User Manual

Crude Oil Model Dashboard

(Version - 1.0)

Submitted to

VOPAK

	NAME	DATE
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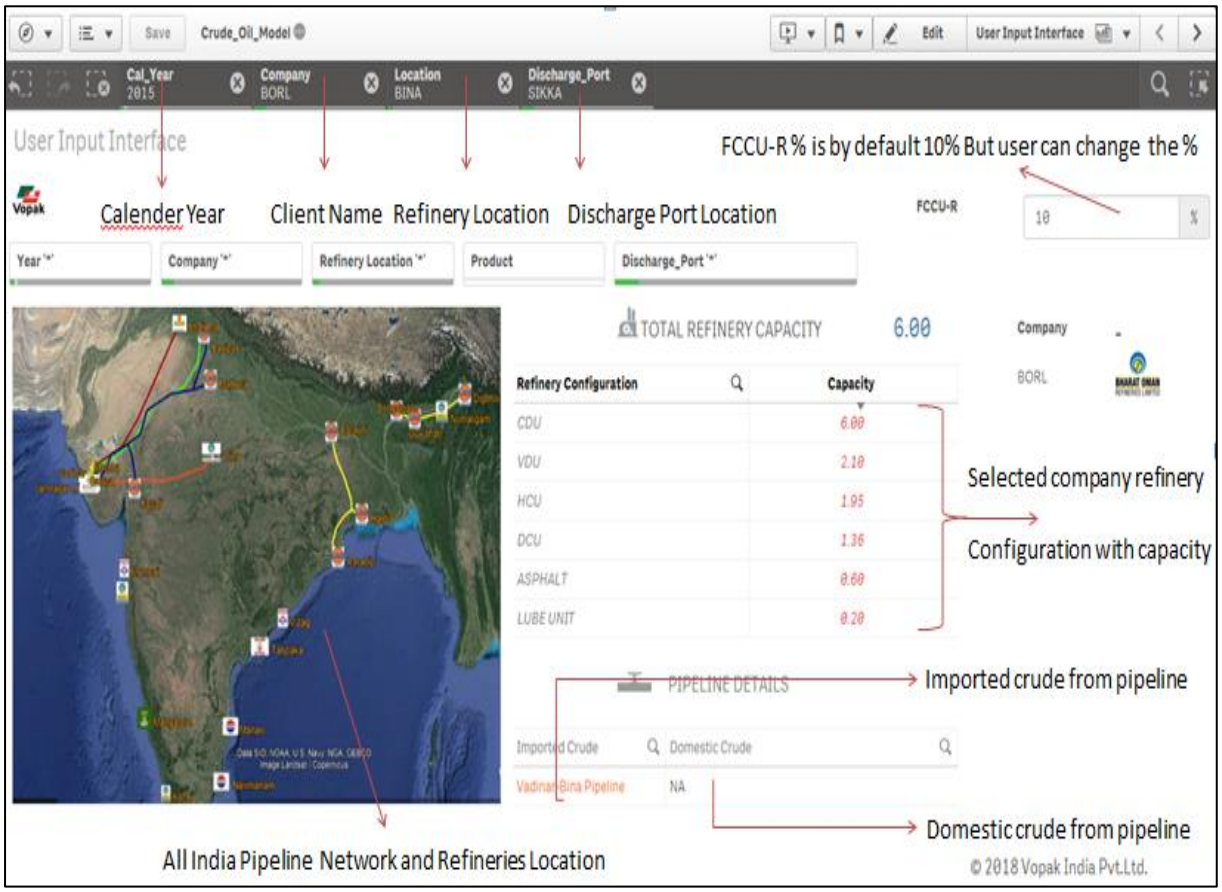
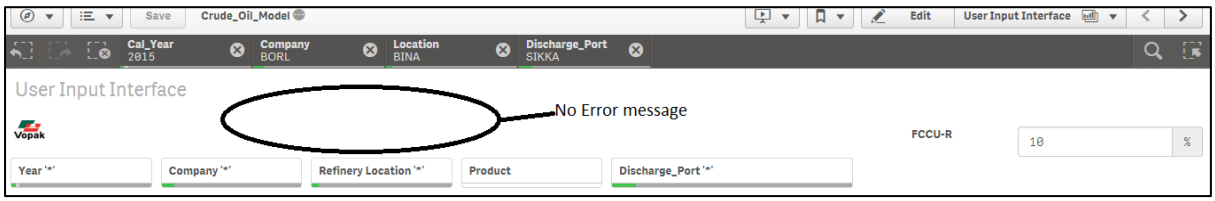
Reviewed By	Ishraque Ahmad	24-06-2018
Approved By	Archan	26-06-2018

1. REPORT NAME: **User Input Interface**



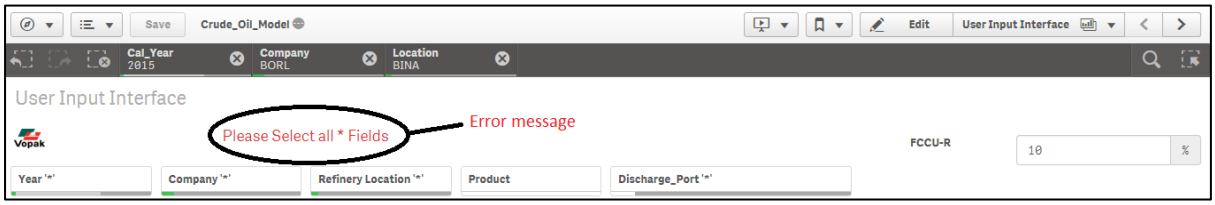
A. BEST CASE(NO EXCEPTION)

You have to select all the mandatory field to proceed the next tab.



