# Developing and Enhancing Worldwide Energy Data

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IEA

# Overview

➢ The IEA and its Energy Data Centre

➢ Work programmes with countries and regions

➢ Energy Data Progress against Challenges and the potential of Digitalisation

# The IEA and its Energy Data Centre

# The IEA

**Formed in 1973** in wake of oil embargo with mission to promote member country energy security – autonomous agency of the Organisation for Economic Cooperation and Development (OECD)

**30 member countries**
<u>Asia Pacific:</u> Australia, Japan, Republic of Korea and New Zealand
<u>Americas:</u> United States, Canada, <u>Mexico (since Feb 2018)</u>
<u>Europe:</u> Austria, Belgium, Czech Rep, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey and United Kingdom
**European Commission** also participates in the work of the IEA
**Chile** is in the process of accession to become members of the IEA
**Brazil, China, India, Indonesia, Morocco, Singapore and Thailand** are countries in **Association**
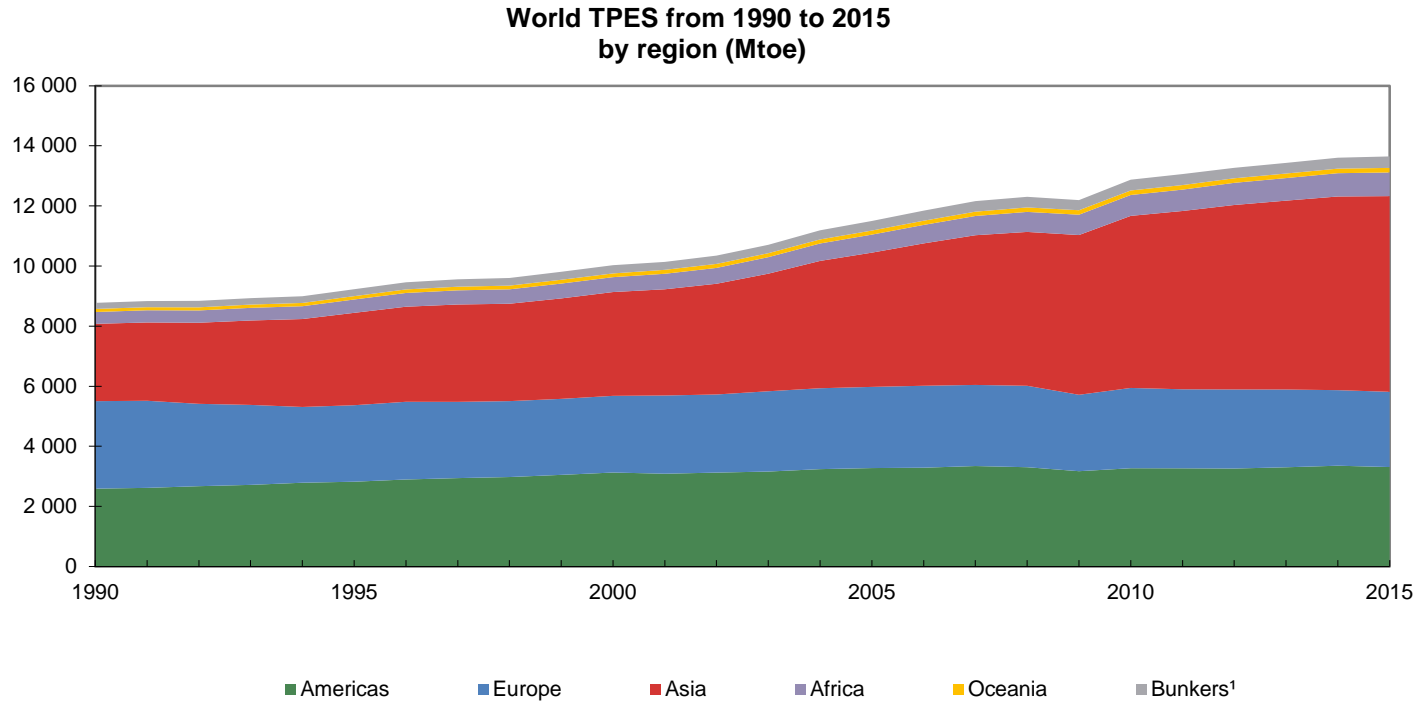
**Decision-making body: Governing Board** - Consists of member country representatives
Under the Governing Board, several committees are focusing on each area
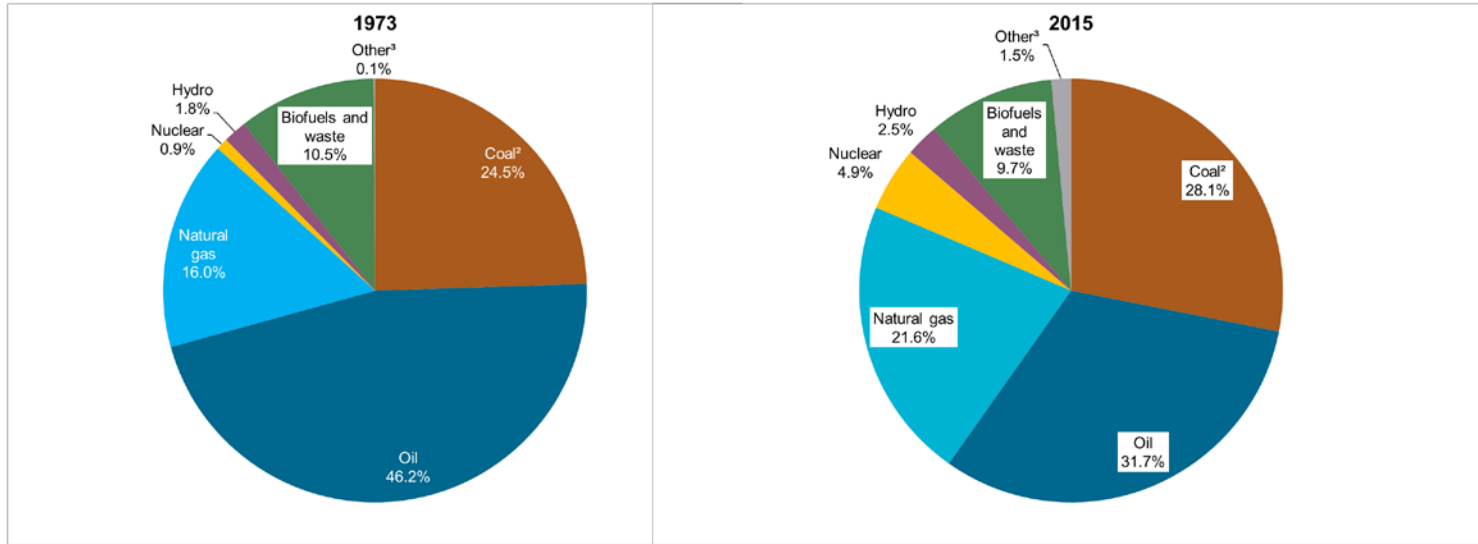**Secretariat: Staff of around 260,** mainly energy experts and statisticians

