# EMFAC-HK Version 3.1.1

Input File Formats

# Objectives

- Describe/illustrate EMFAC-HK v 3.1.1 input file format and keywords
- Provide general description of the input file format to facilitate creating/modifying input files outside of the GUI.
- Provide steps to run EMFAC-HK Version 3.1.1 without using the GUI (i.e., non-interactively or “batch” mode)
- Demonstration

# Components

- **EMFAC-HK V3.1.1 Input file Format**
  - New features
  - Structure of input Files
  - Keywords / Indices
  - Running from the command-line
  - Batch mode use of EMFAC-HK
  - Running/Processing Older INP File Formats

# EMFAC-HK V3.1.1 New Features

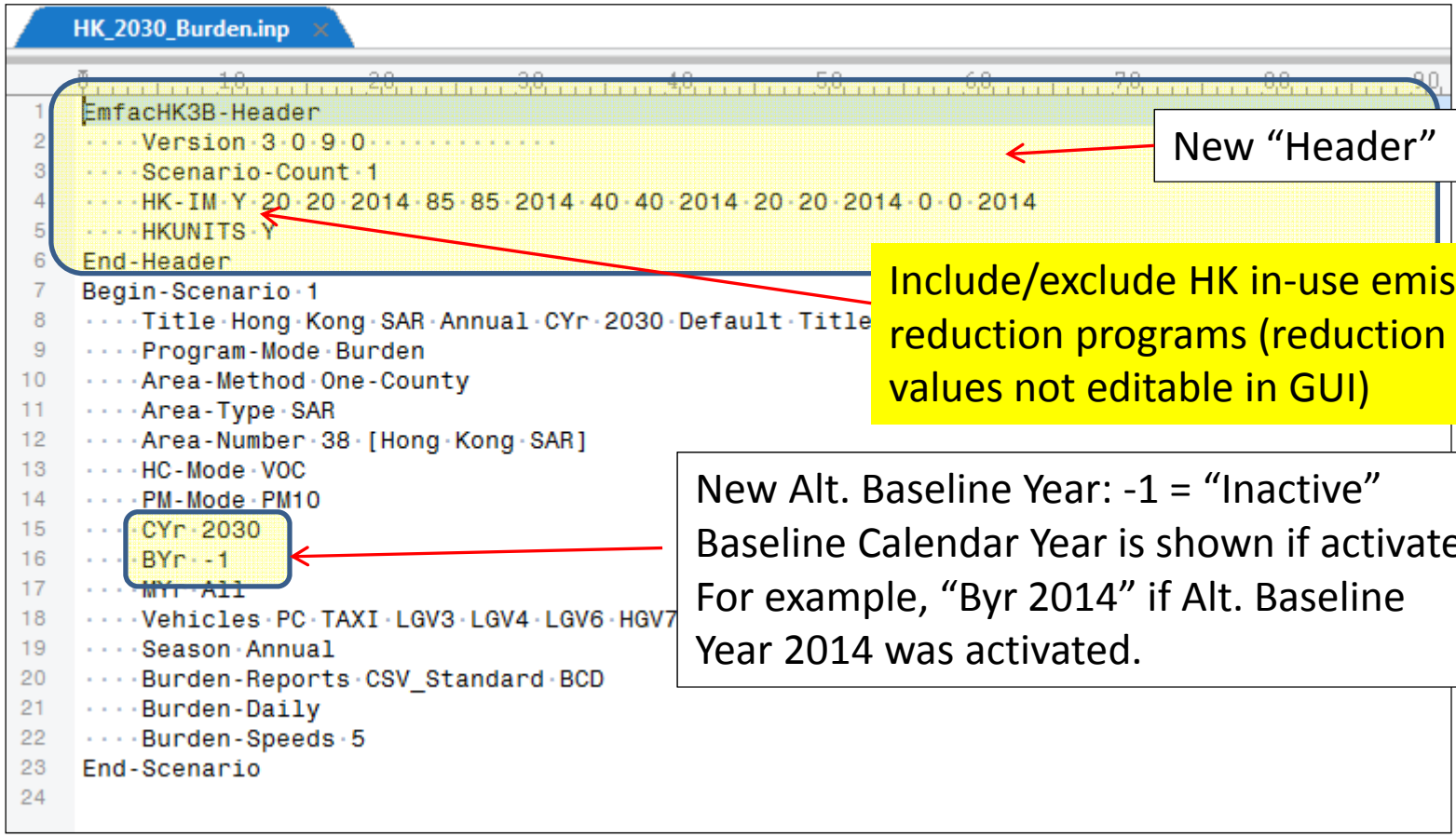
- Single Scenario Model
- INP in SI (i.e. HK) Units

