



BP Statistical Review and JODI data

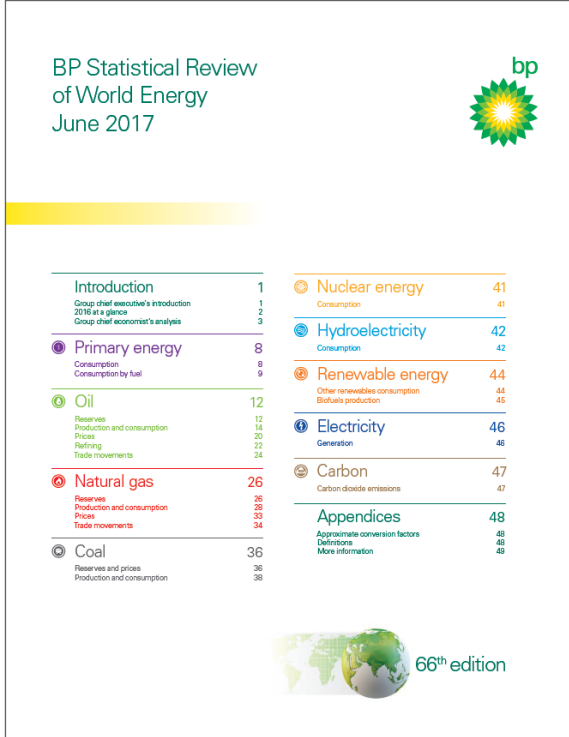
JODI Conference
October 2017

Richard de Caux, BP Economics

Statistical Review of World Energy



- Comprehensive global coverage of energy market data, available for free.
- Includes analysis and discussion of key trends in the energy market
- First publication to show complete global data for previous year.
- In 66th year.



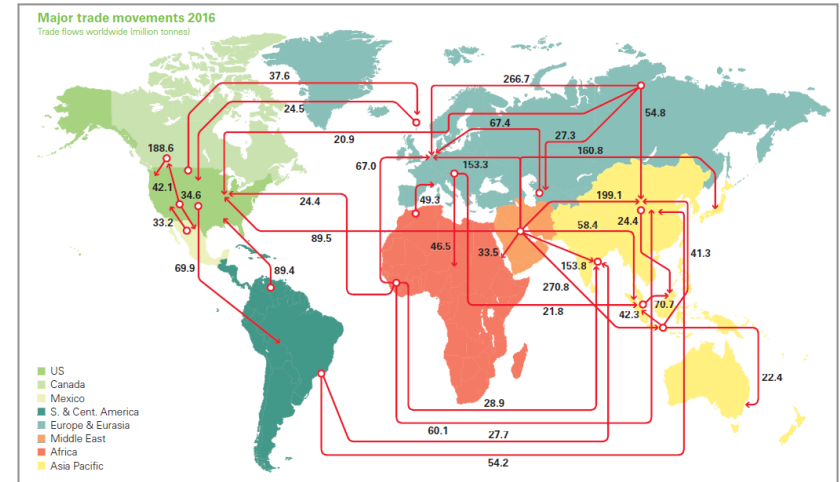
BP Statistical Review
of World Energy
June 2017

| | | | |
|--------------------------------------|----|--------------------------------|----|
| Introduction | 1 | Nuclear energy | 41 |
| Group chief executive's introduction | 1 | Consumption | 41 |
| 2016 at a glance | 2 | Hydroelectricity | 42 |
| Group chief economist's analysis | 3 | Consumption | 42 |
| Primary energy | 8 | Renewable energy | 44 |
| Consumption | 8 | Other renewables consumption | 44 |
| Consumption by fuel | 9 | Biofuels production | 45 |
| Oil | 12 | Electricity | 46 |
| Reserves | 12 | Generation | 46 |
| Production and consumption | 14 | Carbon | 47 |
| Prices | 20 | Carbon dioxide emissions | 47 |
| Refining | 22 | Appendices | 48 |
| Trade movements | 24 | Approximate conversion factors | 48 |
| Natural gas | 26 | Definitions | 48 |
| Reserves | 26 | More information | 48 |
| Production and consumption | 28 | | |
| Prices | 33 | | |
| Trade movements | 34 | | |
| Coal | 36 | | |
| Reserves and prices | 36 | | |
| Production and consumption | 38 | | |