**Modernisation** and Open door policy started in 2015

# Total primary energy supply (TPES) by region

**World TPES from 1990 to 2015
by region (Mtoe)**



Americas ■ Europe ■ Asia ■ Africa ■ Oceania ■ Bunkers[1]

*Source: IEA, Key World Energy Statistics, 2017*

# World total primary energy supply by fuel



**1973**

Other³ 0.1%
Hydro 1.8%
Nuclear 0.9%
Biofuels and waste 10.5%
Coal² 24.5%
Natural gas 16.0%
Oil 46.2%

6,101 Mtoe

**2015**

Other³ 1.5%
Hydro 2.5%
Nuclear 4.9%
Biofuels and waste 9.7%
Coal² 28.1%
Natural gas 21.6%
Oil 31.7%

13 647Mtoe

*Source: IEA, Key World Energy Statistics, 2017*

# Data collection at the IEA: the road to global outreach

- **IEA collects data from 150 countries, on a voluntary basis for all non-OECD countries**



OECD { IEA
       Non IEA

NON-OECD { Association
          Rest

© IEA 2017

# Data Collection by the IEA – source: direct from countries
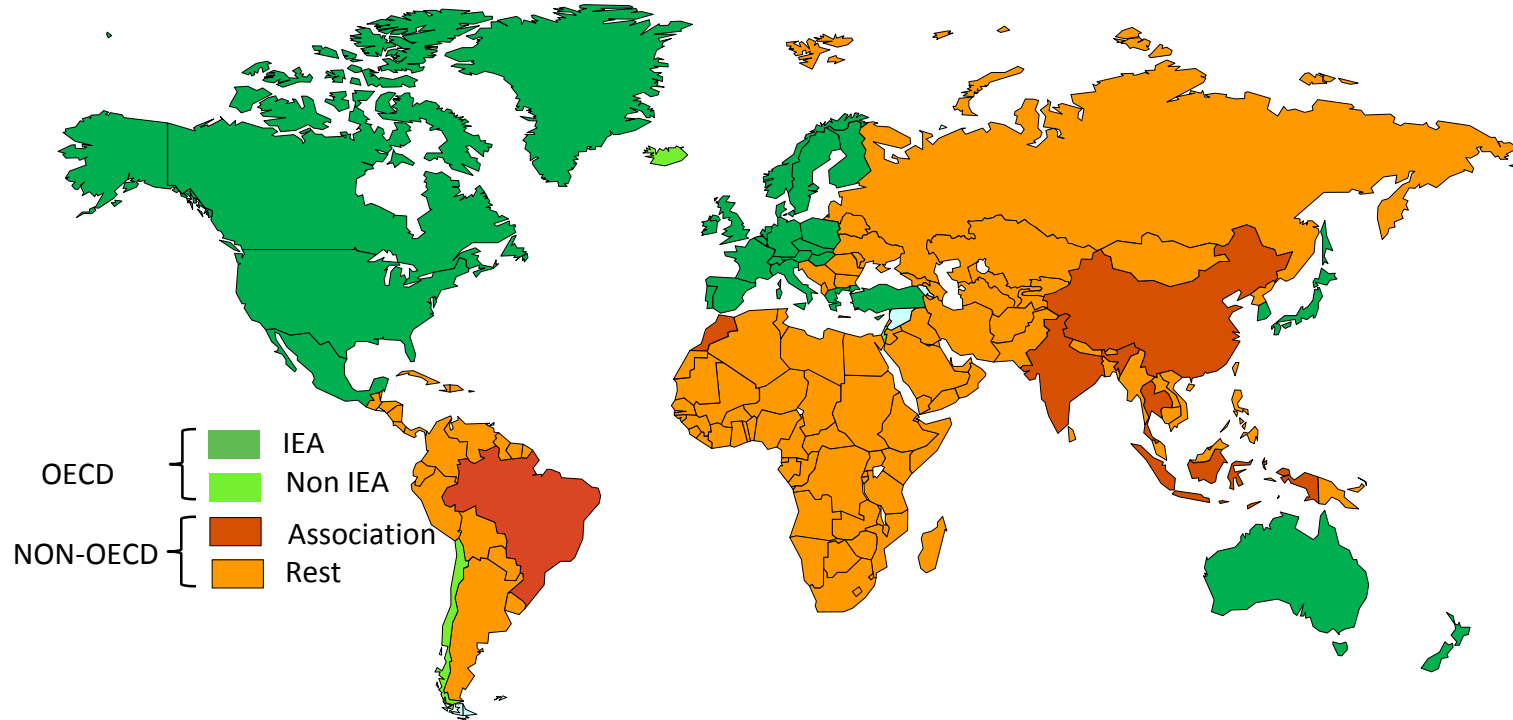
## OECD

- 5 annual Joint questionnaires

- Annual collection on Energy efficiency, RD&D and forecasts

- Quarterly questionnaire on prices and taxes

- Monthly questionnaire
  - Electricity
  - Oil and gas (M-2)
  - Oil and gas (JODI) (M-1)
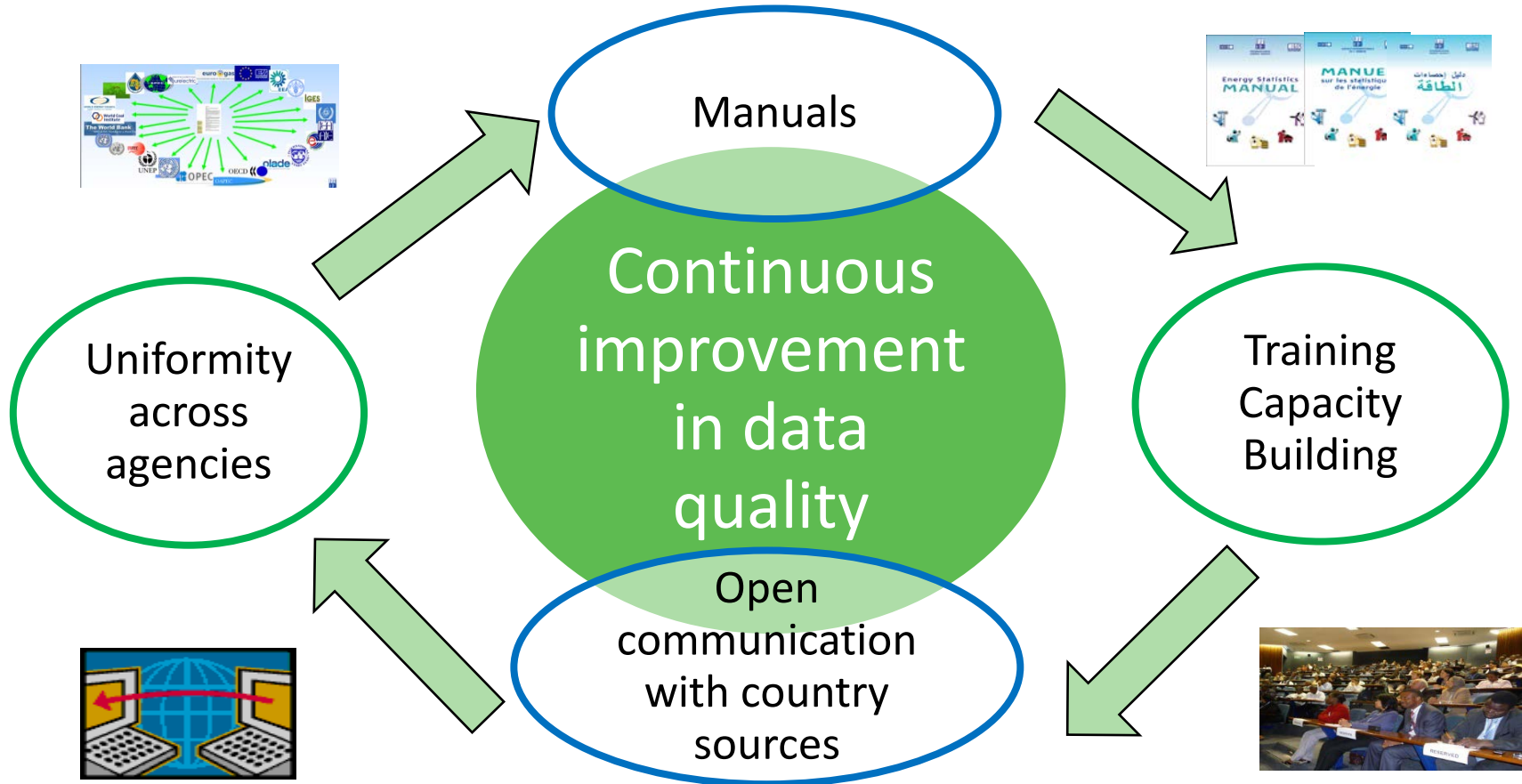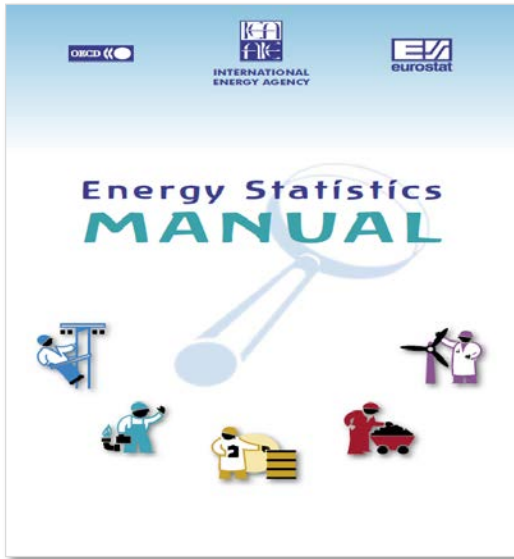
- Emergency questionnaires

## Non-OECD

- Voluntary

- Joint IEA/UNECE/Eurostat questionnaires used by some and growing

- Network of statistics contacts in 120 countries

- Cooperation with international organisations

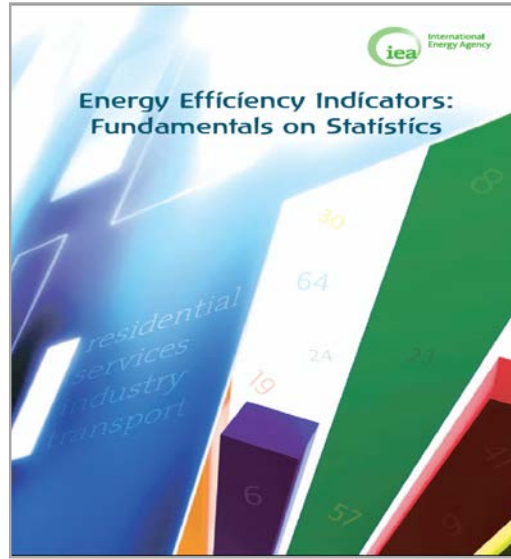Common objective for all - to improve timeliness and detail of data sent to IEA
http://www.iea.org/statistics/resources/questionnaires/

