.7 Heat pump1

As a lot of available heat is content in the waster the use of a heat pump has been considered in the tool. The user can decide to ask for the amount of heat recoverable or not.

Heat Pump

Do you have heat pump?

If you choose yes, in the next step, you can decide how you feed it: with biogas or/and electric energy.

Yes No

UserformHeatpumpYesOrNo

```
Private Sub CommandButton1_Click()
```

```
UserForHeatPump.Show
```

```
UserFormHeatPumpYesORno.Hide
```

```
End Sub
```

```
Private Sub CommandButton2_Click()
```

```
UserFormHeatPumpYesORno.Hide
```

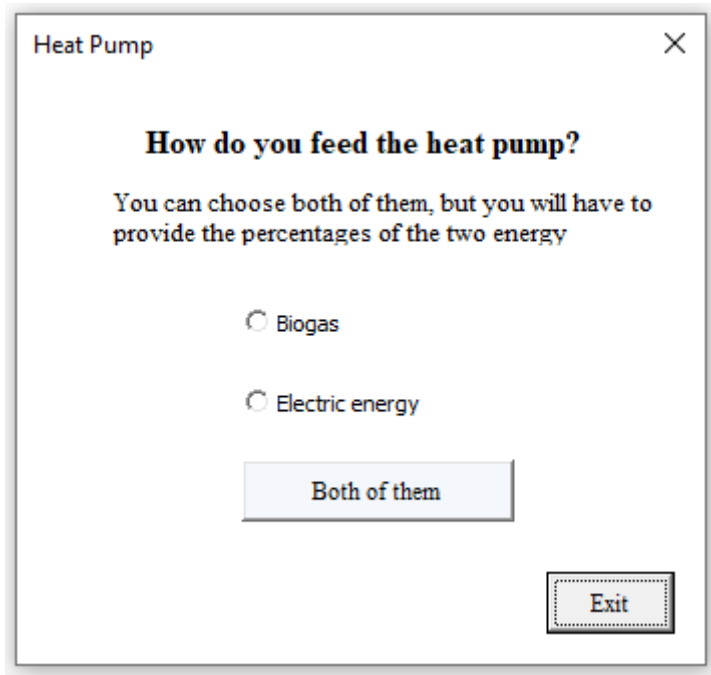
```
End Sub
```

```
Private Sub UserForm_Click()
```

```
End Sub
```

3.3.8 Heat pump2

To work the heat pump require anyway some energy. This energy could be provided in different forms. In this dialog box it is possible to define which form to use, electricity or biogas, or in the case of both decide which percentage of each.



The dialog box is titled "Heat Pump" and contains the following text and controls:

- Title:** Heat Pump
- Question:** How do you feed the heat pump?
- Instruction:** You can choose both of them, but you will have to provide the percentages of the two energy
- Options:**
 - ☐ Biogas
 - ☐ Electric energy
- Buttons:**
 - Both of them:** A button located below the radio buttons.
 - Exit:** A button located at the bottom right of the dialog box.

UserformHeatpump

```

Private Sub CommandButton1_Click()
Dim Ssheet As Worksheet
Set Ssheet = ThisWorkbook.Sheets("RES_WWTP")
If UserForHeatPump.OptionButton1 = True Then
Ssheet.Range("F29") = 1
Ssheet.Range("F28") = 0
Else
If UserForHeatPump.OptionButton2 = True Then
Ssheet.Range("F29") = 0
Ssheet.Range("F28") = 1
End If
End If
UserForHeatPump.Hide
End Sub

Private Sub CommandButton2_Click()
UserForHeatPump.Hide
  
```



UserFormHeatPumpBoth.Show

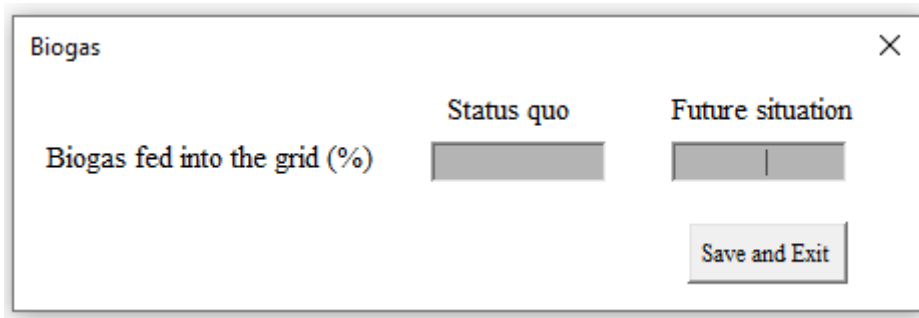
End Sub

Private Sub UserForm_Click()

End Sub

3.3.9 Biogas

The actual trend of the biogas use is the grid fed or its use as biofuel. In this dialog box the information on the status quo of the fed in biomethane and the future perspective is asked to the user to define the future scenarios.



The dialog box titled "Biogas" contains the following elements:

- Status quo**: A label above a single text input field.
- Future situation**: A label above a text input field with a vertical separator line.
- Biogas fed into the grid (%)**: A label positioned to the left of the input fields.
- Save and Exit**: A button located at the bottom right of the dialog.

UserformHeatpump

```

Private MyTextBox(2) As Variant
Private Sub TextBox1_Change()
  TextBox1.Value = CheckTextBoxValue(1)
End Sub
Private Sub TextBox2_Change()
  TextBox2.Value = CheckTextBoxValue(2)
End Sub
Function CheckTextBoxValue(NTextBox As Integer)
  If MyTextBox(NTextBox).Value < 0 Then
    MsgBox "Error: Number minor than zero!", vbCritical
    CheckTextBoxValue = "0"
  Else
    CheckTextBoxValue = MyTextBox(NTextBox).Value
  End If
End Function
Function Remake()
  Me.TextBox1.Value = 0
  Me.TextBox2.Value = 0
End Function
Private Sub UserForm_Initialize()
  Me.TextBox1 = Area
  Set MyTextBox(1) = Me.TextBox1
  Set MyTextBox(2) = Me.TextBox2

```




End Sub

Private Sub CommandButton1_Click()

Dim Ssheet As Worksheet

Set Ssheet = ThisWorkbook.Sheets("RES_WWTP")

Set sSsheet = ThisWorkbook.Sheets("LCA")

Ssheet.Range("K37") = TextBox1

sSsheet.Range("J40") = TextBox2

sSsheet.Range("K40") = TextBox1

UserFormBiogas.Hide

End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit

If CloseMode = vbFormControlMenu Then

Cancel = 1

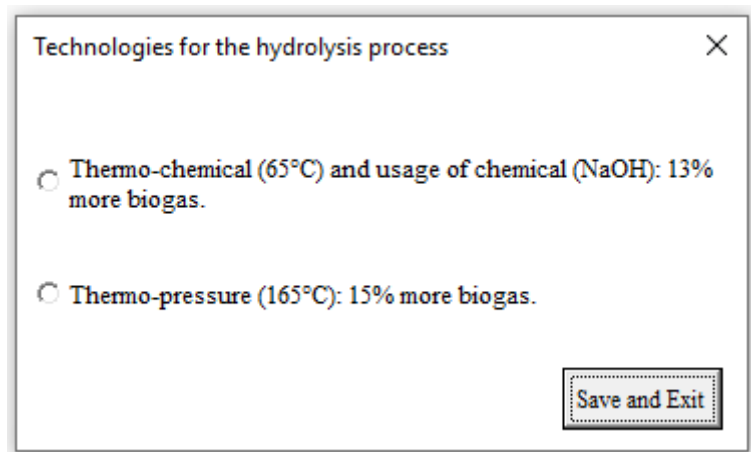
End If

End Sub

3.3.10 Anaerobic Digestion

Anaerobic digestion is the main process to provide valuable energy but it is also one of the more complex because of the numerous parameters that must be considered.

In this dialog box different questions are posed to the user on the possible pre-treatments of the input biomasses, to improve their efficiency in the biogas production.



Technologies for the hydrolysis process [X]

☐ Thermo-chemical (65°C) and usage of chemical (NaOH): 13% more biogas.

☐ Thermo-pressure (165°C): 15% more biogas.

[Save and Exit]

UserformHydrolysis

```
Private Sub OptionButton1_Click()
```

```
If OptionButton1 = True Then
```

```
Worksheets("UpDateAnaerobicDigestion").Cells(25, 2) = "Thermo-chemical"
```

```
Else
```

```
Worksheets("UpDateAnaerobicDigestion").Cells(25, 2) = "NO"
```

```
End If
```

```
End Sub
```

```
Private Sub OptionButton2_Click()
```

```
If OptionButton2 = True Then
```

```
Worksheets("UpDateAnaerobicDigestion").Cells(25, 2) = "Thermo-pressure"
```

```
Else
```

```
Worksheets("UpDateAnaerobicDigestion").Cells(25, 2) = "NO"
```

```
End If
```

```
End Sub
```

```
Private Sub btnhydrolysis1_Click()
```

```
Dim valore As String
```

```
valore = Worksheets("Anaerobic_Digestion").Cells(10, 4)
```

If valore = "Wet" Then

If UserFormSubstrate.CheckBox8 = False Then

UserFormSpecificInputADWet.TextBox7.Locked = True

UserFormSpecificInputADWet.TextBox7.BackColor = vbRed

UserFormSpecificInputADWet.Label18.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox7.Locked = False

UserFormSpecificInputADWet.TextBox7.BackColor = vbGreen

UserFormSpecificInputADWet.Label18.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox1 = False Then

UserFormSpecificInputADWet.TextBox1.Locked = True

UserFormSpecificInputADWet.TextBox1.BackColor = vbRed

UserFormSpecificInputADWet.Label11.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox1.Locked = False

UserFormSpecificInputADWet.TextBox1.BackColor = vbGreen

UserFormSpecificInputADWet.Label11.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox2 = False Then

UserFormSpecificInputADWet.TextBox2.Locked = True

UserFormSpecificInputADWet.TextBox2.BackColor = vbRed

UserFormSpecificInputADWet.Label12.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox2.Locked = False

UserFormSpecificInputADWet.TextBox2.BackColor = vbGreen

UserFormSpecificInputADWet.Label12.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox3 = False Then

UserFormSpecificInputADWet.TextBox3.Locked = True

UserFormSpecificInputADWet.TextBox3.BackColor = vbRed

```
UserFormSpecificInputADWet.Label13.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox3.Locked = False
UserFormSpecificInputADWet.TextBox3.BackColor = vbGreen
UserFormSpecificInputADWet.Label13.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox5 = False Then
UserFormSpecificInputADWet.TextBox4.Locked = True
UserFormSpecificInputADWet.TextBox4.BackColor = vbRed
UserFormSpecificInputADWet.Label15.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox4.Locked = False
UserFormSpecificInputADWet.TextBox4.BackColor = vbGreen
UserFormSpecificInputADWet.Label15.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox6 = False Then
UserFormSpecificInputADWet.TextBox5.Locked = True
UserFormSpecificInputADWet.TextBox5.BackColor = vbRed
UserFormSpecificInputADWet.Label16.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox5.Locked = False
UserFormSpecificInputADWet.TextBox5.BackColor = vbGreen
UserFormSpecificInputADWet.Label16.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox7 = False Then
UserFormSpecificInputADWet.TextBox6.Locked = True
UserFormSpecificInputADWet.TextBox6.BackColor = vbRed
UserFormSpecificInputADWet.Label17.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox6.Locked = False
UserFormSpecificInputADWet.TextBox6.BackColor = vbGreen
UserFormSpecificInputADWet.Label17.BackColor = vbGreen
```

End If

UserFormSpecificInputADWet.Show

Else

If valore = "Semy-Dry" Then

If UserFormSubstrate.CheckBox8 = False Then

UserFormSpecificInputADSemyDry.TextBox7.Locked = True

UserFormSpecificInputADSemyDry.TextBox7.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label18.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox7.Locked = False

UserFormSpecificInputADSemyDry.TextBox7.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label18.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox1 = False Then

UserFormSpecificInputADSemyDry.TextBox1.Locked = True

UserFormSpecificInputADSemyDry.TextBox1.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label11.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox1.Locked = False

UserFormSpecificInputADSemyDry.TextBox1.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label11.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox2 = False Then

UserFormSpecificInputADSemyDry.TextBox2.Locked = True

UserFormSpecificInputADSemyDry.TextBox2.BackColor = vbRed

UserFormSpecificInputADSemyDry.Label12.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox2.Locked = False

UserFormSpecificInputADSemyDry.TextBox2.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label12.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox3 = False Then

```
UserFormSpecificInputADSemyDry.TextBox3.Locked = True
UserFormSpecificInputADSemyDry.TextBox3.BackColor = vbRed
UserFormSpecificInputADSemyDry.Label13.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox3.Locked = False
UserFormSpecificInputADSemyDry.TextBox3.BackColor = vbGreen
UserFormSpecificInputADSemyDry.Label13.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox5 = False Then
UserFormSpecificInputADSemyDry.TextBox4.Locked = True
UserFormSpecificInputADSemyDry.TextBox4.BackColor = vbRed
UserFormSpecificInputADSemyDry.Label15.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox4.Locked = False
UserFormSpecificInputADSemyDry.TextBox4.BackColor = vbGreen
UserFormSpecificInputADSemyDry.Label15.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox6 = False Then
UserFormSpecificInputADSemyDry.TextBox5.Locked = True
UserFormSpecificInputADSemyDry.TextBox5.BackColor = vbRed
UserFormSpecificInputADSemyDry.Label16.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox5.Locked = False
UserFormSpecificInputADSemyDry.TextBox5.BackColor = vbGreen
UserFormSpecificInputADSemyDry.Label16.BackColor = vbGreen
End If
If UserFormSubstrate.CheckBox7 = False Then
UserFormSpecificInputADSemyDry.TextBox6.Locked = True
UserFormSpecificInputADSemyDry.TextBox6.BackColor = vbRed
UserFormSpecificInputADSemyDry.Label17.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox6.Locked = False
```

