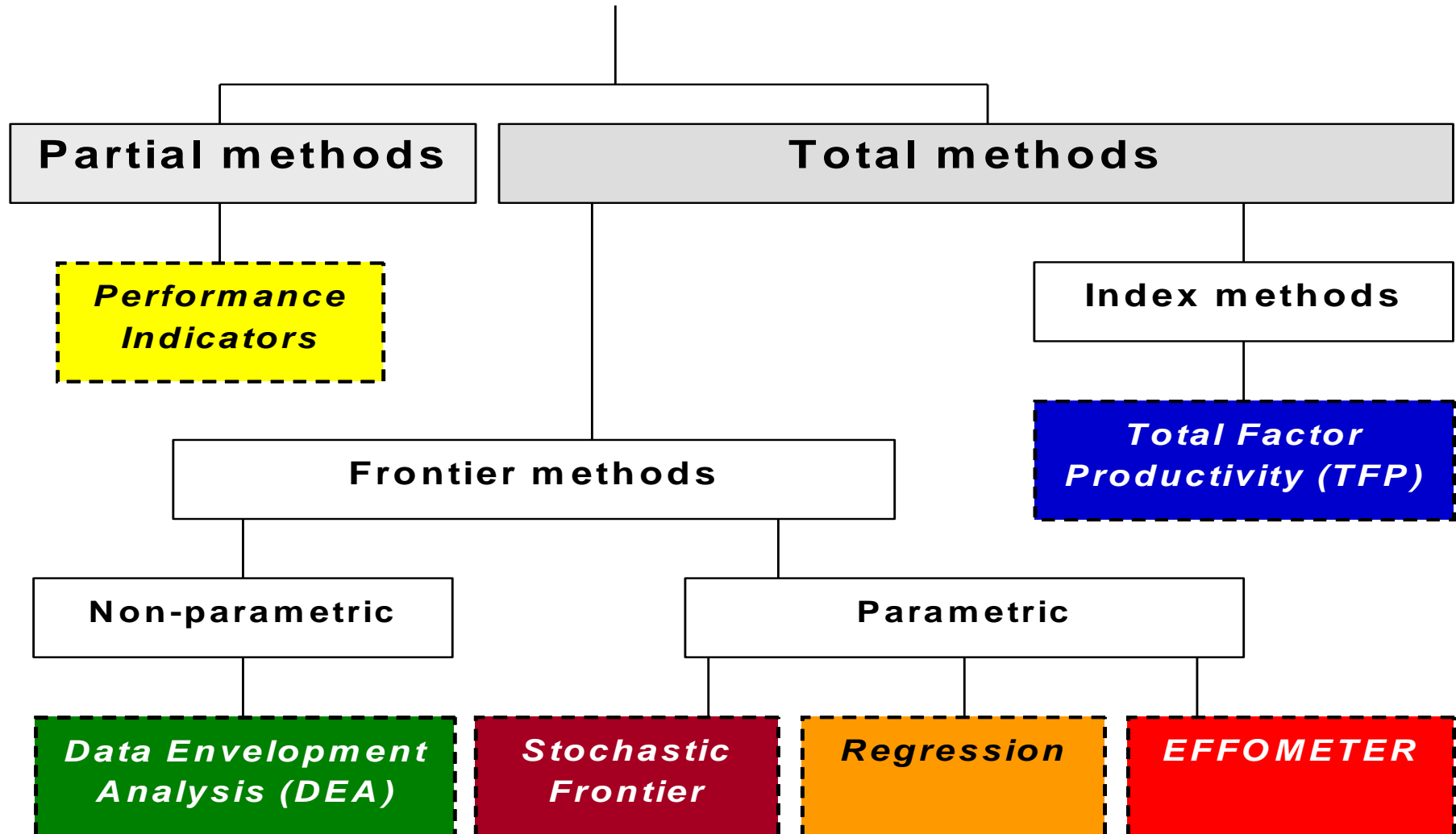
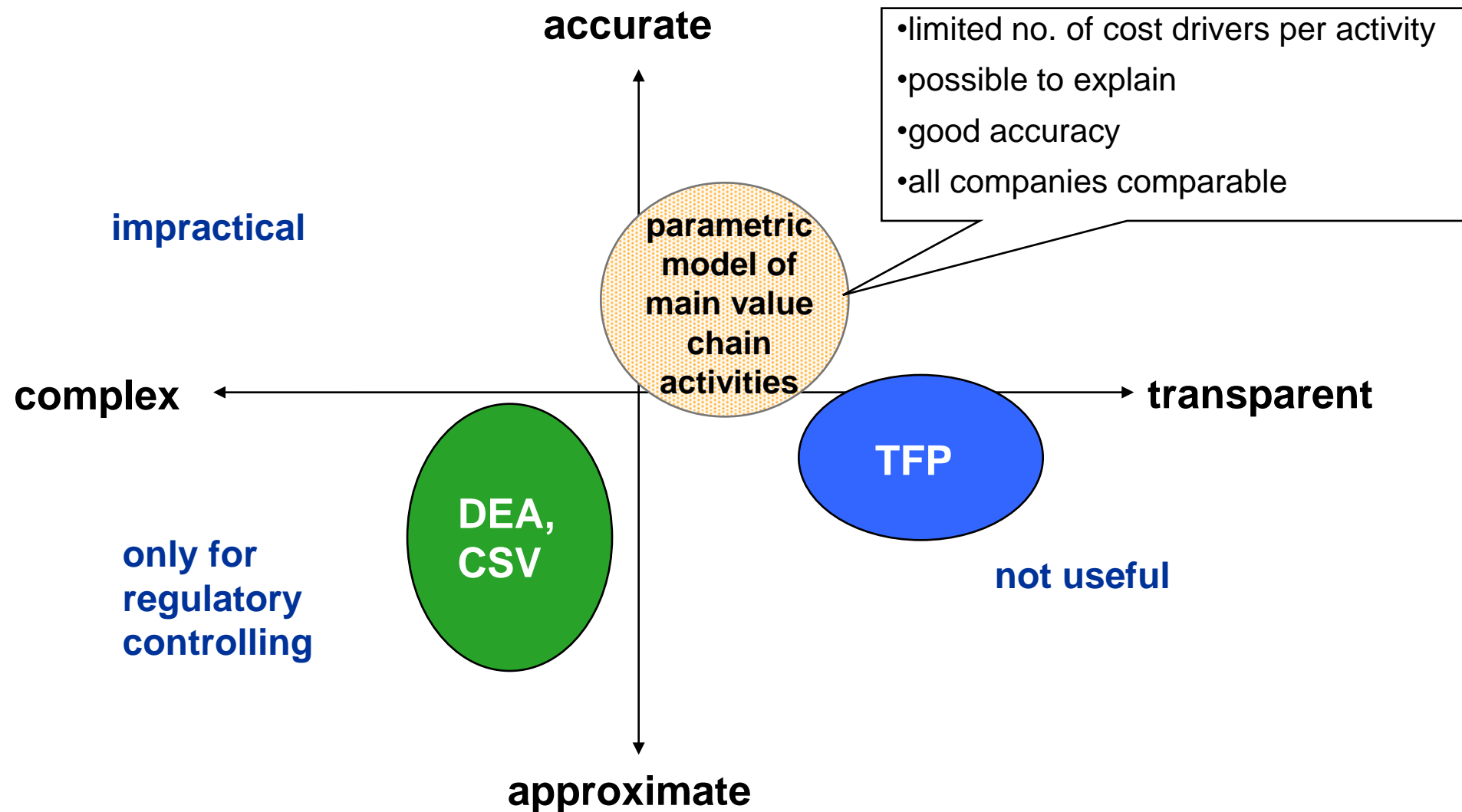


