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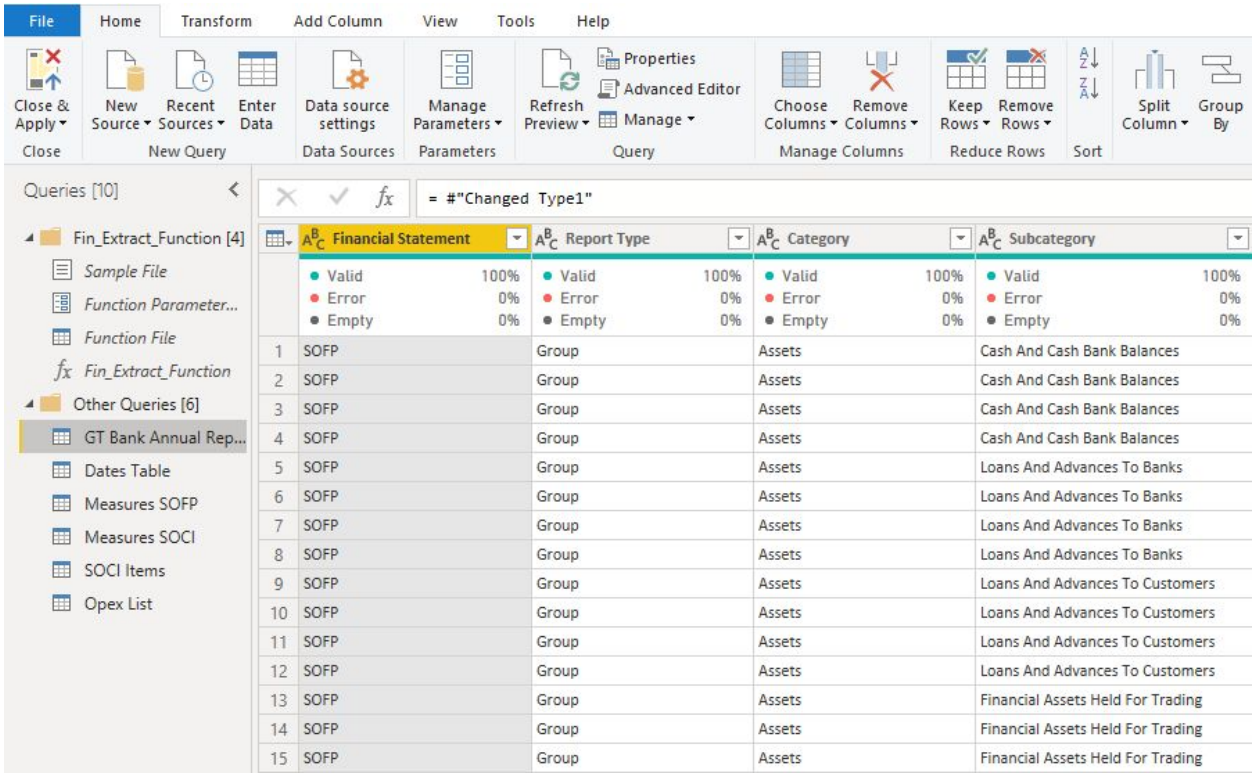
THE MOST COMMON TRANSFORMATIONS IN POWER QUERY

(Excel and Power BI)



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The Most Common Transformations Used in Power Query

Power Query is a data connection technology that enables you to discover, connect, combine, and refine data sources to meet your analysis needs. Features in Power Query are available in Excel and Power BI Desktop. In this document, we will be looking into the common transformations as it relates to Power BI Desktop.

Power Query enables you to import data from various data sources, make connections and shape data into a clean model. Once data has been transformed in Power Query a report or visual can be created from the data model.

Some common transformations used in Power Query Include:

1. Use First Rows as Header

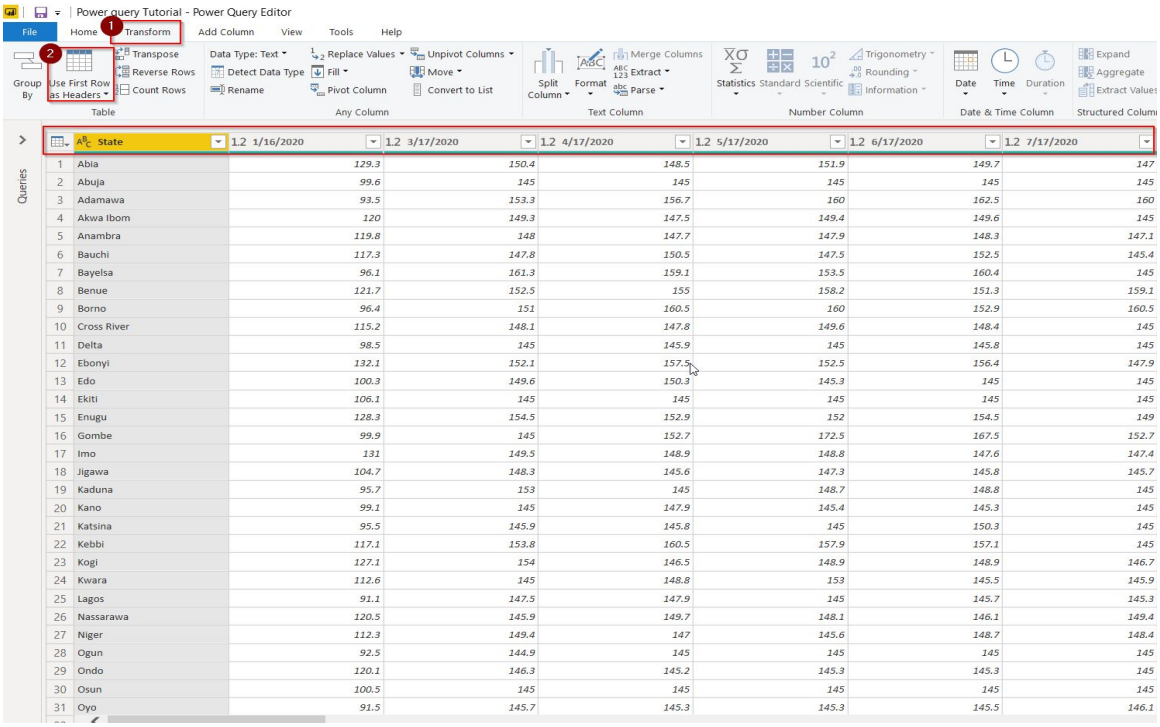
When data is imported to Power Query it is sometimes unstructured data and the column header is part of the dataset and by default labelled **Column 1 - Column 7** as shown below. The desired header for this dataset is shown in row 1 of the image below.

	Column1	Column2	Column3	Column4	Column5	Column6	Column7
1	State	1/16/2020	3/17/2020	4/17/2020	5/17/2020	6/17/2020	7/17/2020
2	Abia	129.3	150.4	148.5	151.9	149.7	147
3	Abuja	99.6	145	145	145	145	145
4	Adamawa	93.5	153.3	156.7	160	162.5	160
5	Akwa Ibom	120	149.3	147.5	149.4	149.6	145
6	Anambra	119.8	148	147.7	147.9	148.3	147.1
7	Bauchi	117.3	147.8	150.5	147.5	152.5	145.4
8	Bayelsa	96.1	161.3	159.1	153.5	160.4	145
9	Benue	121.7	152.5	155	158.2	151.3	159.1
10	Borno	96.4	151	160.5	160	152.9	160.5
11	Cross River	115.2	148.1	147.8	149.6	148.4	145
12	Delta	98.5	145	145.9	145	145.8	145
13	Ebonyi	132.1	152.1	157.5	152.5	156.4	147.9
14	Edo	100.3	149.6	150.3	145.3	145	145
15	Ekiti	106.1	145	145	145	145	145
16	Enugu	128.3	154.5	152.9	152	154.5	149
17	Gombe	99.9	145	152.7	172.5	167.5	152.7
18	Imo	131	149.5	148.9	148.8	147.6	147.4
19	Jigawa	104.7	148.3	145.6	147.3	145.8	145.7
20	Kaduna	95.7	153	145	148.7	148.8	145
21	Kano	99.1	145	147.9	145.4	145.3	145
22	Katsina	95.5	145.9	145.8	145	150.3	145
23	Kebbi	117.1	153.8	160.5	157.9	157.1	145
24	Kogi	127.1	154	146.5	148.9	148.9	146.7
25	Kwara	112.6	145	148.8	153	145.5	145.9
26	Lagos	91.1	147.5	147.9	145	145.7	145.3

The “Use First Row as Headers” transform is used to make row 1 the column header.

Step 1: Go to the Transform Ribbon (Labelled No.1 in the diagram below)

Step 2: Click on First Row as Header(Labelled No.2 in the diagram below)



	State	1/16/2020	3/17/2020	4/17/2020	5/17/2020	6/17/2020	7/17/2020
1	Abia	129.3	150.4	148.5	151.9	149.7	147
2	Abuja	99.6	145	145	145	145	145
3	Adamawa	93.5	153.3	156.7	160	162.5	160
4	Akwa Ibom	120	149.3	147.5	149.4	149.6	145
5	Anambra	119.8	148	147.7	147.9	148.3	147.1
6	Bauchi	117.3	147.8	150.5	147.5	152.5	145.4
7	Bayelsa	96.1	161.3	159.1	153.5	160.4	145
8	Benue	121.7	152.5	155	158.2	151.3	159.1
9	Borno	96.4	151	160.5	160	152.9	160.5
10	Cross River	115.2	148.1	147.8	149.6	148.4	145
11	Delta	98.5	145	145.9	145	145.8	145
12	Ebonyi	132.1	152.1	157.5	152.5	156.4	147.9
13	Edo	100.3	149.6	150.3	145.3	145	145
14	Ekiti	106.1	145	145	145	145	145
15	Enugu	128.3	154.5	152.9	152	154.5	149
16	Gombe	99.9	145	152.7	172.5	167.5	152.7
17	Imo	131	149.5	148.9	148.8	147.6	147.4
18	Jigawa	104.7	148.3	145.6	147.3	145.8	145.7
19	Kaduna	95.7	153	145	148.7	148.8	145
20	Kano	99.1	145	147.9	145.4	145.3	145
21	Katsina	95.5	145.9	145.8	145	150.3	145
22	Kebbi	117.1	153.8	160.5	157.9	157.1	145
23	Kogi	127.1	154	146.5	148.9	148.9	146.7
24	Kwara	112.6	145	148.8	153	145.5	145.9
25	Lagos	91.1	147.5	147.9	145	145.7	145.3
26	Nassarawa	120.5	145.9	149.7	148.1	146.1	149.4
27	Niger	112.3	149.4	147	145.6	148.7	148.4
28	Ogun	92.5	144.9	145	145	145	145
29	Ondo	120.1	146.3	145.2	145.3	145.3	145
30	Osun	100.5	145	145	145	145	145
31	Oyo	91.5	145.7	145.3	145.3	145.5	146.1