66th edition

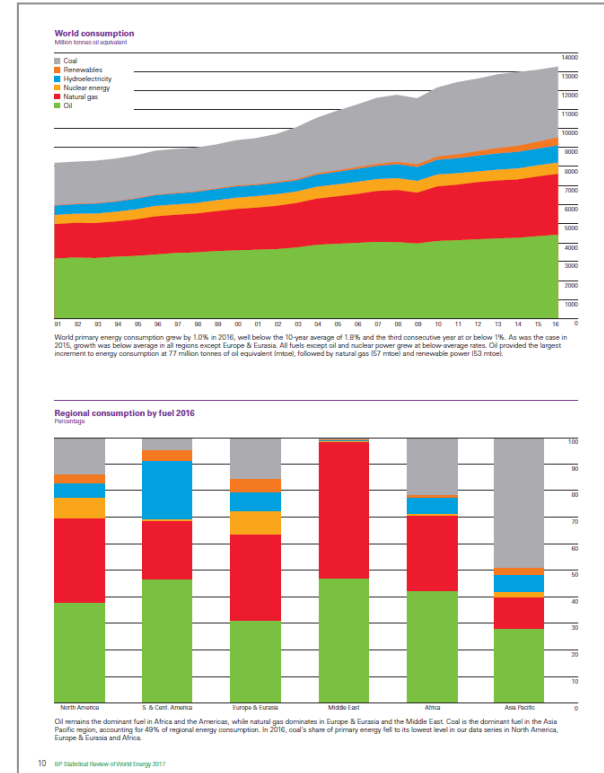
Statistical Review data sources

- Largely dependent on statistics offices, energy ministries and energy companies.
- Increasing availability of primary data online
- Also use third-party sources (e.g. IEA, Eurostat and JODI) and specialist consultants, such as ICIS
- We make use of monthly data when annual data no available



Statistical Review data issues

- Non-OECD data generally harder to find. But Non-OECD becoming larger share of energy market.
- Definitions – naphtha vs gasoline, gasoil vs fuel oil etc.
- Certain data falling through the cracks – e.g. oil used in petrochemicals or power, or natural gas liquids (particularly ethane).
- Fiscal year versus calendar year. Monthly data useful for this



JODI data: the positives



- Extremely valuable – often only source of short term data for many non-OECD countries.
- Structurally improving coverage and data presentation

Joint Organisations Data Initiative (Read-only)