Manuals

Continuous improvement in data quality

Uniformity across agencies

Training Capacity Building
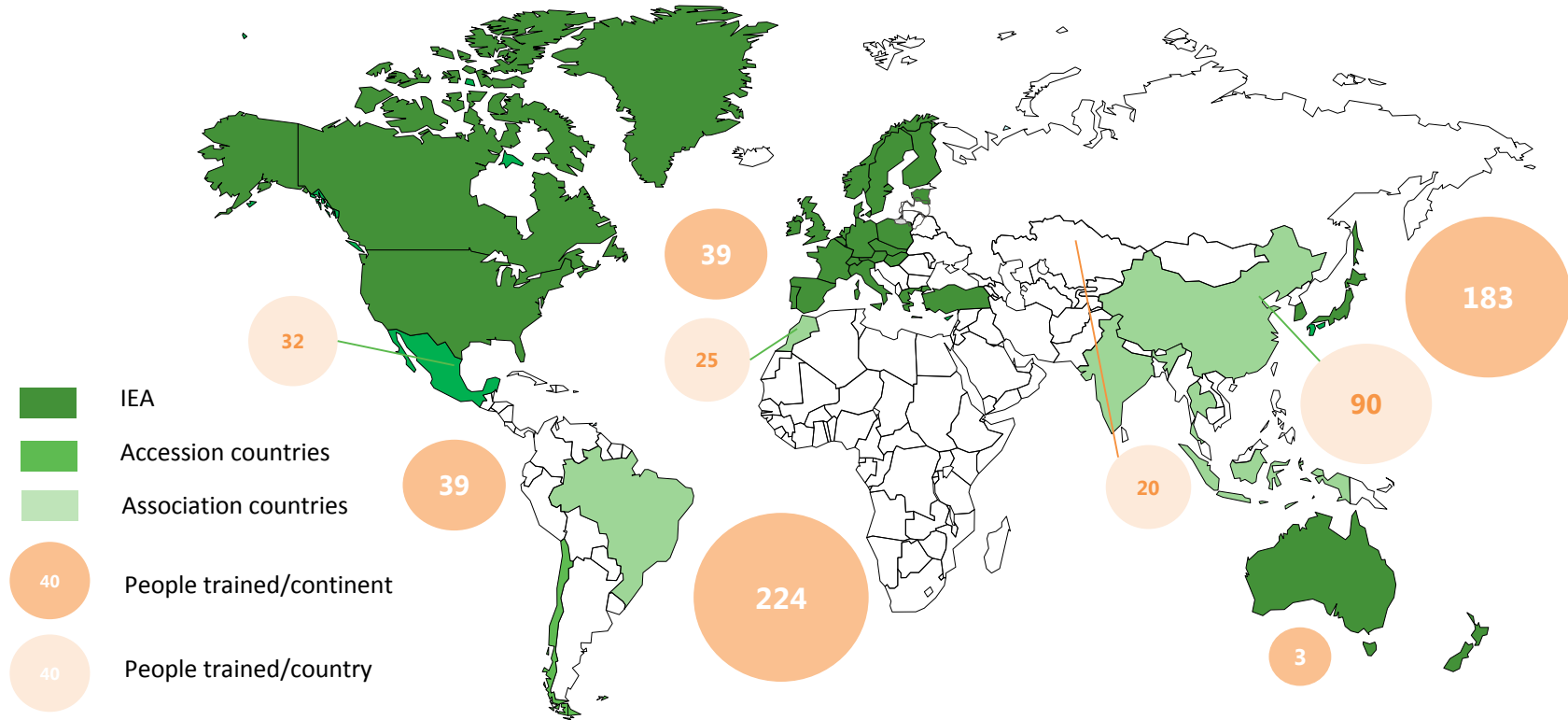
Open communication with country sources

Available in 10 languages



Available in 4 languages

Over 170 country practices

# IEA Statistics Training and Capacity Building Overview in 2017- 2018

**Legend:**
- IEA
- Accession countries
- Association countries
- People trained/continent
- People trained/country

**Map values:**
- 39
- 32
- 25
- 39
- 224
- 20
- 90
- 183
- 3

**The IEA directly trained 496 statisticians worldwide and over 4,500 online**

# Online Training: The IEA Online School Program 2017

| Module | Content | Webinar | Date of release | Views |
|---|---|---|---|---|
| Prices | Both on data collection and analysis of data. | Energy prices (data reporting and use) | 16/08 | 1 009 |
| Data analysis | Dedicated to energy analysts. | Energy efficiency | 23/08 | 956 |
| | | Energy balances | 06/09 | 1 107 |
| | | CO2 | 13/09 | 243 |
| Data reporting | Primarily for our contacts to be trained in how to use the Joint Questionnaires. | Renewables | 23/08 | 240 |
| | | Coal | 20/09 | 300 |
| | | Electricity and heat | 27/09 | 246 |
| | | Oil | 04/10 | 294 |
| | | Gas | 11/10 | 321 |

**9 webinars to cover the range of energy statistics,**
**http://www.iea.org/training/ieaonlinestatisticstrainingprogramme/ieaonlinestatisticsschool2017/**
**(aiming to make available in other languages: French, Spanish, Arabic, Chinese, Russian)**

# Fundamental of energy statistics in Chinese



**IEA stats videos in Chinese launched on 25 May 2018 in China as part of training event on renewables and energy efficiency  available on NBS website**

# Work programmes with countries and regions

# Directed workplans

- India – assistance to develop energy balances, expend knowledge, data collection, data consistency

- China – renewables and energy efficiency

- Indonesia – balances and energy consumption

- Mexico – data in a new market structure

- Africa – energy consumption and consistency with energy balances

- South America – international data consistency

# India

Ongoing cooperation for many years, but detailed IEA support from 2018 :

Fact finding mission in March 2018, discussion on the current state of India's energy statistics and means to improve with 14 ministries.

Strong commitment from all on cooperation to improve data, all seeing the benefit to India and the IEA in so doing.

Two new cross ministry groups being established, on IEA recommendation, to better coordinate work on data and data sharing across ministries with IEA as a member in an advisory role.

- Ministry of Statistics and Program Implementation (MoSPI), responsible for the energy balance
  - MOSPI would share with IEA the forms used to collect data from ministries, so we can advise on changes needed to build a full balance.
  - This would be complemented by a training course during 2018.
  - Cooperation with NSSO (survey office of MoSPI) will be explored to expand data collection and improve demand side data.

- PPAC agreed to join our Petro-Chemical working group, which is working to improve the reporting of this key sector – they would be the first non-IEA member to join.

- Work agreed to unify classifications of products and industries and link them to international definitions.

# Indonesia

- An MoU was signed in March between BPS (stats office) and ESDM
  - a significant development in improved sharing and access to data and also opens up the route for ESDM to include questions in BPS surveys, IEA recommendations from the 2017 mission.

- Meeting with senior advisor to the Minister from strategic planning at ESDM to discuss data needed for sensible energy efficiency policy options:
  - Focus on the use of the data that exists but is not shared yet (including administrative data) and small additions to surveys that could significantly improve knowledge on why energy is used.

- Very successful cross ministry meeting on energy end use data, but need to make this cross ministerial cooperation part of normal work.
  - Real discussions between the ministries helping them identify data overlaps and sources of data.

- New plans to measure the CV of coal data on export (covers 80% of production) from 2018 third quarter.

# China

- Association strengthened the relationship with China National Bureau of Statistics (NBS) and make significant progress in understanding their energy data system:
  - Training events in May 2016 (Beijing), that taught to 100 Province statisticians, and key meetings with China Electricity Council and Tsinghua University
  - Fact-finding mission in March 2017 in the Zhejiang region, gave a deep understanding of data collection and validation at all geographical levels as well as the companies' work to comply with it
  - Secondee from NBS to EDC – work on classification comparisons
  - International workshop on renewables and energy efficiency statistics (Beijing), attended by 100 Province statisticians and 10 neighboring countries – May 2018.
  - Launch on-line training in Chinese

- Since China joined Association, improvements on data affected:
  - The estimation of biomass used by residential
  - Rail consumption of coal adjusted for the 1971-2016
  - Improved timing in responses to questions and ability to raise more questions

# Regional assistance

South America

- Agreement from Olade and the 6 countries to support then to develop a new questionnaire for reporting to Olade that will be consistent with the IEA forms and will mean consistent data is reported to the IEA by these countries. And separate agreement to support Brazil to do the same.