2. Unpivot Column

Power BI Unpivot Columns feature converts the data headers stored **horizontally** into a **vertica**l format to create well-structured data that can be analysed easily. Using the Unpivot Column transformation tool, the selected columns are converted to rows. The selected columns are then split into two columns called **Attribute** and **Value.**

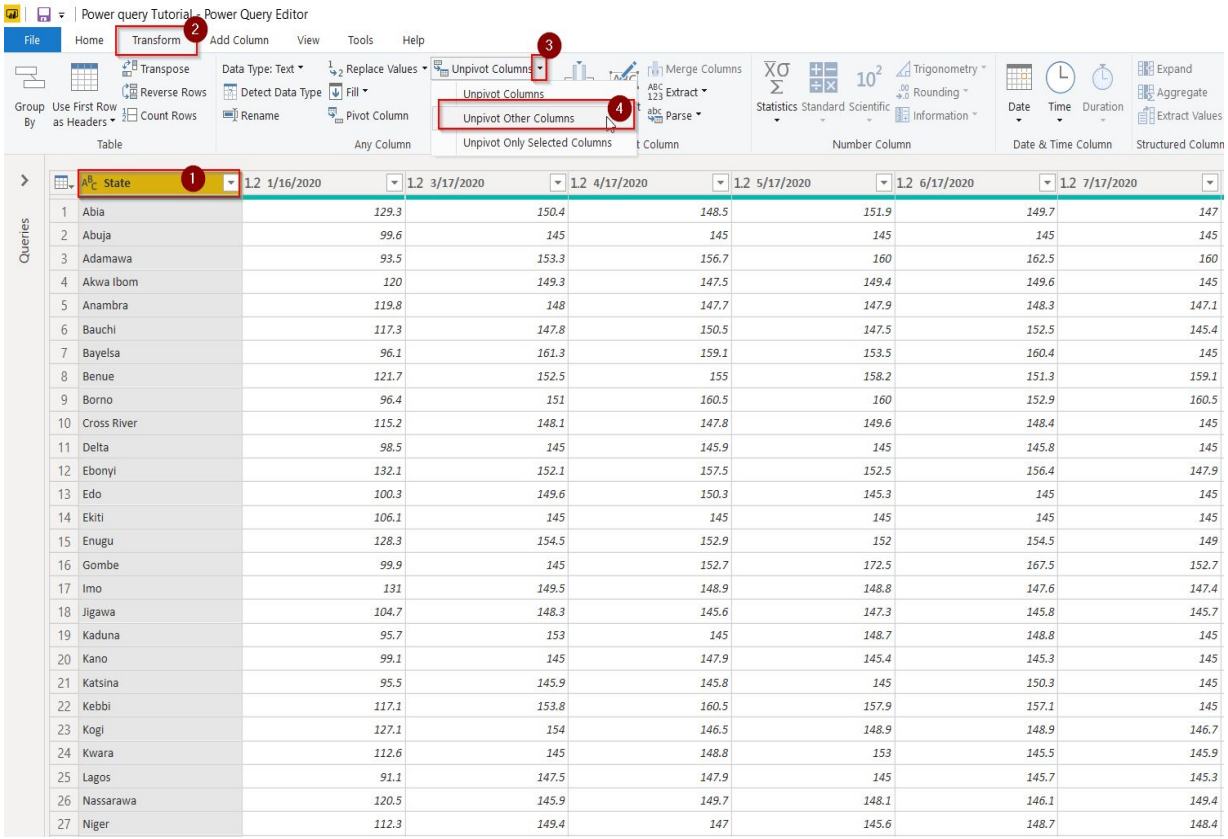
The **Attribute** column represents the header of the columns chosen for Power BI Unpivot Columns.
The **Value** column represents the value which was present under the header's column previously.

In other words, data gets rotated from horizontal to vertical when the Unpivot Column Transform is applied. The data set is re-structured.

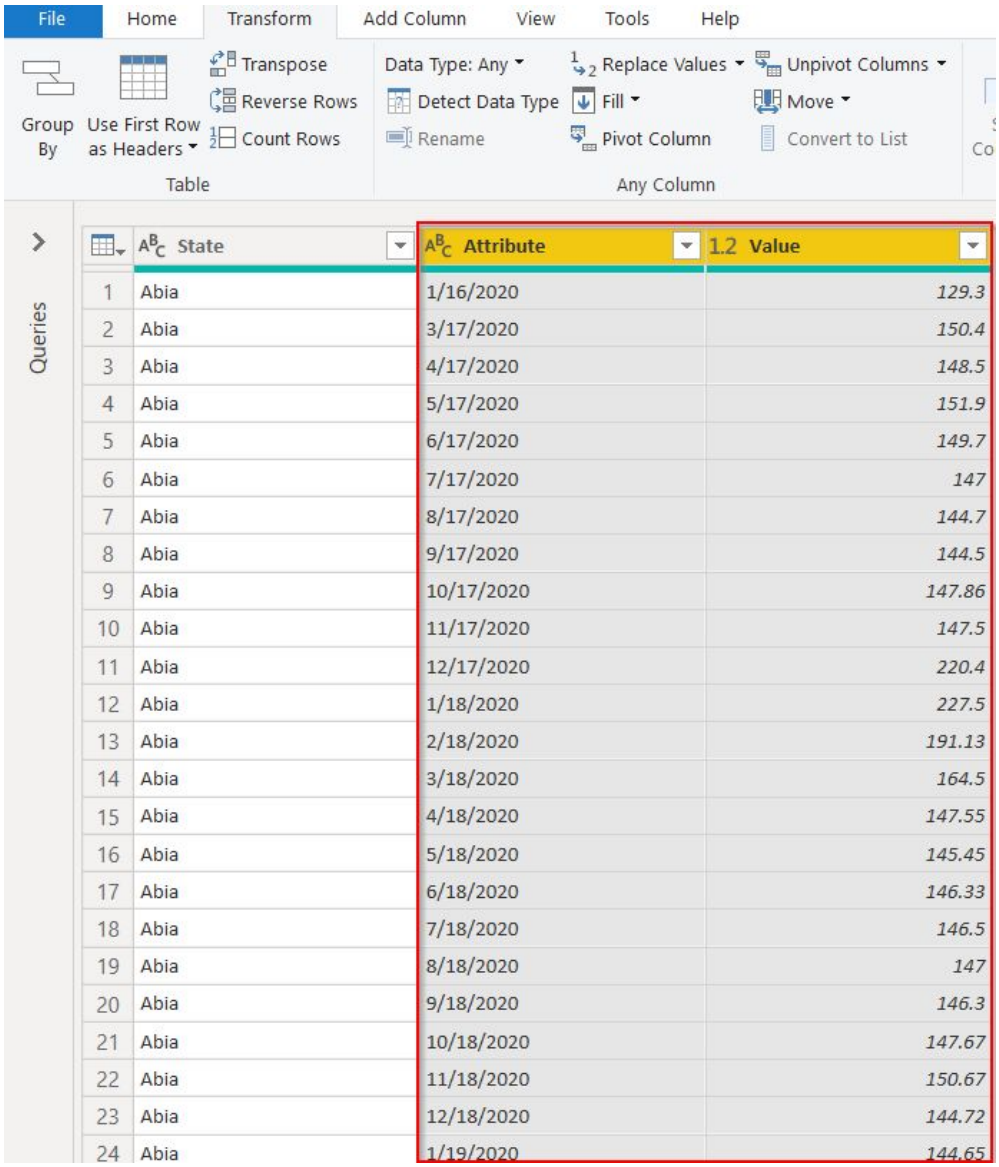
Steps to use Unpivot Transform in Power Query

Step 1: Select the state column (Labelled No.1 in the diagram below)
Step 2: Select the Transform ribbon (Labelled No.2 in the diagram below)
Step 3: Select the dropdown icon attached to the unpivot columns (Labelled No.3 in the diagram below)
Step:4: Select Unpivot Other Columns (Labelled No.4 in the diagram below)

We will use the **unpivot other columns** transformation because the columns to be unpivoted are many in number. Therefore we select the only column that will not be unpivoted and unpivot other columns.



The result is shown below with the horizontal data heads converted to vertical. Two new columns are created called **Attribute** and **Value** which can then be renamed to any column header desired.



	State	Attribute	Value
1	Abia	1/16/2020	129.3
2	Abia	3/17/2020	150.4
3	Abia	4/17/2020	148.5
4	Abia	5/17/2020	151.9
5	Abia	6/17/2020	149.7
6	Abia	7/17/2020	147
7	Abia	8/17/2020	144.7
8	Abia	9/17/2020	144.5
9	Abia	10/17/2020	147.86
10	Abia	11/17/2020	147.5
11	Abia	12/17/2020	220.4
12	Abia	1/18/2020	227.5
13	Abia	2/18/2020	191.13
14	Abia	3/18/2020	164.5
15	Abia	4/18/2020	147.55
16	Abia	5/18/2020	145.45
17	Abia	6/18/2020	146.33
18	Abia	7/18/2020	146.5
19	Abia	8/18/2020	147
20	Abia	9/18/2020	146.3
21	Abia	10/18/2020	147.67
22	Abia	11/18/2020	150.67
23	Abia	12/18/2020	144.72
24	Abia	1/19/2020	144.65

3. Change Data type

There are nine different data types in Power Query Editor. Those data types are listed below:

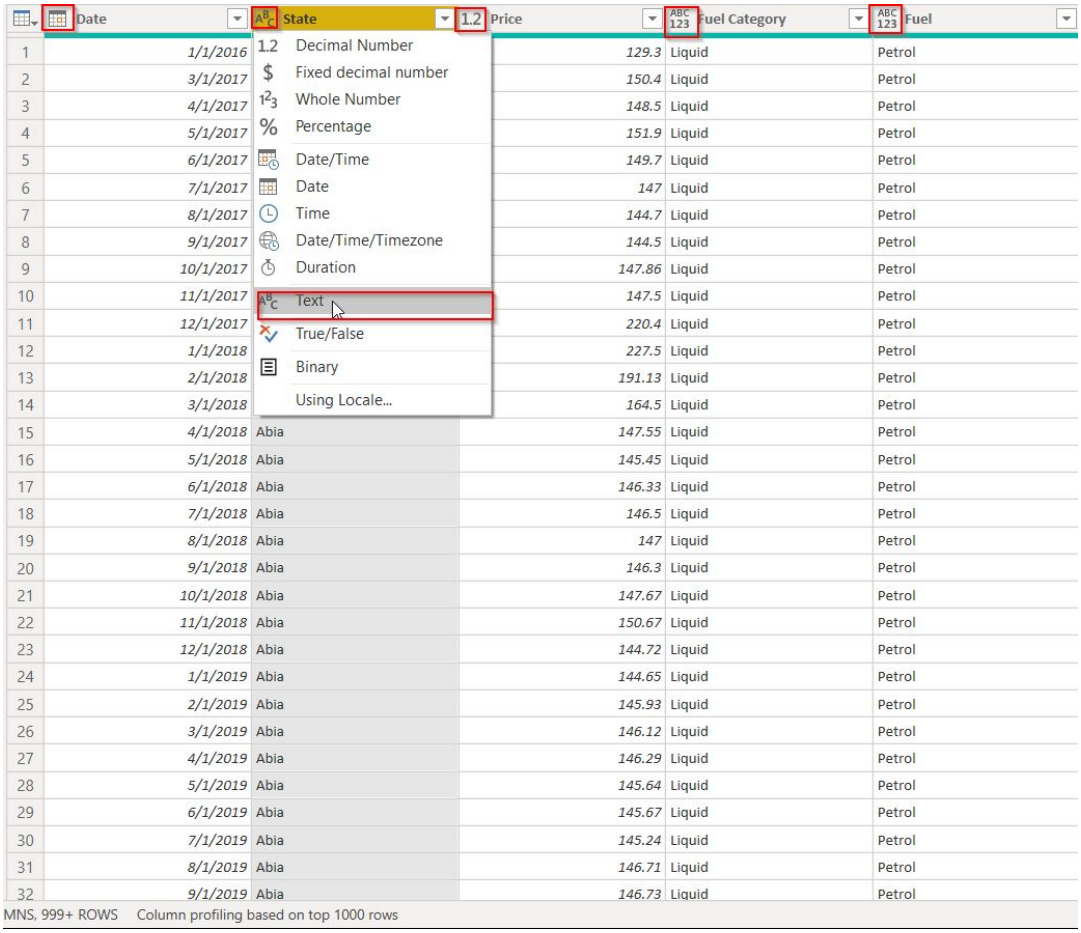
- Decimal Number
- Fixed decimal number
- Whole Number
- Date/Time
- Date
- Time
- Text
- True/False
- Binary

In Power Query switching between the data types above is very essential to creating a data model that can be used for building a report or dashboard.

There are three major ways to change the Data type of a column in Power Query.

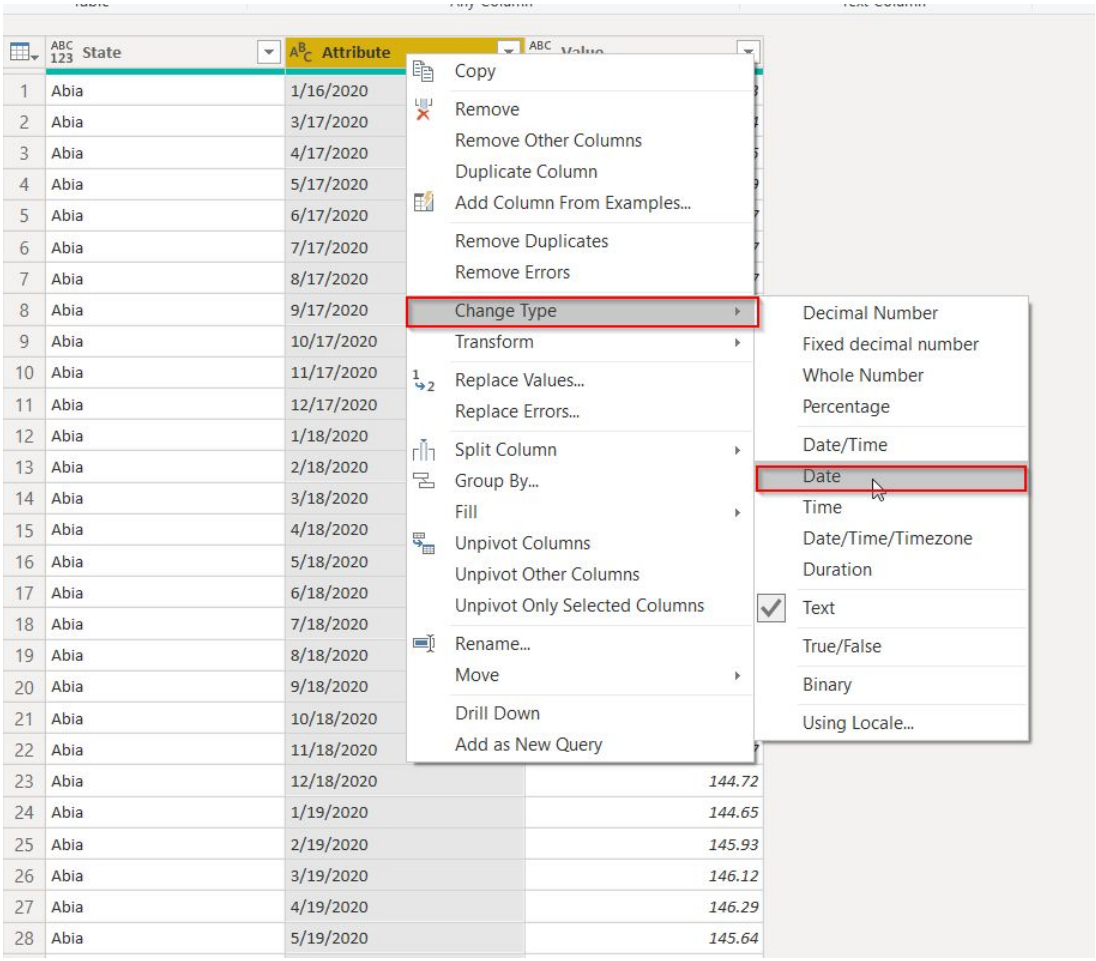
1. **Clicking on the specific column itself**
2. **Right-clicking on the specific column**
3. **Click on data type on the transform ribbon.**

I. **Clicking on the specific column itself** - This can be done by selecting the data type icon at the top left portion of the column you want to change. Look at the examples below to see how it is done.

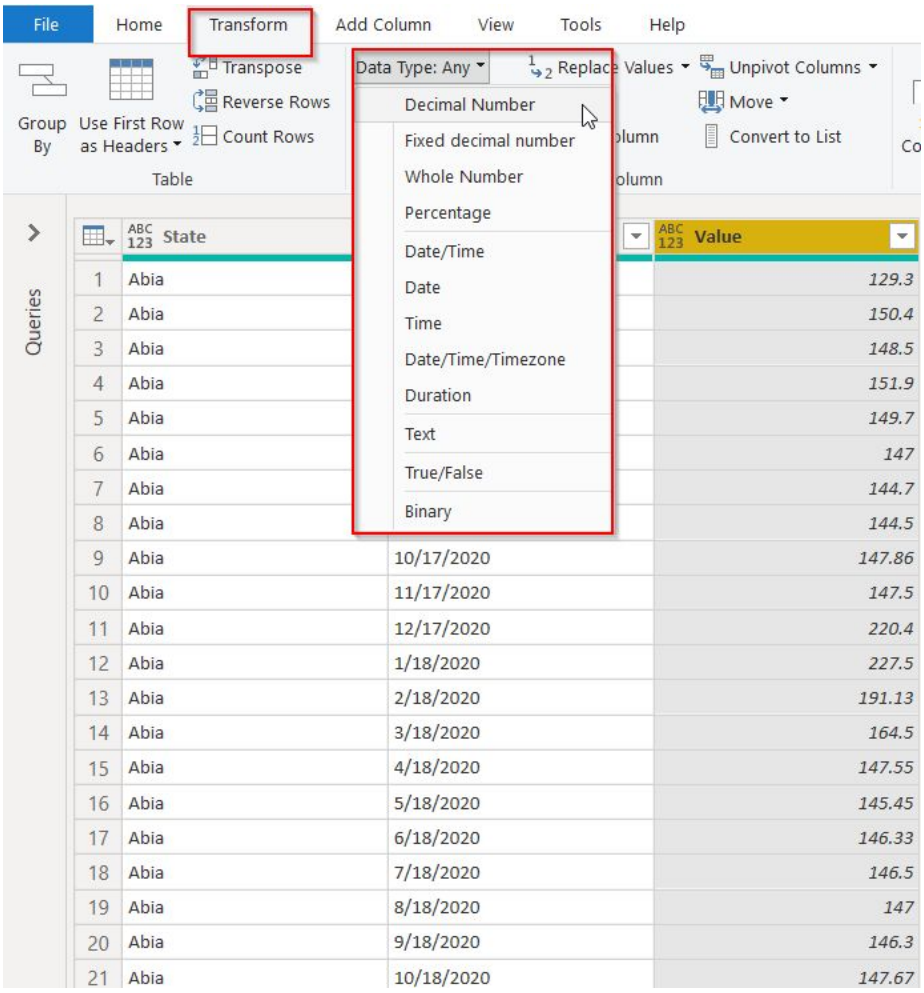


	Date	State	Price	Fuel Category	Fuel
1	1/1/2016		129.3	Liquid	Petrol
2	3/1/2017		150.4	Liquid	Petrol
3	4/1/2017		148.5	Liquid	Petrol
4	5/1/2017		151.9	Liquid	Petrol
5	6/1/2017		149.7	Liquid	Petrol
6	7/1/2017		147	Liquid	Petrol
7	8/1/2017		144.7	Liquid	Petrol
8	9/1/2017		144.5	Liquid	Petrol
9	10/1/2017		147.86	Liquid	Petrol
10	11/1/2017		147.5	Liquid	Petrol
11	12/1/2017		220.4	Liquid	Petrol
12	1/1/2018		227.5	Liquid	Petrol
13	2/1/2018		191.13	Liquid	Petrol
14	3/1/2018		164.5	Liquid	Petrol
15	4/1/2018	Abia	147.55	Liquid	Petrol
16	5/1/2018	Abia	145.45	Liquid	Petrol
17	6/1/2018	Abia	146.33	Liquid	Petrol
18	7/1/2018	Abia	146.5	Liquid	Petrol
19	8/1/2018	Abia	147	Liquid	Petrol
20	9/1/2018	Abia	146.3	Liquid	Petrol
21	10/1/2018	Abia	147.67	Liquid	Petrol
22	11/1/2018	Abia	150.67	Liquid	Petrol
23	12/1/2018	Abia	144.72	Liquid	Petrol
24	1/1/2019	Abia	144.65	Liquid	Petrol
25	2/1/2019	Abia	145.93	Liquid	Petrol
26	3/1/2019	Abia	146.12	Liquid	Petrol
27	4/1/2019	Abia	146.29	Liquid	Petrol
28	5/1/2019	Abia	145.64	Liquid	Petrol
29	6/1/2019	Abia	145.67	Liquid	Petrol
30	7/1/2019	Abia	145.24	Liquid	Petrol
31	8/1/2019	Abia	146.71	Liquid	Petrol
32	9/1/2019	Abia	146.73	Liquid	Petrol

II. **Right-clicking on the specific column:** Right-click on the column then navigate to change type then select the type you want to change the column to from the list.