2. model – inventory of benchmarking methods



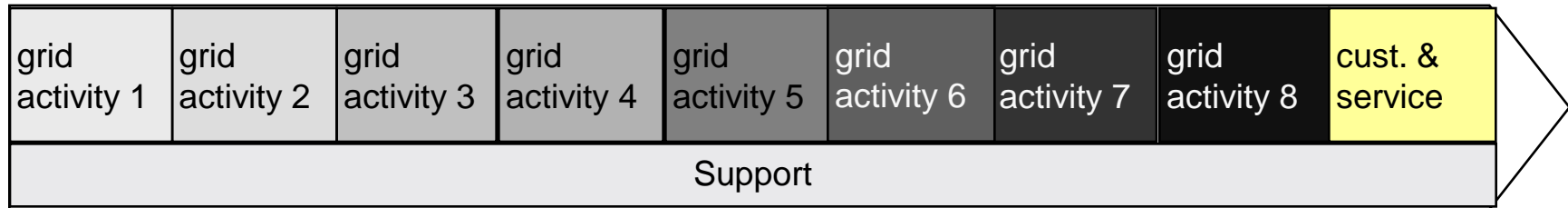
2. model – what type of tool is needed to identify possibilities



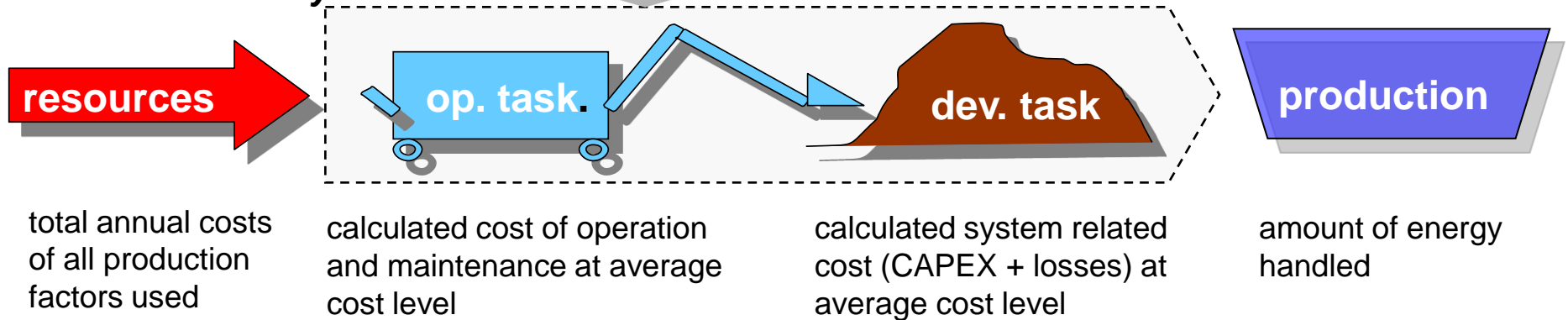
2. model - Effometer

1. business model:

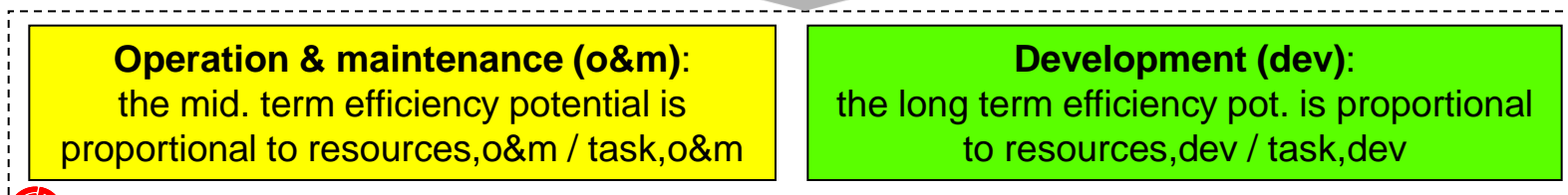
value chain with up to 10 activities



2. for each activity:



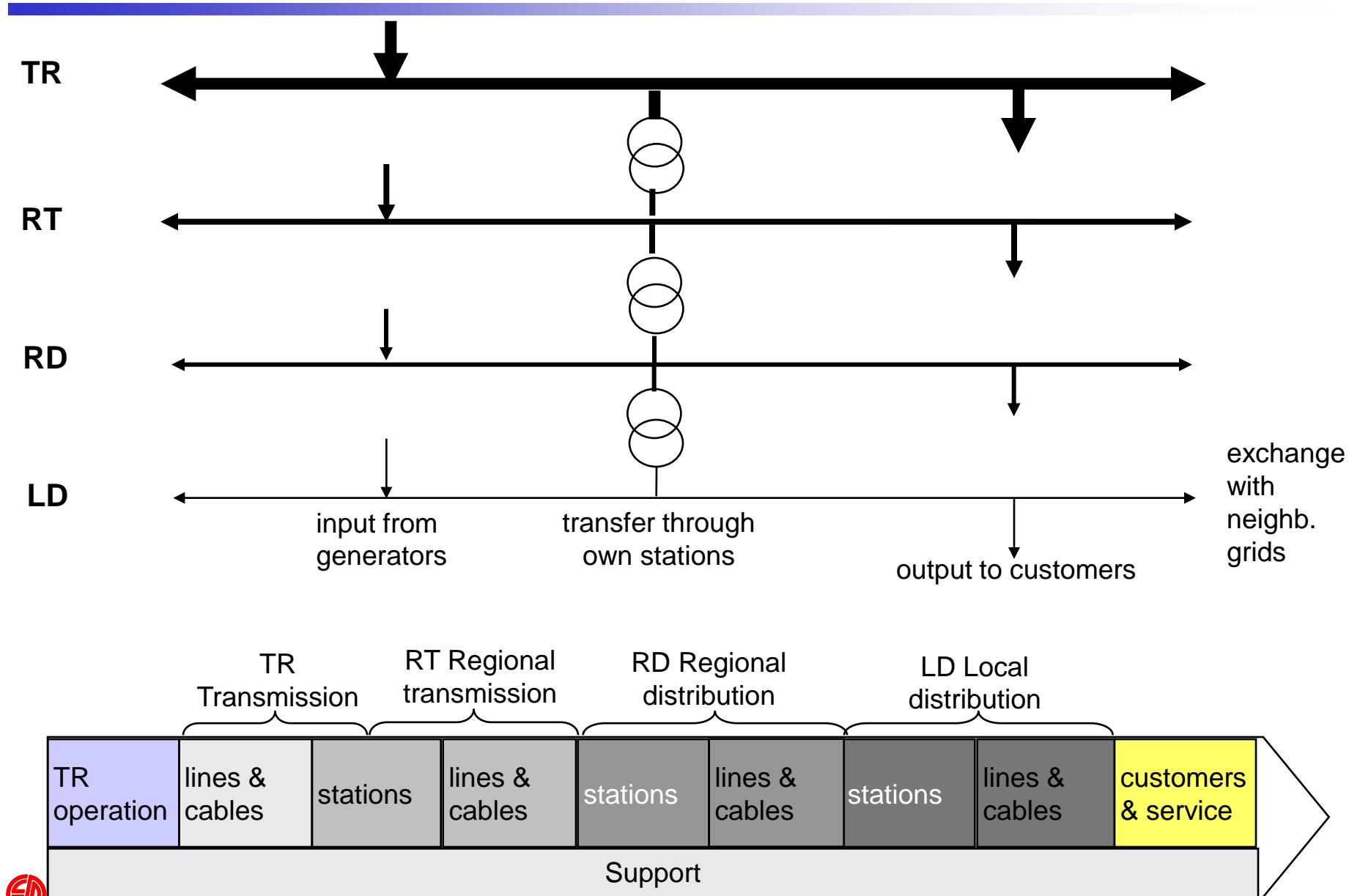
3. functional split:



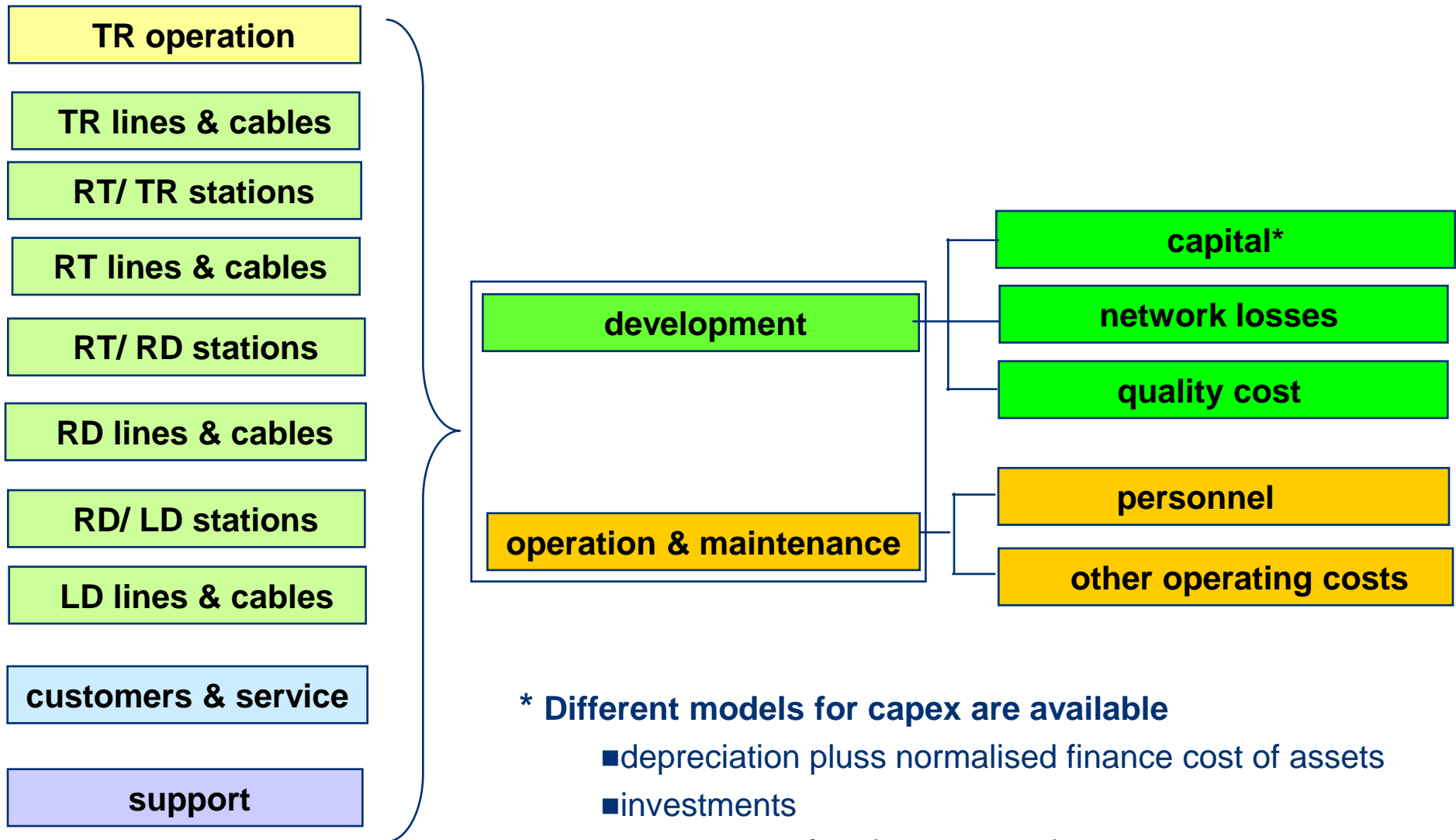
2. *model* – main principles

- each activity is studied in two dimensions: The o&m (mid-term) view and the development (long term) view
- each activity is described by resources spent per year (the relevant cost categories) and its task (the weighted sum of the cost drivers considered)
- efficiency is calculated by comparing the ratio of resources to the task.
- mid term efficiency is found by comparing the ratio of o&m cost to mid term (operating) task and the long term efficiency by comparing the ratio of development cost to long term (development) task
- the operating task is a normalised estimate for the average cost of maintaining and operating the grid per year. The development task is a normalised estimated for the average cost of sustaining and developing the grid per year.
- the ratio of resources to task is called the efficiency factor; i.e. actual cost in relation to the estimated cost considering the relevant cost drivers

2. model for el. networks



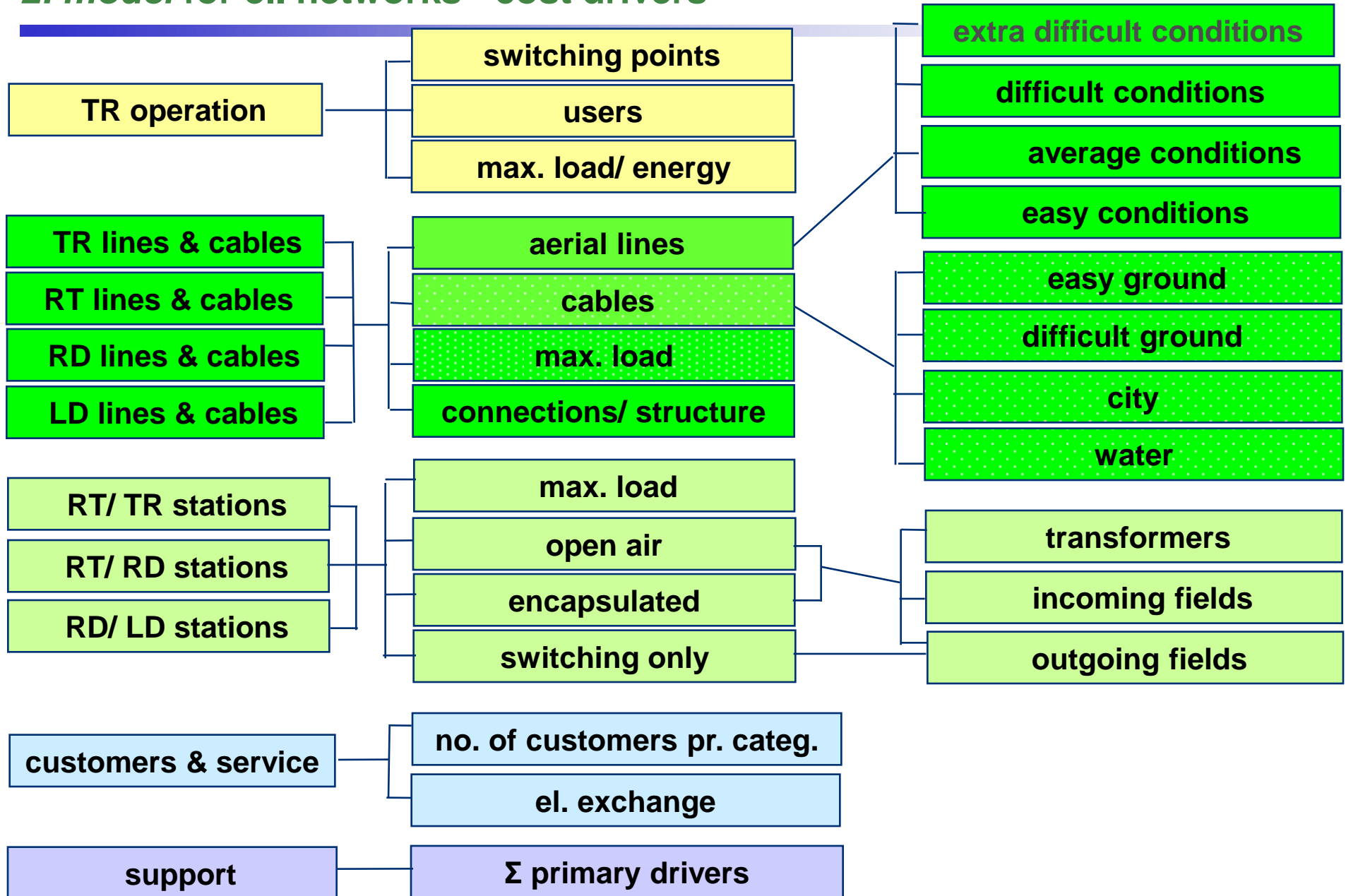
2. model for el. networks – production factors