- All done by taking time to discuss unique data flows and process in South America and showing how IEA reporting process did work for them.

Africa

- The IEA focus is on quality, comparability, and alignment with internationally agreed definitions and methodologies, and expand its individual coverage beyond 30 covered , work with other organisations on the ground (AFREC, IRENA, IAEA, etc), particularly on training and capacity building activities.
  - 2017: 6 training events with AFREC , 2 on energy balances and statistics 4 on energy efficiency data
  - 2018 : 4 workshops done or planned, combining both topics and country focal points.
  - Developed a simplified questionnaire to collect data on energy end use by households  with countries that is now being used and findings discussed at workshops
  - New contacts are identified and relationship with the IEA enhanced increasing  likelihood of additional countries in the next two years.

# Key areas for future work

- Support between training events

- Developing tools for data collection at country level

- Improving knowledge of energy statistics

- Improving practical knowledge – data validation etc

- Data Governance and data sharing

- Demand side data

- Linking data to policy

- International consistency

# Energy Data Progress against Challenges and the potential of Digitalisation

# The need for energy statistics

- Energy underpins all economic activity (output and transport)

- To ensure adequate security and understand risk to supply – be able to understand all flows and ability to model the future

- Energy systems are transforming

- Better data helps improve decision making

- Required to identify cost effective steps for each country's Clean Energy Transitions

- Provides clear understanding for investors and business

- Understanding energy use allows for efficiency, greater output at lower cost

- Design, monitor and evaluate policies

# Addressing current challenges to energy data

- Challenges exist, including
  - Cooperation from business in supplying timely data

  - Confidentiality concerns that prevents data being provided

  - Gaps in the data e.g.: stocks (levels and change), trade breakdowns, non-energy use

  - Incomplete coverage (e.g. of all forms or power generation)

  - Liberalization of energy markets – one company to many

  - Accuracy – e.g. the need for good CV data

- These problems can be solved and many are taking action – need to share practice and work with international guidance and international organisations
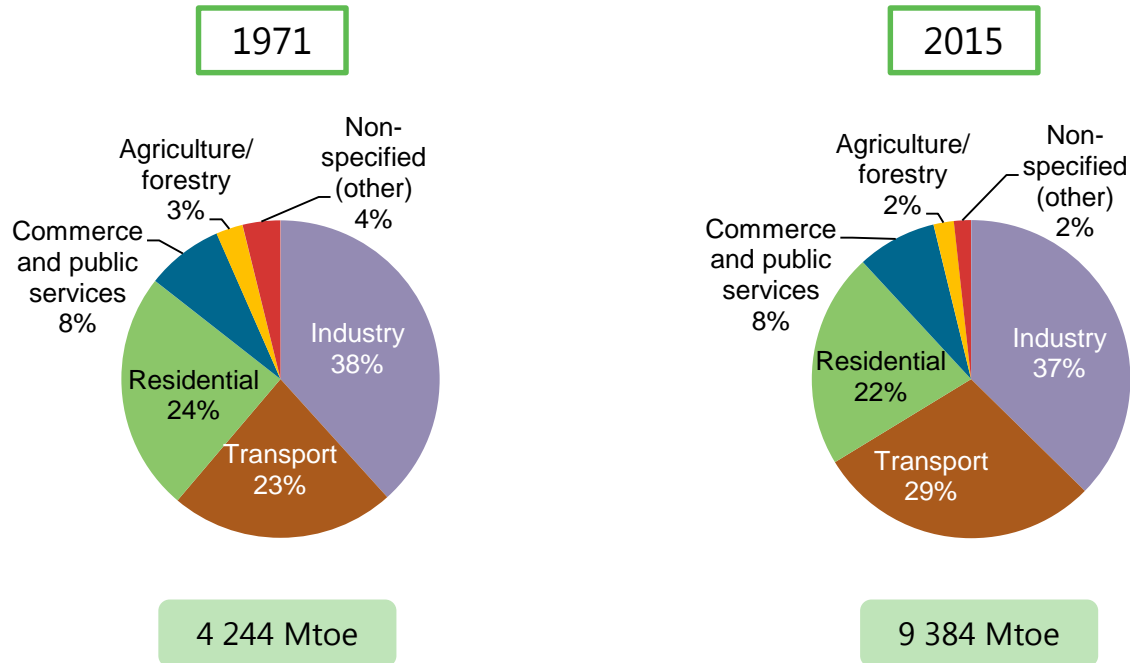
# The new challenges to energy data

- Increasing desire for detailed data on energy end use to make informed policy choices
  - Energy use data creates understanding of the service needed – the why energy is used, not just the what
  - Need detailed energy data and related activity data
  - G20 Energy End Use initiative co-led by France and the IEA
  - Learning from each other, sharing tools and new ideas, developing new approaches

- Off grid generation
  - bring energy to millions of homes, but real issues for measurement
  - Irena leading work to utilize customs and other data to make informed estimates of generation based on mass on PV cells imported
  - Wider outreach also highlighted many other forms of small scale local renewables not covered in official data

