Module1 - 1

```
Sub PopPlantData()
'
Sheets("SNL Plant Data").Calculate

Dim OpCapHurdle As Integer
Dim PlantKey As Integer
Dim PowerPlant As String
'Dim PowerZone As String
Dim FuelType As String
Dim OpStatus As String
'Dim aFOM As Double
'Dim mFOM As Double
'Dim OpCap As Double
'Dim HeatRate As Double
'Dim VOM As Double

'get start point
i = 1
Test = "False"
pn = "Plant Name"
Set rngStart = Sheets("Valuation").Range("A2")
rngStart.Offset(1, 2).Select

Do While Test = "False"
If rngStart.Offset(i - 1, 0) = pn Then
    Set rngStart = rngStart.Offset(i, 0)
    Test = "True"
    Else
    i = i + 1
End If
Loop

'Clear Old Data

Range(rngStart.Offset(0, 0), rngStart.End(xlDown).Offset(0, 34)).Clear

k = 0
i = 1
J = 1
OpCapHurdle = Sheets("Valuation").Range("B4")
nMonths = Sheets("Valuation").Range("B3")


Do While Sheets("SNL Plant Data").Range("A3").Offset(i, 1) <> Empty

fGas = Sheets("Valuation").Range("S4")
fCoal = Sheets("Valuation").Range("S5")
fNuclear = Sheets("Valuation").Range("S6")
fOil = Sheets("Valuation").Range("S7")
'cxNuclear = Sheets("Valuation").Range("U4")


    PlantKey = Sheets("SNL Plant Data").Range("A3").Offset(i, 1)
    Fleet = Sheets("SNL Plant Data").Range("A3").Offset(i, 2)
    Family = Sheets("SNL Plant Data").Range("A3").Offset(i, 3)
    PowerPlant = Sheets("SNL Plant Data").Range("A3").Offset(i, 0)
    State = Sheets("SNL Plant Data").Range("A3").Offset(i, 5)
    FuelType = Sheets("SNL Plant Data").Range("A3").Offset(i, 7)
    Iso = Sheets("SNL Plant Data").Range("A3").Offset(i, 8)
    PowerZone = Sheets("SNL Plant Data").Range("A3").Offset(i, 9)
    FuelCurve = Sheets("SNL Plant Data").Range("A3").Offset(i, 10)
    CO2Rate = Sheets("SNL Plant Data").Range("A3").Offset(i, 11)
    CO2Mrk = Sheets("SNL Plant Data").Range("A3").Offset(i, 12)
    opCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 13)
    OpStatus = Sheets("SNL Plant Data").Range("A3").Offset(i, 6)
    aFOM = Sheets("SNL Plant Data").Range("A3").Offset(i, 19)
    eCapEx = Sheets("SNL Plant Data").Range("A3").Offset(i, 20)
    aStartDate = Sheets("SNL Plant Data").Range("A3").Offset(i, 21)
    aRetDate = Sheets("SNL Plant Data").Range("A3").Offset(i, 22)
    'mFOM = aFOM / 12
```

Determines column to use for specific plant name

Sheet10 - 1

```
Private Sub Worksheet_PivotTableAfterValueChange(ByVal TargetPivotTable As PivotTable, ByVal Targe
tRange As Range)

End Sub

Private Sub Worksheet_PivotTableBeforeAllocateChanges(ByVal TargetPivotTable As PivotTable, ByVal
ValueChangeStart As Long, ByVal ValueChangeEnd As Long, Cancel As Boolean)

End Sub

Private Sub Worksheet_PivotTableChangeSync(ByVal Target As PivotTable)

End Sub

Private Sub Worksheet_SelectionChange(ByVal Target As Range)

End Sub
```

```
    If opCap = "NA" Then
    opCap = 0
    End If
    HeatRate = Sheets("SNL Plant Data").Range("A3").Offset(i, 14)
    If HeatRate = "NA" Or HeatRate = "NM" Then
    HeatRate = 1000
    End If
    If aFOM = "NA" Then
    aFOM = 0
    End If

    VOM = Sheets("SNL Plant Data").Range("A3").Offset(i, 17)
    If VOM = "NA" Then
    VOM = 0
    End If

'Kindel FOM
    Select Case FuelType
    Case "Gas"
    KFOM = Application.WorksheetFunction.Max(fGas, aFOM / 12)
    Case "Coal"
    KFOM = Application.WorksheetFunction.Max(fCoal, aFOM / 12)
    Case "Nuclear"
    KFOM = Application.WorksheetFunction.Max(fNuclear, aFOM / 12)
    Case "Oil"
    KFOM = Application.WorksheetFunction.Max(fOil, aFOM / 12)
    End Select
'Number of Scenarios
 Set rngS = Sheets("Sensitivity HeatRates").Range("C2")

     Select Case rngS.Offset(1, 0)
         Case Is = 0
        nSens = 1
        Case Is <> 0
       nSens = Range(rngS, rngS.End(xlDown)).Rows.Count
    End Select

rngS.Offset(0, -2) = nSens

    For N = 1 To nSens
        If N = 1 Then
            nScenario = "Base"
        Else
            nScenario = rngS.Offset(N - 1, 0)
        End If
 'main filter and assignment

    If opCap > OpCapHurdle And (FuelType = "Gas" Or FuelType = "Coal" Or FuelType = "Nuclear" Or F
uelType = "Oil") And (OpStatus = "Operating" Or OpStatus = "Operating & Planned") Then

      For O = 1 To 3
    For m = 1 To nMonths


    Date1 = DateValue(Sheets("Valuation").Range("B5"))
    If (DateAdd("m", m - 1, Date1) >= aStartDate And DateAdd("m", m - 1, Date1) < aRetDate) Then
    'Capacity Year Calculation
    If Month(DateAdd("m", m - 1, Date1)) > 5 Then
        CapYear = Year(DateAdd("m", m - 1, Date1)) & "/" & Year(DateAdd("m", m - 1, Date1)) + 1
        Else
        CapYear = Year(DateAdd("m", m - 1, Date1)) - 1 & "/" & Year(DateAdd("m", m - 1, Date1))
    End If
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 0) = PowerPlant

    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 1) = PlantKey
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 2) = Iso
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 3) = State
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 4) = Fleet
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 5) = Family
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 6) = FuelType
```

```
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 7) = PowerZone
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 8) = FuelCurve
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 9) = CO2Rate
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 10) = CO2Mrk
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 11) = opCap
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 12) = HeatRate
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 13) = VOM
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 14) = nScenario
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 15) = DateAdd("m", m
- 1, Date1)
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 16) = Year(DateAdd("m
", m - 1, Date1))
    rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 17) = CapYear
      Select Case O
       Case 1
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 18) = "On"
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 19) = aFOM / 12
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 20) = KFOM
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 21) = eCapEx / 12