Unit: Thousand Barrels per day (kb/d) Product: Crude oil BALANCE: Production

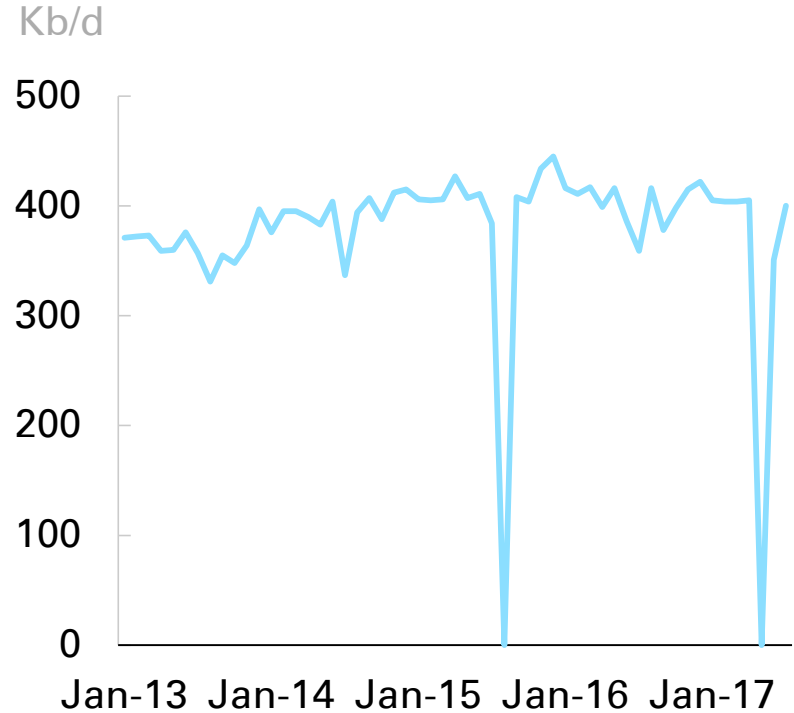
| Country | TIME | Jan2002 | Feb2002 | Mar2002 | Apr2002 | May2002 | Jun2002 | Jul2002 | Aug2002 | Sep2002 |
|--------------------|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Albania | (3) | (3) | (3) | (3) | (3) | (3) | (3) | (3) | (3) | 0 |
| Algeria | (2) | 699 | 699 | 699 | 699 | 702 | 699 | 702 | 704 | 755 |
| Angola | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Argentina | (2) | 768 | 758 | 765 | 765 | 755 | 753 | 762 | 748 | 753 |
| Armenia | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Australia | (1) | 627 | 644 | 617 | 620 | 587 | 646 | 645 | 650 | 620 |
| Austria | (1) | 17 | 18 | 18 | 19 | 18 | 19 | 18 | 18 | 18 |
| Azerbaijan | (3) | 289 | 308 | 298 | 288 | 310 | 316 | 306 | 315 | 315 |
| Bahrain | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bangladesh | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Barbados | (2) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Belarus | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Belgium | (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Belize | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bermuda | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bolivia | (1) | 32 | 31 | 31 | 30 | 30 | 30 | 30 | 31 | 32 |
| Brazil | (1) | 1,446 | 1,439 | 1,461 | 1,474 | 1,486 | 1,506 | 1,457 | 1,509 | 1,489 |
| Brunei Darussalam | (3) | 223 | 212 | 208 | 194 | 199 | 210 | 210 | 224 | 200 |
| Bulgaria | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Canada | (1) | 1,692 | 1,768 | 1,789 | 1,822 | 1,798 | 1,800 | 1,823 | 1,749 | 1,723 |
| Chile | (1) | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 4 |
| China | (1) | 3,374 | 3,339 | 3,358 | 3,342 | 3,377 | 3,613 | 3,406 | 3,498 | 3,440 |
| Chinese Taipei | (2) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Colombia | (2) | 591 | 619 | 597 | 590 | 585 | 574 | 541 | 560 | 585 |
| Costa Rica | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Croatia | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cuba | (1) | 65 | 67 | 63 | 65 | 65 | 71 | 75 | 79 | 81 |
| Cyprus | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Czech Republic | (1) | 4 | 4 | 5 | 4 | 5 | 5 | 6 | 6 | 6 |
| Denmark | (1) | 388 | 385 | 367 | 385 | 376 | 353 | 374 | 302 | 351 |
| Dominican Republic | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ecuador | (2) | 395 | 379 | 384 | 394 | 395 | 397 | 396 | 389 | 400 |
| Egypt (Arab Rep.) | (3) | 694 | 727 | 691 | 710 | 692 | 718 | 687 | 685 | 701 |
| El Salvador | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Estonia | (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Finland | (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| France | (1) | 27 | 27 | 28 | 28 | 27 | 26 | 26 | 26 | 26 |
| Gabon | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gambia | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Georgia | (3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Germany | (1) | 66 | 58 | 67 | 72 | 72 | 73 | 71 | 73 | 67 |
| Greece | (1) | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 |

JODI data: some issues

- Periodic missing or rogue data



JODI data example (oil demand)