- Increasing development of producers being consumer for electricity – how to measure self use
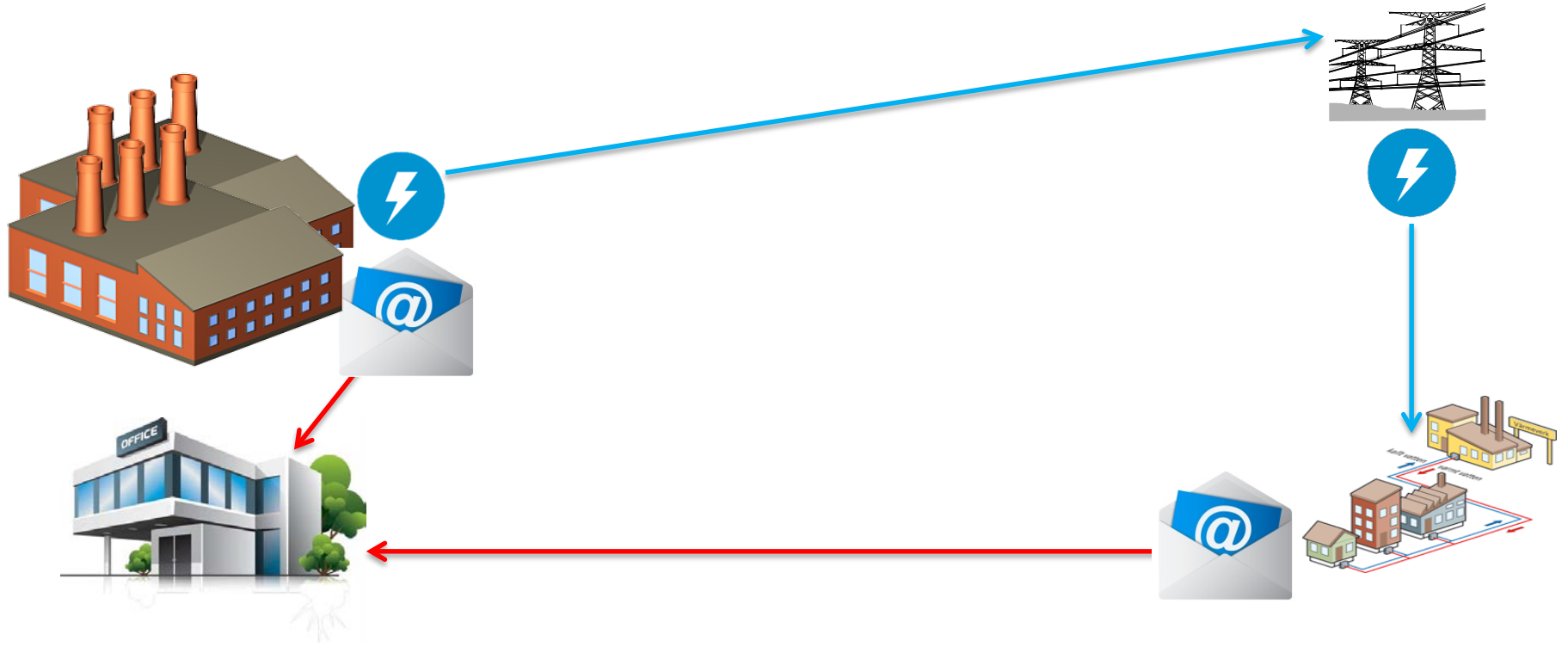
# World total final consumption by sector



1971

Non-specified (other) 4%
Agriculture/forestry 3%
Commerce and public services 8%
Residential 24%
Transport 23%
Industry 38%

4 244 Mtoe

2015

Non-specified (other) 2%
Agriculture/forestry 2%
Commerce and public services 8%
Residential 22%
Transport 29%
Industry 37%

9 384 Mtoe

*Source: IEA, World Energy Balances, 2017*

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# Maximizing new opportunities

- Transparency
  - ➤ Transparency of data builds confidence
  - ➤ Increases engagement and informs debate
  - ➤ Data informs all markets: data vacuums cause uncertainty and increase volatility
  - ➤ JODI

- Open data
  - ➤ Increasing drive to open  data  and make available to all – provides business opportunities and supports academic work
  - ➤ Computer power and development in treating confidentiality are making it easier to release larger data sets