            'If FuelType = "Nuclear" Then
           'rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 22) = cxNucle
ar
            'Else
            'rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 22) = 0
            'End If
       Case 2
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 18) = "2x16"
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 19) = 0
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 20) = 0
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 21) = 0
       'rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 22) = 0
       Case 3
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 18) = "7x8"
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 19) = 0
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 20) = 0
       rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 21) = 0
       'rngStart.Offset((J - 1) * 3 * nMonths + (O - 1) * nMonths + (m - 1) - k, 22) = 0
        End Select
        Else: k = k + 1
          End If

            Next m

            Next O

    J = J + 1
    End If
    Next N


i = i + 1
Loop

Sheets("SNL Plant Data").Calculate

MsgBox "Plant Data Update is Complete"
End Sub


Sub PopMarket()

'get start point
i = 1
Test = "False"
pn = "Plant Name"
Set rngStart = Sheets("Valuation").Range("A2")
rngStart.Offset(1, 2).Select

Do While Test = "False"
If rngStart.Offset(i - 1, 0) = pn Then
```

```
    Set rngStart = rngStart.Offset(i - 1, 0)
    Test = "True"
    Else
    i = i + 1
End If
Loop

'Get Sensativities
 Set rngS = Sheets("Sensitivity HeatRates").Range("C2")
    nSens = Range(rngS, rngS.End(xlDown)).Rows.Count

i = 1
m = 1
F = 1
OnP = 1
OffP = 1
DC = 1



Do While rngStart.Offset(i, 1) <> Empty
    m = 1
    Plant = rngStart.Offset(i, 0)
   FuelType = rngStart.Offset(i, 6)
    PowerZone = rngStart.Offset(i, 7)
    FuelCurve = rngStart.Offset(i, 8)
    Co2R = rngStart.Offset(i, 9)
    Co2M = rngStart.Offset(i, 10)
    nScenario = rngStart.Offset(i, 14)
    DDate = rngStart.Offset(i, 15)
    Peak = rngStart.Offset(i, 18)
    gAdder = Sheets("Valuation").Range("U6")
    P216 = Sheets("Valuation").Range("B9")
    PP216 = Sheets("Valuation").Range("B10")
    PowerMap = "No Map"
    CapMap = "No Map"
    GasMap = "No Map"
    CoalMap = "No Map"
    CapMap2 = "No Map"
    FuelPrice = 0
    PowerPrice = 0
    FuelC = 0
    FuelT = 0
    OffPrice = 0.05
    xPrice = 0.05
    CO2 = 0
    PVol = 0
    FVol = 0
    Cor = 0
    PlantPowerBasis = 0
    nMonth = Month(DDate)
'Get Map Info

     Do While Sheets("Market Map").Range("B4").Offset(m, 0) <> Empty
        If Sheets("Market Map").Range("B4").Offset(m, 0) = PowerZone Then
        PowerMap = Sheets("Market Map").Range("B4").Offset(m, 1)
        CapMap = Sheets("Market Map").Range("B4").Offset(m, 2)
        GasMap = Sheets("Market Map").Range("B4").Offset(m, 3)
        CoalMap = Sheets("Market Map").Range("B4").Offset(m, 4)
        CapMap2 = Sheets("Market Map").Range("B4").Offset(m, 6)
        End If
        m = m + 1
        Loop


'Get Fuel Price

     Select Case FuelType
        Case "Gas"
        If nScenario = "Base" Then
```

```
DD = 1
F = 1
Do While Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) <> Empty
   If Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) = FuelCurve Then
    Do While Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) <> Empty
      If DDate = Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) Then
        FuelC = Sheets("Market Power & Gas Prices").Range("A1").Offset(DD, F - 1)
      End If
    DD = DD + 1
    Loop
   End If
F = F + 1
Loop
Else
For N = 1 To nSens
    If nScenario = rngS.Offset(N, 0) Then
        nMonth = Month(DDate)
        gp = rngS.Offset(N, 1)
      FuelC = gShape(nMonth, gp, FuelCurve)
    End If
Next N
End If

Case "Coal"
DD = 1
F = 1
   Do While Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) <> Empty
   If Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) = FuelCurve Then
    Do While Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) <> Empty
      If DDate = Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) Then
        FuelC = Sheets("Other Fuel Prices").Range("B5").Offset(DD, F - 1)
      End If
    DD = DD + 1
    Loop
   End If
F = F + 1
Loop


Case "Nuclear"
DD = 1
F = 1
Do While Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) <> Empty
   If Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) = FuelCurve Then
    Do While Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) <> Empty
      If DDate = Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) Then
        FuelC = Sheets("Other Fuel Prices").Range("B5").Offset(DD, F - 1)
      End If
    DD = DD + 1
    Loop
   End If
F = F + 1
Loop

Case "Oil"
DD = 1
F = 1
Do While Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) <> Empty
   If Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) = FuelCurve Then
    Do While Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) <> Empty
      If DDate = Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) Then
        FuelC = Sheets("Other Fuel Prices").Range("B5").Offset(DD, F - 1)
      End If
    DD = DD + 1
    Loop
   End If
F = F + 1
Loop
```

```
      End Select

'Get Power Price
      Select Case Peak
        Case "On"
        If nScenario = "Base" Then
        DD = 1
        F = 1

        Do While Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) <> Empty

           If Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) = PowerMap & " Pk"
Then
            Do While Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) <> Empty
              If DDate = Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) Then
                PowerPrice = Sheets("Market Power & Gas Prices").Range("A1").Offset(DD, F - 1)
              End If
            DD = DD + 1
            Loop
           End If
        F = F + 1
        Loop
        Else
        For N = 1 To nSens
            If nScenario = rngS.Offset(N, 0) Then
            gp = rngS.Offset(N, 1)
            nMonth = Month(DDate)
            gps = gShape(nMonth, gp, GasMap)

            PowerPrice = stp(nMonth, PowerMap, gps, Peak)