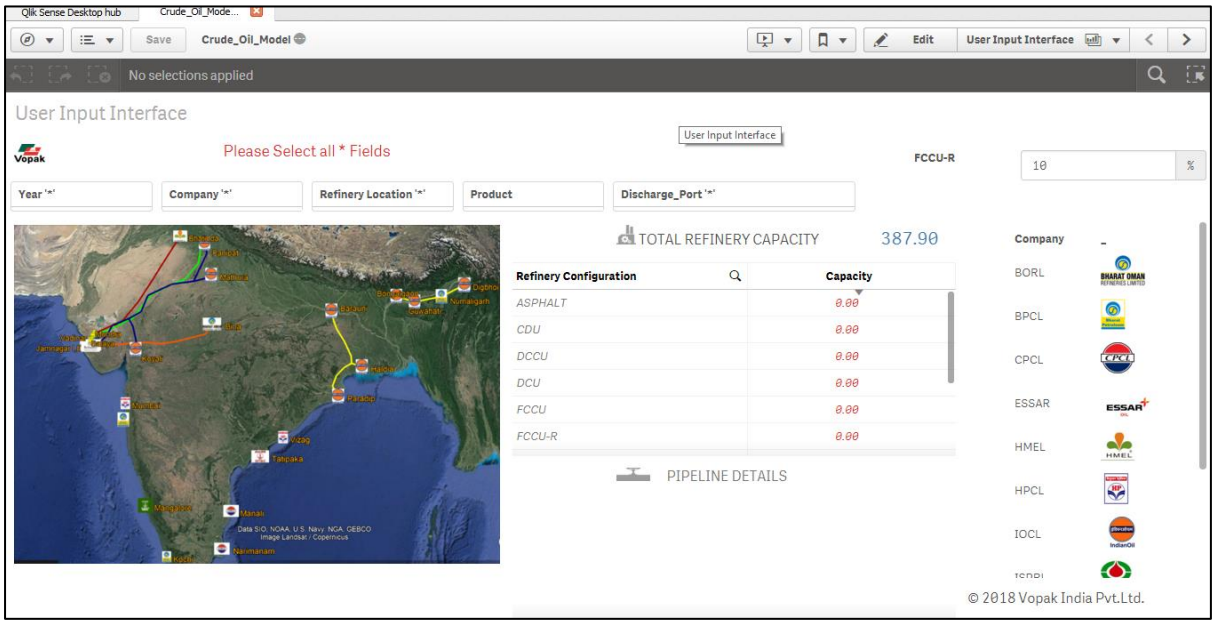
B. EXCEPTION(MANDATORY FIELDS)

All fields are mandatory. Failure to select any one prompt an error message .

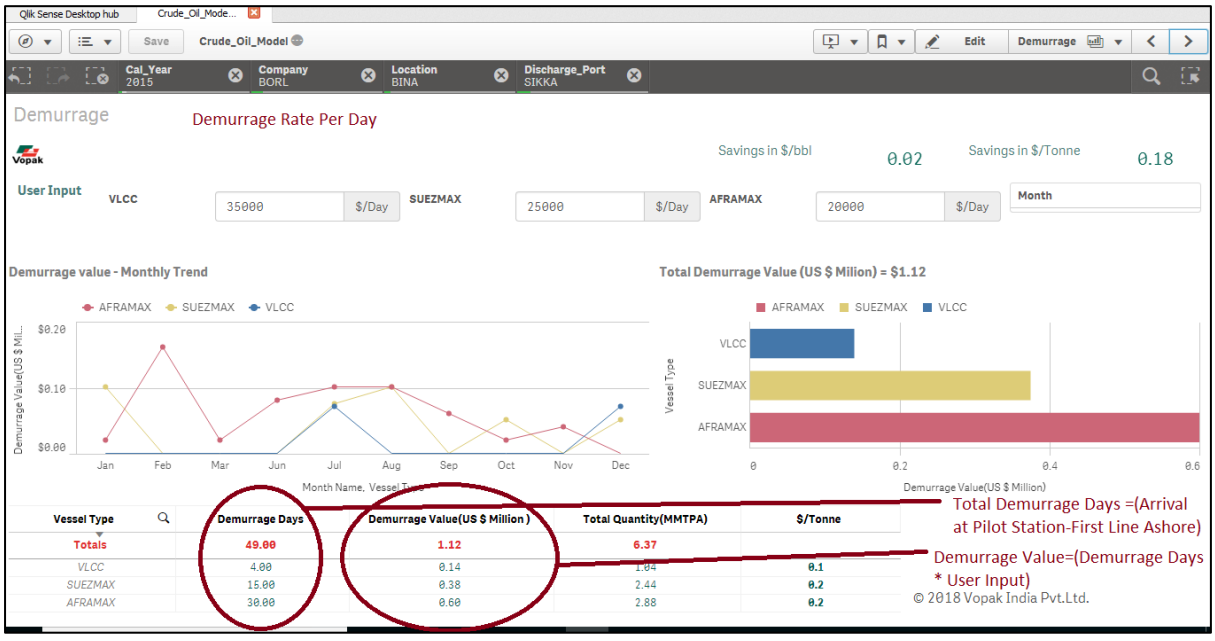


C. BACKEND LOGIC(CODE SNAPSHOTS)

Please Select all the * Fields which is mandatory field .