- Digitalization
  - ➤ A potential game changer for energy data:
  - ➤ Already increasing use of GIS
  - ➤ Data matching (e.g. UK's NEED matching data to understand energy efficiency)
  - ➤ Significant potential with the appropriate regulatory/legal framework
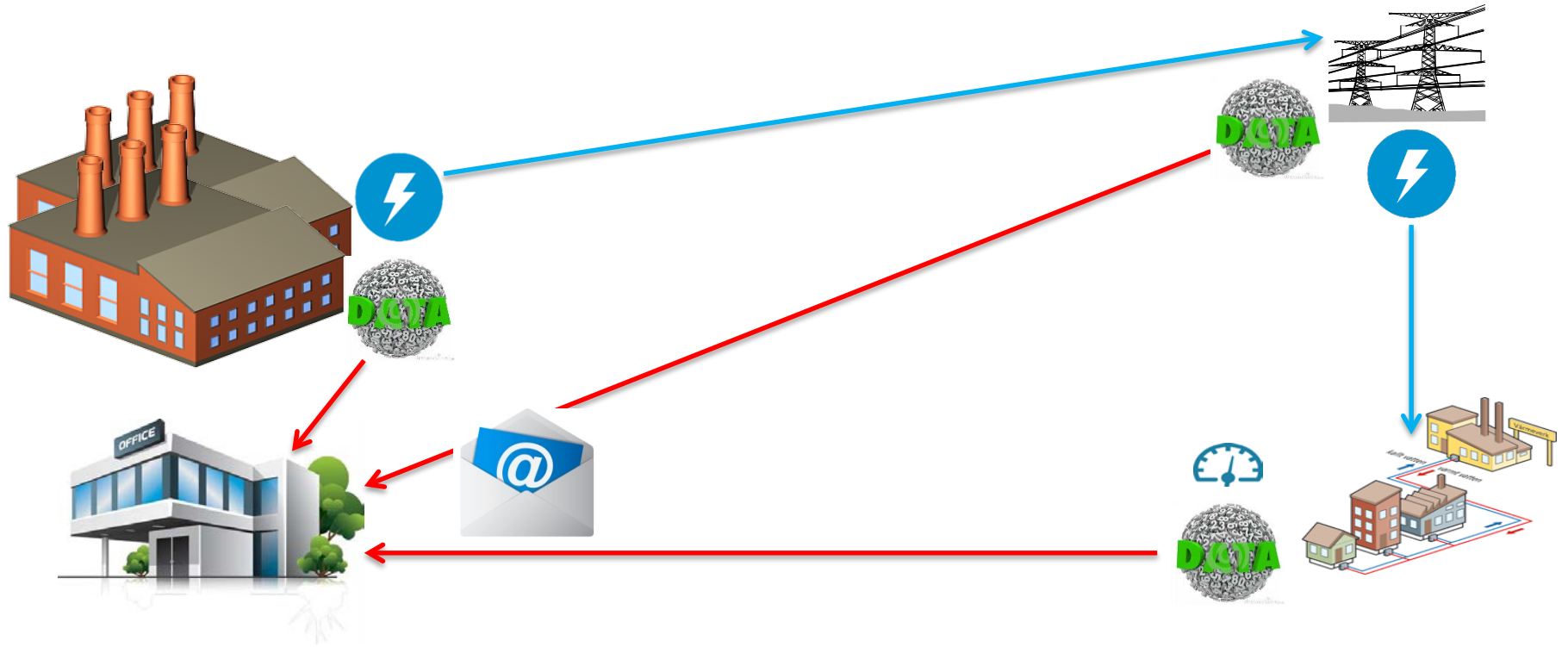
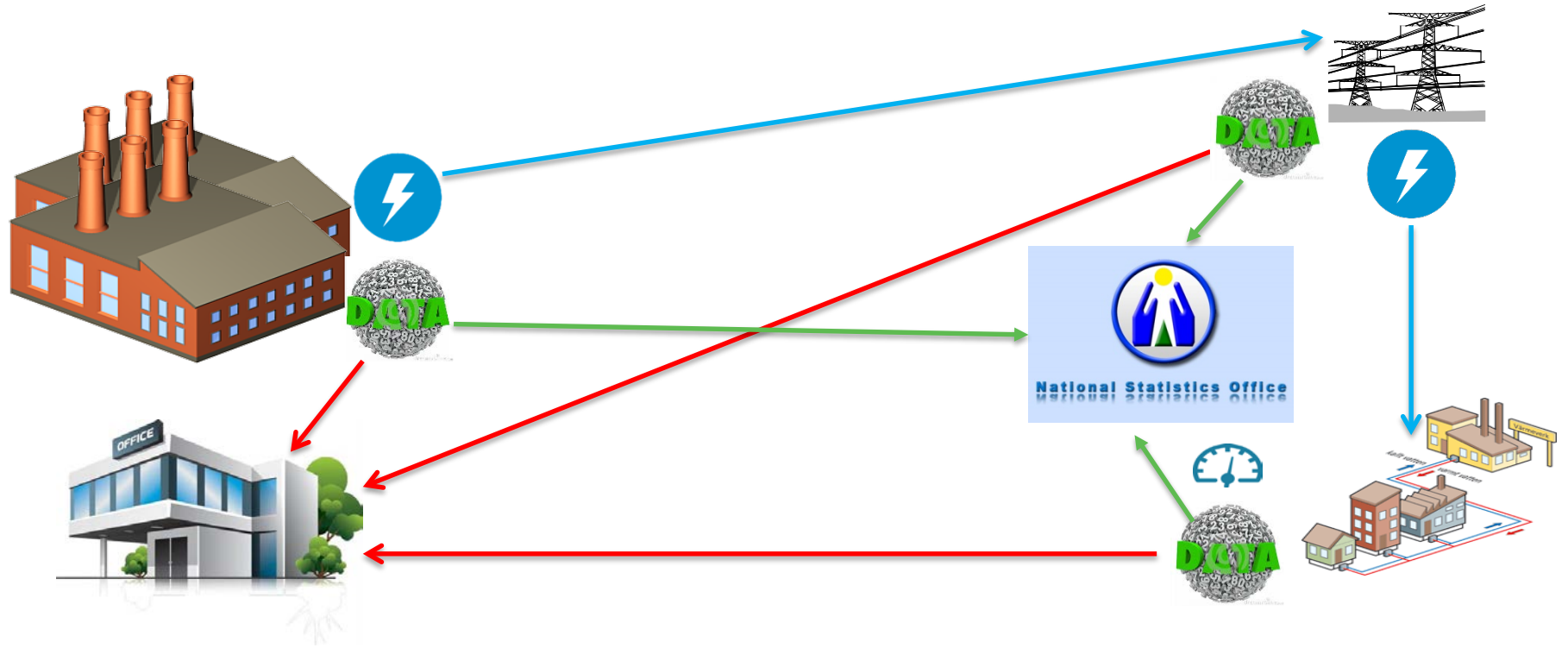# Electricity statistics in a non-digitalized system
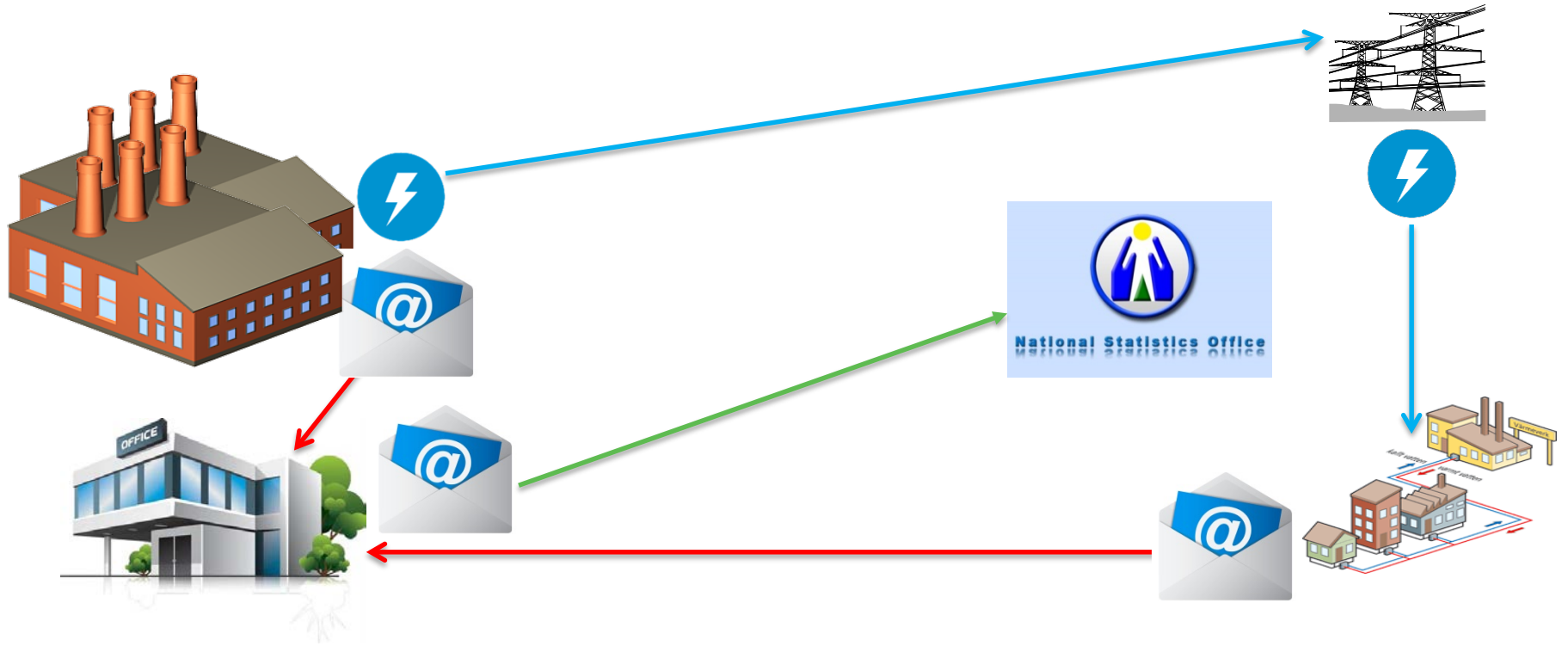
# Electricity statistics: in a digitalized system?