            End If
            Next N
        End If

       Case "2x16"
        If nScenario = "Base" Then
        DD = 1
        F = 1

        Do While Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) <> Empty
           If Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) = PowerMap & " Pk"
Then
            Do While Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) <> Empty
              If DDate = Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) Then
                PowerPrice = Sheets("Market Power & Gas Prices").Range("A1").Offset(DD, F - 1) * P
216
              End If
            DD = DD + 1
            Loop
           End If
        F = F + 1
        Loop
        Else
        For N = 1 To nSens
            If nScenario = rngS.Offset(N, 0) Then
            gp = rngS.Offset(N, 1)
            nMonth = Month(DDate)
            gps = gShape(nMonth, gp, GasMap)

            PowerPrice = stp(nMonth, PowerMap, gps, Peak) * P216
            End If
            Next N
        End If

        Case "7x8"
        If nScenario = "Base" Then
        DD = 1
        F = 1
        Debug.Print PowerMap & " OPk"
```

```
        Do While Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) <> Empty
           If Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) = PowerMap & " OPk"
 Then
            Do While Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) <> Empty
              If DDate = Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) Then
                OffPrice = Sheets("Market Power & Gas Prices").Range("A1").Offset(DD, F - 1)
              End If
            DD = DD + 1
            Loop
           End If
        F = F + 1
        Loop

        DD = 1
        F = 1

        Do While Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) <> Empty
           If Sheets("Market Power & Gas Prices").Range("A1").Offset(0, F - 1) = PowerMap & " Pk"
Then
            Do While Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) <> Empty
              If DDate = Sheets("Market Power & Gas Prices").Range("B1").Offset(DD, 0) Then
                xPrice = Sheets("Market Power & Gas Prices").Range("A1").Offset(DD, F - 1) * P216
              End If
            DD = DD + 1
            Loop
           End If
        F = F + 1
        Loop

        Debug.Print "xPrice" & xPrice
        Debug.Print "OffPrice" & OffPrice
        PowerPrice = (OffPrice - xPrice * PP216) / (1 - PP216)
        PowerPrice = Application.WorksheetFunction.Max(PowerPrice, 0.01)

        'Else
        'For N = 1 To nSens
            'If nScenario = rngS.Offset(N, 0) Then
            'gp = rngS.Offset(N, 1)
            'nMonth = Month(DDate)
            'gps = gShape(nMonth, gp, GasMap)

              'xPrice = stp(nMonth, PowerMap, gps, "On") * P216
              'OffPrice = stp(nMonth, PowerMap, gps, "On")
            'PowerPrice = (OffPrice - xPrice * PP216) / (1 - PP216)
            'End If
        'Next N
        End If

      End Select

'Get Capacity Price
      Select Case Peak
        Case "On"
        DD = 1
        F = 1
        Do While Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) <> Empty

           If Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) = CapMap Then
            Do While Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) <> Empty
              If DDate = Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) Then

                CapPrice = Sheets("Other Fuel Prices").Range("B5").Offset(DD, F - 1)
              End If
            DD = DD + 1
            Loop
           End If
        F = F + 1
        Loop
```

```
        Case "Off"
        CapPrice = 0

      End Select

'Get Vol & Cor

        Select Case FuelType

        Case "Gas"
        DD = 1
            Do While Sheets("Vol & Cor").Range("E6").Offset(DD, 0) <> Empty
              If DDate = Sheets("Vol & Cor").Range("E6").Offset(DD, 0) Then
                FVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 3)
                If Peak = "On" Then
                    PVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 1)
                    Cor = Sheets("Vol & Cor").Range("E6").Offset(DD, 6)
                Else
                    PVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 2)
                    Cor = Sheets("Vol & Cor").Range("E6").Offset(DD, 7)
                End If
              End If
            DD = DD + 1
            Loop

        Case "Coal"
        DD = 1
            Do While Sheets("Vol & Cor").Range("E6").Offset(DD, 0) <> Empty
              If DDate = Sheets("Vol & Cor").Range("E6").Offset(DD, 0) Then
                FVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 4)
                If Peak = "On" Then
                    PVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 1)
                    Cor = Sheets("Vol & Cor").Range("E6").Offset(DD, 8)
                Else
                    PVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 2)
                    Cor = Sheets("Vol & Cor").Range("E6").Offset(DD, 9)
                End If
              End If
            DD = DD + 1
            Loop

        Case "Nuclear"
        DD = 1
            Do While Sheets("Vol & Cor").Range("E6").Offset(DD, 0) <> Empty
              If DDate = Sheets("Vol & Cor").Range("E6").Offset(DD, 0) Then
                FVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 5)
                If Peak = "On" Then
                    PVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 1)
                    Cor = Sheets("Vol & Cor").Range("E6").Offset(DD, 10)
                Else
                    PVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 2)
                    Cor = Sheets("Vol & Cor").Range("E6").Offset(DD, 11)
                End If
              End If
            DD = DD + 1
            Loop

        Case "Oil"
        DD = 1
            Do While Sheets("Vol & Cor").Range("E6").Offset(DD, 0) <> Empty
              If DDate = Sheets("Vol & Cor").Range("E6").Offset(DD, 0) Then
                FVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 12)
                If Peak = "On" Then