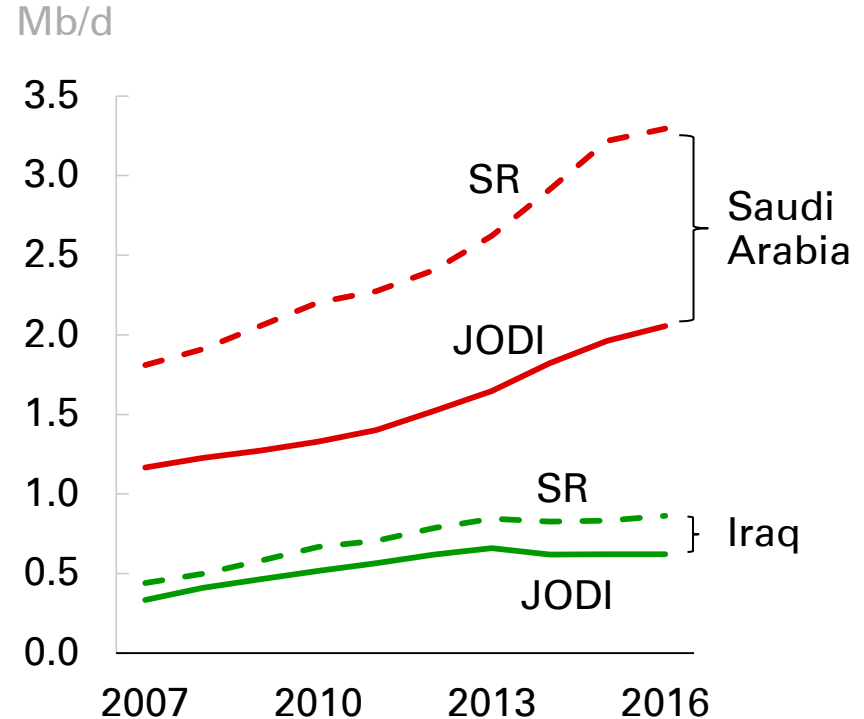




JODI data: some issues

- Periodic missing or rogue data
- Definition of demand. Sales versus total primary consumption.

Annual oil demand





JODI data: some issues

- Periodic missing or rogue data
- Definition of demand. Sales versus total primary consumption.
- Stocks: a bit hidden!

Reports Table Chart

Joint Organisations Data Initiative - Primary (all data)

Other: Unit ▼ Thousand Barrels (kbbi) Product ▼ Crude oil BALANCE ▼ Closing stocks

| TIME | Jul2015 | Aug2015 | Sep2015 | Oct2015 | Nov2015 | Dec2015 | Jan2016 | Feb2016 | Mar2016 | Apr2016 | May2016 | Jun2016 |
|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Country | ↕ | ↕ | ↕ | ↕ | ↕ | ↕ | ↕ | ↕ | ↕ | ↕ | ↕ | ↕ |
| Albania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Algeria | 26,178 | 0 | 25,184 | 24,819 | 25,140 | 25,110 | 24,172 | 23,924 | 23,298 | 23,006 | 23,059 | 22,964 |
| Angola | 18,232 | 18,776 | 18,560 | 21,196 | 21,031 | 22,780 | 12,677 | 14,879 | 16,273 | 14,622 | 13,901 | 15,508 |
| Argentina | 10,553 | 10,646 | 12,785 | 11,716 | 12,395 | 11,755 | 13,445 | 12,651 | 12,495 | 12,623 | 11,785 | 11,270 |
| Armenia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Australia | 11,615 | 12,522 | 11,460 | 12,632 | 10,075 | 11,055 | 11,696 | 11,541 | 9,434 | 10,016 | 11,195 | 10,930 |
| Austria | 6,058 | 5,793 | 6,596 | 6,206 | 6,478 | 6,471 | 6,648 | 6,589 | 6,721 | 6,441 | 6,316 | 6,154 |
| Azerbaijan | 1,179 | 1,231 | 1,363 | 1,408 | 1,437 | 1,017 | 1,128 | 1,091 | 1,437 | 1,673 | 1,548 | 1,386 |
| Bahrain | 759 | 715 | 803 | 700 | 678 | 671 | 656 | 752 | 766 | 678 | 722 | 626 |
| Bangladesh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Barbados | 44 | 41 | 41 | 42 | 42 | 42 | 38 | 41 | 43 | 32 | 33 | 0 |