UserFormSpecificInputADSemyDry.TextBox6.BackColor = vbGreen

UserFormSpecificInputADSemyDry.Label17.BackColor = vbGreen

End If

UserFormSpecificInputADSemyDry.Show

Else

If valore = "Dry" Then

If UserFormSubstrate.CheckBox8 = False Then

UserFormSpecificInputADDry.TextBox7.Locked = True

UserFormSpecificInputADDry.TextBox7.BackColor = vbRed

UserFormSpecificInputADDry.Label18.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox7.Locked = False

UserFormSpecificInputADDrye.TextBox7.BackColor = vbGreen

UserFormSpecificInputADDry.Label18.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox1 = False Then

UserFormSpecificInputADDry.TextBox1.Locked = True

UserFormSpecificInputADDry.TextBox1.BackColor = vbRed

UserFormSpecificInputADDry.Label11.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox1.Locked = False

UserFormSpecificInputADDry.TextBox1.BackColor = vbGreen

UserFormSpecificInputADDry.Label11.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox2 = False Then

UserFormSpecificInputADDry.TextBox2.Locked = True

UserFormSpecificInputADDry.TextBox2.BackColor = vbRed

UserFormSpecificInputADDry.Label12.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox2.Locked = False

UserFormSpecificInputADDry.TextBox2.BackColor = vbGreen

UserFormSpecificInputADDry.Label12.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox3 = False Then

UserFormSpecificInputADDry.TextBox3.Locked = True

UserFormSpecificInputADDry.TextBox3.BackColor = vbRed

UserFormSpecificInputADDry.Label13.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox3.Locked = False

UserFormSpecificInputADDry.TextBox3.BackColor = vbGreen

UserFormSpecificInputADDry.Label13.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox5 = False Then

UserFormSpecificInputADDry.TextBox4.Locked = True

UserFormSpecificInputADDry.TextBox4.BackColor = vbRed

UserFormSpecificInputADDry.Label15.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox4.Locked = False

UserFormSpecificInputADDry.TextBox4.BackColor = vbGreen

UserFormSpecificInputADDry.Label15.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox6 = False Then

UserFormSpecificInputADDry.TextBox5.Locked = True

UserFormSpecificInputADDry.TextBox5.BackColor = vbRed

UserFormSpecificInputADDry.Label16.BackColor = vbRed

Else

UserFormSpecificInputADWet.TextBox5.Locked = False

UserFormSpecificInputADDry.TextBox5.BackColor = vbGreen

UserFormSpecificInputADDry.Label16.BackColor = vbGreen

End If

If UserFormSubstrate.CheckBox7 = False Then

UserFormSpecificInputADDry.TextBox6.Locked = True

UserFormSpecificInputADDry.TextBox6.BackColor = vbRed

```
UserFormSpecificInputADDry.Label17.BackColor = vbRed
Else
UserFormSpecificInputADWet.TextBox6.Locked = False
UserFormSpecificInputADDry.TextBox6.BackColor = vbGreen
UserFormSpecificInputADDry.Label17.BackColor = vbGreen
End If
UserFormSpecificInputADDry.Show
UserFormhydrolysis.Hide
Else
MsgBox "Attention: out of the intervals of anaerobic digestion. Try with other values of dry
substance!", vbCritical
UserFormSubstrate.Show
UserFormhydrolysis.Hide
End If
End If
End If
End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to
exit
If CloseMode = vbFormControlMenu Then
Cancel = 1
End If
End Sub
```

3.3.11 Wet Anaerobic Digestion Specific Input

To calculate the amount of biogas produced the Tool can work with the total organic content in the substrates available or using the specific production of biogas. With this value results will be more precise but this information not always is available for the user. For this reason we ask to the user if it is available.

In the meantime the anaerobic process is considered as wet process or as a dry process.

Information about the efficiency of the CHP unit are requested and also in this case if not known by the user it is possible to ask for some default value.

Wet Anaerobic Digestion Specific Input

Feedstock Properties

Primary Sludge

Secondary Sludge

OFMSW

Food industry waste

Animal Blood

Animal Fat

Other Substrate

Specific production of biogas [m³/kgVS]

Biogas and CHP Parameters

		Recommended
LHV Biogas [MJ/m ³]		18-22
CHP Electric Yield % (Gas engine)		30-40
CHP Thermal Yield % (Gas engine)		50-55

Default Data
Save and Exit

UserformWetAnaerobicDigestionSpecificInput

Private MyTextBox(10) As Variant

Private Sub TextBox1_Change()

TextBox1.Value = CheckTextBoxValue(1)

End Sub

Private Sub TextBox2_Change()

TextBox2.Value = CheckTextBoxValue(2)

End Sub

Private Sub TextBox3_Change()

TextBox3.Value = CheckTextBoxValue(3)

End Sub

Private Sub TextBox4_Change()



```
TextBox4.Value = CheckTextBoxValue(4)
```

```
End Sub
```

```
Private Sub TextBox5_Change()
```

```
TextBox5.Value = CheckTextBoxValue(5)
```

```
End Sub
```

```
Private Sub TextBox6_Change()
```

```
TextBox6.Value = CheckTextBoxValue(6)
```

```
End Sub
```

```
Private Sub tbWet5_Change()
```

```
tbWet5.Value = CheckTextBoxValue(7)
```

```
End Sub
```

```
Private Sub tbWet6_Change()
```

```
tbWet6.Value = CheckTextBoxValue(8)
```

```
End Sub
```

```
Private Sub tbWet7_Change()
```

```
tbWet7.Value = CheckTextBoxValue(9)
```

```
End Sub
```

```
Private Sub TextBox7_Change()
```

```
TextBox7.Value = CheckTextBoxValue(10)
```

```
End Sub
```

```
Function CheckTextBoxValue(NTextBox As Integer)
```

```
If MyTextBox(NTextBox).Value < 0 Then
```

```
MsgBox "Error: Number minor than zero!", vbCritical
```

```
CheckTextBoxValue = "0"
```

```
Else
```

```
CheckTextBoxValue = MyTextBox(NTextBox).Value
```

```
End If
```

```
End Function
```

```
Private Sub UserForm_Activate()
```

```
MsgBox "Press -Default Data- button to see suggested values, then you can change. Press -Exit- to save! Selected substrate-s will be filled in green.", vbOKOnly
```

```
End Sub
```



Function Remake()

Me.TextBox1.Value = 0

Me.TextBox2.Value = 0

Me.TextBox3.Value = 0

Me.TextBox4.Value = 0

Me.TextBox5.Value = 0

Me.TextBox6.Value = 0

Me.tbWet5.Value = 0

Me.tbWet6.Value = 0

Me.tbWet7.Value = 0

Me.TextBox7.Value = 0

End Function

Private Sub UserForm_Initialize()

Set MyTextBox(1) = Me.TextBox1

Set MyTextBox(2) = Me.TextBox2

Set MyTextBox(3) = Me.TextBox3

Set MyTextBox(4) = Me.TextBox4

Set MyTextBox(5) = Me.TextBox5

Set MyTextBox(6) = Me.TextBox6

Set MyTextBox(7) = Me.tbWet5

Set MyTextBox(8) = Me.tbWet6

Set MyTextBox(9) = Me.tbWet7

Set MyTextBox(10) = Me.TextBox7

End Sub

Private Sub btnWet2_Click()

Dim Ssheet As Worksheet

Set Ssheet = ThisWorkbook.Sheets("Anaerobic_Digestion")

If UserFormSubstrate.CheckBox8 = True Then

Me.TextBox7.Value = Ssheet.Range("J16")

Else

Me.TextBox7.Value = 0

End If

```
If UserFormSubstrate.CheckBox1 = True Then
Me.TextBox1.Value = Ssheet.Range("D16")
Else
Me.TextBox1.Value = 0
End If

If UserFormSubstrate.CheckBox2 = True Then
Me.TextBox2.Value = Ssheet.Range("E16")
Else
Me.TextBox2.Value = 0
End If

If UserFormSubstrate.CheckBox3 = True Then
Me.TextBox3.Value = Ssheet.Range("F16")
Else
Me.TextBox3.Value = 0
End If

If UserFormSubstrate.CheckBox5 = True Then
Me.TextBox4.Value = Ssheet.Range("G16")
Else
Me.TextBox4.Value = 0
End If

If UserFormSubstrate.CheckBox6 = True Then
Me.TextBox5.Value = Ssheet.Range("H16")
Else
Me.TextBox5.Value = 0
End If

If UserFormSubstrate.CheckBox7 = True Then
Me.TextBox6.Value = Ssheet.Range("I16")
Else
Me.TextBox6.Value = 0
End If

Me.tbWet5.Value = Sheets("Input").Range("E17")
```



```
Me.tbWet6.Value = Sheets("Input").Range("F17")
Me.tbWet7.Value = Sheets("Input").Range("G17")
End Sub

Private Sub btnWet1_Click()
Dim btnUpgrading As String
Dim Ssheet As Worksheet
Set Ssheet = ThisWorkbook.Sheets("Anaerobic_Digestion")
For i = 1 To 6
Ssheet.Cells(15, 3 + i) = CDBl(MyTextBox(i).Value)
Next i
For i = 7 To 9
Sheets("Input").Cells(16, -2 + i) = CDBl(MyTextBox(i).Value)
Next i
Ssheet.Cells(15, 10) = TextBox7
UserFormSpecificInputADWet.Hide
UserFormhydrolysis.Hide
btnUpgrading = MsgBox("Do you want to include the biogas upgrading?", vbYesNo)
If btnUpgrading = vbYes Then
UserFormUpgrading.Show
Else
Worksheets("UpGrading").Cells(6, 3) = "No"
Worksheets("UpDateAnaerobicDigestion").Cells(1, 6) = "NO"
End If
End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer)
If CloseMode = vbFormControlMenu Then
Cancel = 1
End If
End Sub
```

3.3.12 Technologies for biogas upgrading

As said in a previous page the future of the biogas use is its upgrading to biomethane and injection in grid. To do this it is important to upgrade it to the grid quality requirements. To do this several technologies are available and in this dialog box it is possible to select one of the most commonly used. The info button will provide further more detailed information on the technology considered.

Technologies for biogas upgrading

☐ PSA - Pressure Swing Adsorption Info

☐ PWA - Pressure Water Adsorption Info

☐ Membrane technology Info

Save and Exit

UserformUpgrading

```
Private Sub btnUpgrading_Click()
Dim btnelectrolyzer As String
UserFormUpgrading.Hide
btnelectrolyzer = MsgBox("Do you want to see information about the electrolyzer for power to gas?",
vbYesNo)
If btnelectrolyzer = vbYes Then
Worksheets("UpDateAnaerobicDigestion").Cells(1, 6) = "SI"
Worksheets("LCA").Range("k52") = "SI"
Else
Worksheets("UpDateAnaerobicDigestion").Cells(1, 6) = "NO"
Worksheets("LCA").Range("k52") = "NO"
End If
End Sub

Private Sub OptionButton1_Click()
If OptionButton1 = True Then
Worksheets("UpGrading").Cells(6, 3) = "PSA"
```



```
Worksheets("LCA").Range("J51") = "PSA"
Worksheets("LCA").Range("K51") = "PSA"
Else
If OptionButton1 = False Then
Worksheets("UpGrading").Cells(6, 3) = "NO"
Worksheets("LCA").Range("J51") = "NO"
Worksheets("LCA").Range("K51") = "NO"
End If
End If
End Sub

Private Sub OptionButton2_Click()
If OptionButton2 = True Then
Worksheets("UpGrading").Cells(6, 3) = "PWA"
Worksheets("LCA").Range("J51") = "PWA"
Worksheets("LCA").Range("K51") = "PWA"
Else
If OptionButton2 = False Then
Worksheets("UpGrading").Cells(6, 3) = "NO"
Worksheets("LCA").Range("J51") = "NO"
Worksheets("LCA").Range("K51") = "NO"
End If
End If
End Sub

Private Sub OptionButton3_Click()
If OptionButton3 = True Then
Worksheets("UpGrading").Cells(6, 3) = "Membrane"
Worksheets("UpGrading").Range("J51") = "membranes"
Worksheets("UpGrading").Range("K51") = "membranes"
Else
If OptionButton3 = False Then
Worksheets("UpGrading").Cells(6, 3) = "NO"
Worksheets("LCA").Range("J51") = "NO"
Worksheets("LCA").Range("K51") = "NO"
End If
End If
End Sub
```

```
Private Sub CommandButton1_Click()
```

```
MsgBox "The PSA plant operates the process of separating CO2 from biogas by means of columns within which adsorbent material (usually activated carbon or zeolites) is placed and in which pressures varying throughout the process are applied. At high pressures CO2 is adsorbed by the material used, which is subsequently regenerated thanks to a progressive decrease in pressure. The limits of this technology lie in the necessary pretreatment of the raw biogas in order to eliminate both the H2S which could irreversibly bind to the adsorbent material, and the water vapor that may compromise its structure; vice versa, the advantages consist in the simplicity of construction, in compact and reduced dimensions and in the possibility of finding employment in small size plants.", vbOKOnly
```

```
End Sub
```

```
Private Sub CommandButton2_Click()
```

```
MsgBox "The principle behind PWA technology is the greater solubility of CO2 compared to CH4: the raw gas is made to flow through a treatment column filled with plastic material to increase the contact surface between the gaseous and liquid phase. Inside this column, the gas intercepts a liquid flow in countercurrent, so that the liquid phase at the outlet is enriched with CO2, while the gas is predominantly composed of CH4. To maintain the absorption performance, the washing liquid must be replaced with fresh or regenerated liquid in a separate phase (desorption or regeneration phase); the absorbed species can be freed by simple solvent expansion (flashing), by contact of the solvent with an inert gas stream (stripping), or by heating the solvent (reboiling).", vbOKOnly
```

```
End Sub
```

```
Private Sub CommandButton3_Click()
```

```
MsgBox "The biogas upgrading membranes are made of materials permeable to carbon dioxide, water and ammonia. Hydrogen sulphide, oxygen and nitrogen pass through the membrane to a considerable extent, while methane passes only in very small quantities. Typical membranes for biogas upgrading are made of polymeric materials such as polysulfone, polyimide or polydimethylsiloxane. These materials show favorable selectivity for methane / carbon dioxide separation. To provide a sufficient membrane surface in compact size plants these are applied in the form of hollow fibers combined with a series of parallel membrane modules.", vbOKOnly
```

```
End Sub
```

```
Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit
```

```
If CloseMode = vbFormControlMenu Then
```

```
Cancel = 1
```