                    PVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 1)
                    Cor = Sheets("Vol & Cor").Range("E6").Offset(DD, 13)
                Else
                    PVol = Sheets("Vol & Cor").Range("E6").Offset(DD, 2)
                    Cor = Sheets("Vol & Cor").Range("E6").Offset(DD, 14)
                End If
              End If
```

```
            DD = DD + 1
            Loop


        End Select

'get CO2 price

        DD = 1
        F = 1
        Do While Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) <> Empty
           If Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) = Co2M Then
            Do While Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) <> Empty
              If DDate = Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) Then
                CO2 = Sheets("Other Fuel Prices").Range("B5").Offset(DD, F - 1) * Co2R
              End If
            DD = DD + 1
            Loop
           End If
        F = F + 1
        Loop

'get Fuel Transport

        DD = 1
        F = 1
        Do While Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) <> Empty
           If Sheets("Other Fuel Prices").Range("B5").Offset(0, F - 1) = Plant & " T" Then
            Do While Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) <> Empty
              If DDate = Sheets("Other Fuel Prices").Range("A5").Offset(DD, 0) Then
                FuelT = Sheets("Other Fuel Prices").Range("B5").Offset(DD, F - 1)
             End If
            DD = DD + 1
            Loop
           End If
        F = F + 1
        Loop
        If FuelType = "Gas" And FuelT = 0 Then
        FuelT = gAdder
        End If

'Get Plant Power Basis
      Select Case Peak
        Case "On"
        DD = 1
        F = 1
        Do While Sheets("Plant Power Basis").Range("F5").Offset(0, F - 1) <> Empty
           If Sheets("Plant Power Basis").Range("F5").Offset(0, F - 1) = Plant Then
            Do While Sheets("Plant Power Basis").Range("E5").Offset(DD, 0) <> Empty
              If DDate = Sheets("Plant Power Basis").Range("E5").Offset(DD, 0) Then
                PlantPowerBasis = Sheets("Plant Power Basis").Range("F5").Offset(DD, F - 1)
              End If
            DD = DD + 1
            Loop
           End If
        F = F + 1
        Loop


        Case "2x16"
        DD = 1
        F = 1
        Do While Sheets("Plant Power Basis").Range("AF5").Offset(0, F - 1) <> Empty
           If Sheets("Plant Power Basis").Range("AF5").Offset(0, F - 1) = Plant Then
            Do While Sheets("Plant Power Basis").Range("E5").Offset(DD, 0) <> Empty
              If DDate = Sheets("Plant Power Basis").Range("E5").Offset(DD, 0) Then
                PlantPowerBasis = Sheets("Plant Power Basis").Range("AF5").Offset(DD, F - 1)
              End If
            DD = DD + 1
            Loop
```

```
            End If
        F = F + 1
        Loop

Case "7x8"
        DD = 1
        F = 1
        Do While Sheets("Plant Power Basis").Range("AF5").Offset(0, F - 1) <> Empty
           If Sheets("Plant Power Basis").Range("AF5").Offset(0, F - 1) = Plant Then
            Do While Sheets("Plant Power Basis").Range("E5").Offset(DD, 0) <> Empty
              If DDate = Sheets("Plant Power Basis").Range("E5").Offset(DD, 0) Then
                PlantPowerBasis = Sheets("Plant Power Basis").Range("AF5").Offset(DD, F - 1)
              End If
            DD = DD + 1
            Loop
           End If
        F = F + 1
        Loop


      End Select



'Paste Data


    rngStart.Offset(i, 22) = CapMap
    rngStart.Offset(i, 23) = CapMap2
    rngStart.Offset(i, 24) = CapPrice
    rngStart.Offset(i, 25) = PowerPrice
    rngStart.Offset(i, 26) = PlantPowerBasis
    rngStart.Offset(i, 27) = PowerPrice + PlantPowerBasis
    rngStart.Offset(i, 28) = FuelC
    rngStart.Offset(i, 29) = FuelT
    rngStart.Offset(i, 30) = CO2
    rngStart.Offset(i, 31) = FuelC + FuelT + CO2
    rngStart.Offset(i, 32) = PVol
    rngStart.Offset(i, 33) = FVol
    rngStart.Offset(i, 34) = Cor
i = i + 1
Loop

Sheets("Valuation").Calculate

MsgBox "Market Data Update is Complete"

End Sub


Sub CodeTester()
i = 1
c = 1
cc = 1
Test = "False"
pn = "Plant Name"
Set rngStart = Sheets("Valuation").Range("A2")

Do While Test = "False"
If rngStart.Offset(i - 1, 0) = pn Then
    Set rngStart = rngStart.Offset(i - 1, 0)
    Test = "True"
    Else
    i = i + 1
End If
Loop

'Clear Old Data
```

```
Range(rngStart.Offset(1, 0), rngStart.End(xlDown).Offset(0, 18)).Clear


End Sub

Sub stest()

i = 1
c = 1
Test = False
S = "Scenario"
 Set rngStart = Sheets("Sensativity HeatRates").Range("C2")
nSens = Range(rngStart, rngStart.End(xlDown)).Rows.Count - 1
Set rngAns = Sheets("Sensativity HeatRates").Range("B11")
nA = Range(rngAns, rngAns.End(xlDown)).Rows.Count - 1



For i = 1 To nSens
    nScen = "Scenario" & i
     gp = rngStart.Offset(i, 1)

    'Get date and peak
    For A = 1 To nA
    nPeak = rngAns.Offset(A, 0)
    nMonth = Month(rngAns.Offset(A, 1))
    nPZ = rngAns.Offset(A, 2)

    'Get Power Price
    nPP = stp(nMonth, nPZ, gp, nPeak)
     'write data
     rngAns.Offset(A, 3) = nScen
     rngAns.Offset(A, 4) = gp
     rngAns.Offset(A, 5) = nPP

    Next A
    Next i
End Sub


Function stp(nMonth, nPZ, gp, nPeak)

Set rngHR = Sheets("Sensitivity HeatRates").Range("J12")
nHR = Range(rngHR, rngHR.End(xlDown)).Rows.Count
nPP = 999



        For m = 1 To nHR
            If rngHR.Offset(m - 1, 0) = nMonth And rngHR.Offset(m - 1, 1) = nPZ Then
             If nPeak = "On" Then
                nPP = rngHR.Offset(m - 1, 3) * Exp(rngHR.Offset(m - 1, 4) * gp) * gp

                Else
                nPP = rngHR.Offset(m - 1, 5) * Exp(rngHR.Offset(m - 1, 6) * gp) * gp


                End If
            End If
        Next m

stp = nPP
End Function

Function gShape(nMonth, gp, gBasis)
Set rnggs = Sheets("Sensitivity HeatRates").Range("R11")
gsp = 999

    For m = 1 To 12
        If rnggs.Offset(m, 0) = nMonth Then
```

```
        gsp = gp * rnggs.Offset(m, 1)
        End If
    Next m

    For b = 1 To 84
        If rnggs.Offset(b, 5) = nMonth And rnggs.Offset(b, 6) = gBasis Then
        gpb = gsp * rnggs.Offset(b, 7)