| Parameter | V2.5 INP (English) | V3.1.1 INP (Metric) |
|---|---|---|
| Accrual rates | Mile | Km |
| VKT | Mile | Km |
| Temperature | deg F | deg C |
| Relative Humidity | Percent | (no change) |
| Other Parameters (i.e, fractions, trips, etc) | Unitless | (no change) |

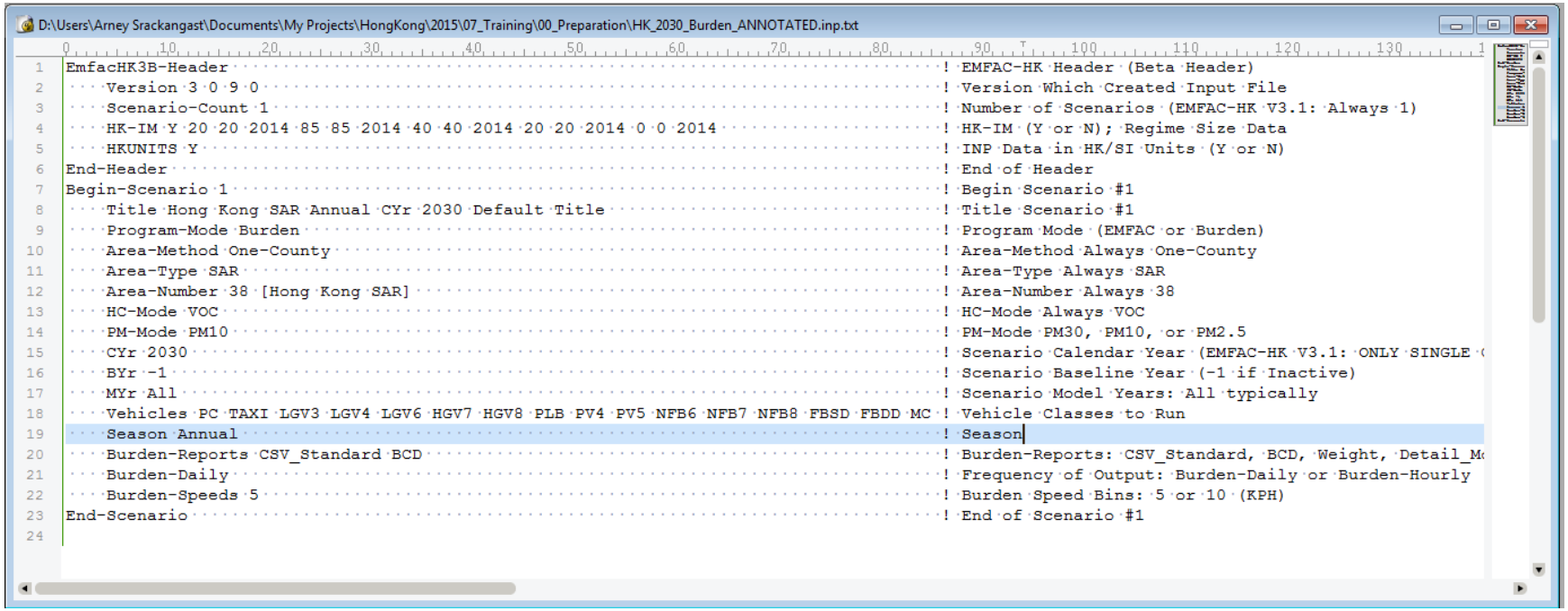
- EMFAC-HK can read older INP files [1]
- Vehicle Classes re-ordered (five placeholders moved to Index 17-21)

[1] Version 2.1 or newer.
Caution: new tech group and other data changes have been applied, and definitions of some existing tech groups have been modified. Also cannot read multiple scenario runs.