2. REPORT NAME:- Demurrage



A. BEST CASE(NO EXCEPTION)

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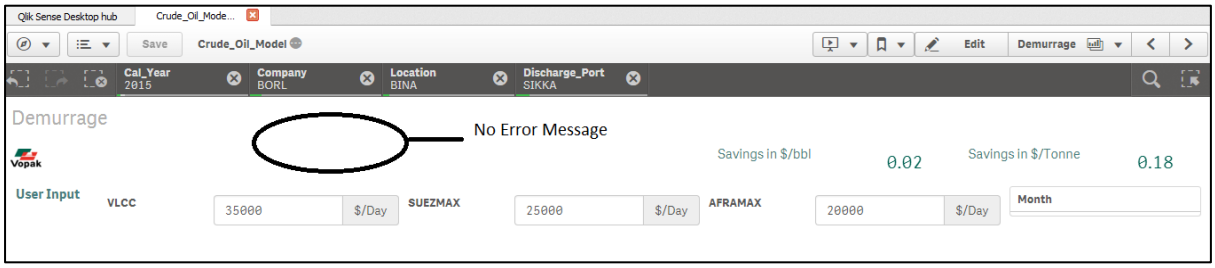


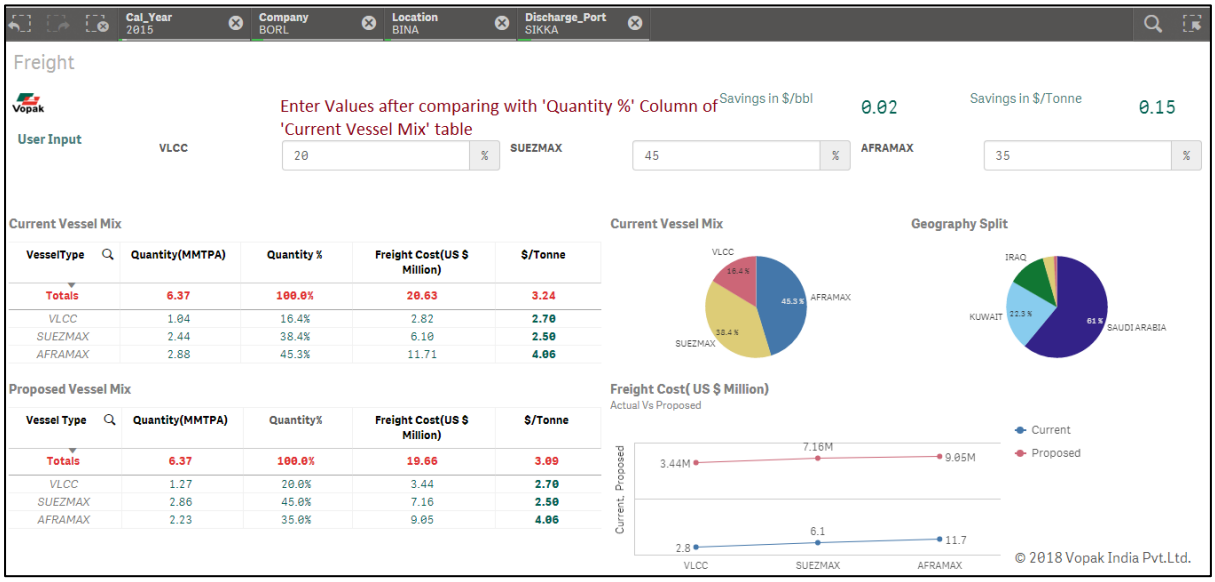
B. EXCEPTION(MANDATORY FIELDS)

All fields are mandatory. Failure to select any one prompt an error message .

C. BACKEND LOGIC(CODE SNAPSHOTS)

```
126
127  Master_Data_Demurrage:
128
129  LOAD
130      "Vessel Type" as Dem_Vessel_Type,
131      Quantity as Dem_Quantity,
132      "First Line Ashore2" as Dem_Date,
133      year("First Line Ashore2") as Cal_Year,
134      "Demurrage Days",
135       Refiner as Company,
136      "Discharge Port" as Discharge_Port
137
138  FROM [lib://Trans/Master Data - Corrected - v2.0.xlsx]
139  (ooxml, embedded labels, table is Trade);
140  Store Master_Data_Demurrage into [lib://Trans/Master_Data_Demurrage.qvd];
141  Drop Table Master_Data_Demurrage;
142
143
144  Master_Dem:
145  LOAD
146      Dem_Vessel_Type,         //Vessel type
147      Dem_Quantity,           //Demurrage Quantity
148      Dem_Date,              // Demurrage Date
149      //Cal_Year,
150      Month(Dem_Date) as Month_Name,      //Month Name
151      "Demurrage Days" as Dem_Day,       // Demurrage Days
152      //Company,
153      //Discharge_Port,
154      AutoNumber(Company&Discharge_Port&Cal_Year) as Check6     //Link key with fact table
155  FROM [lib://Trans/Master_Data_Demurrage.qvd]
156  (qvd);
157
158
```

3. REPORT NAME:- Freight



Purpose of Tab: The Freight Tab calculates the freight cost of the proposed vessel mix that the refiner desires.