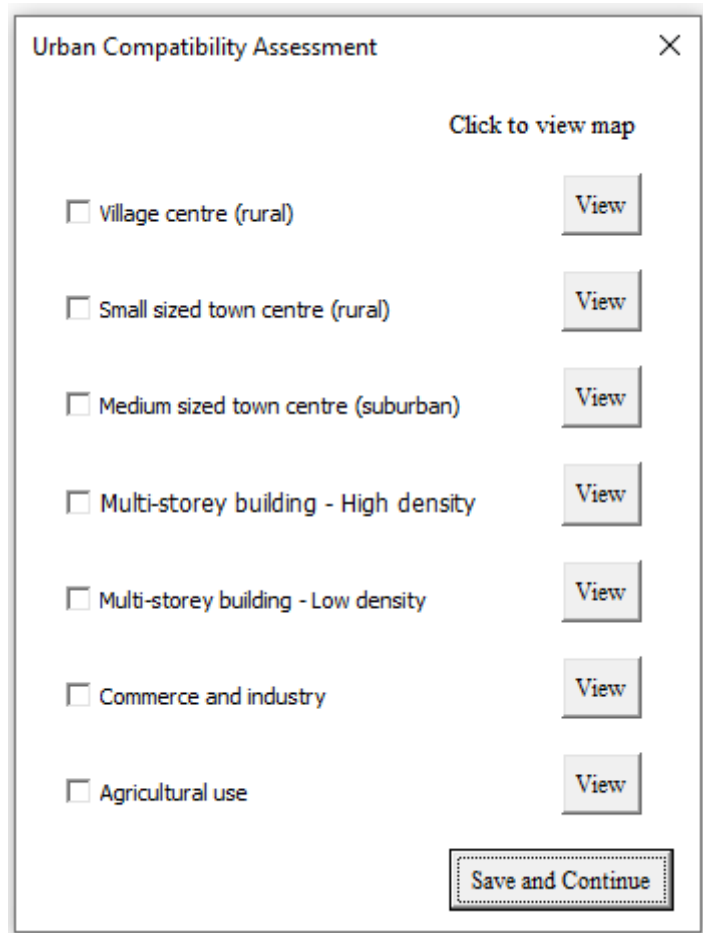
```
End If
```

```
End Sub
```

3.3.13 Urban Compatibility Assessment

One of the main problems of the energy use recovered from a treatment plant is the use of heat.

With this part of the TOOL a deep analysis is done on the possible destination of the heat in a Urban area. In this dialog box is requested at the user which are the available areas where it is possible to use the heat, and a graphical description of the site is provided with the view buttons.



Urban Compatibility Assessment [X]

[Click to view map](#)

<input type="checkbox"/> Village centre (rural)	View
<input type="checkbox"/> Small sized town centre (rural)	View
<input type="checkbox"/> Medium sized town centre (suburban)	View
<input type="checkbox"/> Multi-storey building - High density	View
<input type="checkbox"/> Multi-storey building - Low density	View
<input type="checkbox"/> Commerce and industry	View
<input type="checkbox"/> Agricultural use	View

[Save and Continue](#)

UserformUCA

```
Private MyTextBox(57) As Variant
```

```
Private Sub CommandButton10_Click()
```

```
UserFormType3.Show
```

```
End Sub
```

```
Private Sub CommandButton11_Click()
```

```
UserFormType4.Show
```

```
End Sub
```

```
Private Sub CommandButton5_Click()
```

```
UserFormType1a.Show
```



End Sub

Private Sub CommandButton6_Click()

UserFormType1b.Show

End Sub

Private Sub CommandButton7_Click()

UserFormType1c.Show

End Sub

Private Sub CommandButton8_Click()

UserFormType2a.Show

End Sub

Private Sub CommandButton9_Click()

UserFormType2b.Show

End Sub

Private Sub TextBox1_Change()

TextBox1.Value = CheckTextBoxValue(1)

End Sub

Private Sub TextBox2_Change()

TextBox2.Value = CheckTextBoxValue(2)

End Sub

Private Sub TextBox3_Change()

TextBox3.Value = CheckTextBoxValue(3)

End Sub

Private Sub TextBox4_Change()

TextBox4.Value = CheckTextBoxValue(4)

End Sub

Private Sub TextBox5_Change()

TextBox5.Value = CheckTextBoxValue(5)

End Sub

Private Sub TextBox6_Change()

TextBox6.Value = CheckTextBoxValue(6)

End Sub

Private Sub TextBox7_Change()

TextBox7.Value = CheckTextBoxValue(7)

End Sub

Private Sub TextBox8_Change()

TextBox8.Value = CheckTextBoxValue(8)



End Sub

Private Sub TextBox9_Change()

TextBox9.Value = CheckTextBoxValue(9)

End Sub

Private Sub TextBox10_Change()

TextBox10.Value = CheckTextBoxValue(10)

End Sub

Private Sub TextBox11_Change()

TextBox11.Value = CheckTextBoxValue(11)

End Sub

Private Sub TextBox12_Change()

TextBox12.Value = CheckTextBoxValue(12)

End Sub

Private Sub TextBox13_Change()

TextBox13.Value = CheckTextBoxValue(13)

End Sub

Private Sub TextBox14_Change()

TextBox14.Value = CheckTextBoxValue(14)

End Sub

Private Sub TextBox15_Change()

TextBox15.Value = CheckTextBoxValue(15)

End Sub

Private Sub TextBox16_Change()

TextBox16.Value = CheckTextBoxValue(16)

End Sub

Private Sub TextBox17_Change()

TextBox17.Value = CheckTextBoxValue(17)

End Sub

Private Sub TextBox18_Change()

TextBox18.Value = CheckTextBoxValue(18)

End Sub

Private Sub TextBox19_Change()

TextBox19.Value = CheckTextBoxValue(19)

End Sub

Private Sub TextBox20_Change()

TextBox20.Value = CheckTextBoxValue(20)



End Sub

Private Sub TextBox21_Change()

TextBox21.Value = CheckTextBoxValue(21)

End Sub

Private Sub TextBox22_Change()

TextBox22.Value = CheckTextBoxValue(22)

End Sub

Private Sub TextBox23_Change()

TextBox23.Value = CheckTextBoxValue(23)

End Sub

Private Sub TextBox24_Change()

TextBox24.Value = CheckTextBoxValue(24)

End Sub

Private Sub TextBox25_Change()

TextBox25.Value = CheckTextBoxValue(25)

End Sub

Private Sub TextBox26_Change()

TextBox26.Value = CheckTextBoxValue(26)

End Sub

Private Sub TextBox27_Change()

TextBox27.Value = CheckTextBoxValue(27)

End Sub

Private Sub TextBox28_Change()

TextBox28.Value = CheckTextBoxValue(28)

End Sub

Private Sub TextBox29_Change()

TextBox29.Value = CheckTextBoxValue(29)

End Sub

Private Sub TextBox30_Change()

TextBox30.Value = CheckTextBoxValue(30)

End Sub

Private Sub TextBox31_Change()

TextBox31.Value = CheckTextBoxValue(31)

End Sub

Private Sub TextBox32_Change()

TextBox32.Value = CheckTextBoxValue(32)



End Sub

Private Sub TextBox33_Change()

TextBox33.Value = CheckTextBoxValue(33)

End Sub

Private Sub TextBox34_Change()

TextBox34.Value = CheckTextBoxValue(34)

End Sub

Private Sub TextBox35_Change()

TextBox35.Value = CheckTextBoxValue(35)

End Sub

Private Sub TextBox36_Change()

TextBox36.Value = CheckTextBoxValue(36)

End Sub

Private Sub TextBox37_Change()

TextBox37.Value = CheckTextBoxValue(37)

End Sub

Private Sub TextBox38_Change()

TextBox38.Value = CheckTextBoxValue(38)

End Sub

Private Sub TextBox39_Change()

TextBox39.Value = CheckTextBoxValue(39)

End Sub

Private Sub TextBox40_Change()

TextBox40.Value = CheckTextBoxValue(40)

End Sub

Private Sub TextBox41_Change()

TextBox41.Value = CheckTextBoxValue(41)

End Sub

Private Sub TextBox42_Change()

TextBox42.Value = CheckTextBoxValue(42)

End Sub

Private Sub TextBox43_Change()

TextBox43.Value = CheckTextBoxValue(43)

End Sub

Private Sub TextBox44_Change()

TextBox44.Value = CheckTextBoxValue(44)



End Sub

Private Sub TextBox45_Change()

TextBox45.Value = CheckTextBoxValue(45)

End Sub

Private Sub TextBox46_Change()

TextBox46.Value = CheckTextBoxValue(46)

End Sub

Private Sub TextBox47_Change()

TextBox47.Value = CheckTextBoxValue(47)

End Sub

Private Sub TextBox48_Change()

TextBox48.Value = CheckTextBoxValue(48)

End Sub

Private Sub TextBox49_Change()

TextBox49.Value = CheckTextBoxValue(49)

End Sub

Private Sub TextBox50_Change()

TextBox50.Value = CheckTextBoxValue(50)

End Sub

Private Sub TextBox51_Change()

TextBox51.Value = CheckTextBoxValue(51)

End Sub

Private Sub TextBox52_Change()

TextBox52.Value = CheckTextBoxValue(52)

End Sub

Private Sub TextBox53_Change()

TextBox53.Value = CheckTextBoxValue(53)

End Sub

Private Sub TextBox54_Change()

TextBox54.Value = CheckTextBoxValue(54)

End Sub

Private Sub TextBox55_Change()

TextBox55.Value = CheckTextBoxValue(55)

End Sub

Private Sub TextBox56_Change()

TextBox56.Value = CheckTextBoxValue(56)



End Sub

Private Sub TextBox57_Change()

TextBox57.Value = CheckTextBoxValue(57)

End Sub

Function CheckTextBoxValue(NTextBox As Integer) 'function used in the first 7 strings we call each time when the value entered is <0

If MyTextBox(NTextBox).Value < 0 Then 'no put number minor 0

MsgBox "Error: Number minor than zero!", vbCritical

CheckTextBoxValue = "0"

Else

CheckTextBoxValue = MyTextBox(NTextBox).Value

End If

End Function

Private Sub UserForm_Activate()

MsgBox "Select one or more Type of Areas you want to analyze. After press Save and Continue.", vbOKOnly

End Sub

Private Sub UserForm_Initialize()

TextBox1 = Area

End Sub

Private Sub CommandButton1_Click()

Dim Ssheet As Worksheet

Set Ssheet = ThisWorkbook.Sheets("Input")

If Me.CheckBox1 = True Then

Me.TextBox8.Value = Ssheet.Range("D57")

Else

Me.TextBox8.Value = 0

End If

If Me.CheckBox2 = True Then

Me.TextBox9.Value = Ssheet.Range("E57")

Else

Me.TextBox9.Value = 0

End If

If Me.CheckBox3 = True Then

Me.TextBox10.Value = Ssheet.Range("F57")