III. **Click on data type on the transform ribbon -** On Power query navigate to the transform ribbon then select the **data type** menu to change the data type for the selected column.



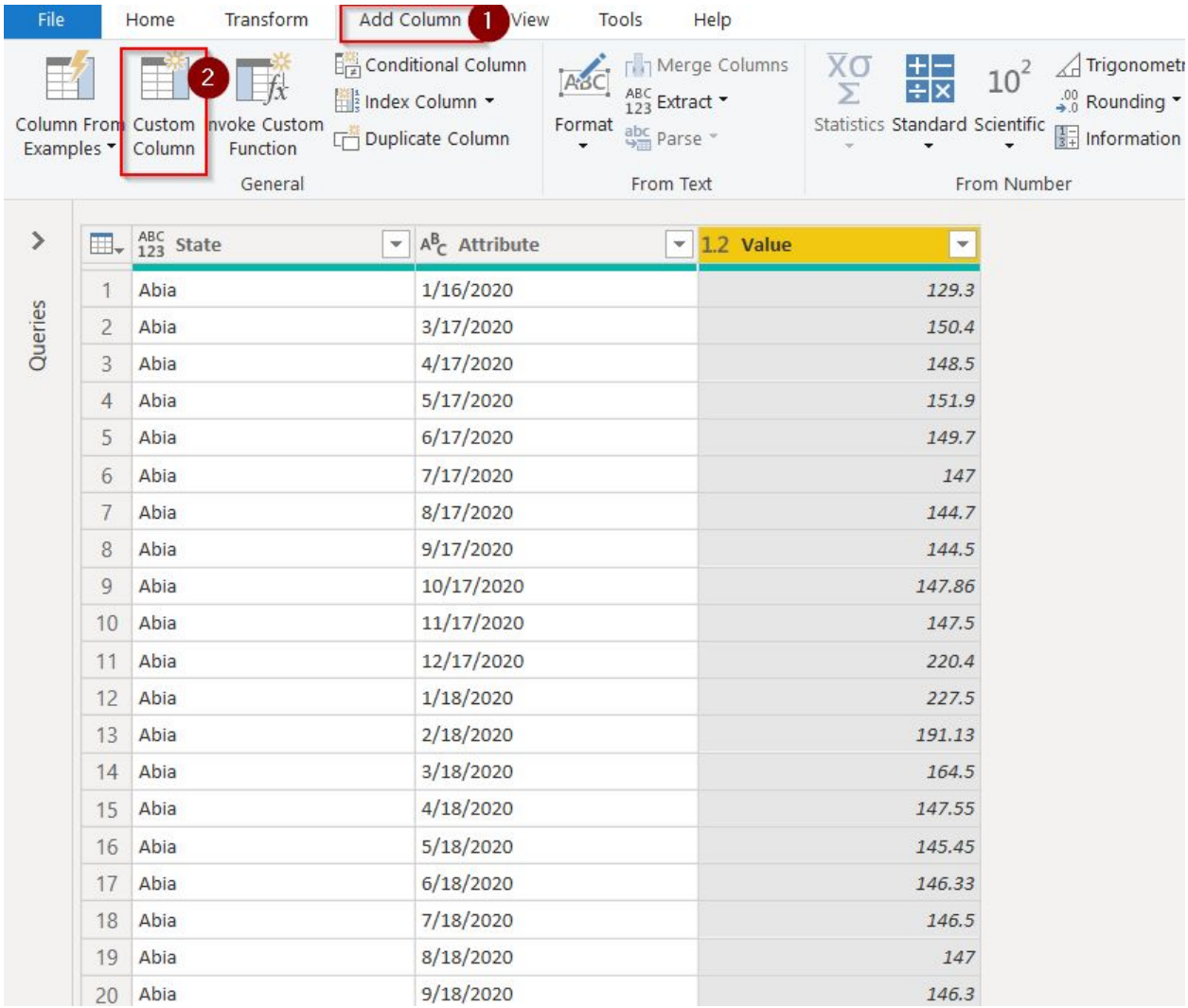
	State		Value
1	Abia		129.3
2	Abia		150.4
3	Abia		148.5
4	Abia		151.9
5	Abia		149.7
6	Abia		147
7	Abia		144.7
8	Abia		144.5
9	Abia	10/17/2020	147.86
10	Abia	11/17/2020	147.5
11	Abia	12/17/2020	220.4
12	Abia	1/18/2020	227.5
13	Abia	2/18/2020	191.13
14	Abia	3/18/2020	164.5
15	Abia	4/18/2020	147.55
16	Abia	5/18/2020	145.45
17	Abia	6/18/2020	146.33
18	Abia	7/18/2020	146.5
19	Abia	8/18/2020	147
20	Abia	9/18/2020	146.3
21	Abia	10/18/2020	147.67

4. Adding Column

Adding a new column is very important in creating a data model. This is a very crucial part in data analysis because you'll encounter many scenarios in which you'll need to create custom columns. Adding a new column can be achieved by following these steps.

Step 1: Go to Add column Ribbon (Labelled No.1 in the diagram below)

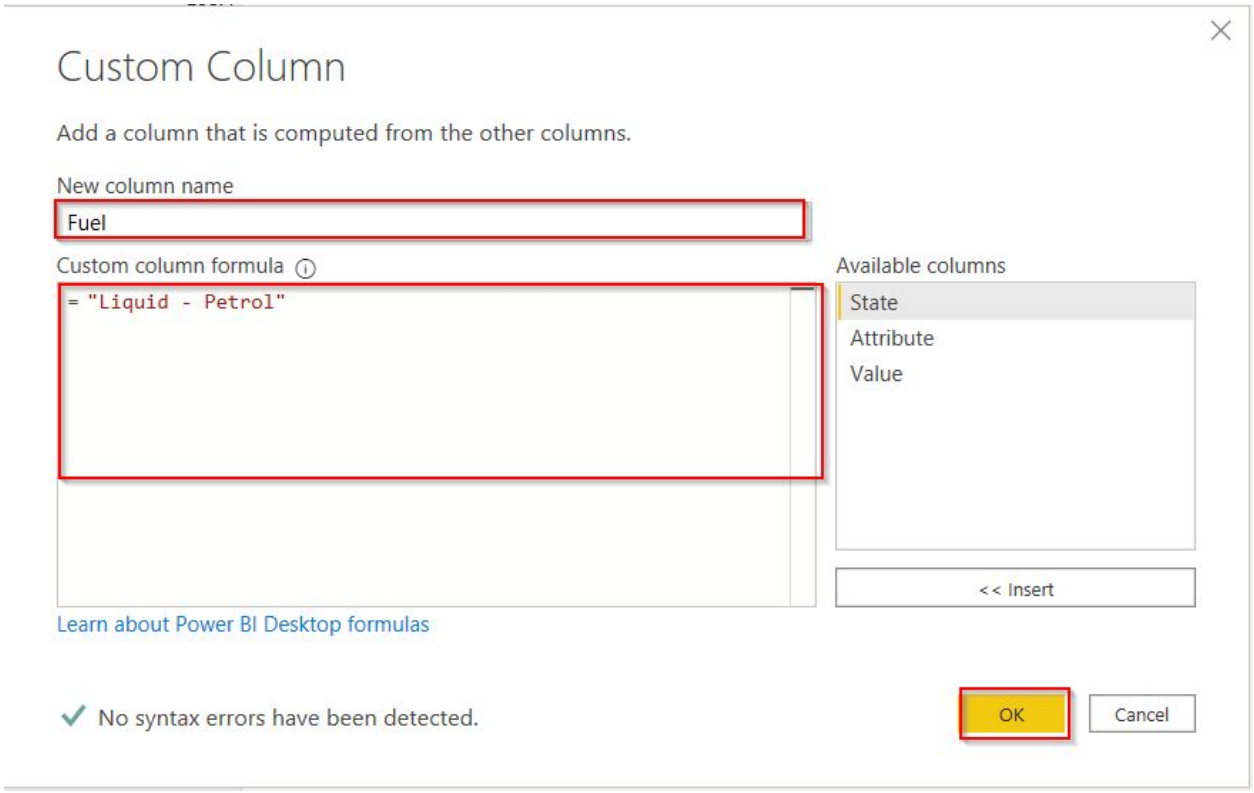
Step 2: Select Custom Column (Labelled No.2 in the diagram below)