# Digitalization – one example to improve data?

- **1st phase?**
  - Business have more timely data (e.g. digital twin of power stations, direct monitoring of networks)
  - Official data still dependent on collection from business (monthly) and consumers (annual with large lags)

- **2nd phase?**
  - Automatic flows of data from digital systems in homes and businesses to statistical offices?

- **Could it happen?**
  - Official stats do not need time critical data, aggregation over time periods (e.g. 1 hour) or time lags (weeks) still a real benefit
  - Detail data could have a longer lag of months
  - Need legislation to maximize the benefit of using data whilst ensuring data protection

# Support from international organisations

- International Recommendations for Energy Statistics
  - Developed by over 20 organisations and agreed by the UNSC as a guide to producing comprehensive and comparable energy statistics
  - Full product classification with definitions
  - Energy balance as the framework to understand energy
  - http://unstats.un.org/unsd/energy/ires/IRES_Whitecover.pdf

- Regional cooperation between Agencies, especially in Latin America

- Common data collection
  - Increasing efforts to harmonize data collection under common terms, long experience with IEA, EU, APEC – very positive work now underway with OLADE and IEA

- Training and capacity building
  - Manuals in multiple languages
  - On-line – the IEA web videos (being translated)
  - Coordination of training

# IEA Statistics Training Events in collaboration with other organisations



Legend:
- Organised by IEA only
- In collaboration with IRENA
- In collaboration with AFREC
- In collaboration with APEC
- In collaboration with UNSD
- In collaboration with ASEAN
- In collaboration with JODI
- In collaboration with G20
- In collaboration with EU4Energy
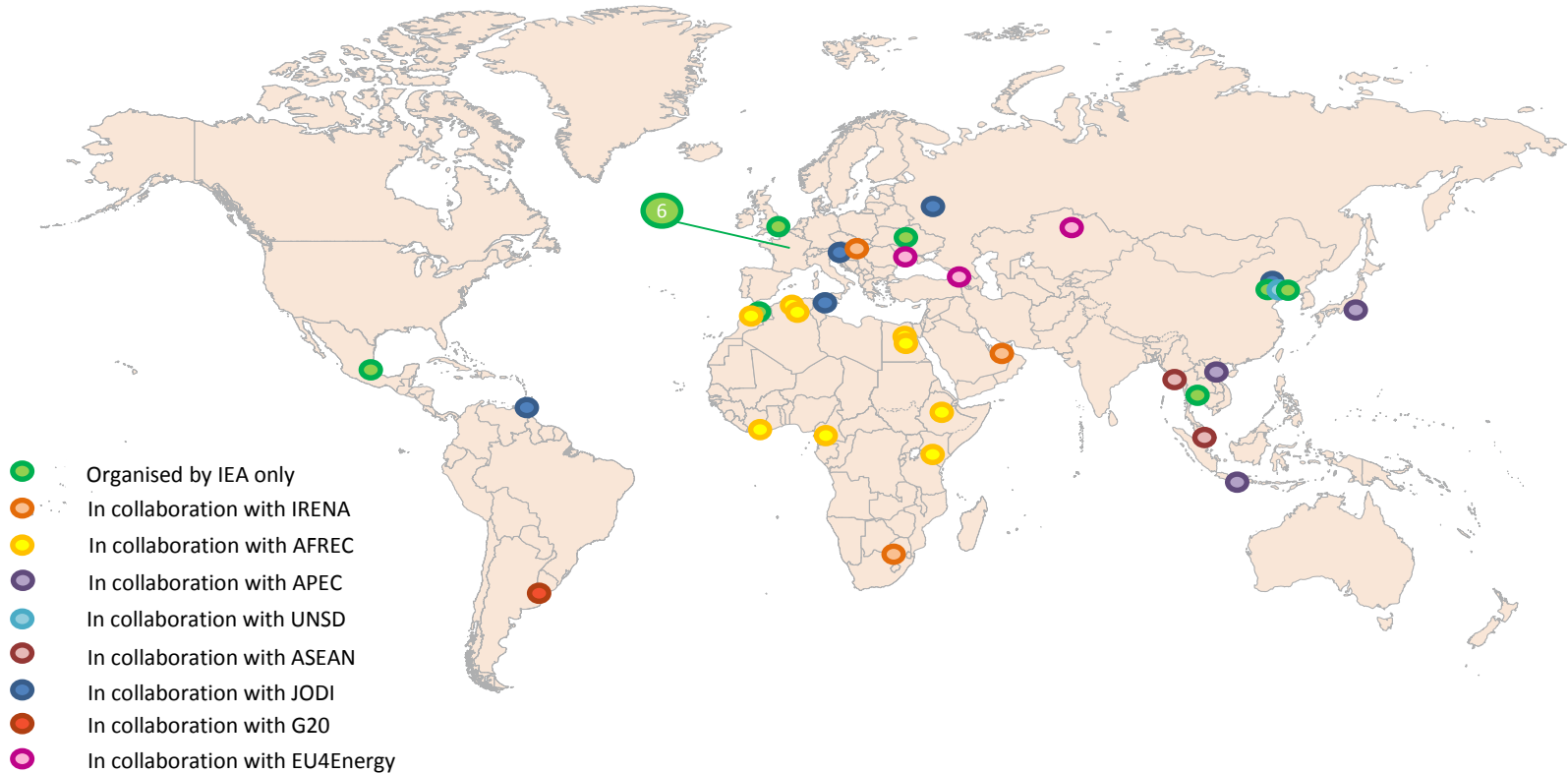
**The IEA has organised 10 training events and co-organised 20 others since 2015**

# Conclusions

- Enhancing the comprehensiveness of energy data will lead to better decisions.

- Countries can further support this by:
  - being open with their data and their methodology;
  - work with the IEA and others to build up tools that all countries can use; and
  - support the efforts of all international organisations in capacity building.

- Resources and their allocation are essential to establish and maintain a national energy statistics system:
  - how energy data are prioritised vs other statistical areas;
  - how synergies can be exploited between energy and other policy areas;
  - what priority is given to the monitoring component within the policy formulation process; and
  - how resources are allocated across areas within the energy domain.

- Data governance and proactive regulation are needed to address any current weaknesses in data collection systems and to ensure that the maximum benefit can be achieved from digitalisation whilst maintaining confidentiality

- Data need to be comparable, timely, regular, complete and made available in a transparent way