Else

Me.TextBox10.Value = 0



```
End If
If Me.CheckBox4 = True Then
Me.TextBox11.Value = Ssheet.Range("G57")
Else
Me.TextBox11.Value = 0
End If
If Me.CheckBox5 = True Then
Me.TextBox12.Value = Ssheet.Range("H57")
Else
Me.TextBox12.Value = 0
End If
End Sub
Private Sub CommandButton2_Click()
Dim Ssheet As Worksheet
Set Ssheet = ThisWorkbook.Sheets("Input")
If Me.CheckBox1 = True Then
Me.TextBox15.Value = Ssheet.Range("D60")
Else
Me.TextBox15.Value = 0
End If
If Me.CheckBox2 = True Then
Me.TextBox16.Value = Ssheet.Range("E60")
Else
Me.TextBox16.Value = 0
End If
If Me.CheckBox3 = True Then
Me.TextBox17.Value = Ssheet.Range("F60")
Else
Me.TextBox17.Value = 0
End If
If Me.CheckBox4 = True Then
Me.TextBox18.Value = Ssheet.Range("G60")
Else
Me.TextBox18.Value = 0
End If
If Me.CheckBox5 = True Then
```



```
Me.TextBox19.Value = Ssheet.Range("H60")
Else
Me.TextBox19.Value = 0
End If
If Me.CheckBox6 = True Then
Me.TextBox20.Value = Ssheet.Range("I60")
Else
Me.TextBox20.Value = 0
End If
End Sub
Private Sub CommandButton3_Click()
Dim Ssheet As Worksheet
Dim Foglio As Worksheet
Set Ssheet = ThisWorkbook.Sheets("Input")
Set Foglio = ThisWorkbook.Sheets("UCA")
Foglio.Cells(2, 4) = TextBox1
Foglio.Cells(2, 5) = TextBox2
Foglio.Cells(2, 6) = TextBox3
Foglio.Cells(2, 7) = TextBox4
Foglio.Cells(2, 8) = TextBox5
Foglio.Cells(2, 9) = TextBox6
Ssheet.Cells(56, 4) = TextBox8
Ssheet.Cells(56, 5) = TextBox9
Ssheet.Cells(56, 6) = TextBox10
Ssheet.Cells(56, 7) = TextBox11
Ssheet.Cells(56, 8) = TextBox12
Ssheet.Cells(59, 4) = TextBox15
Ssheet.Cells(59, 5) = TextBox16
Ssheet.Cells(59, 6) = TextBox17
Ssheet.Cells(59, 7) = TextBox18
Ssheet.Cells(59, 8) = TextBox19
Ssheet.Cells(59, 9) = TextBox20
Foglio.Cells(4, 9) = TextBox27
Foglio.Cells(4, 10) = TextBox28
Foglio.Cells(11, 7) = TextBox29
Foglio.Cells(19, 4) = TextBox30
```

```
Foglio.Cells(19, 5) = TextBox31
Foglio.Cells(19, 6) = TextBox32
Foglio.Cells(19, 7) = TextBox33
Foglio.Cells(19, 8) = TextBox34
Foglio.Cells(19, 9) = TextBox35
Foglio.Cells(21, 4) = TextBox37
Foglio.Cells(21, 5) = TextBox38
Foglio.Cells(21, 6) = TextBox39
Foglio.Cells(21, 7) = TextBox40
Foglio.Cells(21, 8) = TextBox41
Foglio.Cells(21, 9) = TextBox42
Foglio.Cells(24, 4) = TextBox44
Foglio.Cells(24, 5) = TextBox45
Foglio.Cells(24, 6) = TextBox46
Foglio.Cells(24, 7) = TextBox47
Foglio.Cells(24, 8) = TextBox48
Foglio.Cells(24, 9) = TextBox49
Foglio.Cells(24, 10) = TextBox50
Foglio.Cells(26, 4) = TextBox51
Foglio.Cells(26, 5) = TextBox52
Foglio.Cells(26, 6) = TextBox53
Foglio.Cells(26, 7) = TextBox54
Foglio.Cells(26, 8) = TextBox55
Foglio.Cells(26, 9) = TextBox56
Foglio.Cells(26, 10) = TextBox57
If Me.CheckBox1 = True Then
UserFormUCA1.TextBox1.BackColor = vbGreen
UserFormUCA1.TextBox8.BackColor = vbGreen
UserFormUCA1.TextBox15.BackColor = vbGreen
UserFormUCA1.TextBox30.BackColor = vbGreen
UserFormUCA1.TextBox37.BackColor = vbGreen
UserFormUCA1.TextBox44.BackColor = vbGreen
UserFormUCA1.TextBox51.BackColor = vbGreen
UserFormUCA1.TextBox29.BackColor = vbGreen
Else
UserFormUCA1.TextBox1.BackColor = vbRed
```

```
UserFormUCA1.TextBox1.Locked = True
UserFormUCA1.TextBox8.BackColor = vbRed
UserFormUCA1.TextBox8.Locked = True
UserFormUCA1.TextBox15.BackColor = vbRed
UserFormUCA1.TextBox15.Locked = True
UserFormUCA1.TextBox30.BackColor = vbRed
UserFormUCA1.TextBox30.Locked = True
UserFormUCA1.TextBox37.BackColor = vbRed
UserFormUCA1.TextBox37.Locked = True
UserFormUCA1.TextBox44.BackColor = vbRed
UserFormUCA1.TextBox44.Locked = True
UserFormUCA1.TextBox51.BackColor = vbRed
UserFormUCA1.TextBox51.Locked = True
UserFormUCA1.TextBox1.Value = 0
UserFormUCA1.TextBox8.Value = 0
UserFormUCA1.TextBox15.Value = 0
UserFormUCA1.TextBox29.Value = 0
UserFormUCA1.TextBox30.Value = 0
UserFormUCA1.TextBox37.Value = 0
UserFormUCA1.TextBox44.Value = 0
UserFormUCA1.TextBox51.Value = 0
End If
If Me.CheckBox2 = True Then
UserFormUCA1.TextBox2.BackColor = vbGreen
UserFormUCA1.TextBox9.BackColor = vbGreen
UserFormUCA1.TextBox16.BackColor = vbGreen
UserFormUCA1.TextBox31.BackColor = vbGreen
UserFormUCA1.TextBox38.BackColor = vbGreen
UserFormUCA1.TextBox45.BackColor = vbGreen
UserFormUCA1.TextBox52.BackColor = vbGreen
UserFormUCA1.TextBox29.BackColor = vbGreen
Else
UserFormUCA1.TextBox2.BackColor = vbRed
UserFormUCA1.TextBox2.Locked = True
UserFormUCA1.TextBox9.BackColor = vbRed
UserFormUCA1.TextBox9.Locked = True
```

```
UserFormUCA1.TextBox16.BackColor = vbRed
UserFormUCA1.TextBox16.Locked = True
UserFormUCA1.TextBox31.BackColor = vbRed
UserFormUCA1.TextBox31.Locked = True
UserFormUCA1.TextBox38.BackColor = vbRed
UserFormUCA1.TextBox38.Locked = True
UserFormUCA1.TextBox45.BackColor = vbRed
UserFormUCA1.TextBox45.Locked = True
UserFormUCA1.TextBox52.BackColor = vbRed
UserFormUCA1.TextBox52.Locked = True
UserFormUCA1.TextBox2.Value = 0
UserFormUCA1.TextBox9.Value = 0
UserFormUCA1.TextBox16.Value = 0
UserFormUCA1.TextBox31.Value = 0
UserFormUCA1.TextBox38.Value = 0
UserFormUCA1.TextBox45.Value = 0
UserFormUCA1.TextBox52.Value = 0
UserFormUCA1.TextBox29.Value = 0
End If

If Me.CheckBox3 = True Then
UserFormUCA1.TextBox3.BackColor = vbGreen
UserFormUCA1.TextBox10.BackColor = vbGreen
UserFormUCA1.TextBox17.BackColor = vbGreen
UserFormUCA1.TextBox32.BackColor = vbGreen
UserFormUCA1.TextBox39.BackColor = vbGreen
UserFormUCA1.TextBox46.BackColor = vbGreen
UserFormUCA1.TextBox53.BackColor = vbGreen
UserFormUCA1.TextBox29.BackColor = vbGreen
Else
UserFormUCA1.TextBox3.BackColor = vbRed
UserFormUCA1.TextBox3.Locked = True
UserFormUCA1.TextBox10.BackColor = vbRed
UserFormUCA1.TextBox10.Locked = True
UserFormUCA1.TextBox17.BackColor = vbRed
UserFormUCA1.TextBox17.Locked = True
UserFormUCA1.TextBox32.BackColor = vbRed
```

```
UserFormUCA1.TextBox32.Locked = True
UserFormUCA1.TextBox39.BackColor = vbRed
UserFormUCA1.TextBox39.Locked = True
UserFormUCA1.TextBox46.BackColor = vbRed
UserFormUCA1.TextBox46.Locked = True
UserFormUCA1.TextBox53.BackColor = vbRed
UserFormUCA1.TextBox53.Locked = True
UserFormUCA1.TextBox3.Value = 0
UserFormUCA1.TextBox10.Value = 0
UserFormUCA1.TextBox17.Value = 0
UserFormUCA1.TextBox32.Value = 0
UserFormUCA1.TextBox39.Value = 0
UserFormUCA1.TextBox46.Value = 0
UserFormUCA1.TextBox53.Value = 0
UserFormUCA1.TextBox29.Value = 0
End If

If Me.CheckBox4 = True Then
UserFormUCA1.TextBox4.BackColor = vbGreen
UserFormUCA1.TextBox11.BackColor = vbGreen
UserFormUCA1.TextBox18.BackColor = vbGreen
UserFormUCA1.TextBox33.BackColor = vbGreen
UserFormUCA1.TextBox40.BackColor = vbGreen
UserFormUCA1.TextBox47.BackColor = vbGreen
UserFormUCA1.TextBox54.BackColor = vbGreen
UserFormUCA1.TextBox29.BackColor = vbGreen
Else
UserFormUCA1.TextBox4.BackColor = vbRed
UserFormUCA1.TextBox4.Locked = True
UserFormUCA1.TextBox11.BackColor = vbRed
UserFormUCA1.TextBox11.Locked = True
UserFormUCA1.TextBox18.BackColor = vbRed
UserFormUCA1.TextBox18.Locked = True
UserFormUCA1.TextBox33.BackColor = vbRed
UserFormUCA1.TextBox33.Locked = True
UserFormUCA1.TextBox40.BackColor = vbRed
UserFormUCA1.TextBox40.Locked = True
```

```
UserFormUCA1.TextBox47.BackColor = vbRed
UserFormUCA1.TextBox47.Locked = True
UserFormUCA1.TextBox54.BackColor = vbRed
UserFormUCA1.TextBox54.Locked = True
UserFormUCA1.TextBox4.Value = 0
UserFormUCA1.TextBox11.Value = 0
UserFormUCA1.TextBox18.Value = 0
UserFormUCA1.TextBox33.Value = 0
UserFormUCA1.TextBox40.Value = 0
UserFormUCA1.TextBox47.Value = 0
UserFormUCA1.TextBox54.Value = 0
UserFormUCA1.TextBox29.Value = 0
End If

If Me.CheckBox5 = True Then
    UserFormUCA1.TextBox5.BackColor = vbGreen
    UserFormUCA1.TextBox12.BackColor = vbGreen
    UserFormUCA1.TextBox19.BackColor = vbGreen
    UserFormUCA1.TextBox34.BackColor = vbGreen
    UserFormUCA1.TextBox41.BackColor = vbGreen
    UserFormUCA1.TextBox48.BackColor = vbGreen
    UserFormUCA1.TextBox55.BackColor = vbGreen
    UserFormUCA1.TextBox29.BackColor = vbGreen
Else
    UserFormUCA1.TextBox5.BackColor = vbRed
    UserFormUCA1.TextBox5.Locked = True
    UserFormUCA1.TextBox12.BackColor = vbRed
    UserFormUCA1.TextBox12.Locked = True
    UserFormUCA1.TextBox19.BackColor = vbRed
    UserFormUCA1.TextBox19.Locked = True
    UserFormUCA1.TextBox34.BackColor = vbRed
    UserFormUCA1.TextBox34.Locked = True
    UserFormUCA1.TextBox41.BackColor = vbRed
    UserFormUCA1.TextBox41.Locked = True
    UserFormUCA1.TextBox48.BackColor = vbRed
    UserFormUCA1.TextBox48.Locked = True
    UserFormUCA1.TextBox55.BackColor = vbRed
```



```
UserFormUCA1.TextBox55.Locked = True
UserFormUCA1.TextBox5.Value = 0
UserFormUCA1.TextBox12.Value = 0
UserFormUCA1.TextBox19.Value = 0
UserFormUCA1.TextBox34.Value = 0
UserFormUCA1.TextBox41.Value = 0
UserFormUCA1.TextBox48.Value = 0
UserFormUCA1.TextBox55.Value = 0
UserFormUCA1.TextBox29.Value = 0
End If

If Me.CheckBox6 = True Then
    UserFormUCA1.TextBox6.BackColor = vbGreen
    UserFormUCA1.TextBox20.BackColor = vbGreen
    UserFormUCA1.TextBox27.BackColor = vbGreen
    UserFormUCA1.TextBox35.BackColor = vbGreen
    UserFormUCA1.TextBox42.BackColor = vbGreen
    UserFormUCA1.TextBox49.BackColor = vbGreen
    UserFormUCA1.TextBox56.BackColor = vbGreen
    UserFormUCA1.TextBox29.BackColor = vbGreen

Else
    UserFormUCA1.TextBox6.BackColor = vbRed
    UserFormUCA1.TextBox6.Locked = True
    UserFormUCA1.TextBox20.BackColor = vbRed
    UserFormUCA1.TextBox20.Locked = True
    UserFormUCA1.TextBox27.BackColor = vbRed
    UserFormUCA1.TextBox27.Locked = True
    UserFormUCA1.TextBox35.BackColor = vbRed
    UserFormUCA1.TextBox35.Locked = True
    UserFormUCA1.TextBox42.BackColor = vbRed
    UserFormUCA1.TextBox42.Locked = True
    UserFormUCA1.TextBox49.BackColor = vbRed
    UserFormUCA1.TextBox49.Locked = True
    UserFormUCA1.TextBox56.BackColor = vbRed
    UserFormUCA1.TextBox56.Locked = True
    UserFormUCA1.TextBox6.Value = 0
```




```
UserFormUCA1.TextBox20.Value = 0
UserFormUCA1.TextBox27.Value = 0
UserFormUCA1.TextBox35.Value = 0
UserFormUCA1.TextBox42.Value = 0
UserFormUCA1.TextBox49.Value = 0
UserFormUCA1.TextBox56.Value = 0
UserFormUCA1.TextBox29.Value = 0
End If

If Me.CheckBox7 = True Then
    UserFormUCA1.TextBox28.BackColor = vbGreen
    UserFormUCA1.TextBox50.BackColor = vbGreen
    UserFormUCA1.TextBox57.BackColor = vbGreen
    UserFormUCA1.TextBox29.BackColor = vbGreen
Else
    UserFormUCA1.TextBox28.BackColor = vbRed
    UserFormUCA1.TextBox28.Locked = True
    UserFormUCA1.TextBox50.BackColor = vbRed
    UserFormUCA1.TextBox50.Locked = True
    UserFormUCA1.TextBox57.BackColor = vbRed
    UserFormUCA1.TextBox57.Locked = True
    UserFormUCA1.TextBox28.Value = 0
    UserFormUCA1.TextBox50.Value = 0
    UserFormUCA1.TextBox57.Value = 0
    UserFormUCA1.TextBox29.Value = 0
End If

UserFormUCA.Hide
UserFormUCA1.Show
End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer)
    If CloseMode = vbFormControlMenu Then
        Cancel = 1
    End If
End Sub
```