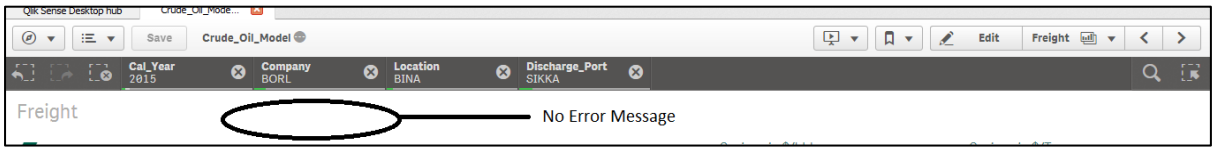
Backend Logic: Compare the percentage entered by the user in the input boxes to the actual percentage of the vessel mix in the "Current Vessel Mix" table. The freight corresponding to the revised quantity calculated as per the entered percentage values is calculated from the back end table by matching the revised quantity to the quantities in the table and picking the corresponding freight. Once done, the revised sum acts as the new freight and is displayed in the "Proposed Vessel Mix" table.

e.g.: In the above snapshot, current quantity equals 1.04 MMTPA for VLCC. This equals 16.4% of total import. The desired % of VLCC given by the user is 20%. We calculate 20% of total import to be 1.27 MMTPA. The application goes to the backend excel sheet and identifies the row at which the import sum equals 1.27 MMTPA. The corresponding row in the freight column is identified and the new freight is calculated as the sum of all rows till this row. The sum is displayed as the new freight value of 3.44 million USD.

The difference between the sums of freight for all three vessel types is divided by the import quantity to obtain the savings in freight

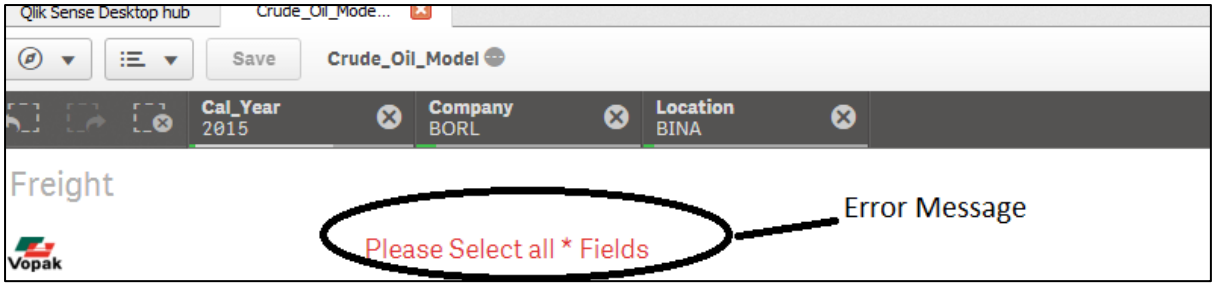
A. BEST CASE(NO EXCEPTION)

You have to select all the mandatory field to proceed the next tab.



B. EXCEPTION(MANDATORY FIELDS)

All fields are mandatory. Failure to select any one prompt an error message .



C. BACKEND LOGIC(CODE SNAPSHOTS)

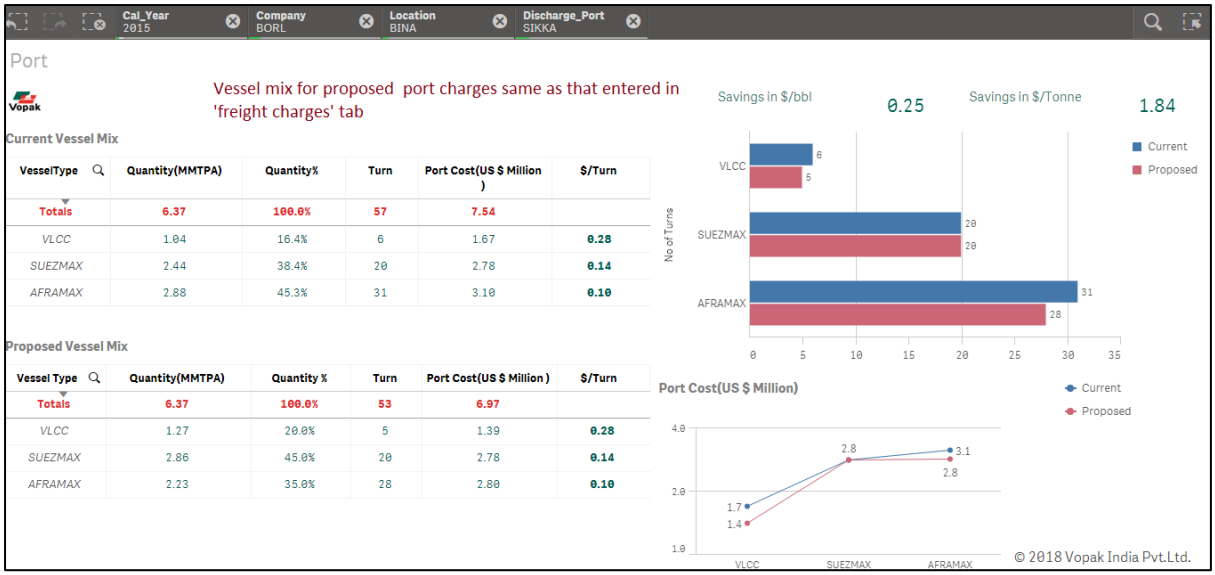
```
      ,Discharge_Port
      , FirstLineAshore
      ,Country
      ;

DROP TABLE Temp;
//DROP TABLE Temp1;

//crrently we calculate the  cost and quantity on  the basis of current and previous row ignoring the date

StandAloneData:
LOAD
    Client as Company               //company name
    , VesselType AS Vstp            // vessel type
    ,Discharge_Port                 // Discharge port
    , Quantity AS Qty               //Quantity
    , FirstLineAshore AS LineDt     //Line Date
    , FreightCost AS Cost           // Freight cost
    , FreightCost / Quantity AS PerUnitCost     //Calculating Unit cost
    , Cum_Quantity AS CmQty                     //Quantity
    , Cum_FreightCost - FreightCost AS Prev_CmCost //Current row total freight cost - Freight cost as previous row freight cost
    , Cum_Quantity - Quantity AS Prev_CmQty        //Current row total freight quantity - Freight quantity as previous row freight
    , Cum_FreightCost AS CmCost                   //Current freight cost
RESIDENT Cumulative_Demo
ORDER BY
    Client
    , VesselType
    ,Discharge_Port
    , Cum_Quantity
;
Store Cumulative_Demo into [lib://Trans/Cumulative_Demo.qvd];
Store StandAloneData into [lib://Trans/StandAloneData.qvd];
```