        End If
    Next b

gShape = gpb

End Function

Sub cumulate()

Set rngcg = Sheets("Valuation").Range("AV9")
nRows = Range(rngcg.Offset(1, -1), rngcg.Offset(1, -1).End(xlDown)).Rows.Count
Debug.Print nRows
Set rngCP = Sheets("Clear Price").Range("A1")



J = 1
For i = 1 To nRows
    opCap = rngcg.Offset(i, -41)
    DDate = rngcg.Offset(i, -37)
    DDate1 = rngcg.Offset(i - 1, -37)
    Cpzone = rngcg.Offset(i, -28)
    CpZone1 = rngcg.Offset(i - 1, -28)
    cumCAP = rngcg.Offset(i - 1, 0)
    Peak = rngcg.Offset(i, -34)
    peak1 = rngcg.Offset(i - 1, -34)
    Sce = rngcg.Offset(i, -38)
    genCost = rngcg.Offset(i, -14)
    pPrice = rngcg.Offset(i, -26)

Debug.Print J
If DDate = DDate1 And Peak = peak1 And Cpzone = CpZone1 Then
  rngcg.Offset(i, 0) = cumCAP + opCap

Else
    rngcg.Offset(i, 0) = opCap
    pTemp = 1000000

End If
'get Clearing Volume

 'If Sce = "Base" And Peak = peak1 And Cpzone = CpZone1 And genCost >= pPrice Then
    'If genCost < pTemp Then
        'cVol = rngcg.Offset(i, 0)
        'pTemp = genCost
        'rngCp.Offset(J, 0) = DDate
        'rngCp.Offset(J, 1) = Cpzone
        'rngCp.Offset(J, 2) = Peak
        'rngCp.Offset(J, 3) = cVol
        'rngCp.Offset(J, 4) = genCost
        'J = J + 1
    'End If
 'End If

Next i


End Sub

Sub getSpricing()

Set rngcg = Sheets("Valuation").Range("AV9")
nRows = Range(rngcg.Offset(1, -1), rngcg.Offset(1, -1).End(xlDown)).Rows.Count
```

```
Set rngCP = Sheets("Clear Price").Range("A1")
cRows = Range(rngCP.Offset(1, 0), rngCP.Offset(1, 0).End(xlDown)).Rows.Count


For k = 5 To 15

If rngCP.Offset(0, k) <> 0 Then

ccSen = rngCP.Offset(0, k)


For J = 1 To cRows
    cMonth = rngCP.Offset(J, 0)
    cczone = rngCP.Offset(J, 1)
    ccPeak = rngCP.Offset(J, 2)
    ccVol = rngCP.Offset(J, 3)
    cTemp = 1000000
    cGen = 0


For i = 1 To nRows

    opCap = rngcg.Offset(i, -41)
    DDate = rngcg.Offset(i, -37)
    DDate1 = rngcg.Offset(i - 1, -37)
    Cpzone = rngcg.Offset(i, -28)
    CpZone1 = rngcg.Offset(i - 1, -28)
    cumCAP = rngcg.Offset(i, 0)
    Peak = rngcg.Offset(i, -34)
    peak1 = rngcg.Offset(i - 1, -34)
    Sce = rngcg.Offset(i, -38)
    genCost = rngcg.Offset(i, -14)
    pPrice = rngcg.Offset(i, -26)
    mMonth = Month(DDate)


'get Senacio Volume

 If Sce = ccSen And Cpzone = cczone And Peak = ccPeak And mMonth = cMonth And cumCAP > ccVol Then
    If cumCAP < cTemp Then
     cTemp = cumCAP
     cGen = genCost
     rngCP.Offset(J, k) = cGen
    End If

  End If

Next i

Next J
End If
Next k

End Sub

Sub BuildBX()


Dim OpCapHurdle As Integer
Dim PlantKey As Integer
Dim PowerPlant As String
'Dim PowerZone As String
Dim FuelType As String
Dim OpStatus As String
Dim aFOM As Double
'Dim mFOM As Double
'Dim OpCap As Double
'Dim HeatRate As Double
'Dim VOM As Double
```

```
'get start point
i = 1
Test = "False"
pn = "Plant"
Set rngStart = Sheets("BX Data").Range("A2")
rngStart.Offset(1, 2).Select

Do While Test = "False"
If rngStart.Offset(i - 1, 0) = pn Then
    Set rngStart = rngStart.Offset(i, 0)
    Test = "True"
    Else
    i = i + 1
End If
Loop

'Clear Old Data

Range(rngStart.Offset(0, 0), rngStart.End(xlDown).Offset(0, 4)).Clear
Range(rngStart.Offset(0, 10), rngStart.End(xlDown).Offset(0, 14)).Clear
Range(rngStart.Offset(0, 16), rngStart.End(xlDown).Offset(0, 16)).Clear
k = 0
i = 1
J = 1
OpCapHurdle = Sheets("Valuation").Range("B4")



Do While Sheets("SNL Plant Data").Range("A3").Offset(i, 1) <> Empty

    PlantKey = Sheets("SNL Plant Data").Range("A3").Offset(i, 1)
    Fleet = Sheets("SNL Plant Data").Range("A3").Offset(i, 2)
    Family = Sheets("SNL Plant Data").Range("A3").Offset(i, 3)
    PowerPlant = Sheets("SNL Plant Data").Range("A3").Offset(i, 0)
    Tech = Sheets("SNL Plant Data").Range("A3").Offset(i, 4)
    State = Sheets("SNL Plant Data").Range("A3").Offset(i, 5)
    FuelType = Sheets("SNL Plant Data").Range("A3").Offset(i, 7)
    Iso = Sheets("SNL Plant Data").Range("A3").Offset(i, 8)
    PowerZone = Sheets("SNL Plant Data").Range("A3").Offset(i, 9)
    FuelCurve = Sheets("SNL Plant Data").Range("A3").Offset(i, 10)
    CO2Rate = Sheets("SNL Plant Data").Range("A3").Offset(i, 11)
    CO2Mrk = Sheets("SNL Plant Data").Range("A3").Offset(i, 12)
    opCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 13)
    OpStatus = Sheets("SNL Plant Data").Range("A3").Offset(i, 6)
    aFOM = Sheets("SNL Plant Data").Range("A3").Offset(i, 19)
    eCapEx = Sheets("SNL Plant Data").Range("A3").Offset(i, 20)
    aStartDate = Sheets("SNL Plant Data").Range("A3").Offset(i, 21)
    aRetDate = Sheets("SNL Plant Data").Range("A3").Offset(i, 22)
    MainCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 24)
    NukeCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 25)
    NBCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 26)
    eFor = Sheets("SNL Plant Data").Range("A3").Offset(i, 28)
    'mFOM = aFOM / 12
    If opCap = "NA" Then
    opCap = 0
    End If
    HeatRate = Sheets("SNL Plant Data").Range("A3").Offset(i, 14)
    If HeatRate = "NA" Or HeatRate = "NM" Then
    HeatRate = 1000
    End If
    VOM = Sheets("SNL Plant Data").Range("A3").Offset(i, 17)
    If VOM = "NA" Then
    VOM = 0
    End If
'main filter and assignment first pass

    If opCap > OpCapHurdle And (FuelType = "Gas" Or FuelType = "Coal" Or FuelType = "Nuclear" Or F
uelType = "Oil") And (OpStatus = "Operating" Or OpStatus = "Operating & Planned") Then
```

```
    rngStart.Offset((J - 1), 0) = PowerPlant

    rngStart.Offset((J - 1), 1) = opCap
    rngStart.Offset((J - 1), 2) = FuelType
    rngStart.Offset((J - 1), 3) = Tech
    rngStart.Offset((J - 1), 4) = HeatRate / 1000
    rngStart.Offset((J - 1), 10) = VOM
    rngStart.Offset((J - 1), 11) = aFOM
    rngStart.Offset((J - 1), 12) = MainCap
    rngStart.Offset((J - 1), 13) = NukeCap
     rngStart.Offset((J - 1), 14) = NBCap
     rngStart.Offset((J - 1), 16) = eFor
    J = J + 1
    End If



i = i + 1
Loop


'get start point
i = 1
Test = "False"
pn = "Plant"
Set rngStart = Sheets("BX Data").Range("A6")
rngStart.Offset(1, 2).Select

Do While Test = "False"
If rngStart.Offset(i - 1, 0) = Empty Then
    Set rngStart = rngStart.Offset(i + 4, 0)