# EMFAC-HK Version 3.1.1
# Example Input File



# Annotated Sample Input File (Basic Scenario)



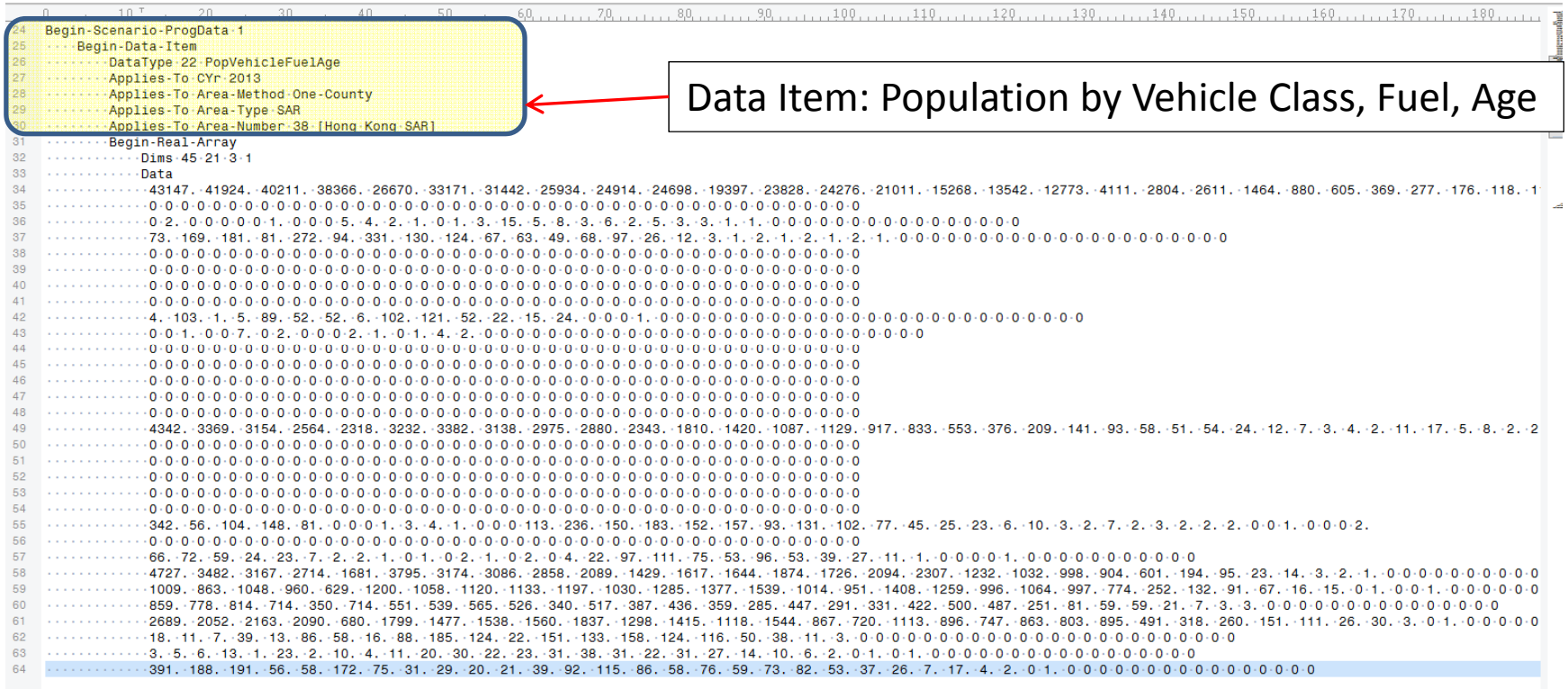
# Annotated Sample Input File (HK_2015_M&HGV_speed.inp)

```
EmfacHK3B-Header
    Version 3 0 9 0
    Scenario-Count 1
    HK-IM Y 20 20 2014 85 85 2014 40 40 2014 20 20 2014 0 0 2014
    HKUNITS N
End-Header
Begin-Scenario 1
    Title Hong Kong SAR Annual CYr 2015 Default Title
    Program-Mode Burden
    Area-Method One-County
    Area-Type SAR
    Area-Number 38 [Hong Kong SAR]
    HC-Mode VOC
    PM-Mode PM10
    CYr 2015
    BYr -1
    MYr All
    Vehicles PC TAXI LGV3 LGV4 LGV6 HGV7 HGV8 PLB PV4 PV5 NFB6 NFB7 NFB8 FBSD FBDD MC
    Season Annual
    Burden-Reports CSV_Standard BCD
    Burden-Daily
    Burden-Speeds 5
End-Scenario
Begin-Scenario-ProgData 2
    Begin-Data-Item
        DataType 7 SpeedFractions
        Applies-To CYr 2015
        Applies-To Area-Method One-County
        Applies-To Area-Type SAR
        Applies-To Area-Number 38 [Hong Kong SAR]
        Applies-To Vehicle HGV8
        Integer-Value 5
        Begin-Real-Array
            Dims 18 24 1 1
            Data
            5.0000001E-02 0 0 0.2 0 0 0.25 0.25 0.25 0 0 0 0 0 0 0 0 0 ! Speed Bin 1-18, Hour 1
            5.0000001E-02 0 0 0.2 0 0 0.25 0.25 0.25 0 0 0 0 0 0 0 0 0 ! Speed Bin 1-18. Hour 2
            5.0000001E-02 0 0 0.2 0 0 0.25 0.25 0.25 0 0 0 0 0 0 0 0 0 ! Speed Bin 1-18. Hour 3
            5.0000001E-02 0 0 0.2 0 0 0.25 0.25 0.25 0 0 0 0 0 0 0 0 0 ! Speed Bin 1-18. Hour 4
            5.0000001E-02 0 0 0.2 0 0 0.25 0.25 0.25 0 0 0 0 0 0 0 0 0 ! Speed Bin 1-18. Hour 5
            5.0000001E-02 0 0 0.2 0 0 0.25 0.25 0.25 0 0 0 0 0 0 0 0 0 ! Speed Bin 1-18. Hour 6
```