4. REPORT NAME:- Port



Purpose of Tab: The Port Tab calculates the Port cost of the proposed vessel mix that is already input in freight tab.

Backend Logic:

1. ***No of turn calculation:*** The application uses the percentage entered in the "Freight Charges" Tab to calculate the quantity imported for that combination. Once done the quantity import is divided by the cargo size in the following table to get the new no. of turns per vessel type:

Vessel Type	Cargo Size
VLCC	270000
SUEZMAX	140000
AFRAMAX	80000

2. ***Port Charges Calculation***: Once the revised No. of turns are obtained we check the Port Charges Master for the same combination of vessel type, discharge port and client and use the same logic used in the Freight Charges calculation to obtain the row at which the No. of turns match the new number. Once the row is locked, the corresponding Port charges are calculated from that row until the first row to obtain the new number.

The New Port Charges per vessel type are divided by the respective New No. of Turns to get the $/Turn figures.

The difference between the sums of port charges for all three vessel types is divided by the import quantity to obtain the savings in Port Charges.

A. BEST CASE(NO EXCEPTION)

You have to select all the mandatory field to proceed the next tab.

B. EXCEPTION(MANDATORY FIELDS)

All fields are mandatory. Failure to select any one prompt an error message .

C. BACKEND LOGIC(CODE SNAPSHOTS)

```
     ,Discharge_Port
     , FirstLineAshore
     ;

DROP TABLE Temp_Port_Charge;
//DROP TABLE Temp1;

//crrently we calculate the  cost and Turn on  the basis of current and previous row ignoring the dat

StandAloneData_Port:
LOAD
    Client as Company           //company name
    , VesselType AS Vstp        // vessel type
    ,Discharge_Port             // Discharge port
    , Turns AS Turns1           //Turn
    , FirstLineAshore AS LineDt  //Line Date
    , Port_Cost AS Cost         // Port cost
    , Port_Cost / Turns AS PerUnitCost    //Calculating Unit cost
    , Cum_Turns AS CmTurn        //Current Turn
    , Cum_Port_Cost - Port_Cost AS Prev_CmCost      //Current row total port cost - port cost as prev
    , Cum_Turns - Turns AS Prev_CmTurn      //Current row total port turns - prot as previous row Pot
    , Cum_Port_Cost AS CmCost              //Current Port cost
RESIDENT Temp_Port_Charge_Demo
ORDER BY
    Client
    , VesselType
    ,Discharge_Port
    , Cum_Turns

;
Store Temp_Port_Charge_Demo into [lib://Trans/Temp_Port_Charge_Demo.qvd];
Store StandAloneData_Port into [lib://Trans/StandAloneData_Port.qvd];
```

3. REPORT NAME:- Crude Mix

This report is used to calculate the savings in $/bbl of the selected refinery after comparing the current import to the refinery unit capacities, both divided into 3 API categories: <22, 22-30, >30, in other words, Heavy, Medium and Light Crude.

Current Import

API	Quantity(MMTPA)	Quantity %	Value(US $ Million)
Totals	6.37		2,517.1
<22	0.00	0.00%	0.0
>=22<30	1.13	17.80%	408.8
>=30	5.23	82.20%	2,108.2

Purpose:

The table shows the breakdown of current import into three API categories and the respective percentages. The application also takes into account "Single port serving multiple refineries" cases. These include Vadinar Port importing crude for IOCL's Panipat, Mathura and Koyali refineries; and Paradip port importing crude oil for IOCL's Haldia, Paradip and Barauni refineries.

Logic Used:

$$(Total\ Import) = (CDU - Domestic)/$$

$$(Sum\ of\ (CDU - Domestic) of\ all\ refineries\ served\ by\ that\ port$$

Projections

With out hinterland blending

API	Max Quantity(MMTPA)	MAX Quantity %	Corr. Import(MMTPA)	Value(US $ Million)
Totals	6.00		6.37	2,372.5
<22	1.96	32.6%	2.08	650.6
>=22<30	0.14	2.4%	0.15	54.7
>=30	3.90	65.0%	4.14	1,667.2

Purpose:

This table gives segregation of refinery units into three categories of API. Hinterland Blending % has also been considered for hinterland refineries. Pipeline norms allow only a certain percentage of heavy crude to be blended. Usual process is to calculate the percentage of the pipeline throughput. However, as one pipeline can be serving multiple refineries, we have considered the percentage blending on the respective CDU capacities of the refineries.