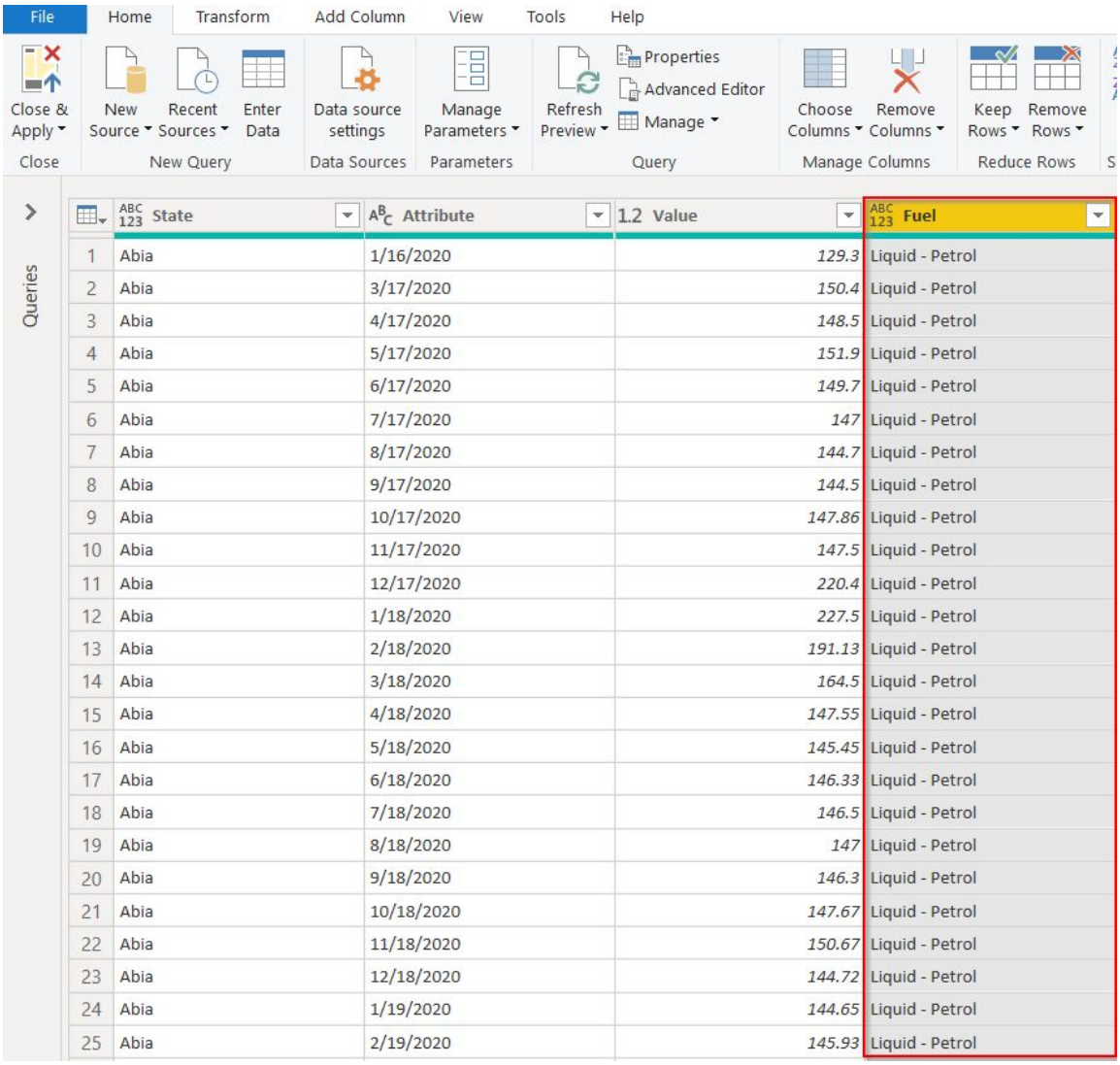
	State	Attribute	Value
1	Abia	1/16/2020	129.3
2	Abia	3/17/2020	150.4
3	Abia	4/17/2020	148.5
4	Abia	5/17/2020	151.9
5	Abia	6/17/2020	149.7
6	Abia	7/17/2020	147
7	Abia	8/17/2020	144.7
8	Abia	9/17/2020	144.5
9	Abia	10/17/2020	147.86
10	Abia	11/17/2020	147.5
11	Abia	12/17/2020	220.4
12	Abia	1/18/2020	227.5
13	Abia	2/18/2020	191.13
14	Abia	3/18/2020	164.5
15	Abia	4/18/2020	147.55
16	Abia	5/18/2020	145.45
17	Abia	6/18/2020	146.33
18	Abia	7/18/2020	146.5
19	Abia	8/18/2020	147
20	Abia	9/18/2020	146.3

After selecting the Custom Column button a Query Editor will appear. Type in **Fuel Category** in the Column Names and **"Liquid"** as the Custom column name and then click the ok button.

Note: The Query Editor is written in a Language called "M"



Finally, a new column called **Fuel** is added to the table with value **Liquid - Petrol** as shown in the diagram below.



	State	Attribute	Value	Fuel
1	Abia	1/16/2020	129.3	Liquid - Petrol
2	Abia	3/17/2020	150.4	Liquid - Petrol
3	Abia	4/17/2020	148.5	Liquid - Petrol
4	Abia	5/17/2020	151.9	Liquid - Petrol
5	Abia	6/17/2020	149.7	Liquid - Petrol
6	Abia	7/17/2020	147	Liquid - Petrol
7	Abia	8/17/2020	144.7	Liquid - Petrol
8	Abia	9/17/2020	144.5	Liquid - Petrol
9	Abia	10/17/2020	147.86	Liquid - Petrol
10	Abia	11/17/2020	147.5	Liquid - Petrol
11	Abia	12/17/2020	220.4	Liquid - Petrol
12	Abia	1/18/2020	227.5	Liquid - Petrol
13	Abia	2/18/2020	191.13	Liquid - Petrol
14	Abia	3/18/2020	164.5	Liquid - Petrol
15	Abia	4/18/2020	147.55	Liquid - Petrol
16	Abia	5/18/2020	145.45	Liquid - Petrol
17	Abia	6/18/2020	146.33	Liquid - Petrol
18	Abia	7/18/2020	146.5	Liquid - Petrol
19	Abia	8/18/2020	147	Liquid - Petrol
20	Abia	9/18/2020	146.3	Liquid - Petrol
21	Abia	10/18/2020	147.67	Liquid - Petrol
22	Abia	11/18/2020	150.67	Liquid - Petrol
23	Abia	12/18/2020	144.72	Liquid - Petrol
24	Abia	1/19/2020	144.65	Liquid - Petrol
25	Abia	2/19/2020	145.93	Liquid - Petrol

5. Split Column

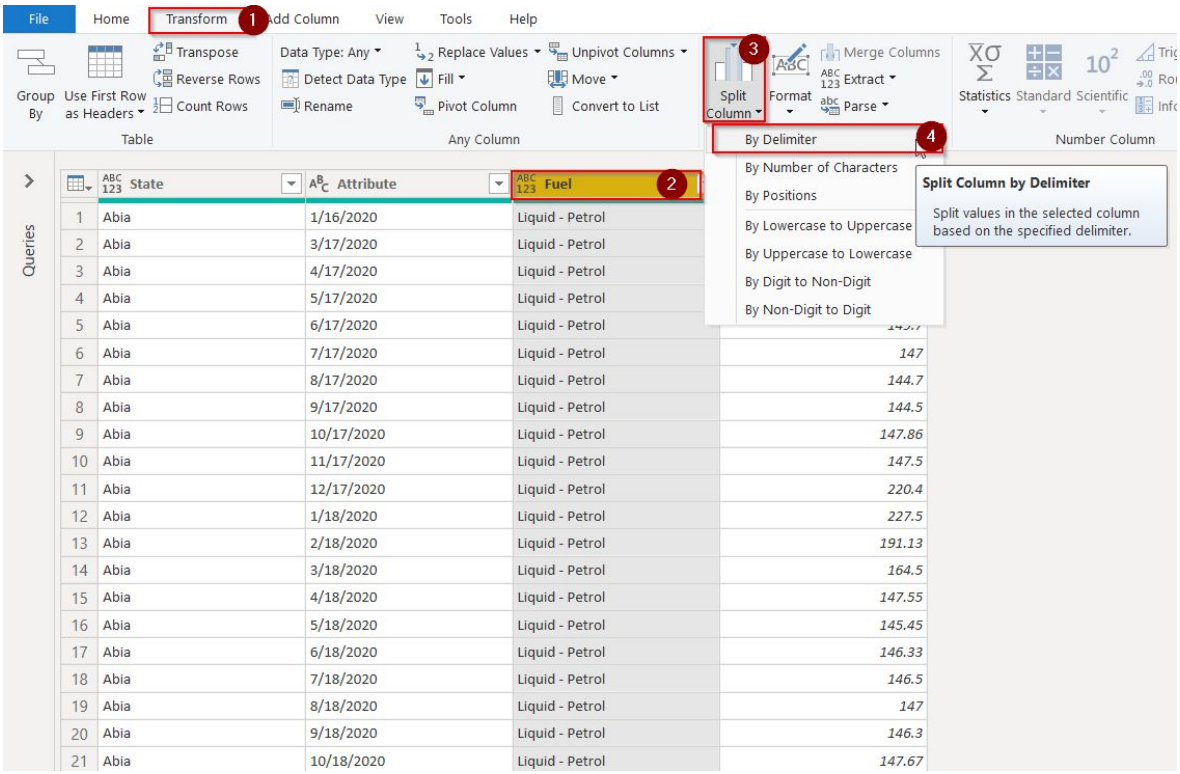
Split column Transform divides a single column into different columns. The steps are shown below:

Step 1: Select the transform Ribbon (labelled No 1 in the diagram below)

Step 2: Select the Column to perform the split column transform (labelled No 2 in the diagram below)

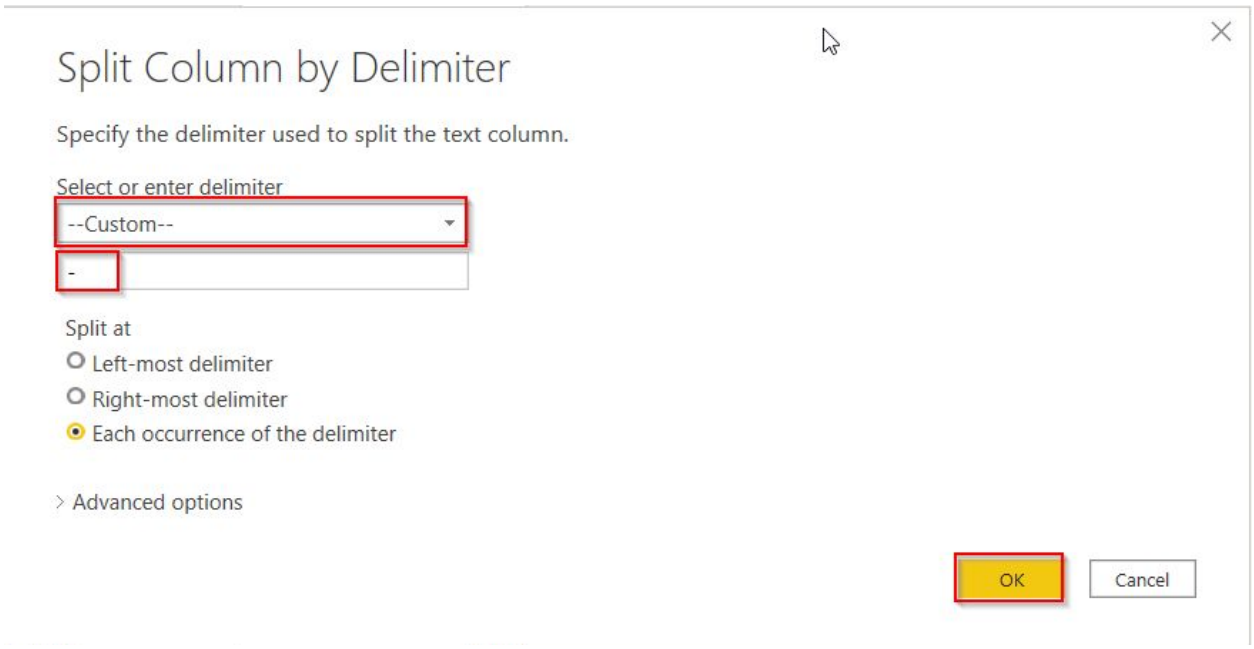
Step 3: Click on the split column (labelled No 3 in the diagram below)