3.3.14 Urban Compatibility Assessment detailed information

In this dialog box for each selected area several performance parameters are requested to identify the different possibilities to better use the energy. If not all parameters are not known from the user the Default button provide the more commonly used values.

Urban Compatibility Assessment

	Village centre (rural)	Small sized town centre (rural)	Median sized town centre (suburban)	Multi-storey building - High density	Multi-storey building - Low density	Commerce and industry	Agricultural use	
Status quo								
Gross development area [ha]	0	0	0	0	0	0		
Specific thermal energy demand [MWh/(ha*y)]	0	0	0	0	0			Default Data
Heat demand [MWh/y]						0	0	
Settlement specific grid length (internal) [m/ha]	0	0	0	0	0	0		Default Data
Grid length (external) [m]	0							
Future situation								
Degree of connection (%)	0	0	0	0	0	0		
Degree of densification (%)	0	0	0	0	0	0		
Degree of energy savings (%)	0	0	0	0	0	0	0	
Share of solar thermal energy provision (%)	0	0	0	0	0	0	0	
Save and Exit								

UserformUCA1

Private MyTextBox(57) As Variant

Private Sub CommandButton10_Click()

UserFormType3.Show

End Sub

Private Sub CommandButton5_Click()

UserFormType1a.Show

End Sub

Private Sub CommandButton6_Click()

UserFormType1b.Show

End Sub

Private Sub CommandButton7_Click()

UserFormType1c.Show

End Sub

Private Sub CommandButton8_Click()



```
UserFormType2a.Show
End Sub

Private Sub CommandButton9_Click()
UserFormType2b.Show
End Sub

Private Sub Frame1_Click()
End Sub

Private Sub TextBox1_Change()
TextBox1.Value = CheckTextBoxValue(1)
End Sub

Private Sub TextBox2_Change()
TextBox2.Value = CheckTextBoxValue(2)
End Sub

Private Sub TextBox3_Change()
TextBox3.Value = CheckTextBoxValue(3)
End Sub

Private Sub TextBox4_Change()
TextBox4.Value = CheckTextBoxValue(4)
End Sub

Private Sub TextBox5_Change()
TextBox5.Value = CheckTextBoxValue(5)
End Sub

Private Sub TextBox6_Change()
TextBox6.Value = CheckTextBoxValue(6)
End Sub

Private Sub TextBox7_Change()
TextBox7.Value = CheckTextBoxValue(7)
End Sub

Private Sub TextBox8_Change()
TextBox8.Value = CheckTextBoxValue(8)
End Sub

Private Sub TextBox9_Change()
TextBox9.Value = CheckTextBoxValue(9)
End Sub

Private Sub TextBox10_Change()
TextBox10.Value = CheckTextBoxValue(10)
```



End Sub

Private Sub TextBox11_Change()

TextBox11.Value = CheckTextBoxValue(11)

End Sub

Private Sub TextBox12_Change()

TextBox12.Value = CheckTextBoxValue(12)

End Sub

Private Sub TextBox13_Change()

TextBox13.Value = CheckTextBoxValue(13)

End Sub

Private Sub TextBox14_Change()

TextBox14.Value = CheckTextBoxValue(14)

End Sub

Private Sub TextBox15_Change()

TextBox15.Value = CheckTextBoxValue(15)

End Sub

Private Sub TextBox16_Change()

TextBox16.Value = CheckTextBoxValue(16)

End Sub

Private Sub TextBox17_Change()

TextBox17.Value = CheckTextBoxValue(17)

End Sub

Private Sub TextBox18_Change()

TextBox18.Value = CheckTextBoxValue(18)

End Sub

Private Sub TextBox19_Change()

TextBox19.Value = CheckTextBoxValue(19)

End Sub

Private Sub TextBox20_Change()

TextBox20.Value = CheckTextBoxValue(20)

End Sub

Private Sub TextBox21_Change()

TextBox21.Value = CheckTextBoxValue(21)

End Sub

Private Sub TextBox22_Change()

TextBox22.Value = CheckTextBoxValue(22)

End Sub

Private Sub TextBox23_Change()

TextBox23.Value = CheckTextBoxValue(23)

End Sub

Private Sub TextBox24_Change()

TextBox24.Value = CheckTextBoxValue(24)

End Sub

Private Sub TextBox25_Change()

TextBox25.Value = CheckTextBoxValue(25)

End Sub

Private Sub TextBox26_Change()

TextBox26.Value = CheckTextBoxValue(26)

End Sub

Private Sub TextBox27_Change()

TextBox27.Value = CheckTextBoxValue(27)

End Sub

Private Sub TextBox28_Change()

TextBox28.Value = CheckTextBoxValue(28)

End Sub

Private Sub TextBox29_Change()

TextBox29.Value = CheckTextBoxValue(29)

End Sub

Private Sub TextBox30_Change()

TextBox30.Value = CheckTextBoxValue(30)

End Sub

Private Sub TextBox31_Change()

TextBox31.Value = CheckTextBoxValue(31)

End Sub

Private Sub TextBox32_Change()

TextBox32.Value = CheckTextBoxValue(32)

End Sub

Private Sub TextBox33_Change()

TextBox33.Value = CheckTextBoxValue(33)

End Sub

Private Sub TextBox34_Change()

TextBox34.Value = CheckTextBoxValue(34)



End Sub

Private Sub TextBox35_Change()

TextBox35.Value = CheckTextBoxValue(35)

End Sub

Private Sub TextBox36_Change()

TextBox36.Value = CheckTextBoxValue(36)

End Sub

Private Sub TextBox37_Change()

TextBox37.Value = CheckTextBoxValue(37)

End Sub

Private Sub TextBox38_Change()

TextBox38.Value = CheckTextBoxValue(38)

End Sub

Private Sub TextBox39_Change()

TextBox39.Value = CheckTextBoxValue(39)

End Sub

Private Sub TextBox40_Change()

TextBox40.Value = CheckTextBoxValue(40)

End Sub

Private Sub TextBox41_Change()

TextBox41.Value = CheckTextBoxValue(41)

End Sub

Private Sub TextBox42_Change()

TextBox42.Value = CheckTextBoxValue(42)

End Sub

Private Sub TextBox43_Change()

TextBox43.Value = CheckTextBoxValue(43)

End Sub

Private Sub TextBox44_Change()

TextBox44.Value = CheckTextBoxValue(44)

End Sub

Private Sub TextBox45_Change()

TextBox45.Value = CheckTextBoxValue(45)

End Sub

Private Sub TextBox46_Change()

TextBox46.Value = CheckTextBoxValue(46)



```
End Sub

Private Sub TextBox47_Change()
    TextBox47.Value = CheckTextBoxValue(47)
End Sub

Private Sub TextBox48_Change()
    TextBox48.Value = CheckTextBoxValue(48)
End Sub

Private Sub TextBox49_Change()
    TextBox49.Value = CheckTextBoxValue(49)
End Sub

Private Sub TextBox50_Change()
    TextBox50.Value = CheckTextBoxValue(50)
End Sub

Private Sub TextBox51_Change()
    TextBox51.Value = CheckTextBoxValue(51)
End Sub

Private Sub TextBox52_Change()
    TextBox52.Value = CheckTextBoxValue(52)
End Sub

Private Sub TextBox53_Change()
    TextBox53.Value = CheckTextBoxValue(53)
End Sub

Private Sub TextBox54_Change()
    TextBox54.Value = CheckTextBoxValue(54)
End Sub

Private Sub TextBox55_Change()
    TextBox55.Value = CheckTextBoxValue(55)
End Sub

Private Sub TextBox56_Change()
    TextBox56.Value = CheckTextBoxValue(56)
End Sub

Private Sub TextBox57_Change()
    TextBox57.Value = CheckTextBoxValue(57)
End Sub

Function CheckTextBoxValue(NTextBox As Integer)
    If MyTextBox(NTextBox).Value < 0 Then
```



```
MsgBox "Error: Number minor than zero!", vbCritical
CheckTextBoxValue = "0"
Else
CheckTextBoxValue = MyTextBox(NTextBox).Value
End If
End Function

Private Sub UserForm_Activate()
MsgBox "Insert values in the green cells.", vbOKOnly
End Sub

Private Sub UserForm_Initialize()
TextBox1 = Area
Set MyTextBox(1) = Me.TextBox1
Set MyTextBox(2) = Me.TextBox2
Set MyTextBox(3) = Me.TextBox3
Set MyTextBox(4) = Me.TextBox4
Set MyTextBox(5) = Me.TextBox5
Set MyTextBox(6) = Me.TextBox6
Set MyTextBox(7) = Me.TextBox7
Set MyTextBox(8) = Me.TextBox8
Set MyTextBox(9) = Me.TextBox9
Set MyTextBox(10) = Me.TextBox10
Set MyTextBox(11) = Me.TextBox11
Set MyTextBox(12) = Me.TextBox12
Set MyTextBox(13) = Me.TextBox13
Set MyTextBox(14) = Me.TextBox14
Set MyTextBox(15) = Me.TextBox15
Set MyTextBox(16) = Me.TextBox16
Set MyTextBox(17) = Me.TextBox17
Set MyTextBox(18) = Me.TextBox18
Set MyTextBox(19) = Me.TextBox19
Set MyTextBox(20) = Me.TextBox20
Set MyTextBox(21) = Me.TextBox21
Set MyTextBox(22) = Me.TextBox22
Set MyTextBox(23) = Me.TextBox23
Set MyTextBox(24) = Me.TextBox24
Set MyTextBox(25) = Me.TextBox25
```




```
Set MyTextBox(26) = Me.TextBox26
Set MyTextBox(27) = Me.TextBox27
Set MyTextBox(28) = Me.TextBox28
Set MyTextBox(29) = Me.TextBox29
Set MyTextBox(30) = Me.TextBox30
Set MyTextBox(31) = Me.TextBox31
Set MyTextBox(32) = Me.TextBox32
Set MyTextBox(33) = Me.TextBox33
Set MyTextBox(34) = Me.TextBox34
Set MyTextBox(35) = Me.TextBox35
Set MyTextBox(36) = Me.TextBox36
Set MyTextBox(37) = Me.TextBox37
Set MyTextBox(38) = Me.TextBox38
Set MyTextBox(39) = Me.TextBox39
Set MyTextBox(40) = Me.TextBox40
Set MyTextBox(41) = Me.TextBox41
Set MyTextBox(42) = Me.TextBox42
Set MyTextBox(43) = Me.TextBox43
Set MyTextBox(44) = Me.TextBox44
Set MyTextBox(45) = Me.TextBox45
Set MyTextBox(46) = Me.TextBox46
Set MyTextBox(47) = Me.TextBox47
Set MyTextBox(48) = Me.TextBox48
Set MyTextBox(49) = Me.TextBox49
Set MyTextBox(50) = Me.TextBox50
Set MyTextBox(51) = Me.TextBox51
Set MyTextBox(52) = Me.TextBox52
Set MyTextBox(53) = Me.TextBox53
Set MyTextBox(54) = Me.TextBox54
Set MyTextBox(55) = Me.TextBox55
Set MyTextBox(56) = Me.TextBox56
Set MyTextBox(57) = Me.TextBox57
Me.TextBox7.Locked = True
Me.TextBox7.BackColor = vbBlack
Me.TextBox13.Locked = True
Me.TextBox13.BackColor = vbBlack
```



```
Me.TextBox14.Locked = True
Me.TextBox14.BackColor = vbBlack
Me.TextBox21.Locked = True
Me.TextBox21.BackColor = vbBlack
Me.TextBox22.Locked = True
Me.TextBox22.BackColor = vbBlack
Me.TextBox23.Locked = True
Me.TextBox23.BackColor = vbBlack
Me.TextBox24.Locked = True
Me.TextBox24.BackColor = vbBlack
Me.TextBox25.Locked = True
Me.TextBox25.BackColor = vbBlack
Me.TextBox26.Locked = True
Me.TextBox26.BackColor = vbBlack
Me.TextBox36.Locked = True
Me.TextBox36.BackColor = vbBlack
Me.TextBox43.Locked = True
Me.TextBox43.BackColor = vbBlack
End Sub

Private Sub CommandButton1_Click()
Dim Ssheet As Worksheet
Set Ssheet = ThisWorkbook.Sheets("Input")
If UserFormUCA.CheckBox1 = True Then
Me.TextBox8.Value = Ssheet.Range("D57")
Else
Me.TextBox8.Value = 0
End If
If UserFormUCA.CheckBox2 = True Then
Me.TextBox9.Value = Ssheet.Range("E57")
Else
Me.TextBox9.Value = 0
End If
If UserFormUCA.CheckBox3 = True Then
Me.TextBox10.Value = Ssheet.Range("F57")
Else
Me.TextBox10.Value = 0
```