    Test = "True"
    Else
    i = i + 1
End If
Loop

rngStart.Offset(-1, 0) = "Plant's Not In Stack"


'Clear Old Data

Range(rngStart.Offset(0, 0), rngStart.End(xlDown).Offset(0, 4)).Clear
Range(rngStart.Offset(0, 10), rngStart.End(xlDown).Offset(0, 14)).Clear
Range(rngStart.Offset(0, 16), rngStart.End(xlDown).Offset(0, 16)).Clear
k = 0
i = 1
J = 1
OpCapHurdle = Sheets("Valuation").Range("B4")



Do While Sheets("SNL Plant Data").Range("A3").Offset(i, 1) <> Empty

    PlantKey = Sheets("SNL Plant Data").Range("A3").Offset(i, 1)
    Fleet = Sheets("SNL Plant Data").Range("A3").Offset(i, 2)
    Family = Sheets("SNL Plant Data").Range("A3").Offset(i, 3)
    PowerPlant = Sheets("SNL Plant Data").Range("A3").Offset(i, 0)
    Tech = Sheets("SNL Plant Data").Range("A3").Offset(i, 4)
    State = Sheets("SNL Plant Data").Range("A3").Offset(i, 5)
    FuelType = Sheets("SNL Plant Data").Range("A3").Offset(i, 7)
    Iso = Sheets("SNL Plant Data").Range("A3").Offset(i, 8)
    PowerZone = Sheets("SNL Plant Data").Range("A3").Offset(i, 9)
    FuelCurve = Sheets("SNL Plant Data").Range("A3").Offset(i, 10)
    CO2Rate = Sheets("SNL Plant Data").Range("A3").Offset(i, 11)
    CO2Mrk = Sheets("SNL Plant Data").Range("A3").Offset(i, 12)
    opCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 13)
    OpStatus = Sheets("SNL Plant Data").Range("A3").Offset(i, 6)
    aFOM = Sheets("SNL Plant Data").Range("A3").Offset(i, 19)
    eCapEx = Sheets("SNL Plant Data").Range("A3").Offset(i, 20)
```

```
    aStartDate = Sheets("SNL Plant Data").Range("A3").Offset(i, 21)
    aRetDate = Sheets("SNL Plant Data").Range("A3").Offset(i, 22)
    MainCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 24)
    NukeCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 25)
    NBCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 26)
    eFor = Sheets("SNL Plant Data").Range("A3").Offset(i, 28)
    'mFOM = aFOM / 12
    If opCap = "NA" Then
    opCap = 0
    End If
    HeatRate = Sheets("SNL Plant Data").Range("A3").Offset(i, 14)
    If HeatRate = "NA" Or HeatRate = "NM" Then
    HeatRate = 1000
    End If
    VOM = Sheets("SNL Plant Data").Range("A3").Offset(i, 17)
    If VOM = "NA" Then
    VOM = 0
    End If
 'main filter and assignment Second pass

    If opCap <= OpCapHurdle And (FuelType <> "Gas" Or FuelType <> "Coal" Or FuelType <> "Nuclear"
Or FuelType <> "Oil") And (OpStatus = "Operating" Or OpStatus = "Operating & Planned") Then

    rngStart.Offset((J - 1), 0) = PowerPlant

    rngStart.Offset((J - 1), 1) = opCap
    rngStart.Offset((J - 1), 2) = FuelType
    rngStart.Offset((J - 1), 3) = Tech
    rngStart.Offset((J - 1), 4) = HeatRate / 1000
    rngStart.Offset((J - 1), 10) = VOM
    rngStart.Offset((J - 1), 11) = aFOM
    rngStart.Offset((J - 1), 12) = MainCap
    rngStart.Offset((J - 1), 13) = NukeCap
     rngStart.Offset((J - 1), 14) = NBCap
     rngStart.Offset((J - 1), 16) = eFor
    J = J + 1
    End If



i = i + 1
Loop




MsgBox "BX Data Update is Complete"
End Sub

Sub BuildBXStack()


Dim OpCapHurdle As Integer
Dim PlantKey As Integer
Dim PowerPlant As String
'Dim PowerZone As String
Dim FuelType As String
Dim OpStatus As String
'Dim aFOM As Double
'Dim mFOM As Double
'Dim OpCap As Double
'Dim HeatRate As Double
'Dim VOM As Double

'get start point
 = 1
Test = "False"
on = "Plant"
Set rngStart = Sheets("BX Stack").Range("A2")
```

```
rngStart.Offset(1, 2).Select

Do While Test = "False"
If rngStart.Offset(i - 1, 0) = pn Then
    Set rngStart = rngStart.Offset(i, 0)
    Test = "True"
    Else
    i = i + 1
End If
Loop

'Clear Old Data

Range(rngStart.Offset(0, 0), rngStart.End(xlDown).Offset(0, 35)).Clear
'Range(rngStart.Offset(0, 12), rngStart.End(xlDown).Offset(0, 15)).Clear

k = 0
i = 1
J = 1
OpCapHurdle = Sheets("Valuation").Range("B4")
endDate = Sheets("Valuation").Range("B5")


Do While Sheets("SNL Plant Data").Range("A3").Offset(i, 1) <> Empty

    PlantKey = Sheets("SNL Plant Data").Range("A3").Offset(i, 1)
    Fleet = Sheets("SNL Plant Data").Range("A3").Offset(i, 2)
    Family = Sheets("SNL Plant Data").Range("A3").Offset(i, 3)
    PowerPlant = Sheets("SNL Plant Data").Range("A3").Offset(i, 0)
    Tech = Sheets("SNL Plant Data").Range("A3").Offset(i, 4)
    State = Sheets("SNL Plant Data").Range("A3").Offset(i, 5)
    FuelType = Sheets("SNL Plant Data").Range("A3").Offset(i, 7)
    Iso = Sheets("SNL Plant Data").Range("A3").Offset(i, 8)
    PowerZone = Sheets("SNL Plant Data").Range("A3").Offset(i, 9)
    FuelCurve = Sheets("SNL Plant Data").Range("A3").Offset(i, 10)
    CO2Rate = Sheets("SNL Plant Data").Range("A3").Offset(i, 11)
    CO2Mrk = Sheets("SNL Plant Data").Range("A3").Offset(i, 12)
    opCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 13)
    OpStatus = Sheets("SNL Plant Data").Range("A3").Offset(i, 6)
    aFOM = Sheets("SNL Plant Data").Range("A3").Offset(i, 19)
    eCapEx = Sheets("SNL Plant Data").Range("A3").Offset(i, 20)
    aStartDate = Sheets("SNL Plant Data").Range("A3").Offset(i, 21)
    aRetDate = Sheets("SNL Plant Data").Range("A3").Offset(i, 22)
    MainCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 24)
    NukeCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 25)
    NBCap = Sheets("SNL Plant Data").Range("A3").Offset(i, 26)
    eFor = Sheets("SNL Plant Data").Range("A3").Offset(i, 28)
    'mFOM = aFOM / 12
    If opCap = "NA" Then
    opCap = 0
    End If
    HeatRate = Sheets("SNL Plant Data").Range("A3").Offset(i, 14)
    If HeatRate = "NA" Or HeatRate = "NM" Then
    HeatRate = 1000
    End If
    VOM = Sheets("SNL Plant Data").Range("A3").Offset(i, 17)
    If VOM = "NA" Then
    VOM = 0
    End If
 'main filter and assignment first pass

    If opCap > OpCapHurdle And (FuelType = "Gas" Or FuelType = "Coal" Or FuelType = "Nuclear" Or F
uelType = "Oil") And (OpStatus = "Operating" Or OpStatus = "Operating & Planned") And (aRetDate >
endDate) Then

    rngStart.Offset((J - 1), 0) = PowerPlant

    rngStart.Offset((J - 1), 1) = opCap
    rngStart.Offset((J - 1), 2) = Fleet
    rngStart.Offset((J - 1), 3) = FuelType
```

```
    rngStart.Offset((J - 1), 4) = Tech
    rngStart.Offset((J - 1), 5) = HeatRate / 1000