Logic Used for <22 Hinterland Blending:

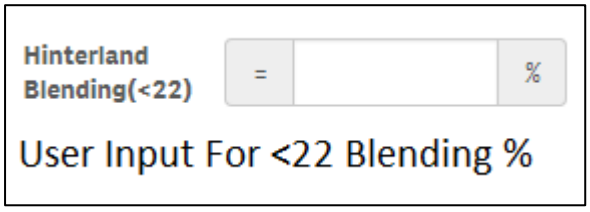
a. User enters the percentage blending of heavy allowed for the pipeline

b. The application calculates this percentage of CDU

c. This figure is then compared with the sum of all units considered for <22

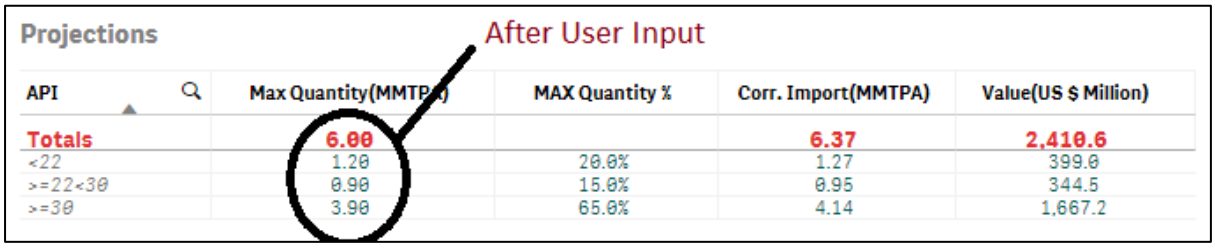
d. The system considers the lesser of the two values as that becomes the new maximum permissible heavy crude for that refinery

In the above case, no value was entered and hence the system considers 100% blending which implies the refinery can take heavy crude equivalent to the sum of the unit capacities i.e. 1.96 MMTPA

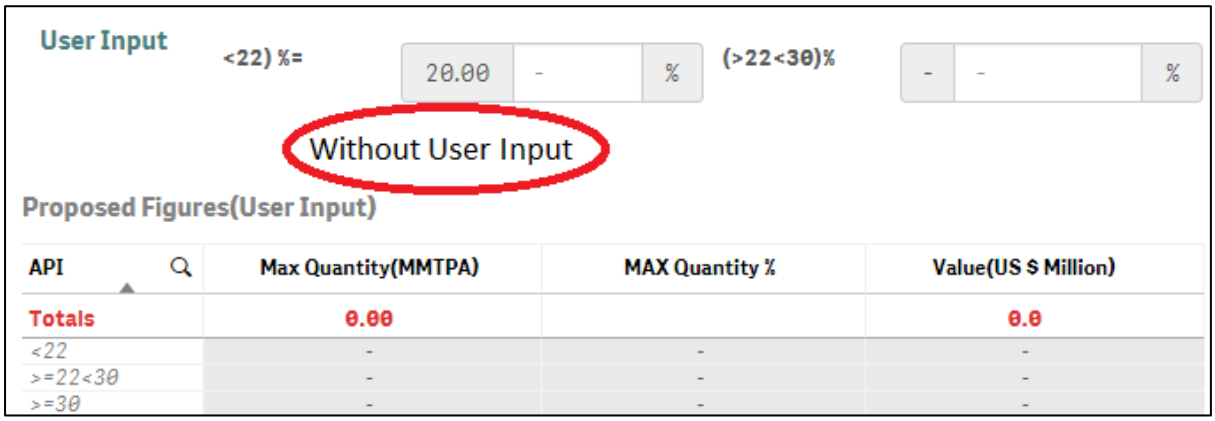


User inputs 20% allowable blending i.e. 20% of 6 MMTPA which equals 1.2 MMTPA.

The system compares the two value and finds 1.2 < 1.96 and replaces the <22 capacity with this figure. The remaining (1.96-1.2) = 0.76 MMTPA is logically moved down to the next category of API i.e. 22-30. Hence the new capacity of the refinery to accept (22-30) Crude is (0.14+0.76) = 0.90 MMTPA



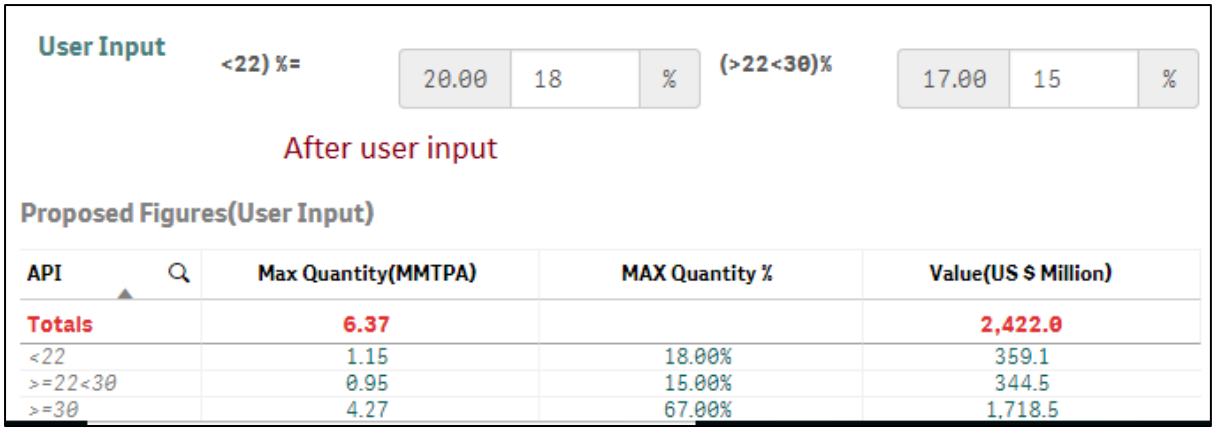
The table then calculates the percentage of the three API categories and gives us the figures the refiner can import ideally in all 3 categories as per the current import