End If

If UserFormUCA.CheckBox4 = True Then

Me.TextBox11.Value = Ssheet.Range("G57")

Else

Me.TextBox11.Value = 0

End If

If UserFormUCA.CheckBox5 = True Then

Me.TextBox12.Value = Ssheet.Range("H57")

Else

Me.TextBox12.Value = 0

End If

End Sub

Private Sub CommandButton2_Click()

Dim Ssheet As Worksheet

Set Ssheet = ThisWorkbook.Sheets("Input")

If UserFormUCA.CheckBox1 = True Then

Me.TextBox15.Value = Ssheet.Range("D60")

Else

Me.TextBox15.Value = 0

End If

If UserFormUCA.CheckBox2 = True Then

Me.TextBox16.Value = Ssheet.Range("E60")

Else

Me.TextBox16.Value = 0

End If

If UserFormUCA.CheckBox3 = True Then

Me.TextBox17.Value = Ssheet.Range("F60")

Else

Me.TextBox17.Value = 0

End If

If UserFormUCA.CheckBox4 = True Then

Me.TextBox18.Value = Ssheet.Range("G60")

Else

Me.TextBox18.Value = 0

End If



```
If UserFormUCA.CheckBox5 = True Then
Me.TextBox19.Value = Ssheet.Range("H60")
Else
Me.TextBox19.Value = 0
End If

If UserFormUCA.CheckBox6 = True Then
Me.TextBox20.Value = Ssheet.Range("I60")
Else
Me.TextBox20.Value = 0
End If

End Sub

Private Sub CommandButton3_Click()
Dim Ssheet As Worksheet
Dim Foglio As Worksheet
Set Ssheet = ThisWorkbook.Sheets("Input")
Set Foglio = ThisWorkbook.Sheets("UCA")
Foglio.Cells(2, 4) = TextBox1
Foglio.Cells(2, 5) = TextBox2
Foglio.Cells(2, 6) = TextBox3
Foglio.Cells(2, 7) = TextBox4
Foglio.Cells(2, 8) = TextBox5
Foglio.Cells(2, 9) = TextBox6
Ssheet.Cells(56, 4) = TextBox8
Ssheet.Cells(56, 5) = TextBox9
Ssheet.Cells(56, 6) = TextBox10
Ssheet.Cells(56, 7) = TextBox11
Ssheet.Cells(56, 8) = TextBox12
Ssheet.Cells(59, 4) = TextBox15
Ssheet.Cells(59, 5) = TextBox16
Ssheet.Cells(59, 6) = TextBox17
Ssheet.Cells(59, 7) = TextBox18
Ssheet.Cells(59, 8) = TextBox19
Ssheet.Cells(59, 9) = TextBox20
Foglio.Cells(4, 9) = TextBox27
Foglio.Cells(4, 10) = TextBox28
Foglio.Cells(11, 7) = TextBox29
```



```
Foglio.Cells(19, 4) = TextBox30
Foglio.Cells(19, 5) = TextBox31
Foglio.Cells(19, 6) = TextBox32
Foglio.Cells(19, 7) = TextBox33
Foglio.Cells(19, 8) = TextBox34
Foglio.Cells(19, 9) = TextBox35
Foglio.Cells(21, 4) = TextBox37
Foglio.Cells(21, 5) = TextBox38
Foglio.Cells(21, 6) = TextBox39
Foglio.Cells(21, 7) = TextBox40
Foglio.Cells(21, 8) = TextBox41
Foglio.Cells(21, 9) = TextBox42
Foglio.Cells(24, 4) = TextBox44
Foglio.Cells(24, 5) = TextBox45
Foglio.Cells(24, 6) = TextBox46
Foglio.Cells(24, 7) = TextBox47
Foglio.Cells(24, 8) = TextBox48
Foglio.Cells(24, 9) = TextBox49
Foglio.Cells(24, 10) = TextBox50
Foglio.Cells(26, 4) = TextBox51
Foglio.Cells(26, 5) = TextBox52
Foglio.Cells(26, 6) = TextBox53
Foglio.Cells(26, 7) = TextBox54
Foglio.Cells(26, 8) = TextBox55
Foglio.Cells(26, 9) = TextBox56
Foglio.Cells(26, 10) = TextBox57
UserFormUCA1.Hide
End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer)
If CloseMode = vbFormControlMenu Then
Cancel = 1
End If
End Sub

Private Sub CommandButton4_Click()
UserFormLegendUCA.Show
End Sub
```



Function Remake()

Me.TextBox1.Value = 0

Me.TextBox2.Value = 0

Me.TextBox3.Value = 0

Me.TextBox4.Value = 0

Me.TextBox5.Value = 0

Me.TextBox6.Value = 0

Me.TextBox7.Value = 0

Me.TextBox8.Value = 0

Me.TextBox9.Value = 0

Me.TextBox10.Value = 0

Me.TextBox11.Value = 0

Me.TextBox12.Value = 0

Me.TextBox13.Value = 0

Me.TextBox14.Value = 0

Me.TextBox15.Value = 0

Me.TextBox16.Value = 0

Me.TextBox17.Value = 0

Me.TextBox18.Value = 0

Me.TextBox19.Value = 0

Me.TextBox20.Value = 0

Me.TextBox21.Value = 0

Me.TextBox22.Value = 0

Me.TextBox23.Value = 0

Me.TextBox24.Value = 0

Me.TextBox25.Value = 0

Me.TextBox26.Value = 0

Me.TextBox27.Value = 0

Me.TextBox28.Value = 0

Me.TextBox29.Value = 0

Me.TextBox29.Value = 0

Me.TextBox30.Value = 0

Me.TextBox31.Value = 0

Me.TextBox32.Value = 0

Me.TextBox33.Value = 0

Me.TextBox34.Value = 0



Me.TextBox35.Value = 0
Me.TextBox36.Value = 0
Me.TextBox37.Value = 0
Me.TextBox38.Value = 0
Me.TextBox39.Value = 0
Me.TextBox40.Value = 0
Me.TextBox41.Value = 0
Me.TextBox42.Value = 0
Me.TextBox43.Value = 0
Me.TextBox44.Value = 0
Me.TextBox45.Value = 0
Me.TextBox46.Value = 0
Me.TextBox47.Value = 0
Me.TextBox48.Value = 0
Me.TextBox49.Value = 0
Me.TextBox50.Value = 0
Me.TextBox51.Value = 0
Me.TextBox52.Value = 0
Me.TextBox53.Value = 0
Me.TextBox54.Value = 0
Me.TextBox55.Value = 0
Me.TextBox56.Value = 0
Me.TextBox57.Value = 0
End

3.3.15 Economic Evaluation

The economic evaluation of the chosen technologies is a relevant part of the TOOL. Most of these value are contry or more site specific. For this reason several information on the costs are asked to the user. Also here it is possible to select some default values but the result will be a bit weak because the default values are collected from the average values present in literature or in the EUROSTAT tables.

1-Economic Values

×

Price of electricity

CNG price for cars

Selling price of electricity

Selling price for biomethane with subsidy [€/Nm3]

Selling price for heat [€/GJ]

Sludge disposal price [€/t]

Default Data

Save and go on

UserformEconomic

Function Remake()

Dim sett As Worksheet

Set sett = ThisWorkbook.Sheets("Input")

sett.Range("C104") = 0

sett.Range("C105") = 0

sett.Range("C106") = 0

sett.Range("C107") = 0

sett.Range("C108") = 0

sett.Range("C109") = 0

sett.Range("C110") = 0



sett.Range("D104") = 0

sett.Range("D105") = 0

sett.Range("D106") = 0

sett.Range("D107") = 0

sett.Range("D108") = 0

sett.Range("D109") = 0

sett.Range("D110") = 0

sett.Range("E104") = 0

sett.Range("E105") = 0

sett.Range("E106") = 0

sett.Range("E107") = 0

sett.Range("E108") = 0

sett.Range("E109") = 0

sett.Range("E110") = 0

sett.Range("F104") = 0

sett.Range("F105") = 0

sett.Range("F106") = 0

sett.Range("F107") = 0

sett.Range("F108") = 0

sett.Range("F109") = 0

sett.Range("F110") = 0

sett.Range("G104") = 0

sett.Range("G105") = 0

sett.Range("G106") = 0

sett.Range("G107") = 0

sett.Range("G108") = 0

sett.Range("G109") = 0

sett.Range("G110") = 0

sett.Range("H104") = 0

sett.Range("H105") = 0

sett.Range("H106") = 0

sett.Range("H107") = 0

sett.Range("H108") = 0

sett.Range("H109") = 0

sett.Range("H110") = 0

Me.TextBox1.Value = 0



```
Me.TextBox2.Value = 0
Me.TextBox3.Value = 0
Me.TextBox4.Value = 0
Me.TextBox5.Value = 0
Me.TextBox6.Value = 0
Me.TextBox14.Value = ""
End Function

Private Sub UserForm_Activate()
TextBox14.Value = ThisWorkbook.Sheets("Plant description").Range("C1").Value
TextBox14.Locked = True
End Sub

Private Sub CommandButton2_Click()
Dim Ssheet As Worksheet
Set Ssheet = ThisWorkbook.Sheets("Input")
Dim valore As String
valore = Worksheets("Plant description").Cells(1, 3)
If valore = "European Union" Then
Me.TextBox1.Value = Ssheet.Range("C113")
Me.TextBox2.Value = Ssheet.Range("D113")
Me.TextBox3.Value = Ssheet.Range("E113")
Me.TextBox4.Value = Ssheet.Range("F113")
Me.TextBox5.Value = Ssheet.Range("G113")
Me.TextBox6.Value = Ssheet.Range("H113")
Else
If valore = "Germany" Then
Me.TextBox1.Value = Ssheet.Range("C114")
Me.TextBox2.Value = Ssheet.Range("D114")
Me.TextBox3.Value = Ssheet.Range("E114")
Me.TextBox4.Value = Ssheet.Range("F114")
Me.TextBox5.Value = Ssheet.Range("G114")
Me.TextBox6.Value = Ssheet.Range("H114")
Else
If valore = "Austria" Then
Me.TextBox1.Value = Ssheet.Range("C115")
Me.TextBox2.Value = Ssheet.Range("D115")
Me.TextBox3.Value = Ssheet.Range("E115")
```



```
Me.TextBox4.Value = Ssheet.Range("F115")
Me.TextBox5.Value = Ssheet.Range("G115")
Me.TextBox6.Value = Ssheet.Range("H115")
Else
If valore = "Croatia" Then
Me.TextBox1.Value = Ssheet.Range("C116")
Me.TextBox2.Value = Ssheet.Range("D116")
Me.TextBox3.Value = Ssheet.Range("E116")
Me.TextBox4.Value = Ssheet.Range("F116")
Me.TextBox5.Value = Ssheet.Range("G116")
Me.TextBox6.Value = Ssheet.Range("H116")
Else
If valore = "Italy" Then
Me.TextBox1.Value = Ssheet.Range("C117")
Me.TextBox2.Value = Ssheet.Range("D117")
Me.TextBox3.Value = Ssheet.Range("E117")
Me.TextBox4.Value = Ssheet.Range("F117")
Me.TextBox5.Value = Ssheet.Range("G117")
Me.TextBox6.Value = Ssheet.Range("H117")
Else

If valore = "Czech Republic" Then
Me.TextBox1.Value = Ssheet.Range("C118")
Me.TextBox2.Value = Ssheet.Range("D118")
Me.TextBox3.Value = Ssheet.Range("E118")
Me.TextBox4.Value = Ssheet.Range("F118")
Me.TextBox5.Value = Ssheet.Range("G118")
Me.TextBox6.Value = Ssheet.Range("H118")
Else
If valore = "Sweden" Then
Me.TextBox1.Value = Ssheet.Range("C119")
Me.TextBox2.Value = Ssheet.Range("D119")
Me.TextBox3.Value = Ssheet.Range("E119")
Me.TextBox4.Value = Ssheet.Range("F119")
Me.TextBox5.Value = Ssheet.Range("G119")
Me.TextBox6.Value = Ssheet.Range("H119")
```



```
End If
End If
End If
End If
End If
End If
End If
End Sub

Private Sub CommandButton1_Click()
Dim Ssheet As Worksheet
Set Ssheet = ThisWorkbook.Sheets("Input")
Dim valore As String
valore = Worksheets("Plant description").Cells(1, 3)
If valore = "European Union" Then
Ssheet.Range("C104") = TextBox1
Ssheet.Range("D104") = TextBox2
Ssheet.Range("E104") = TextBox3
Ssheet.Range("F104") = TextBox4
Ssheet.Range("G104") = TextBox5
Ssheet.Range("H104") = TextBox6
Else
If valore = "Germany" Then
Ssheet.Range("C105") = TextBox1
Ssheet.Range("D105") = TextBox2
Ssheet.Range("E105") = TextBox3
Ssheet.Range("F105") = TextBox4
Ssheet.Range("G105") = TextBox5
Ssheet.Range("H105") = TextBox6
Else
If valore = "Austria" Then
Ssheet.Range("C106") = TextBox1
Ssheet.Range("D106") = TextBox2
Ssheet.Range("E106") = TextBox3
Ssheet.Range("F106") = TextBox4
Ssheet.Range("G106") = TextBox5
Ssheet.Range("H106") = TextBox6
```



