# Methods of assessing JODI oil data quality


Presented by

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# Outline

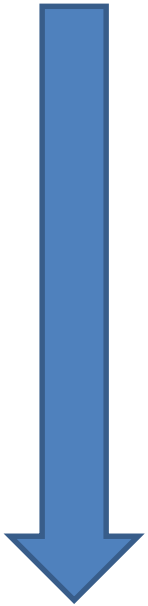
- **Balance Check**
  - Primary side vs. Secondary side
- **Internal consistency checks**
  - Primary side vs. Secondary Side
- **Other checks**
  - Comparison with other information
- **Meta Data**
- **Smiley faces**
- **Cost and burden**

# Balance check

## Table 1 Oil balance

### Primary oil

| | Crude Oil | NGL | … |
|---|---|---|---|
| | (1) | (2) | (3) |
| + Production | | | |
| + From Other sources | | | |
| + Imports | | | |
| - Exports | | | |
| + Products Transferred /Backflows | | | |
| - Direct Use | | | |
| - Stock Change | | | |
| - Statistical Difference | 0 | 0 | 0 |
| = Refinery Intake | | | |
| Closing stocks | | | |



### Secondary oil

| | LPG | Naphtha | … |
|---|---|---|---|
| | (5) | (6) | (7) |
| + Refinery Output | | | |
| + Receipts | | | |
| + Imports | | | |
| - Exports | | | |
| - Products Transferred | | | |
| + Interproduct Transfers | | | |
| - Stock Change | | | |
| - Statistical Difference | 0 | 0 | 0 |
| = Demand | | | |
| Closing stocks | | | |

# Balance check

## Primary oil

| | Crude Oil | NGL | … |
|---|---|---|---|
| | (1) | (2) | (3) |
| + Production | | | |
| + From Other sources | | | |
| + Imports | | | |
| - Exports | | | |
| + Products Transferred /Backflows | | | |
| - Direct Use | | | |
| - Stock Change | | | |
| - Statistical Difference | 0 | 0 | 0 |
| = Refinery Intake | | | |
| Closing stocks | | | |

## Secondary oil

| | LPG | Naphtha | … |
|---|---|---|---|
| | (5) | (6) | (7) |
| + Refinery Output | | | |
| + Receipts | | | |
| + Imports | | | |
| - Exports | | | |
| - Products Transferred | | | |
| + Interproduct Transfers | | | |
| - Stock Change | | | |
| - Statistical Difference | 0 | 0 | 0 |
| = Demand | | | |
| Closing stocks | | | |

# Balance check – primary oil

- **Calculated** refinery intake ≈ **reported** refinery intake
- Calculated refinery intake := production + from other sources + imports – exports + products transferred/backflows – direct use – stock change
- **Calculated** refinery intake - **reported** refinery intake = **Statistical Difference**
- Statistical difference should be small in relative terms (**less than 10% of Reported Intake??**)

# Balance check – primary oil

| | | Crude oil (tb/d) |
|---|---|---|
| + | Production | 3681 |
| + | From other sources | 0 |
| + | Imports | 2 |
| - | Exports | 0 |
| + | Products transferred/backflows | 0 |
| - | Direct use | 200 |
| - | Stock change | -295 |
| - | Reported refinery intake | 3550 |
| = | Statistical difference | 228 |
| % | Percentage statistical difference | 6.4% |

# Balance check – petroleum products

- **Calculated** demand ≈ **reported** demand
- Calculated demand := refinery output + receipts + imports – exports - products transferred + interproduct transfers – stock change
- **Calculated** demand - **reported** demand = **Statistical Difference**
- **Statistical difference** should be small in relative terms (**less than 10% of demand**)

# Balance check – petroleum products

| | | Total products ( tb/d ) |
|---|---|---|
| + | Refinery output | 126 |
| + | Receipts | 0 |
| + | Imports | 59 |
| - | Exports | 13 |
| - | Products transferred | 0 |
| + | Interproduct transfers | 0 |
| - | Stock change | -2 |
| - | Reported demand | 176 |
| = | Statistical difference | -2 |
| % | Percentage statistical difference | -1% |

# Balance check

- Applicable **only** if all data **are complete** and reliable
- **Large deviations** would require **review** and/or **verification/correction**
- **Applicable** to **every column**
- **Range** of **over 10%** is **quite large**

# Internal consistency checks

Quantities of **Refinery Intake** should correspond to quantities in **Gross Refinery output** (processing gains are the source of slight mismatch)

| | Crude Oil | NGL | … |
|---|---|---|---|
| | (1) | (2) | (3) |
| + Production | | | |
| + From Other sources | | | |
| + Imports | | | |
| - Exports | | | |
| + Products Transferred /Backflows | | | |
| - Direct Use | | | |
| - Stock Change | | | |
| - Statistical Difference | 0 | 0 | 0 |
| = Refinery Intake | | | |
| Closing stocks | | | |

| | LPG | Naphtha | … |
|---|---|---|---|
| | (5) | (6) | (7) |
| + Refinery Output | | | |
| + Receipts | | | |
| + Imports | | | |
| - Exports | | | |
| - Products Transferred | | | |
| + Interproduct Transfers | | | |
| - Stock Change | | | |
| - Statistical Difference | 0 | 0 | 0 |
| = Demand | | | |
| Closing stocks | | | |