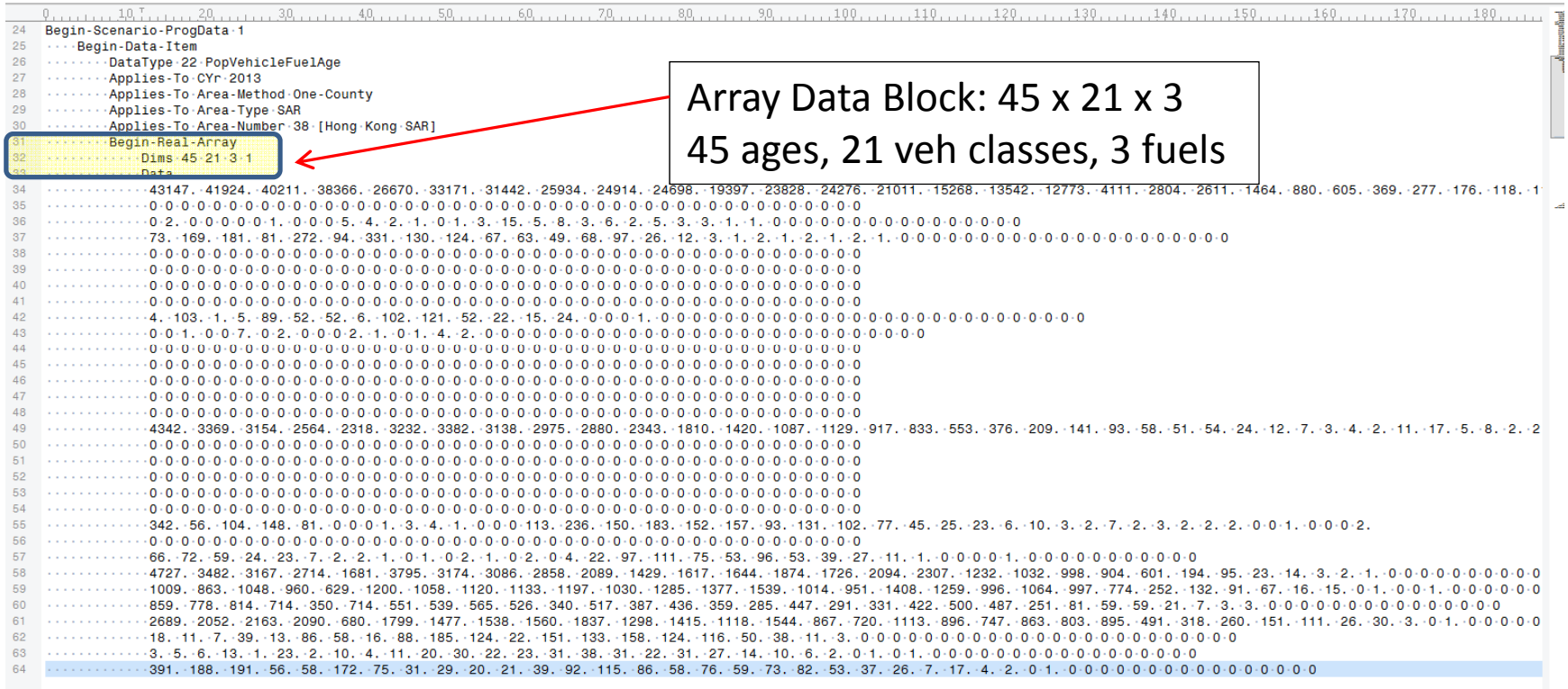
# EMFAC-HK Version 3.1.1 Input Format Program Data Edit Syntax