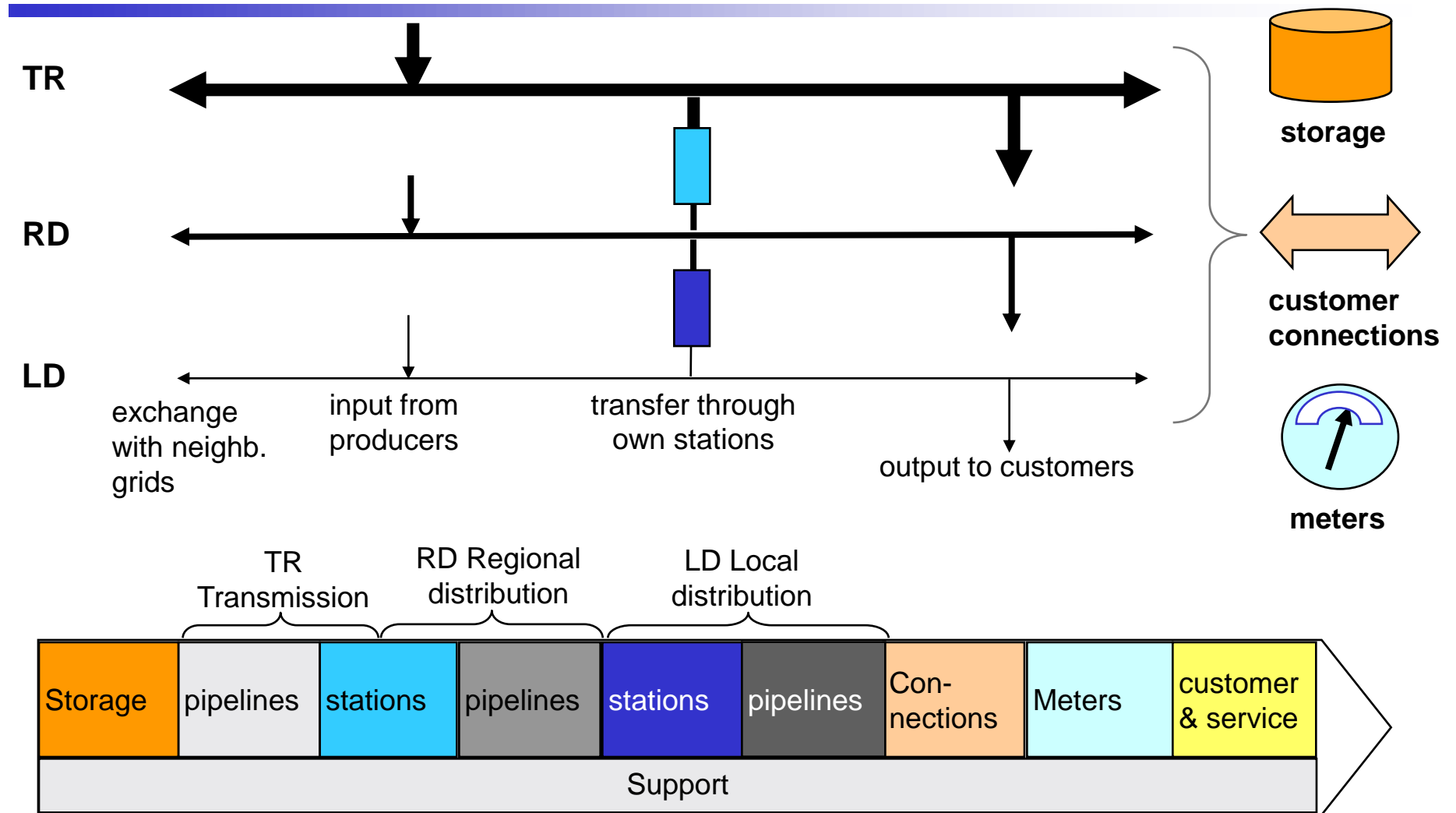
* Different models for capex are available

- depreciation plus normalised finance cost of assets
- investments
- average % of replacement value

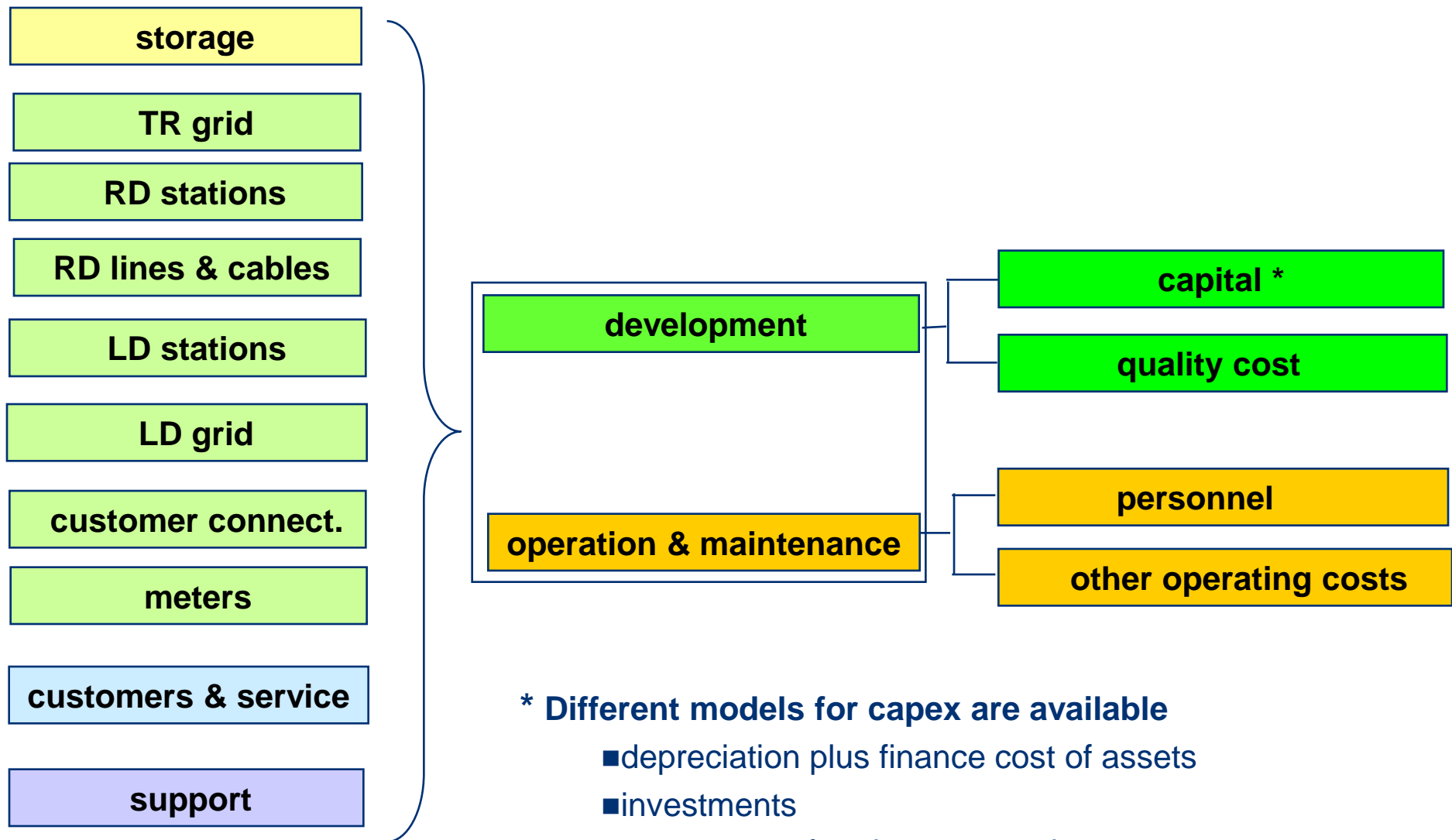
2. model for el. networks - cost drivers