Step 4: Select By Delimiter (labelled No 4 in the diagram below)

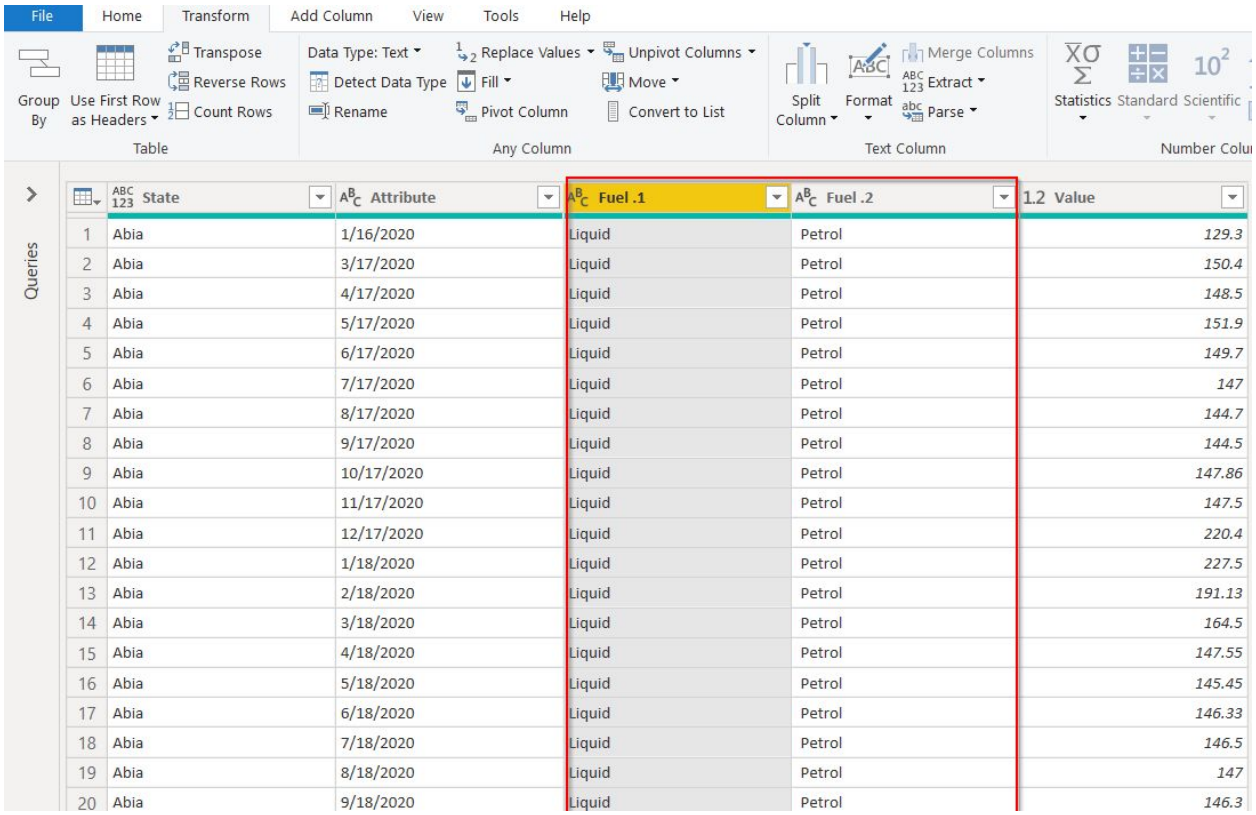


	State	Attribute	Fuel	
1	Abia	1/16/2020	Liquid - Petrol	
2	Abia	3/17/2020	Liquid - Petrol	
3	Abia	4/17/2020	Liquid - Petrol	
4	Abia	5/17/2020	Liquid - Petrol	
5	Abia	6/17/2020	Liquid - Petrol	
6	Abia	7/17/2020	Liquid - Petrol	147
7	Abia	8/17/2020	Liquid - Petrol	144.7
8	Abia	9/17/2020	Liquid - Petrol	144.5
9	Abia	10/17/2020	Liquid - Petrol	147.86
10	Abia	11/17/2020	Liquid - Petrol	147.5
11	Abia	12/17/2020	Liquid - Petrol	220.4
12	Abia	1/18/2020	Liquid - Petrol	227.5
13	Abia	2/18/2020	Liquid - Petrol	191.13
14	Abia	3/18/2020	Liquid - Petrol	164.5
15	Abia	4/18/2020	Liquid - Petrol	147.55
16	Abia	5/18/2020	Liquid - Petrol	145.45
17	Abia	6/18/2020	Liquid - Petrol	146.33
18	Abia	7/18/2020	Liquid - Petrol	146.5
19	Abia	8/18/2020	Liquid - Petrol	147
20	Abia	9/18/2020	Liquid - Petrol	146.3
21	Abia	10/18/2020	Liquid - Petrol	147.67

After Selecting **by Delimiter** option from the drop-down, a dialogue box will appear to specify the type of delimiter to be used to split the column into two. Select **Custom** and use the **hyphen(-)** to split this column. Select the split at Each Occurrence of delimiter option.



The result of using the split column transform is shown below as two new columns formerly separated by a hyphen (-). The new titles for columns are **Fuel.1 & Fuel.2** as shown below.



	State	Attribute	Fuel .1	Fuel .2	Value
1	Abia	1/16/2020	Liquid	Petrol	129.3
2	Abia	3/17/2020	Liquid	Petrol	150.4
3	Abia	4/17/2020	Liquid	Petrol	148.5
4	Abia	5/17/2020	Liquid	Petrol	151.9
5	Abia	6/17/2020	Liquid	Petrol	149.7
6	Abia	7/17/2020	Liquid	Petrol	147
7	Abia	8/17/2020	Liquid	Petrol	144.7
8	Abia	9/17/2020	Liquid	Petrol	144.5
9	Abia	10/17/2020	Liquid	Petrol	147.86
10	Abia	11/17/2020	Liquid	Petrol	147.5
11	Abia	12/17/2020	Liquid	Petrol	220.4
12	Abia	1/18/2020	Liquid	Petrol	227.5
13	Abia	2/18/2020	Liquid	Petrol	191.13
14	Abia	3/18/2020	Liquid	Petrol	164.5
15	Abia	4/18/2020	Liquid	Petrol	147.55
16	Abia	5/18/2020	Liquid	Petrol	145.45
17	Abia	6/18/2020	Liquid	Petrol	146.33
18	Abia	7/18/2020	Liquid	Petrol	146.5
19	Abia	8/18/2020	Liquid	Petrol	147
20	Abia	9/18/2020	Liquid	Petrol	146.3

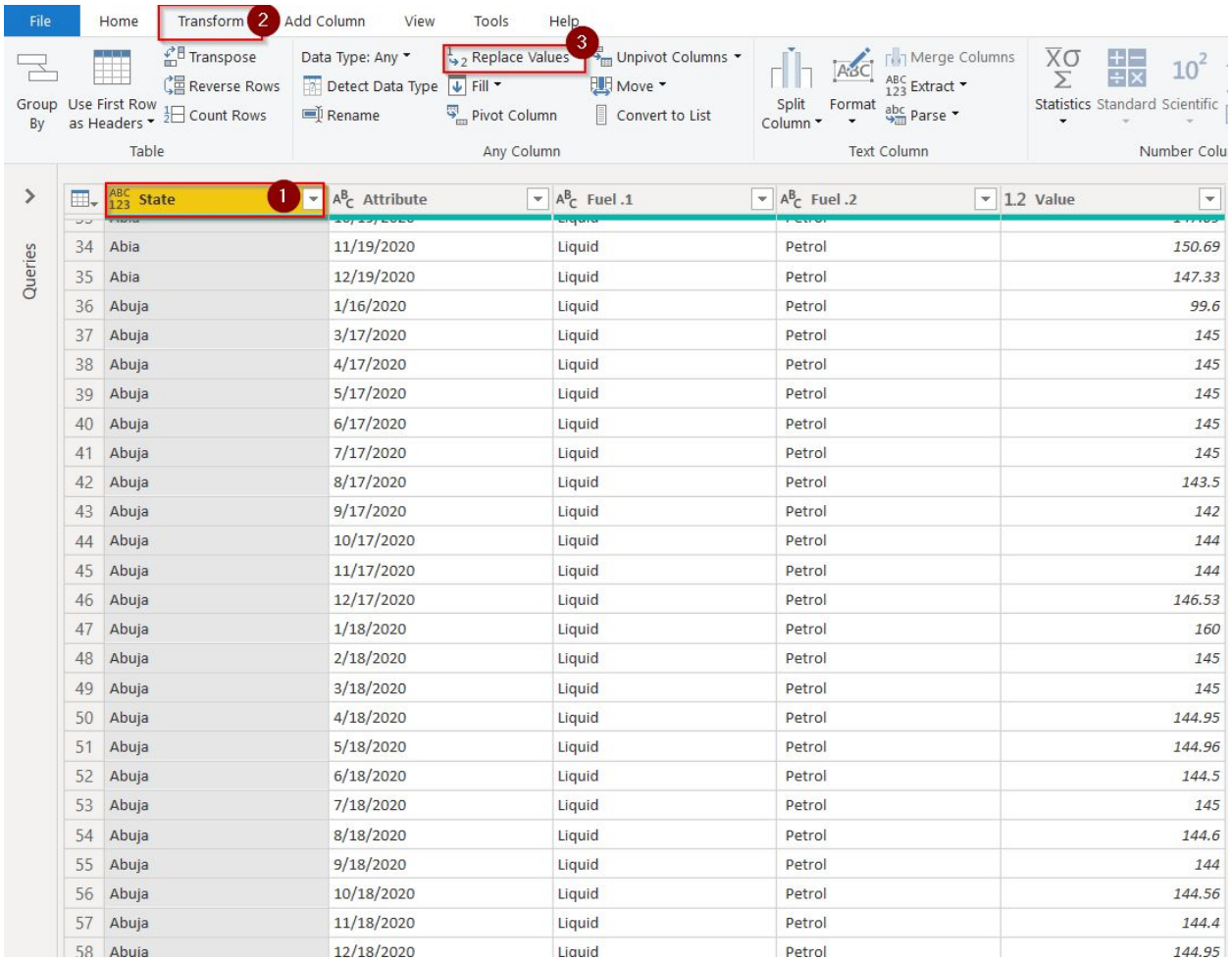
6. Replace Values

This Transformation is used to replace one value with another value in a selected column