| | A |
|---|---|
| 1 | ! scenario data |
| 2 | !BEGIN-SCENARIO-PROGDATA (# Data Items) |
| 3 | ! BEGIN-DATA-ITEM (Repeat for each data item) |
| 4 | ! DATATYPE 19 PopTotal |
| 5 | ! APPLIES-TO CYR 2020 |
| 6 | ! APPLIES-TO BYR 2014 |
| 7 | ! APPLIES-TO SEASON Summer |
| 8 | ! APPLIES-TO AREA-METHOD One-County |
| 9 | ! APPLIES-TO AREA-TYPE SAR |
| 10 | ! APPLIES-TO AREA-NUMBER 38 |
| 11 | ! APPLIES-TO VEHICLE PC |
| 12 | ! APPLIES-TO MYR All |
| 13 | ! APPLIES-TO AGES All |
| 14 | ! APPLIES-TO EXH-TECH-GROUP 23 |
| 15 | ! APPLIES-TO EVAP-TECH-GROUP 15 |
| 16 | ! APPLIES-TO FUEL Gas |
| 17 | ! REAL-VALUE nn.nn |
| 18 | ! INTEGER-VALUE nn |
| 19 | ! BEGIN-REAL-ARRAY nn |
| 20 | ! values.nn |
| 21 | ! END-REAL-ARRAY |
| 22 | ! END DATA-ITEM |
| 23 | !END-SCENARIO-PROGDATA |

# EMFAC-HK Version 3.1.1
# Program Data – Data Item



# EMFAC-HK Version 3.1.1
# Program Data – Array Size



# EMFAC-HK Version 3.1.1
# Program Data – Array Data

45 columns (ages 1 to 45)