# Internal consistency checks

- Automatic checks could be incorporated in the questionnaire to point out inconsistencies
- **Fuel checks** – **total oil products** should be equal to the **sum of reported products** (excluding memo items – automotive diesel and jet fuel)
- Statistician should ensure that this property holds in all columns
- Indication of misreporting of data

# Other checks

| | Crude Oil | NGL | … | Total | | Petroleum Products | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | LPG | Naphtha | … | Total Products |
| | (1) | (2) | (3) | (4) | | (5) | (6) | (7) | (13) |
| + Production | 0 | 0 | 0 | 0 | + Refinery Output | 0 | 0 | 0 | 0 |
| + From Other sources | | | 0 | 0 | + Receipts | 0 | 0 | 0 | 0 |
| + Imports | 0 | 0 | 0 | 0 | + Imports | 0 | 0 | 0 | 0 |
| - Exports | 0 | 0 | 0 | 0 | - Exports | 0 | 0 | 0 | 0 |
| + Products Transferred /Backflows | | | 0 | 0 | - Products Transferred | 0 | 0 | 0 | 0 |
| - Direct Use | 0 | 0 | 0 | 0 | + Interproduct Transfers | 0 | 0 | 0 | 0 |
| - Stock Change | 0 | 0 | 0 | 0 | - Stock Change | 0 | 0 | 0 | 0 |
| - Statistical Difference | 0 | 0 | 0 | 0 | - Statistical Difference | 0 | 0 | 0 | 0 |
| = Refinery Intake | 0 | 0 | 0 | 0 | = Demand | 0 | 0 | 0 | 0 |
| Closing stocks | 0 | 0 | 0 | 0 | Closing stocks | 0 | 0 | 0 | 0 |

| |
|---|
| Larger or equal to zero |
| Zero |
| Positive, neagtive or Zero |

# Other Tables

1- For **Crude** – the **Total** should be equal to the **Sum of all Streams** where applicable

2- For **NGLs** – the **Total** should be equal to the **Sum of all NGL** subcategories

- Field (lease) condensates
- Plant condensates
- Gas plant LPG
- Others

3- For **Other Primary oil**– the **Total** should be equal to the **Sum of all subcategories**

- CTL
- GTL
- Others

# Other checks

- Comparison with
  - data from other sources
  - last years' annual data
- Time-series check (seasonality, outliers, etc.)
- Visual checks
- Metadata

# Metadata

- The simplest definition of metadata is that it is **data** about **data**. More specifically **information** (data) about a **particular content** (data)
- **Metadata** describes how and when and by whom a particular set of data was collected; how the data is formatted
- **Metadata** must be updated when there is a change in resource it describes
- It can be useful to keep **metadata** even when the resource no longer exists
- **Metadata** enhances data transparency and is essential for understanding information stored in a database

# Smiley faces

- Timeliness
- Completeness
- Sustainability

# Smiley faces (timeliness)

- The **JODI database** is expected to be updated **regularly**.
- The **timeliness** indicates whether submissions were submitted at the **expected deadline**

"**good**" when **6 submissions** received within **45 days** after the end of the reference month

"**fair**" when **4 or 5 submissions** received

"**less reliable**" when **less** than **4 submissions** received

# Smiley faces (completeness)

**Completeness** measures the number of expected data points out of the **maximum 42** in the **JODI questionnaire** which are filled in

"**good**" when **more** than **90%** of the data are given for production, stock change/closing and demand

"**fair**" when **between 60%** and **90%** of the data are given

"**less reliable**" when **less** than **60%** of the data are given

# Smiley faces (sustainability)

**Sustainability** is the number of the monthly **JODI data** (timely) **submissions** evaluated **2 months** after the end of the **six-month period**

"**good**" if the **6 questionnaires** have been **submitted**

"**fair**" if **4 or 5 questionnaires** have been **submitted**

"**less reliable**" when **less** than **4** questionnaires have been **submitted**

# Cost and burden

- The **quality** of the **data** will be affected by available resources to collect, analyze and store energy statistics
- **Costs**: Specialized equipment, office space, utility bills, staff-hours involved, software, etc.
- **Response burden**: Simplest way to measure is the time spent by the respondent to provide information
- A compromise between **quality** and **cost** and **burden** must be achieved

# Cost and burden

- Functions of cost/burden
  - **Collection** of data
  - **Level** of disaggregation
  - **Time lags**, frequencies of data
  - Applied methodologies

# Thank you.

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# Metadata