API	Max Quantity(MMTPA)	MAX Quantity %	Value(US $ Million)
Totals	0.00		0.0
<22	-	-	-
>=22<30	-	-	-
>=30	-	-	-

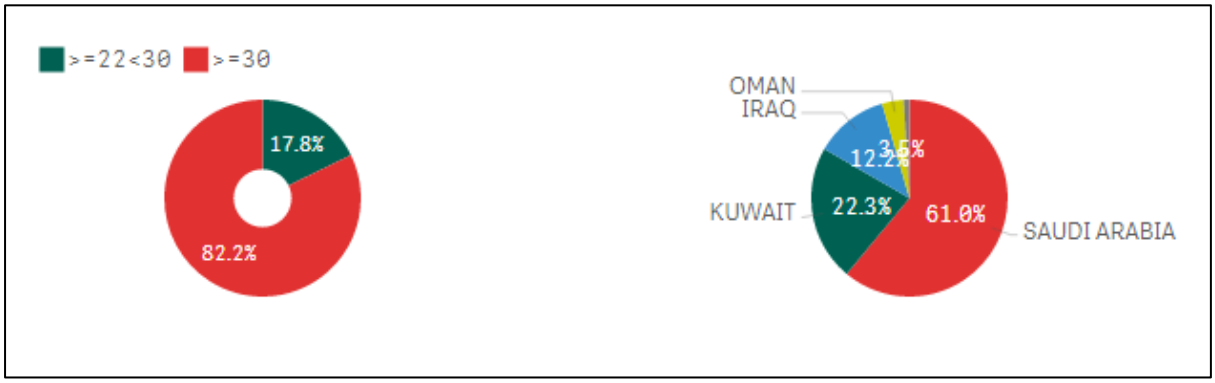
It then gives the user an option to enter the percentage of import for each API category (maximum value is calculated in the "Projections" Tab).

If the user does not utilize all the units for Heavy Crude to the fullest, the balance percentage is then passed on to the Medium Crude category.

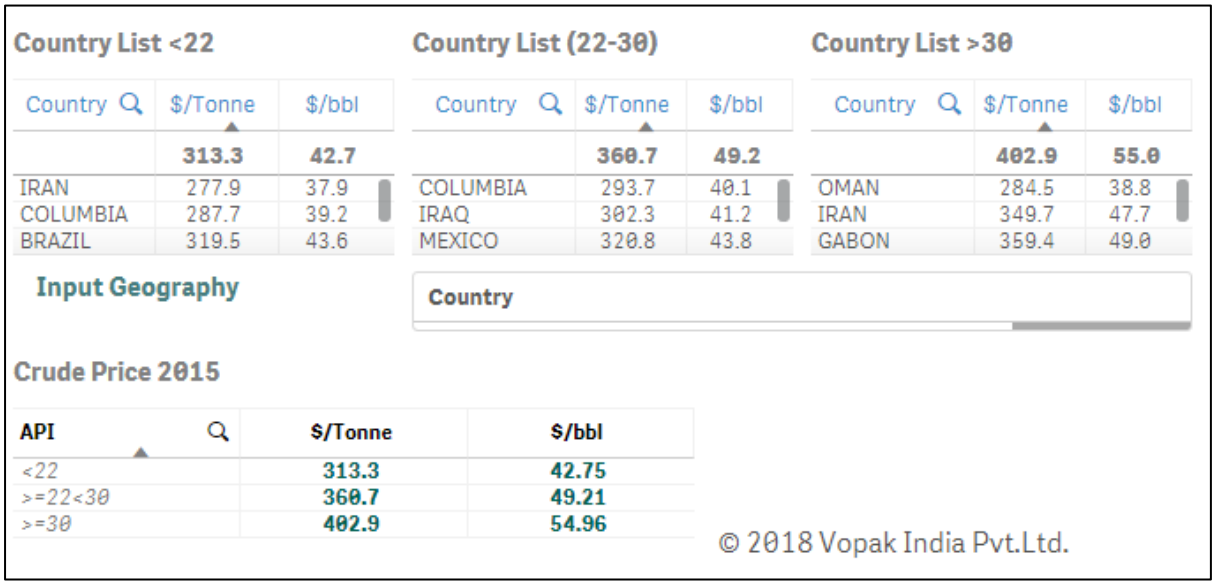


API	Max Quantity(MMTPA)	MAX Quantity %	Value(US $ Million)
Totals	6.37		2,422.0
<22	1.15	18.00%	359.1
>=22<30	0.95	15.00%	344.5
>=30	4.27	67.00%	1,718.5