| Belarus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Belgium | 4,289 | 4,260 | 4,459 | 5,284 | 4,164 | 4,606 | 4,341 | 5,166 | 4,466 | 4,931 | 5,152 | 5,019 |
| Belize | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bermuda | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bolivia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brazil | 27,123 | 30,553 | 32,124 | 26,803 | 27,915 | 32,130 | 30,359 | 26,553 | 24,410 | 20,264 | 24,800 | 24,800 |
| Brunei Darussalam | 2,290 | 1,569 | 1,765 | 1,255 | 1,474 | 1,534 | 1,416 | 1,691 | 1,669 | 1,419 | 1,516 | 1,163 |
| Bulgaria | 2,338 | 1,708 | 1,942 | 1,657 | 2,030 | 1,847 | 2,067 | 1,723 | 2,250 | 2,485 | 2,397 | 1,745 |
| Canada | 66,861 | 64,038 | 62,608 | 63,927 | 68,570 | 65,291 | 67,082 | 65,040 | 66,020 | 64,885 | 61,937 | 62,748 |
| Chile | 3,833 | 4,808 | 4,884 | 4,191 | 4,785 | 4,366 | 4,199 | 3,871 | 4,039 | 4,260 | 4,351 | 3,239 |
| China | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chinese Taipei | 27,734 | 27,226 | 29,372 | 24,357 | 26,945 | 26,908 | 30,011 | 24,512 | 26,528 | 26,666 | 26,442 | 26,162 |
| Colombia | 2,005 | 2,164 | 3,066 | 3,042 | 2,524 | 2,073 | 1,690 | 1,560 | 1,304 | 1,403 | 1,369 | 1,856 |
| Costa Rica | 59 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Croatia | 8,486 | 6,780 | 7,344 | 7,173 | 7,989 | 7,366 | 6,476 | 6,810 | 6,580 | 6,758 | 7,982 | 8,004 |
| Cuba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cyprus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Czech Republic | 8,439 | 8,512 | 8,984 | 8,770 | 8,608 | 8,719 | 8,645 | 8,534 | 8,903 | 9,058 | 9,117 | 9,802 |
| Denmark | 3,169 | 3,545 | 3,884 | 3,353 | 3,530 | 3,906 | 3,258 | 3,176 | 3,398 | 2,233 | 3,412 | 3,162 |
| Dominican Republic | 835 | 411 | 490 | 437 | 714 | 492 | 588 | 269 | 378 | 485 | 558 | 438 |
| Ecuador | 8,285 | 7,933 | 8,208 | 9,731 | 10,100 | 9,254 | 8,844 | 9,026 | 8,272 | 9,345 | 8,675 | 9,353 |