2. model for gas networks



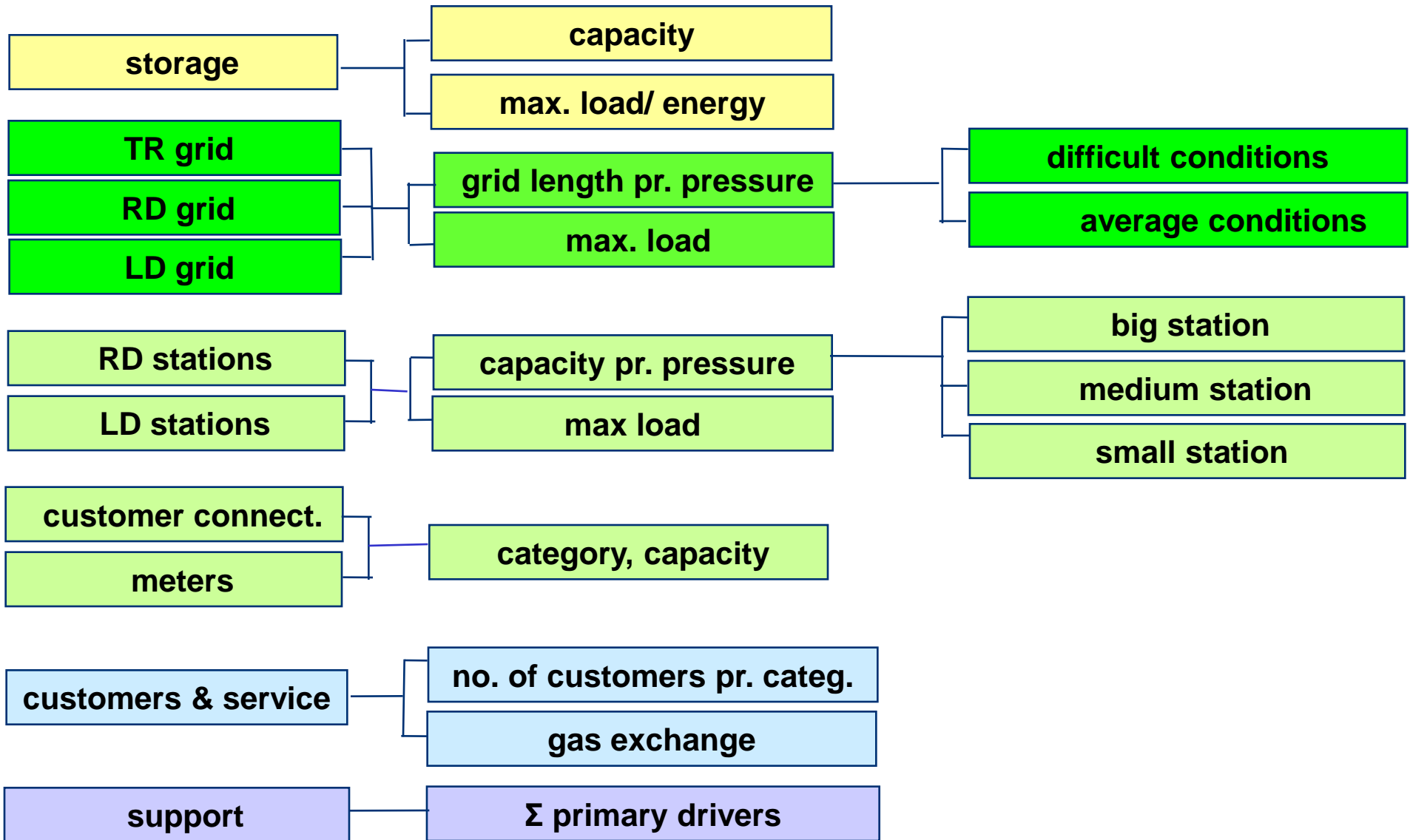
2. model for gas networks – production factors



* Different models for capex are available

- depreciation plus finance cost of assets
- investments
- average % of replacement value