Else

If valore = "Croatia" Then

Ssheet.Range("C107") = TextBox1

Ssheet.Range("D107") = TextBox2

Ssheet.Range("E107") = TextBox3

Ssheet.Range("F107") = TextBox4

Ssheet.Range("G107") = TextBox5

Ssheet.Range("H107") = TextBox6

Else

If valore = "Italy" Then

Ssheet.Range("C108") = TextBox1

Ssheet.Range("D108") = TextBox2

Ssheet.Range("E108") = TextBox3

Ssheet.Range("F108") = TextBox4

Ssheet.Range("G108") = TextBox5

Ssheet.Range("H108") = TextBox6

Else

If valore = "Czech Republic" Then

Ssheet.Range("C109") = TextBox1

Ssheet.Range("D109") = TextBox2

Ssheet.Range("E109") = TextBox3

Ssheet.Range("F109") = TextBox4

Ssheet.Range("G109") = TextBox5

Ssheet.Range("H109") = TextBox6

Else

If valore = "Sweden" Then

Ssheet.Range("C110") = TextBox1

Ssheet.Range("D110") = TextBox2

Ssheet.Range("E110") = TextBox3

Ssheet.Range("F110") = TextBox4

Ssheet.Range("G110") = TextBox5

Ssheet.Range("H110") = TextBox6

End If

End If

End If

End If



End If

End If

End If

UserFormEconomic.Hide

UserFormEconomic1.Show

End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer)

If CloseMode = vbFormControlMenu Then

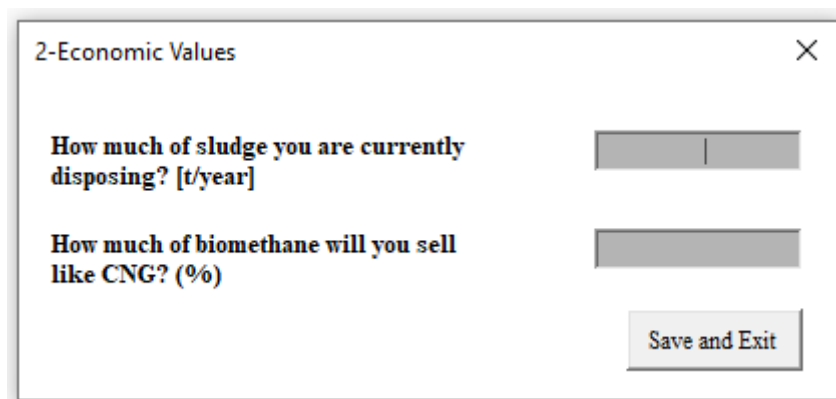
Cancel = 1

End If

End Sub

3.3.16 2-Economic Values

In this dialog box it is requested to define how much sludge is disposed and how much CNG is sold to evaluate the final costs and incomes of these two components.



2-Economic Values [X]

How much of sludge you are currently disposing? [t/year]

How much of biomethane will you sell like CNG? (%)

Save and Exit

UserformEconomic1

```

Private MyTextBox(2) As Variant
Private Sub TextBox1_Change()
  TextBox1.Value = CheckTextBoxValue(1)
End Sub
Private Sub TextBox2_Change()
  TextBox2.Value = CheckTextBoxValue(2)
End Sub
Function CheckTextBoxValue(NTextBox As Integer)
  If MyTextBox(NTextBox).Value < 0 Then
    MsgBox "Error: Number minor than zero!", vbCritical

    CheckTextBoxValue = "0"
  Else
    CheckTextBoxValue = MyTextBox(NTextBox).Value
  End If
End Function
Function Remake()
  Dim sett As Worksheet
  Set sett = ThisWorkbook.Sheets("Economic evaluation")
  sett.Range("D28") = 0
  sett.Range("D29") = 0

```



```
Me.TextBox1.Value = 0
Me.TextBox2.Value = 0
End Function

Private Sub UserForm_Initialize()
    TextBox2 = Total
    Set MyTextBox(1) = Me.TextBox1
    Set MyTextBox(2) = Me.TextBox2
End Sub

Private Sub CommandButton1_Click()
    Dim Ssheet As Worksheet
    Set Ssheet = ThisWorkbook.Sheets("Economic evaluation")
    Ssheet.Range("D28") = TextBox1
    Ssheet.Range("D29") = TextBox2
    UserFormEconomic1.Hide
End Sub

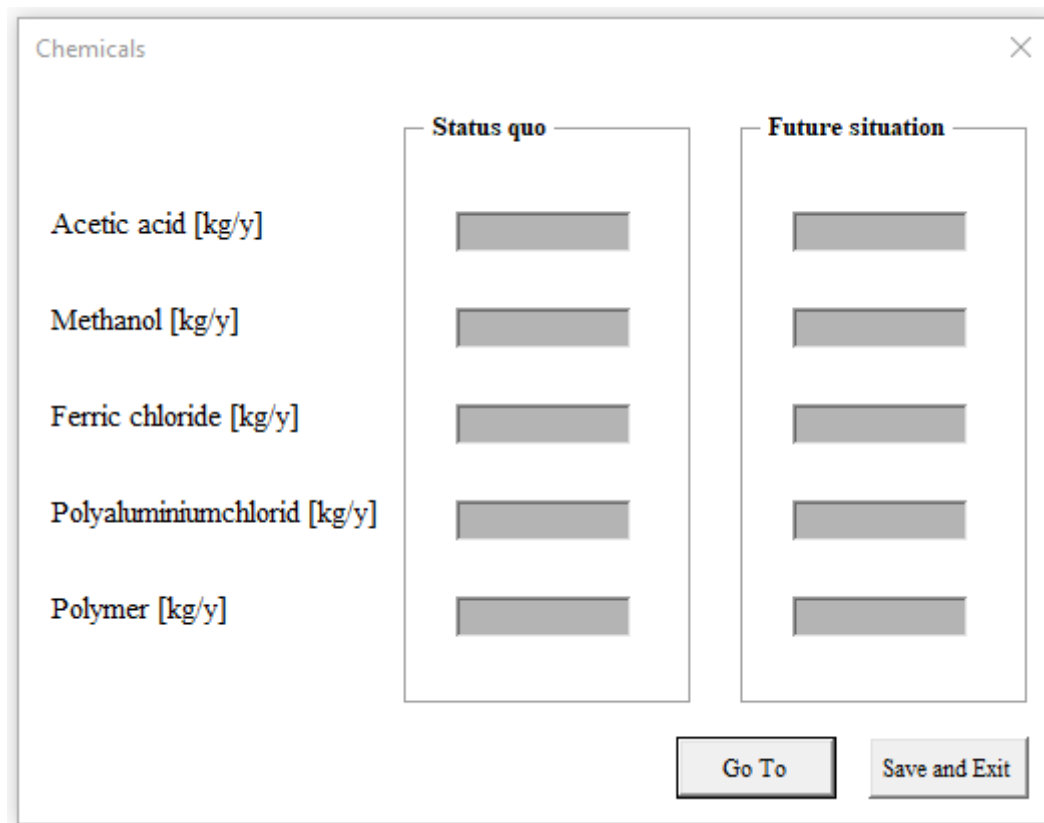
Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer)
    If CloseMode = vbFormControlMenu Then
        Cancel = 1
    End If
End Sub
```


3.3.17 LCA

To evaluate the environmental effect of the new technologies implemented an light LCA evaluation based on the carbon foot print has done.

To do this several further information of the use of chemicals as shown in this diealog box or on the use of the biogas and heat is requeste at the user.

This part of the tool use much more indifomation that those requested to the user, but these information are already collected from the other Tools sheets and for thi reason there are non codes available.



UserformLCAchemicals

```
Private MyTextBox(10) As Variant
```

```
Private Sub UserForm_Activate()
```

```
MsgBox "Before to fill check if you have all the requested values. If not, click -Go To- button to insert zero values data.", vbOKOnly
```

```
End Sub
```

```
Private Sub CommandButton2_Click()
```

```
Set Foglio = ThisWorkbook.Sheets("Input")
```

```
Foglio.Range("C68") = 0
```

```
Foglio.Range("C69") = 0
```

```
Foglio.Range("C70") = 0
```



```
Foglio.Range("C71") = 0
Foglio.Range("C72") = 0
Foglio.Range("E68") = 0
Foglio.Range("E69") = 0
Foglio.Range("E70") = 0
Foglio.Range("E71") = 0
Foglio.Range("E72") = 0
UserFormLCA.Show
UserFormLCAchemicals.Hide
End Sub

Private Sub CommandButton1_Click()
Set Foglio = ThisWorkbook.Sheets("Input")
Foglio.Range("C68") = Me.TextBox1
Foglio.Range("C69") = Me.TextBox2
Foglio.Range("C70") = Me.TextBox3
Foglio.Range("C71") = Me.TextBox4
Foglio.Range("C72") = Me.TextBox5
Foglio.Range("E68") = Me.TextBox6
Foglio.Range("E69") = Me.TextBox7
Foglio.Range("E70") = Me.TextBox8
Foglio.Range("E71") = Me.TextBox9
Foglio.Range("E72") = Me.TextBox10
UserFormLCA.Show
UserFormLCAchemicals.Hide
End Sub

Function Remake()
Me.TextBox1.Value = 0
Me.TextBox2.Value = 0
Me.TextBox3.Value = 0
Me.TextBox4.Value = 0
Me.TextBox5.Value = 0
Me.TextBox6.Value = 0
Me.TextBox7.Value = 0
Me.TextBox8.Value = 0
Me.TextBox9.Value = 0
Me.TextBox10.Value = 0
```

End Function

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer)

If CloseMode = vbFormControlMenu Then

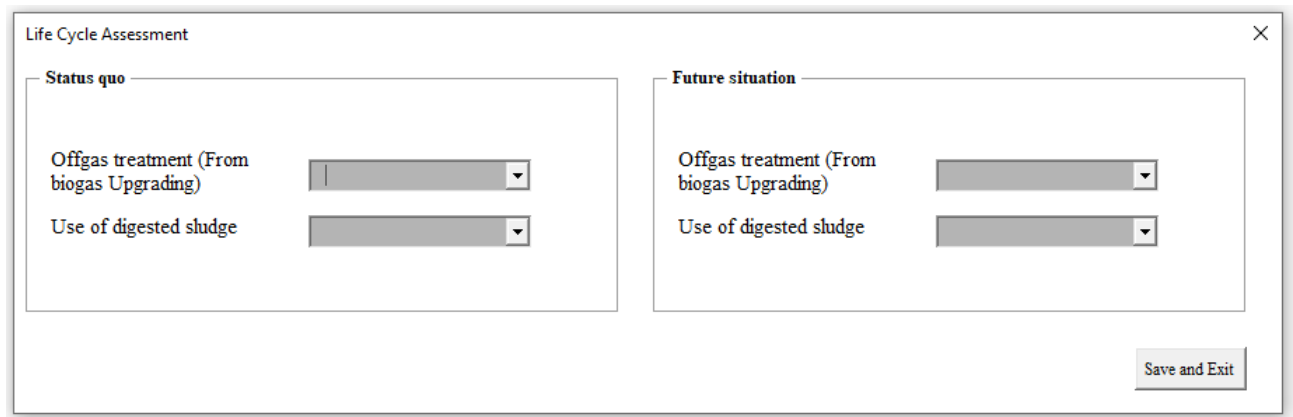
Cancel = 1

End If

End Sub

3.3.18 Life Cycle Assessment 2

To finalize the environmental impact of the LCA analysis also the use offgas tratemnts and the use of the digestate are relevant information requested at the user.