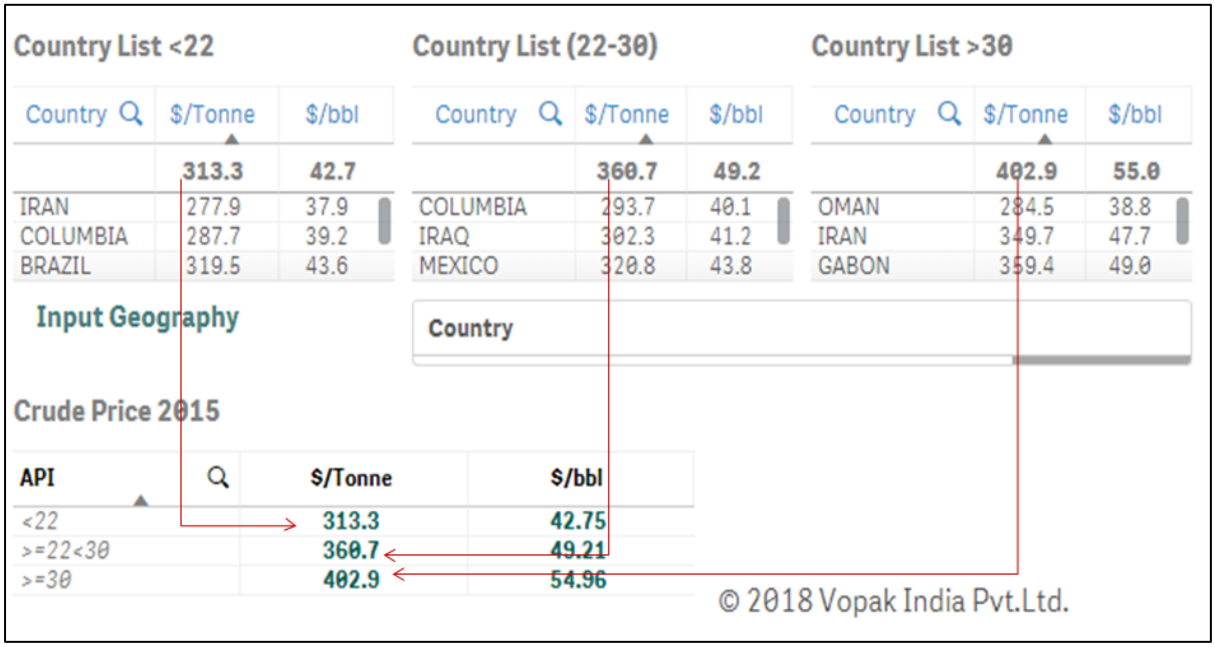
As can be seen, user enters 18% Heavy Crude and this leaves a balance of 2%, which is then added to Medium Crude to give a total Medium Crude Import Capacity of (15+2) equals 17%



The pie charts indicate the import details by API and by geography



The table lists down the crude price for that year for the respective API categories and also gives the user the option to change the geography of import for each category if he wishes to do so.



The average price of the geographies selected is then displayed in the Price table, which is then used as the multiplying factor for each API category in the savings calculations

A. BEST CASE(NO EXCEPTION)

You have to select all the mandatory field to proceed the next tab.

B. EXCEPTION(MANDATORY FIELDS)

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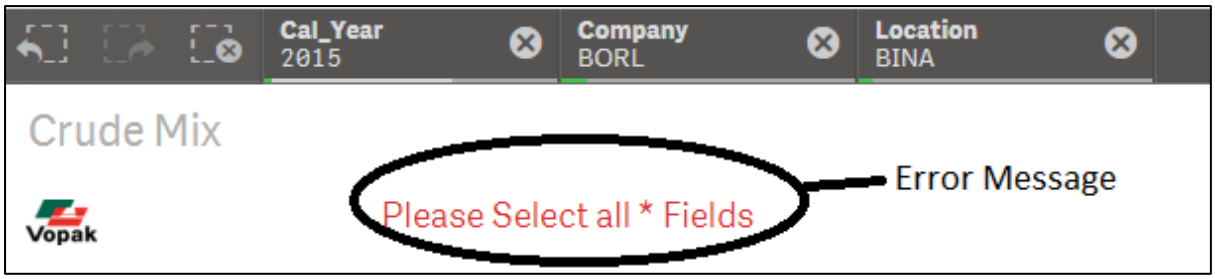

C. BACKEND LOGIC(CODE SNAPSHOTS)

```
Main2:

LOAD
    API_Gravity,        //Api gravity field is just divide the api into 3 category which is ('<22,>=22-<30,>=30')
    Discharge_Port,     //Discharge Port
    //Company,
    Region_Crud,        //Region field for Crude Mix Tab
    Country_Crud,       //Region field for Crude Mix Tab
    //Cal_Year,
    Qty as Qty_Crud,    //Import Quantity field for Crude Mix Tab
    //AutoNumber(Company&Cal_Year) as Check2,
    AutoNumber(API_Gravity&Cal_Year) as Check3, //Link key which is linked with Price Master table
    AutoNumber(Company&Discharge_Port) as Check5,  //Link key which is linked with fact table
    AutoNumber(Company&Discharge_Port&Cal_Year) as Check6  //Link key which is linked with fact table
FROM [lib://Trans/New.qvd]
(qvd);



Main:

LOAD
    //API_Gravity,
    Country_Value,          //Country Field of Price Master
    "Price Quantity",       //Quantity Field of Price Master
    Price,                  //Value field of Price Master
    //Cal_Year,

    AutoNumber(API_Gravity&Cal_Year) as Check3    //Link key which is linked with Main2(crude mix) table
```