    rngStart.Offset((J - 1), 6) = eFor
    rngStart.Offset((J - 1), 7) = VOM
    rngStart.Offset((J - 1), 8) = "=SUMIFS(Valuation!$AF$14:$AF$11713,Valuation!$A$14:$A$11713,$A"
 & 8 + J - 1 & ")/(36)"
    rngStart.Offset((J - 1), 9) = "=CHOOSE($Z$4,V" & 8 + J - 1 & ",Y" & 8 + J - 1 & ")"
    rngStart.Offset((J - 1), 10) = "=CHOOSE($Z$4,W" & 8 + J - 1 & ",Z" & 8 + J - 1 & ")"
    rngStart.Offset((J - 1), 11) = "=IFERROR(J" & 8 + J - 1 & "/K" & 8 + J - 1 & "*1000,0)"
    rngStart.Offset((J - 1), 12) = "=+J" & 8 + J - 1 & "/B" & 8 + J - 1 & "*1000"
    rngStart.Offset((J - 1), 13) = aFOM
    rngStart.Offset((J - 1), 14) = MainCap
    rngStart.Offset((J - 1), 15) = NukeCap
     rngStart.Offset((J - 1), 16) = NBCap
     rngStart.Offset((J - 1), 17) = "=VLOOKUP(CONCATENATE(E" & 8 + J - 1 & ",D" & 8 + J - 1 & "),P
enalties!$F$25:$R$34,13,FALSE)"
     rngStart.Offset((J - 1), 20) = "=MAX(0,-M" & 8 + J - 1 & "+N" & 8 + J - 1 & "+O" & 8 + J - 1
& "+P" & 8 + J - 1 & "+Q" & 8 + J - 1 & "+R" & 8 + J - 1 & "+S" & 8 + J - 1 & "+T" & 8 + J - 1 & "
)"
    rngStart.Offset((J - 1), 21) = "=SUMIFS(Valuation!$AX$14:$AX$11713,Valuation!$A$14:$A$11713,$A
" & 8 + J - 1 & ")/10^6"
    rngStart.Offset((J - 1), 22) = "=SUMIFS(Valuation!$BB$14:$BB$11713,Valuation!$A$14:$A$11713,$A
" & 8 + J - 1 & ")/1000"
    rngStart.Offset((J - 1), 24) = "=SUMIFS(Valuation!$AW$14:$AW$11713,Valuation!$A$14:$A$11713,$A
" & 8 + J - 1 & ")/10^6"
    rngStart.Offset((J - 1), 25) = "=SUMIFS(Valuation!$BA$14:$BA$11713,Valuation!$A$14:$A$11713,$A
" & 8 + J - 1 & ")/1000"

    If J - 1 = 0 Then
    rngStart.Offset((J - 1), 27) = "=+B8"
    Else
    rngStart.Offset((J - 1), 27) = "=+B" & 8 + J - 1 & "+ AB" & 8 + J - 2
    End If
    rngStart.Offset((J - 1), 28) = "=IF($D" & 8 + J - 1 & "=AC$7,$U" & 8 + J - 1 & ",#N/A)"
    rngStart.Offset((J - 1), 29) = "=IF($D" & 8 + J - 1 & "=AD$7,$U" & 8 + J - 1 & ",#N/A)"
    rngStart.Offset((J - 1), 30) = "=IF($D" & 8 + J - 1 & "=AE$7,$U" & 8 + J - 1 & ",#N/A)"
    rngStart.Offset((J - 1), 31) = "=IF($D" & 8 + J - 1 & "=AF$7,$U" & 8 + J - 1 & ",#N/A)"
    rngStart.Offset((J - 1), 32) = "=IF($D" & 8 + J - 1 & "=AG$7,$U" & 8 + J - 1 & ",#N/A)"
    rngStart.Offset((J - 1), 33) = "=IF($D" & 8 + J - 1 & "=AH$7,$U" & 8 + J - 1 & ",#N/A)"
    rngStart.Offset((J - 1), 34) = "=IF($D" & 8 + J - 1 & "=AI$7,$U" & 8 + J - 1 & ",#N/A)"
    rngStart.Offset((J - 1), 35) = "=IF($D" & 8 + J - 1 & "=AJ$7,$U" & 8 + J - 1 & ",#N/A)"
    rngStart.Offset((J - 1), 36) = "=IF($D" & 8 + J - 1 & "=AK$7,$U" & 8 + J - 1 & ",#N/A)"


    J = J + 1
    End If



i = i + 1
Loop
'Formatting
Sheets("BX Stack").Range(rngStart.Offset(0, 1), rngStart.End(xlDown).Offset(0, 1)).NumberFormat =
"#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 5), rngStart.End(xlDown).Offset(0, 5)).NumberFormat =
"#,##0.0"
Sheets("BX Stack").Range(rngStart.Offset(0, 6), rngStart.End(xlDown).Offset(0, 6)).NumberFormat =
"0.0%"
Sheets("BX Stack").Range(rngStart.Offset(0, 7), rngStart.End(xlDown).Offset(0, 8)).NumberFormat =
"$0.00"
Sheets("BX Stack").Range(rngStart.Offset(0, 9), rngStart.End(xlDown).Offset(0, 9)).NumberFormat =
"$#,##0.00"
Sheets("BX Stack").Range(rngStart.Offset(0, 10), rngStart.End(xlDown).Offset(0, 10)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 11), rngStart.End(xlDown).Offset(0, 21)).NumberFormat
= "$#,##0.00"
Sheets("BX Stack").Range(rngStart.Offset(0, 22), rngStart.End(xlDown).Offset(0, 22)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 24), rngStart.End(xlDown).Offset(0, 24)).NumberFormat
= "$#,##0.00"
```

```
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 25)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 27)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 28)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 29)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 30)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 31)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 32)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 33)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 34)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 35)).NumberFormat
= "#,##0"
Sheets("BX Stack").Range(rngStart.Offset(0, 25), rngStart.End(xlDown).Offset(0, 36)).NumberFormat
= "#,##0"


Sheets("BX Stack").Calculate

MsgBox "BX Stack Update is Complete"
End Sub



Sub StackAdders()

'get start point
i = 1
J = 1
lastrow = Sheets("BX Stack").Range("A8").End(xlDown).Row
Do While Sheets("Stack Adders").Range("A1").Offset(i, 0) <> Empty
    SAdder = Sheets("Stack Adders").Range("A1").Offset(i, 0)
    SMWs = Sheets("Stack Adders").Range("A1").Offset(i, 1)
    SZone = Sheets("Stack Adders").Range("A1").Offset(i, 2)
    SFuel = Sheets("Stack Adders").Range("A1").Offset(i, 3)
    SCapPay = Sheets("Stack Adders").Range("A1").Offset(i, 4)
    SCumCap = Sheets("Stack Adders").Range("A1").Offset(i, 5)

If SFuel <> "VRR" Then


'Debug.Print lastrow
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 0) = SAdder
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 1) = SMWs
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 2) = SZone
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 3) = SFuel
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 20) = SCapPay

    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 27) = "=+B" & lastrow + J & "+ AB" & la
strow + J - 1

    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 28) = "=IF($D" & lastrow + J & "=AC$7,$
U" & lastrow + J & ",#N/A)"
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 29) = "=IF($D" & lastrow + J & "=AD$7,$
U" & lastrow + J & ",#N/A)"
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 30) = "=IF($D" & lastrow + J & "=AE$7,$
U" & lastrow + J & ",#N/A)"
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 31) = "=IF($D" & lastrow + J & "=AF$7,$
U" & lastrow + J & ",#N/A)"
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 32) = "=IF($D" & lastrow + J & "=AG$7,$
U" & lastrow + J & ",#N/A)"
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 33) = "=IF($D" & lastrow + J & "=AH$7,$
U" & lastrow + J & ",#N/A)"
```

```