2. model for gas networks – cost drivers



2. model – Effometer database electricity

Extent of database	Financial data per company
<p>Power distribution</p> <p>Approximately 100 companies included</p> <p>NL: 15</p> <p>UK: 10</p> <p>Scandinavia: 40</p> <p>Germany: 20</p> <p>Other countries: approx. 15</p> <p>Approximately 120 data entries per company</p>	<p>Opex</p> <p>Split by O&M, customer service, support, neighbouring networks</p> <p>Split by O&M by grid level, specifying stations and cables and lines</p> <p>Capex</p> <p>Split in new investments and reinvestments</p> <p>Split by stations, lines and cables, support</p> <p>Operating results (income – operating costs)</p> <p>Assets: Book value, write-off time, replacement value (volume and unit prices)</p>
Technical data per company	Operational data per company
<p>Network length:</p> <p>Length overhead & underground</p> <p>Split by TR, RT, RD and LD</p> <p>Conditions for lines and cables :</p> <p>access congestions</p> <p>ground conditions</p> <p>Number and size of stations</p> <p>Number of indoor and outdoor stations</p> <p>Number transformers and bays</p> <p>N. of connections and feeding lines per level</p> <p>Capacity and voltages in stations</p>	<p>Delivered kWh (TR, RT, RD, LD); peak load</p> <p>Number of customers (TR, RT, RD, LD)</p> <p>Network losses and costs of network losses</p> <p>Outages (non-delivered kWh)</p> <p>Staff (man-labor years)</p> <p>Level of outsourcing</p> <p>Working conditions (e.g., 10 indicators)</p> <p>Qualitative level of efficiency (e.g., level of performance management, level of standardization, level of IT usage)</p>

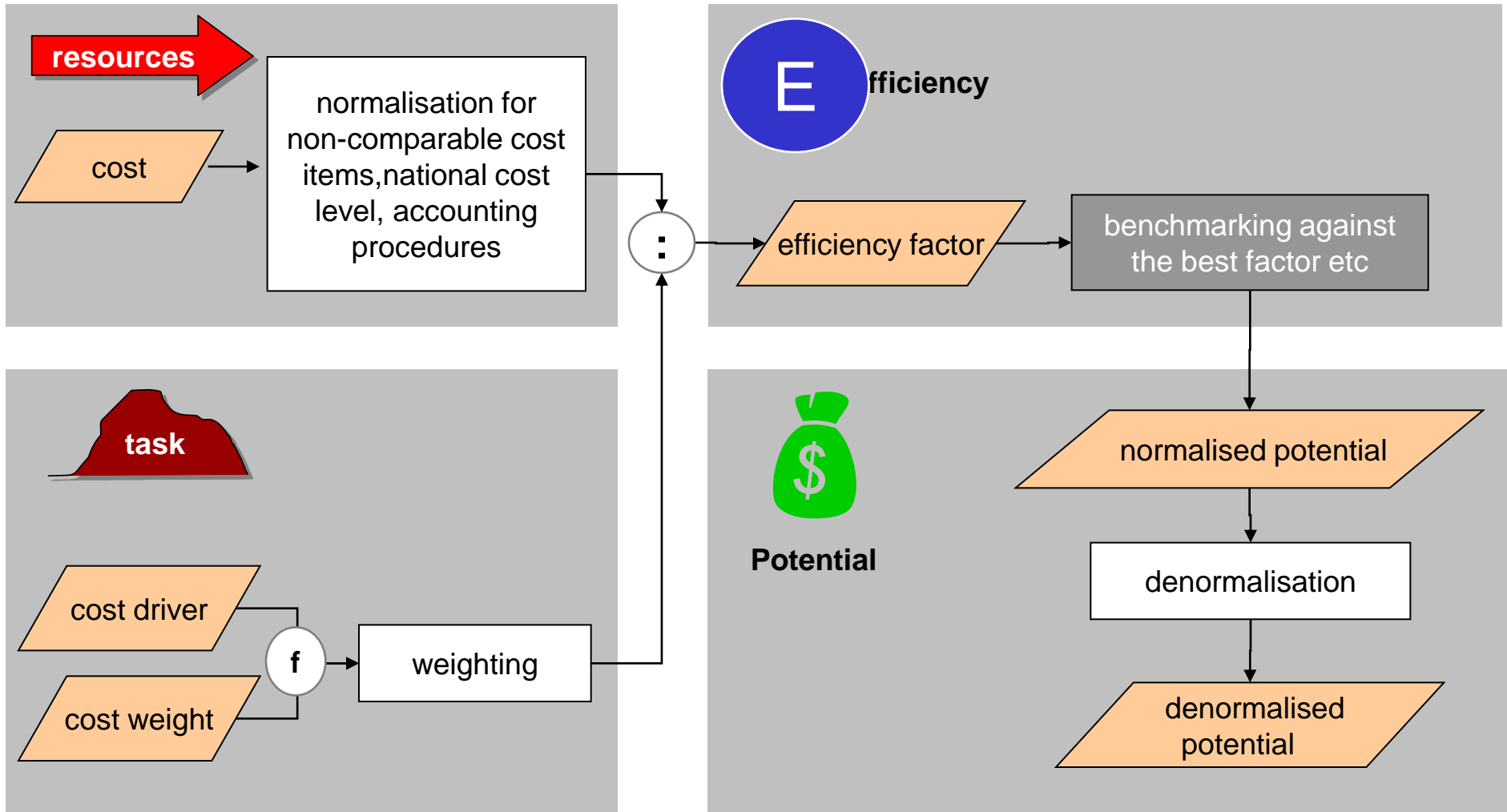
2. model – Effometer database gas

Extent of database	Financial data per company
<p>Gas distribution and transmission Approximately 30 companies included NL: 10 Germany: 15 Other countries: approx. 5 TSOs: 2</p> <p>20 of the datasets are from the past 2-5 years . All data is inflation adjusted up to current price-levels Approximately 100 data entries per company</p>	<p>Opex Split by O&M, customer service, support, Split by O&M by grid level, specifying stations, customer connections, meters and lines</p> <p>Capex Split in new investments and reinvestments Split by stations, lines, customer connections and meters</p> <p>Operating results (income – operating costs) Assets: Book value, write-off time, replacement value (volume and unit prices)</p>
Technical data per company	Operational data per company
<p>Network length: Length per pressure level Split by TR, RD and LD</p> <p>Conditions for lines and cables : access, congestion ground condition</p> <p>Number of network units Number transfer stations RD and LD Number customer connections and meters</p> <p>N. of connections and feeding lines per level Capacity and pressure</p>	<p>Delivered m3 (TR, RD, LD); peak load Number of customers (TR, RD, LD) Outages (non-delivered kWh) Staff (man-labor years) Level of outsourcing Working conditions, optional (e.g., 10 indicators)</p>