21 rows (vehicle class 1-21)

```
Begin Scenario ProgData 1
    Begin Data Item
        DataType 22 PopVehicleFuelAge
        Applies To CYr 2013
        Applies To Area Method One County
        Applies To Area Type SAR
        Applies To Area Number 38 [Hong Kong SAR]
        Begin Real Array
            Dims 45 21 3 1
            Data
             43147. 41924. 40211. 38366. 26670. 33171. 31442. 25934. 24914. 24698. 19397. 23828. 24276. 21011. 15268. 13542. 12773. 4111. 2804. 2611. 1464. 880. 605. 369. 277. 176. 118. 1
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 2. 0 0 0 0 0 1. 0 0 0 5. 4. 2. 1. 0 1. 3. 15. 5. 8. 3. 6. 2. 5. 3. 3. 1. 1. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             73. 169. 181. 81. 272. 94. 331. 130. 124. 67. 63. 49. 68. 97. 26. 12. 3. 1. 2. 1. 2. 1. 2. 1. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             4. 103. 1. 5. 89. 52. 52. 6. 102. 121. 52. 22. 15. 24. 0 0 0 1. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 1. 0 0 7. 0 2. 0 0 0 2. 1. 0 1. 4. 2. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             4342. 3369. 3154. 2564. 2318. 3232. 3382. 3138. 2975. 2880. 2343. 1810. 1420. 1087. 1129. 917. 833. 553. [illegible] 2. 11. 17. 5. 8. 2. 2
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             342. 56. 104. 148. 81. 0 0 0 1. 3. 4. 1. 0 0 0 113. 236. 150. 183. 152. 157. 93. 131. 102. 77. 45. 25. 23 [illegible]
             0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             66. 72. 59. 24. 23. 7. 2. 2. 1. 0 1. 0 2. 1. 0 2. 0 4. 22. 97. 111. 75. 53. 96. 53. 39. 27. 11. 1. 0 0 0 [illegible]
             4727. 3482. 3167. 2714. 1681. 3795. 3174. 3086. 2858. 2089. 1429. 1617. 1644. 1874. 1726. 2094. 2307. 1232. 1032. 998. 904. 601. 194. 95. 23. 14. 3. 2. 1. 0 0 0 0 0 0 0 0 0 0