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 34) = "=IF($D" & lastrow + J & "=AI$7,$
U" & lastrow + J & ",#N/A)"
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 35) = "=IF($D" & lastrow + J & "=AJ$7,$
U" & lastrow + J & ",#N/A)"
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 36) = "=IF($D" & lastrow + J & "=AK$7,$
U" & lastrow + J & ",#N/A)"


    Else: J = J - 1
End If
i = i + 1
J = J + 1


Loop

i = 1
lastrow = Sheets("BX Stack").Range("A8").End(xlDown).Row
Do While Sheets("Stack Adders").Range("A1").Offset(i, 0) <> Empty
    SAdder = Sheets("Stack Adders").Range("A1").Offset(i, 0)
    SMWs = Sheets("Stack Adders").Range("A1").Offset(i, 1)
    SZone = Sheets("Stack Adders").Range("A1").Offset(i, 2)
    SFuel = Sheets("Stack Adders").Range("A1").Offset(i, 3)
    SCapPay = Sheets("Stack Adders").Range("A1").Offset(i, 4)
    SCumCap = Sheets("Stack Adders").Range("A1").Offset(i, 5)
    SDPrice = Sheets("Stack Adders").Range("A1").Offset(i, 6)

If SFuel = "VRR" Then


    Sheets("BX Stack").Range("A1").Offset(lastrow + i - 1, 0) = SAdder
    Sheets("BX Stack").Range("A1").Offset(lastrow + i - 1, 1) = SMWs
    Sheets("BX Stack").Range("A1").Offset(lastrow + J - 1, 2) = SZone
    Sheets("BX Stack").Range("A1").Offset(lastrow + i - 1, 3) = SFuel
    Sheets("BX Stack").Range("A1").Offset(lastrow + i - 1, 25) = SCapPay
    Sheets("BX Stack").Range("A1").Offset(lastrow + i - 1, 27) = SCumCap
    Sheets("BX Stack").Range("A1").Offset(lastrow + i - 1, 36) = SDPrice
End If
i = i + 1
Loop

Sheets("BX Stack").Calculate

MsgBox "Stack Adders is Complete"
End Sub



Sub BXStackMaster()

Sheets("BX Stack").Calculate

i = 1
Test = "False"
pn = "Plant"
Set rngStart = Sheets("BX Stack").Range("A2")
rngStart.Offset(1, 2).Select

Do While Test = "False"
If rngStart.Offset(i - 1, 0) = pn Then
    Set rngStart = rngStart.Offset(i, 0)
    Test = "True"
    Else
    i = i + 1
End If
Loop

Dim stackrange As Range
```

```
Set stackrange = Range(rngStart.Offset(0, 0), rngStart.End(xlDown).Offset(0, 25))
stackrange.Sort Key1:=rngStart.Offset(0, 20), Order1:=xlAscending, Key2:=rngStart.Offset(0, 2), Or
der2:=xlAscending, Header:=xlNo
Sheets("BX Stack").Calculate
MsgBox "Sort is Complete"
End Sub
```

```
Module2 - 1

Function BlackEuro(Fp, Xp, t, ir, V, cp)

Dim D1 As Double
Dim D2 As Double
Dim op As Double

D1 = (WorksheetFunction.Ln(Fp / Xp) + (0.5 * V ^ 2) * t) / (V * (t) ^ (0.5))
D2 = D1 - V * (t) ^ (0.5)

Select Case cp
Case Is = "CALL"
    op = Exp(-ir * t) * (Fp * WorksheetFunction.NormSDist(D1) - Xp * WorksheetFunction.NormSDist(D
2))
Case Is = "PUT"
    op = Exp(-ir * t) * (Xp * WorksheetFunction.NormSDist(-D2) - Fp * WorksheetFunction.NormSDist(
-D1))
End Select


BlackEuro = op


End Function
Function BlackSpread(Fp1, Fp2, Xp, t, ir, V1, V2, Cor, cp)


Dim Fp As Double
Dim V As Double
Dim D1 As Double
Dim D2 As Double
Dim op As Double

Fp = Fp1 / (Fp2 + Xp)
V = (V1 ^ 2 + (V2 * Fp2 / (Fp2 + Xp)) ^ 2 - (2 * Cor * V1 * V2 * (Fp2 / (Fp2 + Xp)))) ^ (0.5)
D1 = (WorksheetFunction.Ln(Fp) + (0.5 * V ^ 2) * t) / (V * (t) ^ (0.5))
D2 = D1 - V * (t) ^ (0.5)

Select Case cp
Case Is = "CALL"
    op = (Fp2 + Xp) * Exp(-ir * t) * (Fp * WorksheetFunction.NormSDist(D1) - WorksheetFunction.Nor
mSDist(D2))
Case Is = "PUT"
    op = (Fp2 + Xp) * Exp(-ir * t) * (WorksheetFunction.NormSDist(-D2) - Fp * WorksheetFunction.No
rmSDist(-D1))
End Select


BlackSpread = op


End Function
Sub bEcheck()
Dim Fp1 As Double
Dim Fp2 As Double
Dim Xp As Double
Dim t As Double
Dim ir As Double
Dim V1 As Double
Dim V2 As Double
Dim cp As String
Dim Cor As Double


Dim Fp As Double
Dim V As Double
Dim D1 As Double
Dim D2 As Double
Dim op As Double

Fp1 = 28
```

```
Module2 - 2

Fp2 = 20
Xp = 7
t = 0.25
ir = 0.05
V1 = 0.29
V2 = 0.36
Cor = 0.42
cp = "CALL"



Fp = Fp1 / (Fp2 + Xp)
V = (V1 ^ 2 + (V2 * Fp2 / (Fp2 + Xp)) ^ 2 - (2 * Cor * V1 * V2 * (Fp2 / (Fp2 + Xp)))) ^ (0.5)
D1 = (WorksheetFunction.Ln(Fp) + (0.5 * V ^ 2) * t) / (V * (t) ^ (0.5))
D2 = D1 - V * (t) ^ (0.5)

Select Case cp
Case Is = "CALL"
    op = (Fp2 + Xp) * Exp(-ir * t) * (Fp * WorksheetFunction.NormSDist(D1) - WorksheetFunction.Nor
mSDist(D2))
Case Is = "PUT"
    op = (Fp2 + Xp) * Exp(-ir * t) * (WorksheetFunction.NormSDist(-D2) - Fp * WorksheetFunction.No
rmSDist(-D1))
End Select



End Sub
Function BlackSpreadDelta1(Fp1, Fp2, Xp, t, ir, V1, V2, Cor, cp)


Dim Fp As Double
Dim V As Double
Dim D1 As Double
Dim D2 As Double
Dim op As Double
Dim DS1 As Double
Dim DS2 As Double


Fp = Fp1 / (Fp2 + Xp)
V = (V1 ^ 2 + (V2 * Fp2 / (Fp2 + Xp)) ^ 2 - (2 * Cor * V1 * V2 * (Fp2 / (Fp2 + Xp)))) ^ (0.5)
D1 = (WorksheetFunction.Ln(Fp) + (0.5 * V ^ 2) * t) / (V * (t) ^ (0.5))
D2 = D1 - V * (t) ^ (0.5)


Select Case cp
Case Is = "CALL"
    DS1 = Exp(-ir * t) * WorksheetFunction.NormSDist(D1)
Case Is = "PUT"
    DS1 = Exp(-ir * t) * (WorksheetFunction.NormSDist(D1) - 1)
End Select


BlackSpreadDelta1 = DS1


End Function

Function BlackSpreadDelta2(Fp1, Fp2, Xp, t, ir, V1, V2, Cor, cp)


Dim Fp As Double
Dim V As Double
Dim D1 As Double
Dim D2 As Double
Dim op As Double
Dim DS1 As Double
```

Module2 - 3

```
Dim DS2 As Double


Fp = Fp1 / (Fp2 + Xp)
V = (V1 ^ 2 + (V2 * Fp2 / (Fp2 + Xp)) ^ 2 - (2 * Cor * V1 * V2 * (Fp2 / (Fp2 + Xp)))) ^ (0.5)
D1 = (WorksheetFunction.Ln(Fp) + (0.5 * V ^ 2) * t) / (V * (t) ^ (0.5))
D2 = D1 - V * (t) ^ (0.5)


Select Case cp
Case Is = "CALL"
    DS2 = Exp(-ir * t) * WorksheetFunction.NormSDist(D2)
Case Is = "PUT"
    DS2 = Exp(-ir * t) * (WorksheetFunction.NormSDist(D2) - 1)
End Select


BlackSpreadDelta2 = DS2


End Function
```

Module3 - 1

```
Option Explicit

Sub Create_PivotTable()

Dim PT As PivotTable
Dim PTCache As PivotCache

Worksheets("Valuation").Select

    Set PTCache = ActiveWorkbook.PivotCaches.Create(xlDatabase, Cells(13, 1).CurrentRegion)
    Set PT = ActiveSheet.PivotTable.Add(PivotCache:=PTCache, Tabledestination:=Range("CB13"))
        With PT
        .PivotFields("Plant Name").Orientation = xlRowField
        .PivotFields("Delivery Year").Oreintation = xlColField
        .PivotFields("Extrinsic Margin For Consolidated Model").Oreintation = xlDataField
        .DisplayFieldCaptions = False
        End With

End Sub
```