Step 1: Select the column that is to be worked on (Labelled No.1 in the diagram below)

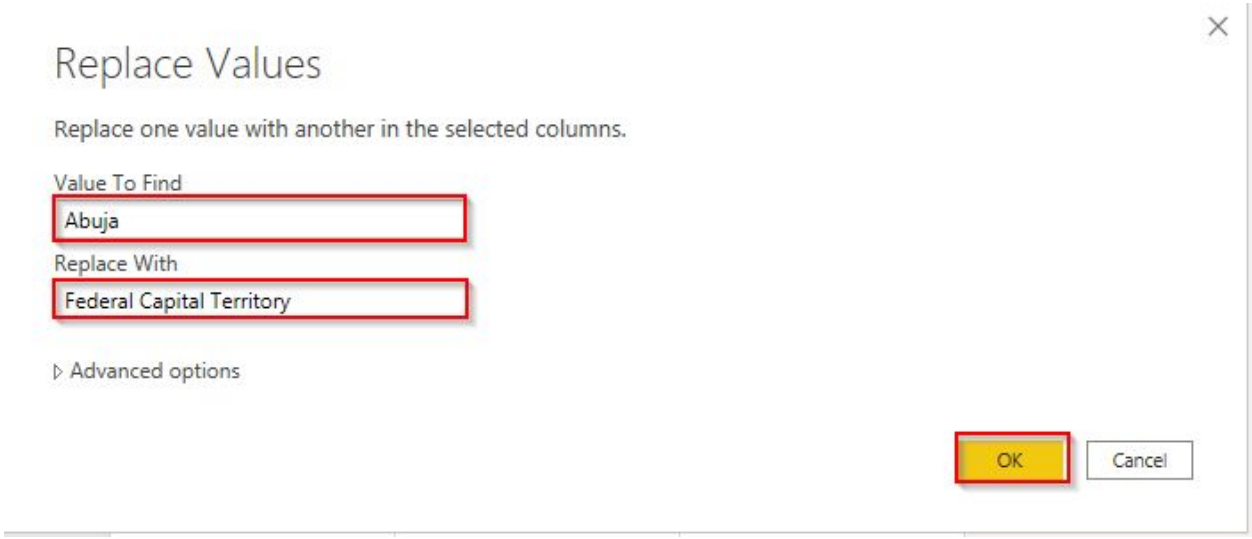
Step 2: Select the Transform Ribbon (Labelled No.2 in the diagram below)

Step 3: Select Replace Values(Labelled No.2 in the diagram below)

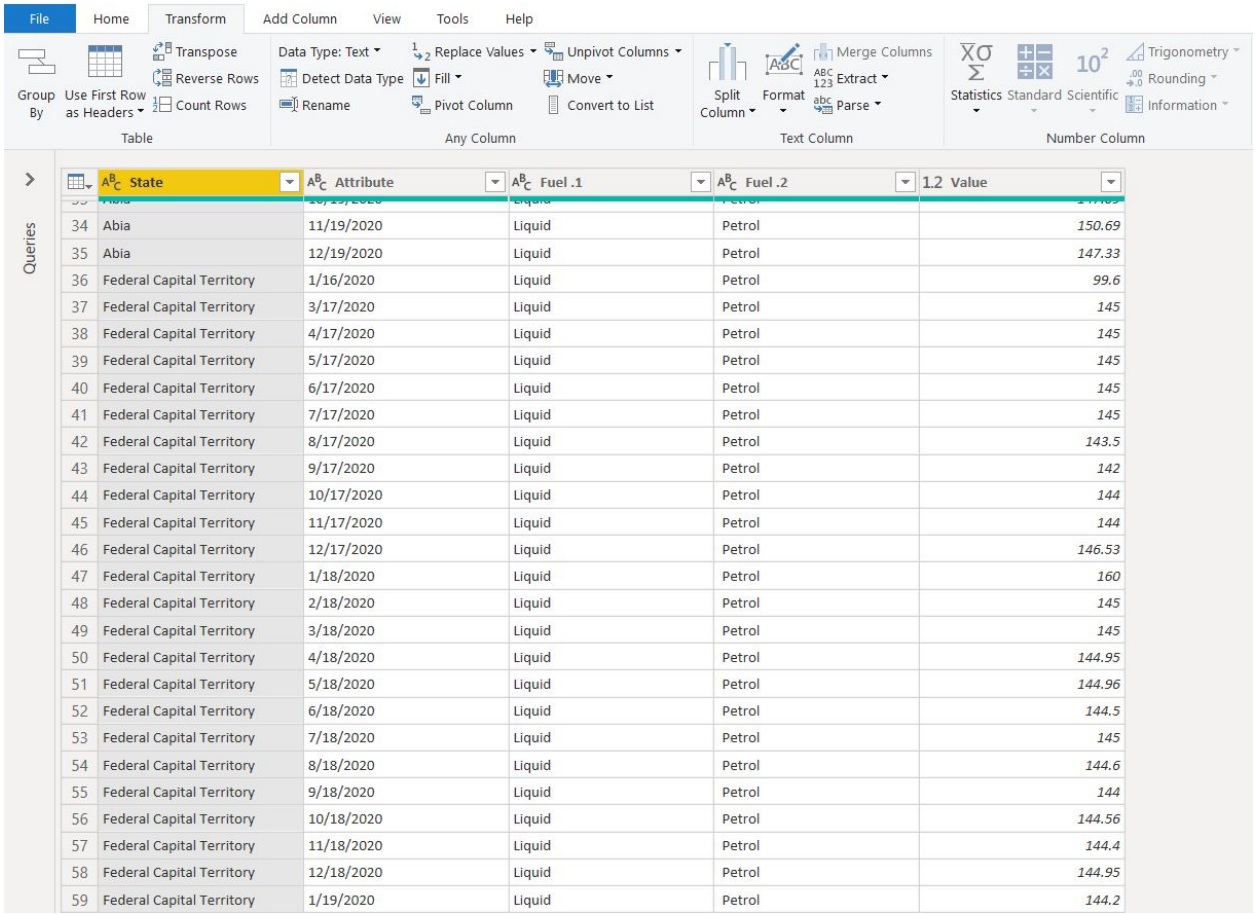


	State	Attribute	Fuel .1	Fuel .2	Value
34	Abia	11/19/2020	Liquid	Petrol	150.69
35	Abia	12/19/2020	Liquid	Petrol	147.33
36	Abuja	1/16/2020	Liquid	Petrol	99.6
37	Abuja	3/17/2020	Liquid	Petrol	145
38	Abuja	4/17/2020	Liquid	Petrol	145
39	Abuja	5/17/2020	Liquid	Petrol	145
40	Abuja	6/17/2020	Liquid	Petrol	145
41	Abuja	7/17/2020	Liquid	Petrol	145
42	Abuja	8/17/2020	Liquid	Petrol	143.5
43	Abuja	9/17/2020	Liquid	Petrol	142
44	Abuja	10/17/2020	Liquid	Petrol	144
45	Abuja	11/17/2020	Liquid	Petrol	144
46	Abuja	12/17/2020	Liquid	Petrol	146.53
47	Abuja	1/18/2020	Liquid	Petrol	160
48	Abuja	2/18/2020	Liquid	Petrol	145
49	Abuja	3/18/2020	Liquid	Petrol	145
50	Abuja	4/18/2020	Liquid	Petrol	144.95
51	Abuja	5/18/2020	Liquid	Petrol	144.96
52	Abuja	6/18/2020	Liquid	Petrol	144.5
53	Abuja	7/18/2020	Liquid	Petrol	145
54	Abuja	8/18/2020	Liquid	Petrol	144.6
55	Abuja	9/18/2020	Liquid	Petrol	144
56	Abuja	10/18/2020	Liquid	Petrol	144.56
57	Abuja	11/18/2020	Liquid	Petrol	144.4
58	Abuja	12/18/2020	Liquid	Petrol	144.95

After selecting the **Replace Value** on the transform ribbon, a dialogue box will appear. Type in the value to find in the selected column and the value to replace it with. In this case, the value to find is **Abuja** and the value to replace is **Federal Capital Territory** then click the OK button.



Finally, the result of replacing the value is shown below. With all values of **Abuja** in the state column replaced with Federal Capital Territory.