2. *model* – Effometer database for other utilities

- **garbage handling/ waste management**
 - 30 Norwegian companies
 - stable and accurate model have been used for 7 years
 - model includes service standard and environmental impact
- **water and sewage grids**
 - 45 Norwegian companies
 - model have been developed during the past 3 years
 - model includes service standard

2. model – how inputs are converted to results, one business area



2. model – how inputs are converted to results, cost normalisation

normalisation of cost level for national- and time related cost differences:

- Eurostat-figures are used to normalise cost of losses
- the Penn State University ppp-index is used for other opex and capex
- older data is normalised according to inflation and generic productivity increase

normalisation of cost level for different non-comparable cost items:

- cost caused by special grid responsibilities may be specified and if relevant removed from the comparison
- non-typical cost (legacy, restructuring etc) may be specified and if relevant removed from the comparison
- provisions and extraordinary cost may be removed from the comparison

normalisation for differences in accounting procedures capex-opex:

- cash cost or a fraction of replacement value may be used as a proxy for capex
- the boundary between capex and opex may be shifted for companies with extreme values

2. *model* – how inputs are converted to results, task normalisation

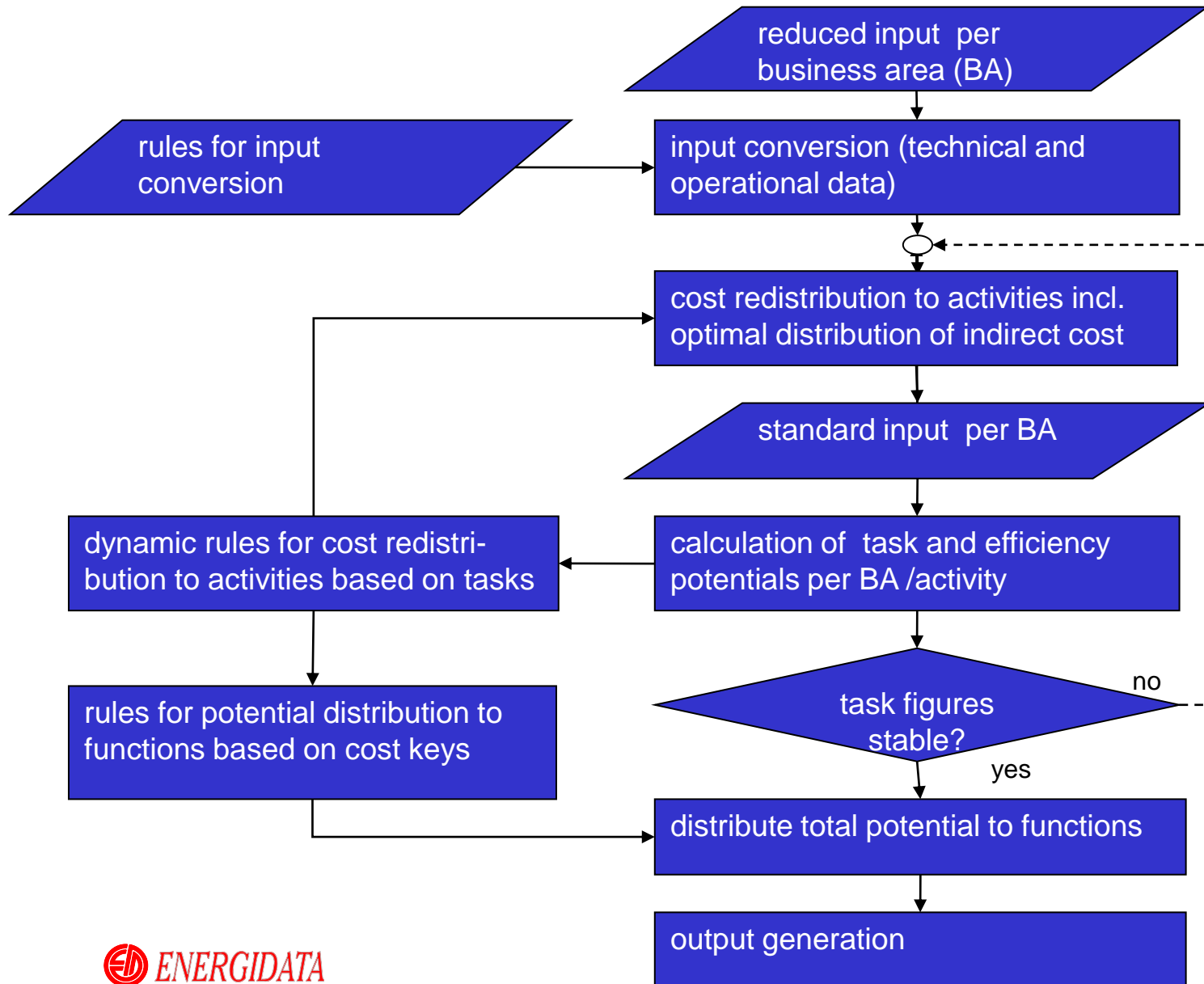
task functions:

- the tasks are calculated per activity based on cost functions which includes all the most important cost drivers
- the functions assumes constant return to scale

weights for cost drivers:

- the relative magnitude of cost weights per driver has been estimated by industry experts and through regression analysis
- these cost weights are documented in the input form and participants may propose alternative values based on their records.
- for every benchmarking the absolute cost weight is set to values which equalises task and cost per activity for the participating group of companies

2. model – integrated analysis of several business areas



Features:

- simplified inputs
- template for detailed functional analysis
- optimisation of keyed cost
- used for multiutilities

2. model – levels of analysis

- 1. benchmarking of performance: Effometer, alt. models**
- 2. benchmarking of business practises: Generic model with ca 100-150 check- points**
- 3. benchmarking of functions: Tailor made extension of Effometer**
- 4. benchmarking of processes Tailor made based on graphical process mapping**

2. model – integrated performance and practice benchmarking