             1009. 863. 1048. 960. 629. 1200. 1058. 1120. 1133. 1197. 1030. 1285. 1377. 1539. 1014. 951. 1408. 1259. 996. 1064. 997. 774. 252. 132. 91. 67. 16. 15. 0 1. 0 0 1. 0 0 0 0 0 0
             859. 778. 814. 714. 350. 714. 551. 539. 565. 526. 340. 517. 387. 436. 359. 285. 447. 291. 331. 422. 500. 487. 251. 81. 59. 59. 21. 7. 3. 3. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             2689. 2052. 2163. 2090. 680. 1799. 1477. 1538. 1560. 1837. 1298. 1415. 1118. 1544. 867. 720. 1113. 896. 747. 863. 803. 895. 491. 318. 260. 151. 111. 26. 30. 3. 0 1. 0 0 0 0
             [illegible]
             3. 5. 6. 13. 1. 23. 2. 10. 4. 11. 20. 30. 22. 23. 31. 38. 31. 22. 31. 27. 14. 10. 6. 2. 0 1. 0 1. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
             391. 188. 191. 56. 58. 172. 75. 31. 29. 20. 21. 39. 92. 115. 86. 58. 76. 59. 73. 82. 53. 37. 26. 7. 17. 4. 2. 0 1. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

Fuel Block 1 (petrol)
Repeated for..
Block 2 (diesel)
Block 3 (LPG)

# Keywords in INP

| Keyword | Description |
|---|---|
| Temperature | Temperature |
| RelativeHumidity | Relative Humidity |
| RVP | Gasoline RVP |
| SpeedFractions | Speed Distribution by Hr |
| ExhaustTechFrac | Exhaust Technology Group Fractions |
| EvapTechFrac | Evap Technology Group Fractions |
| VMTTotal | VMT Total |
| VMTVehicle | VMT by Vehicle Class |
| VMTVehicleFuel | VMT by Vehicle Class, Fuel |
| VMTVehicleFuelHour | VMT by Vehicle Class, Fuel, Hr |
| TripsTotal | Trips Total |
| TripsVehicle | Trips by Vehicle Class |
| TripsVehicleFuel | Trips by Vehicle Class, Fuel |
| TripsVehicleFuelHour | Trips by Vehicle Class, Fuel, Hr |

| Keyword | Description |
|---|---|
| PopTotal | Population Total |
| PopVehicle | Pop by Vehicle Class |
| PopVehicleFuel | Pop by Vehicle Class, Fuel |
| PopVehicleFuelAge | Pop by Vehicle Class, Fuel, Hr |
| Applies-To Cyr | Pop for Calendar Year |
| Applies-To Byr | Pop for Alternate Base Year |