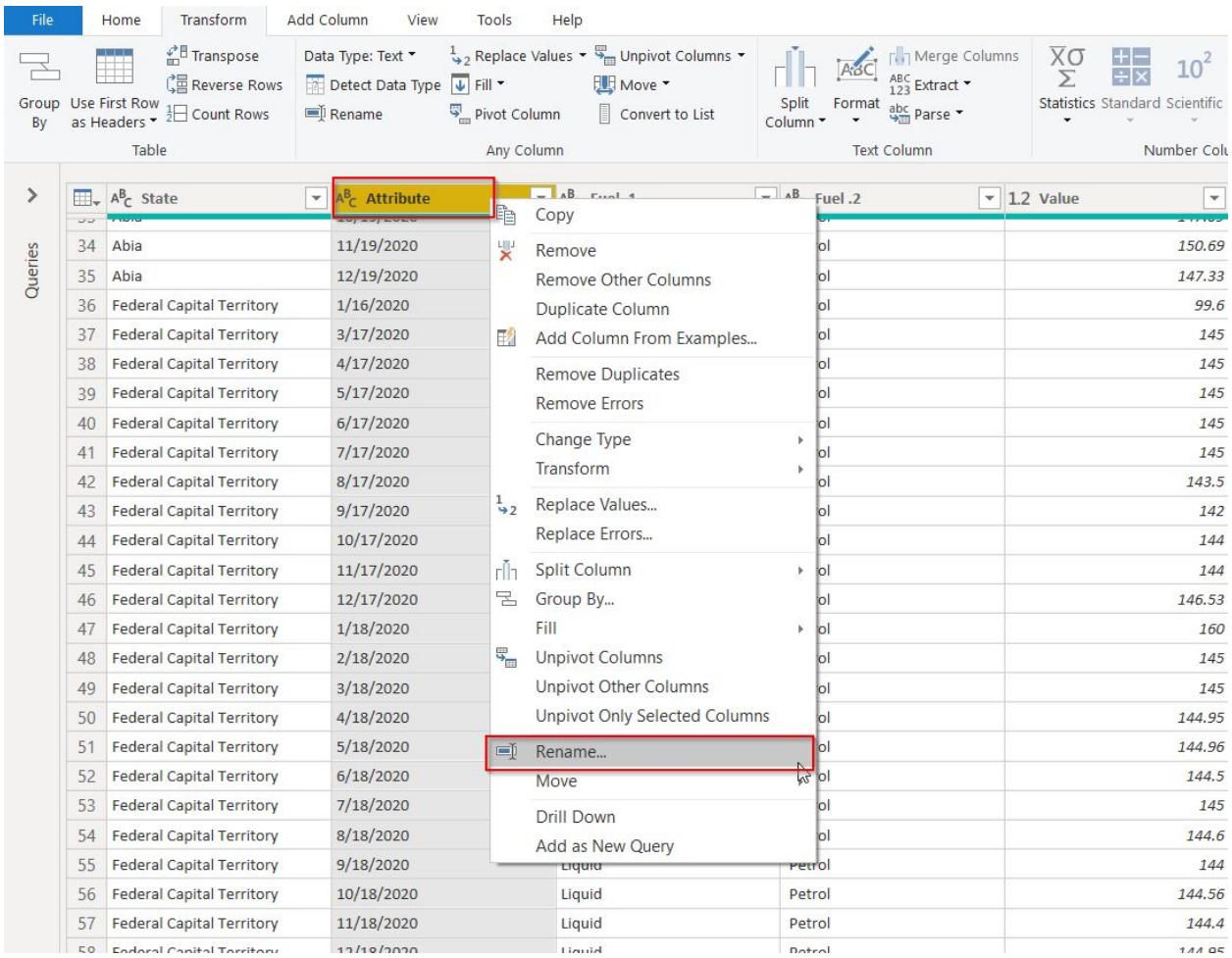


	State	Attribute	Fuel .1	Fuel .2	Value
34	Abia	11/19/2020	Liquid	Petrol	150.69
35	Abia	12/19/2020	Liquid	Petrol	147.33
36	Federal Capital Territory	1/16/2020	Liquid	Petrol	99.6
37	Federal Capital Territory	3/17/2020	Liquid	Petrol	145
38	Federal Capital Territory	4/17/2020	Liquid	Petrol	145
39	Federal Capital Territory	5/17/2020	Liquid	Petrol	145
40	Federal Capital Territory	6/17/2020	Liquid	Petrol	145
41	Federal Capital Territory	7/17/2020	Liquid	Petrol	145
42	Federal Capital Territory	8/17/2020	Liquid	Petrol	143.5
43	Federal Capital Territory	9/17/2020	Liquid	Petrol	142
44	Federal Capital Territory	10/17/2020	Liquid	Petrol	144
45	Federal Capital Territory	11/17/2020	Liquid	Petrol	144
46	Federal Capital Territory	12/17/2020	Liquid	Petrol	146.53
47	Federal Capital Territory	1/18/2020	Liquid	Petrol	160
48	Federal Capital Territory	2/18/2020	Liquid	Petrol	145
49	Federal Capital Territory	3/18/2020	Liquid	Petrol	145
50	Federal Capital Territory	4/18/2020	Liquid	Petrol	144.95
51	Federal Capital Territory	5/18/2020	Liquid	Petrol	144.96
52	Federal Capital Territory	6/18/2020	Liquid	Petrol	144.5
53	Federal Capital Territory	7/18/2020	Liquid	Petrol	145
54	Federal Capital Territory	8/18/2020	Liquid	Petrol	144.6
55	Federal Capital Territory	9/18/2020	Liquid	Petrol	144
56	Federal Capital Territory	10/18/2020	Liquid	Petrol	144.56
57	Federal Capital Territory	11/18/2020	Liquid	Petrol	144.4
58	Federal Capital Territory	12/18/2020	Liquid	Petrol	144.95
59	Federal Capital Territory	1/19/2020	Liquid	Petrol	144.2

Finally, before ending this tutorial we will be renaming the columns we just transformed from the beginning of this tutorial.

7. Renaming a Column

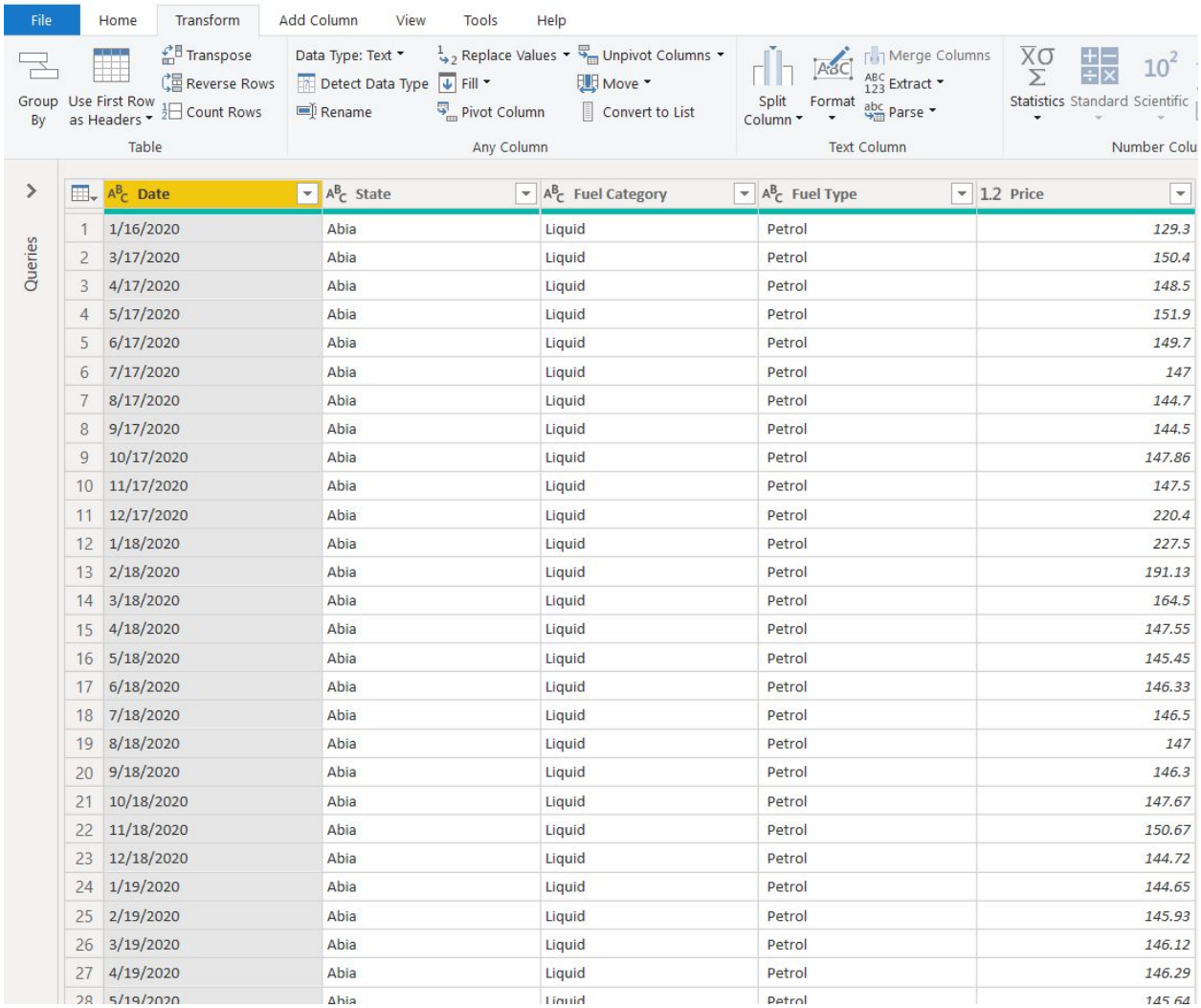
Right-click on the column to be renamed and navigate to rename as shown in the screenshot below.



Go ahead and rename:

- Attribute to Date
- Fuel.1 to Fuel Category
- Fuel.2 to Fuel Type
- Value to Price

Here is a final screenshot of the dataset we just transformed.



	Date	State	Fuel Category	Fuel Type	Price
1	1/16/2020	Abia	Liquid	Petrol	129.3
2	3/17/2020	Abia	Liquid	Petrol	150.4
3	4/17/2020	Abia	Liquid	Petrol	148.5
4	5/17/2020	Abia	Liquid	Petrol	151.9
5	6/17/2020	Abia	Liquid	Petrol	149.7
6	7/17/2020	Abia	Liquid	Petrol	147
7	8/17/2020	Abia	Liquid	Petrol	144.7
8	9/17/2020	Abia	Liquid	Petrol	144.5
9	10/17/2020	Abia	Liquid	Petrol	147.86
10	11/17/2020	Abia	Liquid	Petrol	147.5
11	12/17/2020	Abia	Liquid	Petrol	220.4
12	1/18/2020	Abia	Liquid	Petrol	227.5
13	2/18/2020	Abia	Liquid	Petrol	191.13
14	3/18/2020	Abia	Liquid	Petrol	164.5
15	4/18/2020	Abia	Liquid	Petrol	147.55
16	5/18/2020	Abia	Liquid	Petrol	145.45
17	6/18/2020	Abia	Liquid	Petrol	146.33
18	7/18/2020	Abia	Liquid	Petrol	146.5
19	8/18/2020	Abia	Liquid	Petrol	147
20	9/18/2020	Abia	Liquid	Petrol	146.3
21	10/18/2020	Abia	Liquid	Petrol	147.67
22	11/18/2020	Abia	Liquid	Petrol	150.67
23	12/18/2020	Abia	Liquid	Petrol	144.72
24	1/19/2020	Abia	Liquid	Petrol	144.65
25	2/19/2020	Abia	Liquid	Petrol	145.93
26	3/19/2020	Abia	Liquid	Petrol	146.12
27	4/19/2020	Abia	Liquid	Petrol	146.29
28	5/19/2020	Abia	Liquid	Petrol	145.64

Quick tip: You can also double-click on the column header to rename the column.

Thank you for downloading this tutorial.

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