JODI data: some issues

- Periodic missing or rogue data
- Definition of demand. Sales versus total primary consumption.
- Stocks: a bit hidden!
- Lagging data from some countries – sometime several months.

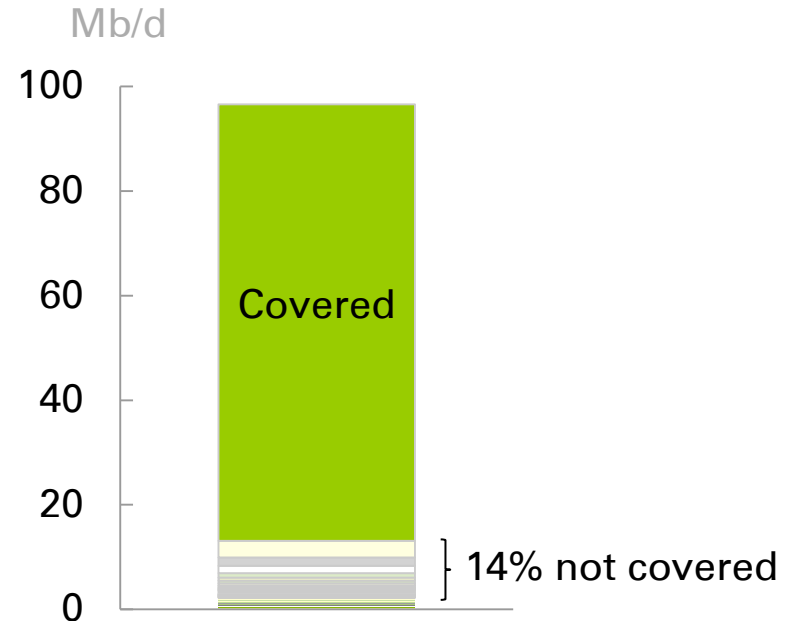
| Unit: Tkc | Product: | BALANCE: Demand | | | | | | | | | |
|-----------|----------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| Sep-16 | Oct-16 | Nov-16 | Dec-16 | Jan-17 | Feb-17 | Mar-17 | Apr-17 | May-17 | Jun-17 | Jul-17 | |
| 378 | 398 | 415 | 422 | 405 | 404 | 404 | 405 | 0 | 351 | 400 | |
| 96 | 105 | 127 | 134 | 86 | 63 | 73 | 91 | 89 | 91 | 108 | |
| 683 | 671 | 662 | 684 | 653 | 640 | 673 | 662 | 638 | 0 | 0 | |
| 971 | 978 | 1030 | 1016 | 937 | 1078 | 1062 | 1028 | 1095 | 1095 | 1062 | |
| 283 | 276 | 270 | 252 | 250 | 251 | 271 | 246 | 257 | 276 | 277 | |
| 120 | 86 | 95 | 69 | 101 | 108 | 97 | 83 | 83 | 95 | 85 | |
| 29 | 29 | 55 | 27 | 25 | 25 | 32 | 9 | 9 | 33 | 29 | |
| 134 | 150 | 123 | 113 | 112 | 148 | 126 | 173 | 173 | 170 | 0 | |
| 704 | 722 | 675 | 704 | 696 | 685 | 674 | 659 | 657 | 638 | 639 | |
| 3 | 3 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2471 | 2439 | 2338 | 2382 | 2340 | 2513 | 2519 | 2368 | 2350 | 2474 | 2437 | |
| 15 | 14 | 14 | 13 | 13 | 14 | 14 | 15 | 16 | 15 | 0 | |
| 241 | 245 | 253 | 242 | 225 | 237 | 208 | 251 | 248 | 267 | 258 | |
| 2421 | 2322 | 2326 | 2422 | 2304 | 2235 | 2308 | 2128 | 2366 | 2433 | 2474 | |
| 315 | 307 | 318 | 328 | 318 | 330 | 326 | 318 | 327 | 341 | 336 | |
| 11602 | 10574 | 11397 | 11876 | 11738 | 11738 | 12825 | 12636 | 12842 | 12725 | 11856 | |
| 908 | 1027 | 1061 | 1054 | 1018 | 986 | 935 | 973 | 1048 | 1026 | 1057 | |
| 273 | 294 | 299 | 186 | 295 | 292 | 283 | 300 | 269 | 267 | 0 | |
| 50 | 45 | 43 | 56 | 55 | 53 | 55 | 52 | 59 | 0 | 0 | |
| 74 | 67 | 66 | 88 | 46 | 62 | 57 | 68 | 81 | 78 | 85 | |
| 59 | 53 | 51 | 58 | 55 | 55 | 51 | 46 | 52 | 55 | 64 | |
| 194 | 200 | 225 | 195 | 181 | 181 | 198 | 212 | 227 | 221 | 219 | |
| 173 | 159 | 165 | 151 | 148 | 145 | 159 | 149 | 163 | 163 | 148 | |
| 69 | 66 | 71 | 77 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 247 | 246 | 249 | 240 | 219 | 205 | 232 | 225 | 0 | 0 | 0 | |
| 910 | 842 | 806 | 818 | 844 | 890 | 856 | 873 | 777 | 802 | 0 | |
| 30 | 27 | 27 | 28 | 29 | 34 | 27 | 22 | 27 | 27 | 22 | |
| 207 | 198 | 200 | 189 | 180 | 183 | 187 | 176 | 197 | 200 | 201 | |
| 1755 | 1698 | 1584 | 1678 | 1758 | 1723 | 1729 | 1643 | 1695 | 1769 | 1743 | |
| 0 | 0 | 0 | 0 | 5 | 24 | 22 | 34 | 26 | 32 | 0 | |
| 2540 | 2563 | 2615 | 2505 | 2560 | 2566 | 2720 | 2557 | 2585 | 2559 | 2480 | |
| 311 | 284 | 298 | 356 | 305 | 294 | 282 | 280 | 286 | 323 | 332 | |
| 79 | 82 | 91 | 99 | 92 | 95 | 95 | 90 | 0 | 0 | 0 | |
| 398 | 396 | 433 | 443 | 415 | 403 | 419 | 445 | 415 | 393 | 414 | |
| 155 | 140 | 169 | 173 | 158 | 165 | 171 | 168 | 167 | 178 | 171 | |
| 14 | 18 | 14 | 16 | 9 | 5 | 19 | 6 | 25 | 20 | 22 | |
| 3992 | 4342 | 4506 | 4340 | 4098 | 4614 | 4302 | 4518 | 4635 | 4483 | 3699 | |



JODI data: some issues

- Periodic missing or rogue data
- Definition of demand. Sales versus total primary consumption.
- Stocks: a bit hidden!
- Lagging data from some countries – sometime several months.
- Coverage could still be improved. Would a separate annual data database help?

Oil demand – JODI coverage (from July 2016 onwards)





Conclusion

- JODI is a valuable resource for short term and long term energy market analysis.
- The data quality, coverage and presentation are improving.
- But there are potential areas for improvement in each of these.
- There always is!