KPI DEFINITIONS

--KPI

"OverCrowding"

--Value Expression

[Measures].[Congestion Level]

--Goal Expression

(KPIValue("Overcrowding"), ParallelPeriod (

[Dim Date].[Hierarchy].[Date Year], 1,

[Dim Date].[Hierarchy].CurrentMember)) * 0.095

--Status Expression

IIF(KPIValue("Overcrowding") < KPIGoal("Overcrowding"), 1, -1)

--Trend Expression

IIf (KPIValue("Overcrowding") > (KPIValue("Overcrowding"), ParallelPeriod (

[Dim Date].[Hierarchy].[Date Year], 1,

[Dim Date].[Hierarchy].CurrentMember)), 1, -1)

--KPI

"Delay"

--Value Expression

[Measures].[Delay Amount]

--Goal Expression

(KPIValue("Delay"), ParallelPeriod (

[Dim Date].[Hierarchy].[Date Year], 1,

[Dim Date].[Hierarchy].CurrentMember)) * 0.095

--Status Expression

IIF(KPIValue("Delay") < KPIGoal("Delay"), 1, -1)

--Trend Expression

IIF(KPIValue("Delay") > (KPIValue("Delay"),ParallelPeriod (

[Dim Date].[Hierarchy].[Date Year], 1,

[Dim Date].[Hierarchy].CurrentMember)), 1, -1)

ANALYTICAL PROBLEM QUERIES

--1. What train rode most often?

```
SELECT NON EMPTY { [Measures].[Fact Real Section Count] } ON COLUMNS,

NON EMPTY { TOPCOUNT ([Dim Train].[Train Id Bk].[Train Id Bk].ALLMEMBERS,

1,[Measures].[Fact Real Section Count]) } DIMENSION PROPERTIES
MEMBER_CAPTION,

MEMBER_UNIQUE_NAME ON ROWS FROM [ETL Trains]
```

--2. What event appeared most often?

```
SELECT NON EMPTY {[Measures].[Fact Real Section Count]} ON COLUMNS,

NON EMPTY {TOPCOUNT(FILTER([Dim Event].[Event Type].[Event
Type].ALLMEMBERS,

[Dim Event].[Event Type].CURRENTMEMBER.MEMBER_CAPTION <> 'Unknown'),
1,

[Measures].[Fact Real Section Count])}

DIMENSION PROPERTIES MEMBER_CAPTION, MEMBER_UNIQUE_NAME ON
ROWS FROM [ETL Trains];
```

--3. What is the average congstion level in the metro on Friday on Politechnika?

```
SELECT NON EMPTY { [Measures].[AVG_Congestion] } ON COLUMNS FROM

( SELECT ( { [Start Station].[Station Name].&[Politechnika] } )

ON COLUMNS FROM ( SELECT ( { [Dim Date].[Date Day Of Week].&[6] } )

ON COLUMNS FROM [ETL Trains])) WHERE ( [Dim Date].[Date Day Of Week].&[6],

[Start Station].[Station Name].&[Politechnika])
```

--4. How many passangers use the metro each Friday?

```
SELECT NON EMPTY { [Measures].[Amount Of Passengers] }

ON COLUMNS FROM ( SELECT ( { [Dim Date].[Date Day Of Week].&[6] } )
```

ON COLUMNS FROM [ETL Trains]) WHERE ([Dim Date].[Date Day Of Week].&[6])

--5. What is the change in average congestion from Politechinka to Stokłosy?

WITH

MEMBER [Measures].[Average Congestion Politechnika] AS

AVG({[Start Station].[Station Name].&[Politechnika]}, [Measures].[AVG_Congestion])

MEMBER [Measures].[Average Congestion Raclawicka] AS

AVG({[Start Station].[Station Name].&[Raclawicka]}, [Measures].[AVG_Congestion])

MEMBER [Measures].[Change in Average Congestion] AS

[Measures].[Average Congestion Raclawicka] - [Measures].[Average Congestion Politechnika]

SELECT

{[Measures].[Average Congestion Politechnika], [Measures].[Average Congestion Raclawicka],

[Measures].[Change in Average Congestion]} ON COLUMNS

FROM

[ETL Trains]

--6. Which stations have the lowest and highest congestion?

--Lowest:

SELECT NON EMPTY { [Measures].[Minimum Congestion Level] }

ON COLUMNS, NON EMPTY TOPCOUNT({ ([Start Station].[Station Name].[Station Name].ALLMEMBERS) },

1, [Measures].[Maximum Congestion Level]) ON ROWS FROM [ETL Trains]

--Highest:

SELECT NON EMPTY { [Measures].[Maximum Congestion Level] }

ON COLUMNS, NON EMPTY TOPCOUNT({ ([Start Station].[Station Name].[Station Name].ALLMEMBERS) },

1, [Measures].[Maximum Congestion Level]) ON ROWS FROM [ETL Trains]

--7. What is a difference in amount of pasangers using the metro in thursday and friday?

WITH MEMBER [Measures].[Passengers on Sunday] AS SUM({[Dim Date].[Date Day Of Week].&[5]},

[Measures].[Amount Of Passengers]) MEMBER [Measures].[Passengers on Monday] AS

SUM({[Dim Date].[Date Day Of Week].&[6]}, [Measures].[Amount Of Passengers])

MEMBER [Measures].[Difference in Passengers] AS

[Measures].[Passengers on Sunday] - [Measures].[Passengers on Monday] SELECT

{[Measures].[Difference in Passengers]} ON COLUMNS FROM [ETL Trains]

--8. What is the average delay of trains?

SELECT NON EMPTY { [Measures].[Fact Real Section Count], [Measures].[AVG_Delay] }

ON COLUMNS FROM [ETL Trains]

--9. Compare average delay amounts from 2021 and 2022.

SELECT

{ [Measures].[AVG_Delay]} ON COLUMNS,{[Dim Date].[Hierarchy].[Date Year].&[2021],

[Dim Date].[Hierarchy].[Date Year].&[2022]} ON ROWS FROM [ETL Trains];

--10. Show if trains ever arrive at scheduled time.

WITH SET [Arrived Early Trains] AS FILTER([Dim Train].[Train Id Sk].[Train Id Sk].ALLMEMBERS,

[Measures].[Minimum Delay Amount] = 0) SELECT NON EMPTY {[Measures].[Minimum Delay Amount],

[Measures].[Fact Real Section Count]} ON COLUMNS,NON EMPTY [Arrived Early Trains]

DIMENSION PROPERTIES MEMBER_CAPTION, MEMBER_UNIQUE_NAME ON ROWS FROM [ETL Trains];