| AccrualTotal | Accrual Total |
| AccrualVehicle | Accr by Vehicle Class |
| AccrualVehicleFuel | Accr by Vehicle Class, Fuel |
| AccrualVehicleFuelAge | Accr by Vehicle Class, Fuel, Hr |
| HK-IM | Regime Size Change |

Note: New Datatype codes added to EMFAC-HK V3.1.1 for VKT, Alt Baseline, HK

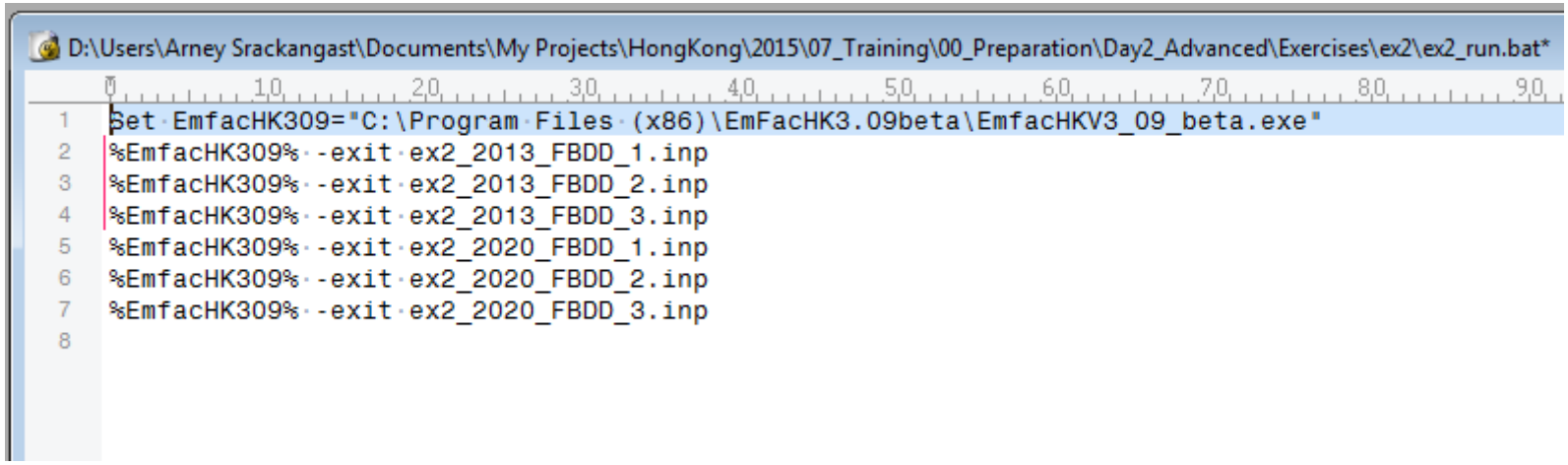
# Running EMFAC-HK Non-Interactively (i.e., Bypassing the GUI)

- Purpose: user's who have already created input files and want to run without going through the GUI (i.e., execute the program from the command window or a batch file).
- Find out where EMFAC-HK is installed on your system
  - `"C:\Program Files\EMFACHK31"` `(Windows 32-bit)`
  - `"C:\Program Files (x86)\EMFACHK31"` `(Windows 64-bit)`
- Use a text editor (i.e., notepad, etc.) and create a batch file to house the non-interactive batch file commands
  - Notepad emfac.bat
- Use the "set" command to create a shortcut to the EMFAC-HK located on your computer.
- Example:
  - `set EmfacHK31="C:\Program Files\EMFACHK31\EmfacHKV3_1.exe"` `(Windows 32-bit)`
  - `set EmfacHK31="C:\Program Files (x86)\EMFACHK31\EmfacHKV3_1.exe"` `(Windows 64-bit)`

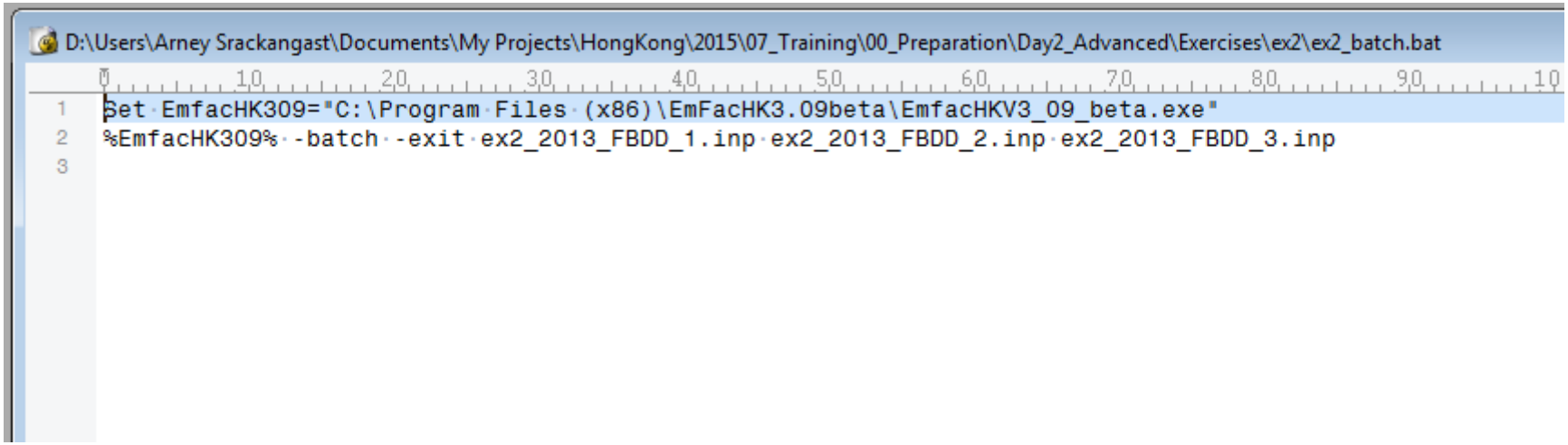
# Running EMFAC-HK Non-Interactively (i.e., Bypassing the GUI)

- Executing input files one at a time:
  - `%EMFACHK31% **-exit** HK_2030_Burden.inp`
- Executing multiple files at a time:
  - `%EMFACHK31% **-batch** HK_2030_Burden.inp HK_2015_Burden_by_Hour.inp HK_2015_change_pop_VKT.inp HK_2015_Conformity_Trip.inp`

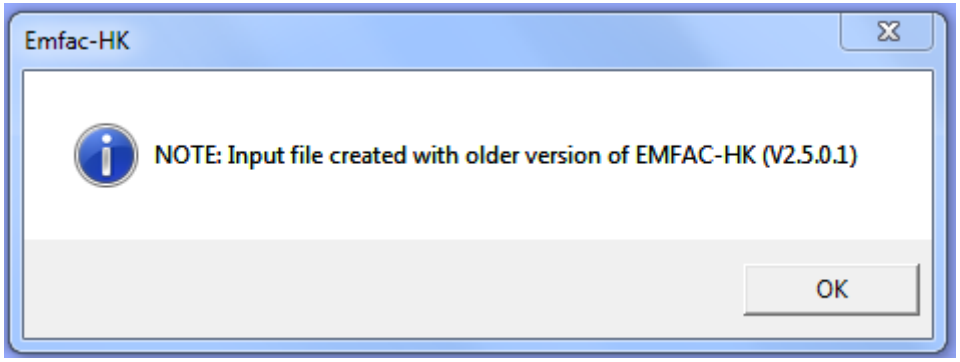
# Running EMFAC-HK Non-Interactively (One-at-a-Time Example)



# Running EMFAC-HK Non-Interactively (Batch Example)



# Reading Prior INP Files

- Version 2.1 INP file or newer
- Caution
  - Use at risk
  - Prior INP will have older technology group breakdown
  - Single scenario only

# Reading Prior INP Files