The screenshot shows a 'Life Cycle Assessment' dialog box with a close button (X) in the top right corner. It is divided into two main sections: 'Status quo' and 'Future situation'. Each section contains two dropdown menus. In the 'Status quo' section, the first dropdown is labeled 'Offgas treatment (From biogas Upgrading)' and the second is 'Use of digested sludge'. The 'Future situation' section has identical labels for its two dropdowns. At the bottom right of the dialog, there is a button labeled 'Save and Exit'.

UserformLCA

Private Sub CommandButton1_Click()

Dim Ssheet As Worksheet

Set Ssheet = ThisWorkbook.Sheets("LCA")

Ssheet.Range("J13") = "Natural gas"

Ssheet.Range("K13") = "Natural gas"

Ssheet.Range("J52") = ComboBox3

Ssheet.Range("K52") = ComboBox7

Ssheet.Range("J57") = ComboBox5

Ssheet.Range("K57") = ComboBox6

UserFormLCA.Hide

End Sub

Private Sub UserForm_QueryClose(Cancel As Integer, CloseMode As Integer) 'to not use red X to exit

If CloseMode = vbFormControlMenu Then



Cancel = 1

End If

End Sub

3.3.19 Report

At the end of the evaluation a report will be generated.

In the report are reported all the input values introduced from the user and all the output values that the software has calculated.

It is possible to save the report as a pdf file to compare in a subsequent moment the different scenarios considered.

INCREASED RENEWABLE ENERGY AND ENERGY EFFICIENCY BY INTEGRATING, COMBINING AND EMPOWERING URBAN WASTEWATER AND ORGANIC WASTE MANAGEMENT SYSTEMS.

Useful information about this tool

Input data

_WWTP_description

Name of WWTP/operator	
Address of WWTP	
Contact person	
Country	0
Year of commissioning of the last expansion stage	
Treatment capacity	
Connected population	90000

_Substrate_analyzed

	Total	Total Solid (%)	C feed (% solid)	H feed (% solid)	O feed (% solid)	N feed (% solid)	Ash feed (% solid)	Vmd feed (% solid)	FC feed (% solid)	Income price [€/t]
Primary Sludge	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0
Secondary Sludge	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0
Organic fraction MSW	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0
Digesterate	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0
Food industry waste	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0
Animal blood	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0
Animal fat	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0
Other substrate	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0

Wastewater Treatment Plant_EE/RES_Modify Parameters

WWTP Properties_Energy Efficiency

Q _{ww} Daily average of wastewater flow [m ³ /d]	0,00
COD _{in} Daily average of COD inflow concentration [mg/l]	0,00
Sludge temperature [°C]	0,00

Ambient air temperature [°C]	0,00
Building surface [m ²]	0,00
Building heat demand [kWh/(y*m ²)] (depending on the age of the building)	0,00

EE _{tot} Total electric energy consumption [kWh/d]	0,00
---	------

Inflow pumping station and mechanical pre-treatment

Pumping station [kWh/d]	NA
Screen [kWh/d]	NA
Sand trap and primary clarifier [kWh/d]	NA

Mechanical-biological treatment

Aeration [kWh/d]	NA
Screens [kWh/d]	NA
Return sludge pumps [kWh/d]	NA
Mixellations (sec. clarifier) [kWh/d]	NA

Sludge treatment

Thickening [kWh/d]	NA
Digestion [kWh/d]	NA
Dewatering [kWh/d]	NA

Infrastructure

Heating [kWh/d]	NA
Misc. infrastructure [kWh/d]	NA

WWTP Properties_Renewable Energy Sources

Solar power

Photovoltaics

Area for solar energy [m ²]	NA
Electrical efficiency (%)	NA

Solar thermal

Area for solar energy [m ²]	NA
Thermal efficiency (%)	NA

Hybrid collectors

Area for solar energy [m ²]	NA
Electrical efficiency (%)	NA
Thermal efficiency (%)	NA

Hydro power

Usable height [m]	NA
Turbine and generator efficiency (%)	NA

Energy from biogas

Digester gas fed into the grid (%)	0	Status quo
Digester gas fed into the grid (%)	100	Future situation

Anaerobic Digestion_Modify Parameters

	Primary Sludge	Secondary Sludge	Organic fraction MSW	Food industry waste	Animal blood	Animal fat	Other substrate
Specific production of biogas [m ³ /kgVS]	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Type of hydrolysis No hydrolysis.

LHV Biogas [MJ/m ³]	#DIV/0!
CHP Electric Yield % (Gas engine)	#DIV/0!
CHP Thermal Yield % (Gas engine)	#DIV/0!

Biogas upgrading process No biogas upgrading.

Power to Gas You haven't chosen to use PtG.

Urban Compatibility Assessment_Modify Parameters

Status quo

	Type 1 a	Type 1b	Type 1c	Type 2a	Type 2b	Type 3	Type 4
Gross development area [ha]	3333						NA
Specific thermal energy demand [MWh/(ha*y)]	333	0	0	0	0	NA	NA
Heat demand [MWh/y]	NA	NA	NA	NA	NA		
Settlement specific grid length (internal) [m/ha]	0	0	0	0	0	0	NA
Grid length (external) [m]							

Future situation

	Type 1 a	Type 1b	Type 1c	Type 2a	Type 2b	Type 3	Type 4
Degree of connection (%)	NA						
Degree of densification (%)	NA						
Degree of energy savings (%)							
Share of solar thermal energy provision (%)							

Economic parameters_Modify Parameters

		0
Price of electricity	€/kWh	0
CNG price for cars	€/Nm3	0
Selling price of electricity	€/kWh	0
Selling price for biomethane with subsidy	€/Nm3	0
Selling price for heat	€/GJ	0
Disposal price sludge	€/t	0

Life Cycle Assessment_Modify Parameters

		Status quo	Future situation
Acetic acid	kg/y	NA	NA
Methanol	kg/y	NA	NA
Peroic chloride	kg/y	NA	NA
Polyaluminiumchlorid	kg/y	NA	NA
Polymer	kg/y	NA	NA
Offgas treatment (From biogas Upgrading)			
Sludge Use		Co-Incineration	Co-Incineration

Results

WWTP Properties_Energy Efficiency

Electric energy consumption		Standard range	
WWTP total [kWh/PE120/y]	#DIV/0!	20,00	50,00
1) inflow pumping station and mechanical pre-treatment [kWh/PE120/y]	#DIV/0!	2,50	5,50
1.1 pumping stations [kWh/PE120/y]	#DIV/0!	1,50	3,50
1.2 screening [kWh/PE120/y]	#DIV/0!	0,50	1,00
1.3 sand trap and primary clarifier [kWh/PE120/y]	#DIV/0!	0,50	1,00
2) mechanical-biological treatment [kWh/PE120/y]	#DIV/0!	14,50	33,00
2.1 aeration [kWh/PE120/y]	#DIV/0!	11,50	22,00
2.2 stirrers [kWh/PE120/y]	#DIV/0!	1,50	4,50
2.3 return sludge pumps [kWh/PE120/y]	#DIV/0!	1,00	4,50
2.4 mixers/blenders (rec. clarifier) [kWh/PE120/y]	#DIV/0!	0,50	2,00
3) sludge treatment [kWh/PE120/y]	#DIV/0!	2,00	7,00
3.1 dewatering [kWh/PE120/y]	#DIV/0!	0,50	1,00
3.2 digestion [kWh/PE120/y]	#DIV/0!	1,00	2,50
3.3 dewatering [kWh/PE120/y]	#DIV/0!	0,50	2,50
4) infrastructure [kWh/PE120/y]	#DIV/0!	1,00	4,50
4.1 heating [kWh/PE120/y]	#DIV/0!	0,00	2,50
4.2 misc. Infrastructure [kWh/PE120/y]	#DIV/0!	1,00	2,00

Thermal energy consumption

WWTP total [kWh/PE120/y]	#DIV/0!	0,00	30,00
sludge heating [kWh/PE120/y]	#DIV/0!	8,00	12,00
transmission loss, digester tower heating [kWh/PE120/y]	#DIV/0!	0,00	4,00
generation, storage and distribution loss [kWh/PE120/y]	#DIV/0!	0,00	2,00
heat for buildings [kWh/PE120/y]	#DIV/0!	0,00	2,00

WWTP Properties_Renewable Energy Sources

	energy content (feed-in to gas grid) [kWh/month]	utilizable electric energy [kWh/month]	utilizable thermal energy [kWh/month]
January	#DIV/0!	#DIV/0!	#DIV/0!
February	#DIV/0!	#DIV/0!	#DIV/0!
March	#DIV/0!	#DIV/0!	#DIV/0!
April	#DIV/0!	#DIV/0!	#DIV/0!
May	#DIV/0!	#DIV/0!	#DIV/0!
June	#DIV/0!	#DIV/0!	#DIV/0!
July	#DIV/0!	#DIV/0!	#DIV/0!
August	#DIV/0!	#DIV/0!	#DIV/0!
September	#DIV/0!	#DIV/0!	#DIV/0!
October	#DIV/0!	#DIV/0!	#DIV/0!
November	#DIV/0!	#DIV/0!	#DIV/0!
December	#DIV/0!	#DIV/0!	#DIV/0!

Anaerobic Digestion

#DIV/0!

Engine power [kW _{el}]	#DIV/0!
Power for the grid [kW _{el} /y]	#DIV/0!
Energy available for heating [kW _{th} /y]	#DIV/0!
Biogas production [Nm ³ /year]	#DIV/0!
Digestate mass [t/year]	#DIV/0!
Solid fraction after separator [t/year]	#DIV/0!
Water fraction after separator [t/year]	#DIV/0!

Power to Gas

PEM-Electrolyser_Energy consumption [kWh/Nm ³]	NA
Electrolyser_Installed Power [kW]	NA
Total Methane [Nm ³ /year]	NA
Electric energy consumption of the hydrolyser [MWh/y]	NA

Biogas UpGrading

Amount of clean biomethane [Nm ³ /year]	NA
Total amount of output gas [Nm ³ /year]	NA
Total electricity consumption for biogas upgrading [kWh/year]	NA
Electricity from biomethane [kWh/year]	NA
Thermal energy from biomethane [kWh/year]	NA
Thermal energy from biomethane [GJ/year]	NA

Anaerobic Digestion and Composting

Compost mass [t/year]	926,11
Final compost moisture (%)	45,00
Final compost temperature [°C]	30,00
Addition of co-substrate [t dry/year]	2013,27

Anaerobic Digestion and HTC

Hydrochar mass [t/year]	891,35
Hydrochar carbon content (%C solid)	57,80
LHV - Hydrochar Lower Heating Value [MJ/t]	24325,33
Input Power [kW]	752,86

Anaerobic Digestion and Gasification

Engine power [kW _{el}]	NA
Power for the grid [kW _{el} /y]	NA
Energy available for heating [kW _{th} /y]	NA
Syngas production [Nm ³ /year]	NA
LHV - Syngas Lower Heating Value [MJ/Nm ³]	NA
η cold (%)	NA

Urban Compatibility Assessment

Status quo

	Type 1 a	Type 1 b	Type 1 c	Type 2a	Type 2b	Type 3	Type 4
Heat demand [MWh/y]	110989	#VALUE!	#VALUE!	#VALUE!	#VALUE!		
Current heat demand [MWh/y]							#VALUE!
Calculated grid length (internal) [m]	0	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#####	NA
Total grid length [m]							#VALUE!
Occupancy density [MWh/m]							#VALUE!

Future situation

	Type 1 a	Type 1 b	Type 1 c	Type 2a	Type 2b	Type 3	Type 4
Adapted heat demand [MWh/y]	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#####	
Potential [MWh/y]	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#####	#####
Interim heat demand 1 [MWh/y]	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#####	#####
Interim heat demand 2 [MWh/y]	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#####	#####
Interim heat demand 3 [MWh/y]	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#####	#####
Future heat demand [MWh/y]							#VALUE!
Occupancy density [MWh/m]							#VALUE!

Economic evaluation

Total operating costs [€/year]	#VALUE!
Total investment cost [€]	#VALUE!
Incomes - external waste processing [€/year]	#DIV/0!
Incomes biogas utilisation in CHP (heat) [€/year]	#VALUE!
Incomes biogas utilisation in CHP (electricity) [€/year]	#DIV/0!
Incomes biomethane selling into the grid [€/year]	#DIV/0!
Incomes biomethane selling CNG [€/year]	#DIV/0!
Benefit (return) of project [year]	#NOME?

Life Cycle Assessment_Modify Parameters:

	Status quo		Future situation	
Carbon footprint elec. Energy	Total CO2-eq	#DIV/0!		#DIV/0!
Carbon footprint th. Energy	Total CO2-eq	#DIV/0!		#DIV/0!
Carbon footprint N2O anaerobic treatment	Total CO2-eq	0,00		0,00
Carbon footprint sludge handling	Total CO2-eq	0,00		#DIV/0!
Sum carbon footprint chemicals	Total CO2-eq	0,00		0,00
Carbon footprint CHP and flare emissions	Total CO2-eq	#DIV/0!		#DIV/0!
Credits for exported electricity	Total CO2-eq	#DIV/0!		#DIV/0!
Credits for exported heat	Total CO2-eq	#DIV/0!		#DIV/0!
Carbon footprint methane slip during upgrading	Total CO2-eq	0,00		#DIV/0!
Credit for injected biomethane	Total CO2-eq	0,00		#DIV/0!
Carbon footprint sludge use	Total CO2-eq	0,00		#DIV/0!
	Sum	#DIV/0!		#DIV/0!