Power Process Maturity

Questionnaire for Stakeholders

Infrastructure: Power and IT

Distribution

End Consumer

Bulk Generation

Transmission

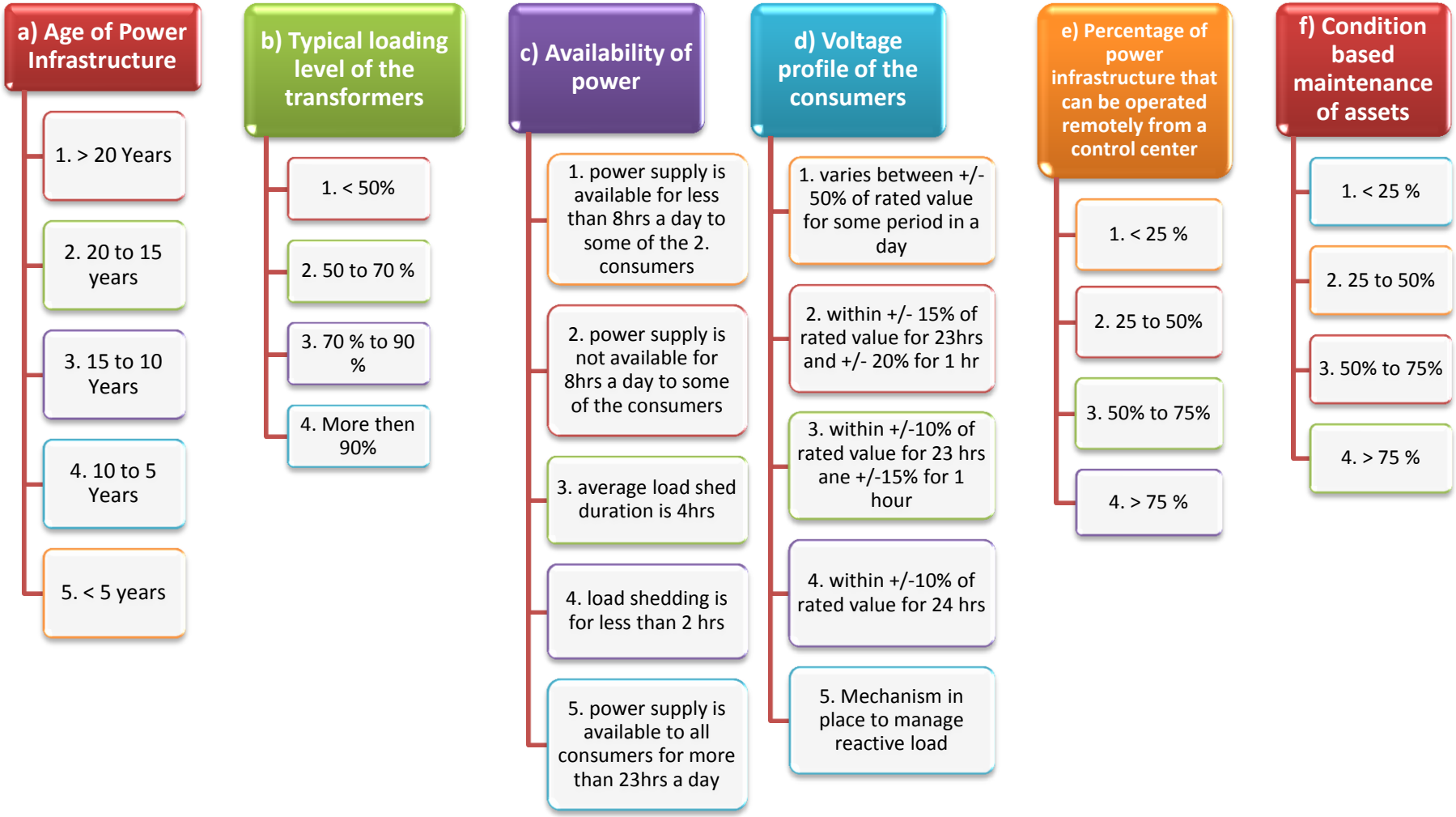
Renewables

Power Process Maturity

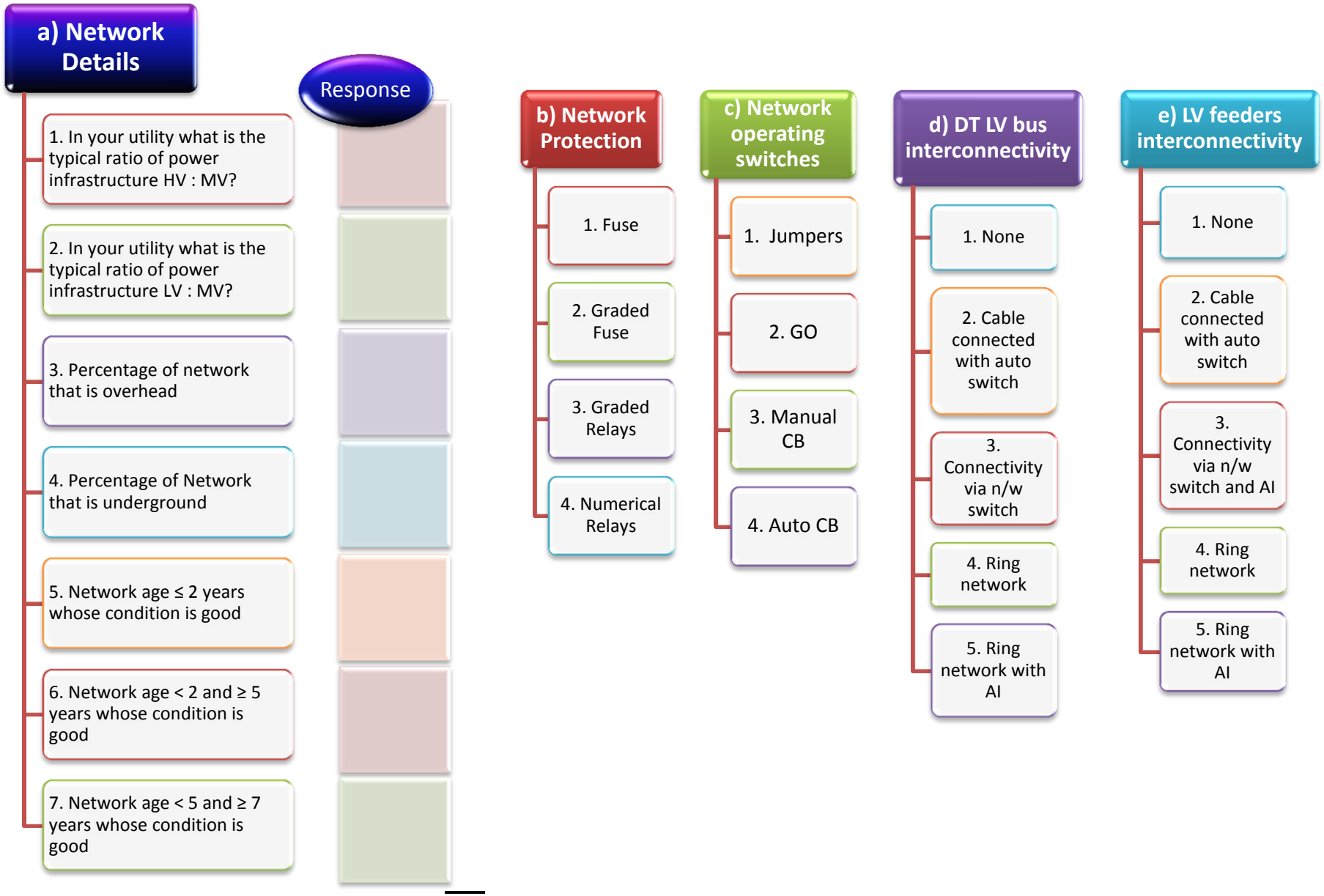
Infrastructure

1.1 Infrastructure

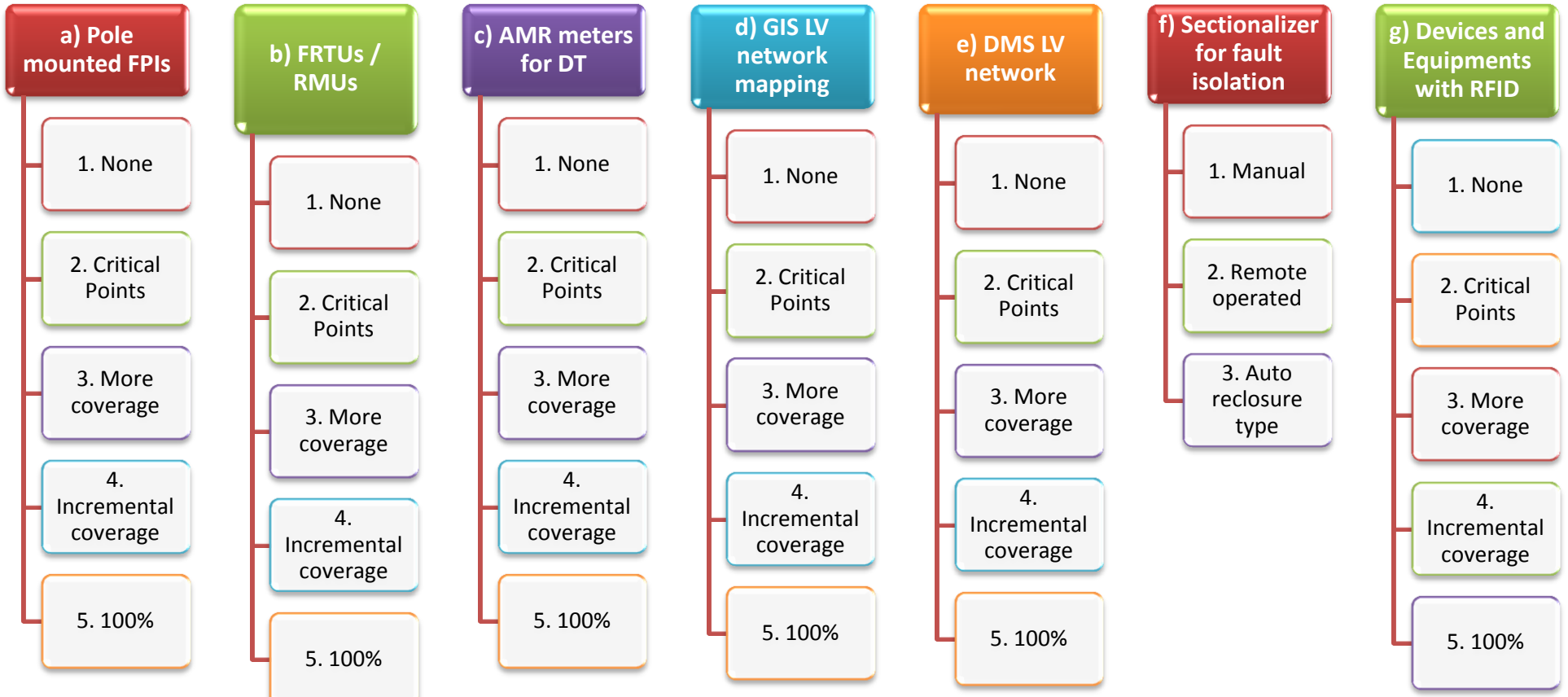
1.1.1 Power Infrastructure



1.1.2 Power Infrastructure

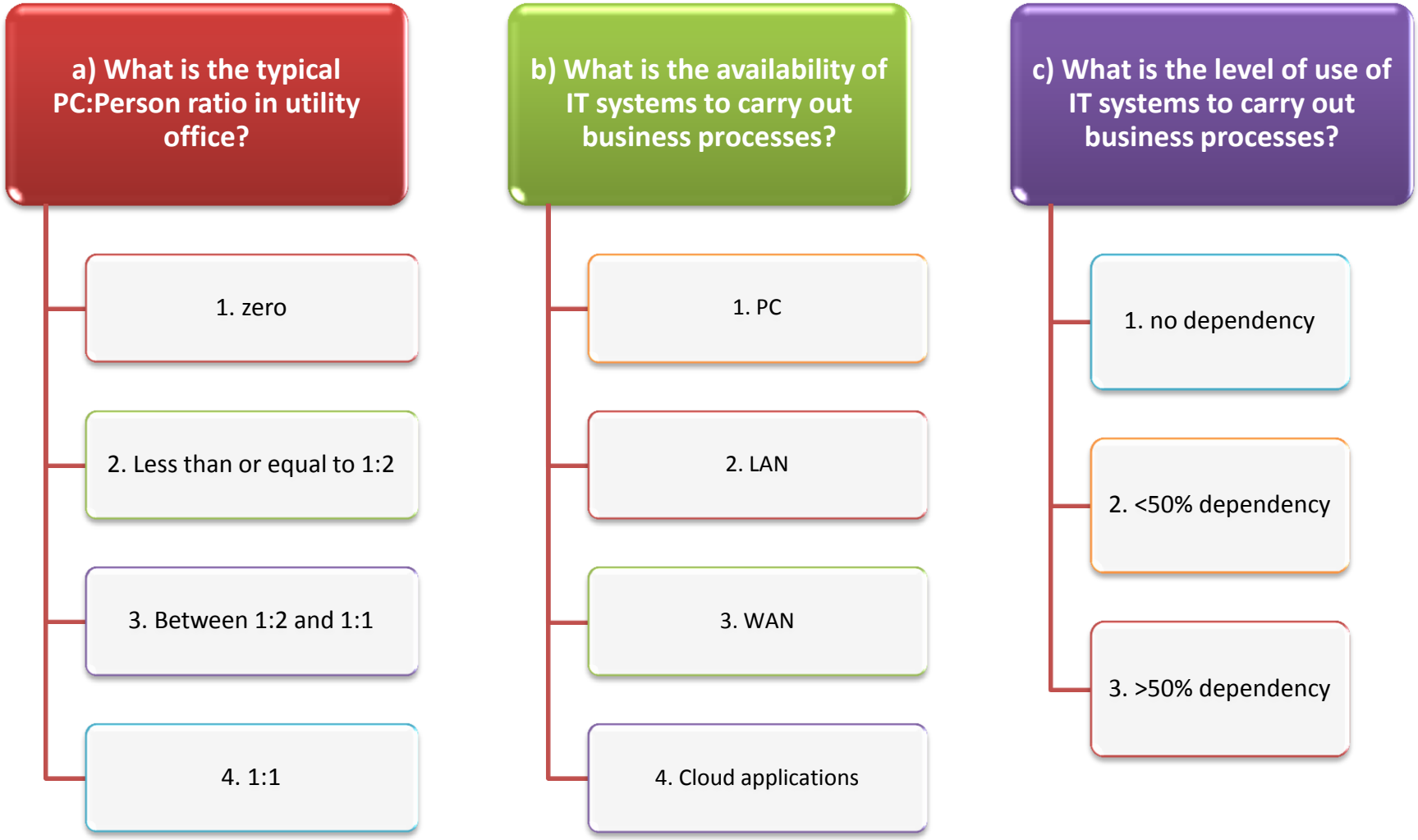


1.1.3 Power Infrastructure



1.2 Infrastructure

1.2.1 IT Infrastructure



Power Process Maturity

Distribution

2.1 Distribution

a) Meter Reading

1. Basic meters which record the units of energy consumed. The meters are read physically by meter readers.
2. Automated Meter Reading (AMR) is deployed. All the meters are read via hand held units or drive-by vehicles, which transfer data to the control centre on synchronization.
3. AMI is deployed. All the meter readings are read regularly (say, every 15 min) remotely and the data is logged on a central server where it can be used for billing as well as supporting DR event in real time for'Negawatt' generation.

b) Tariff Schemes - Time of Use TOU/Critical Peak Pricing (CPP) etc.

1. A simple fixed flat rate tariff is used which is multiplied by the no. of units consumed to get the bill amount.
2. The consumption level is divided into slabs and the tariff rate changes as the slab changes
3. Basic time of use (ToU) tariff implemented with pre-defined time blocks in the day and the applicable tariffs known to users in advanced.
4. Along with the ToU, critical peak pricing (CPP) is also implemented and during the peak periods the prices are communicated to the consumer.
5. Time of Use (ToU), critical peak pricing (CPP) tariff mechanisms are implemented. The realtime time prices are displayed on the smart meter, based on which the consumer can resechdule the demands.

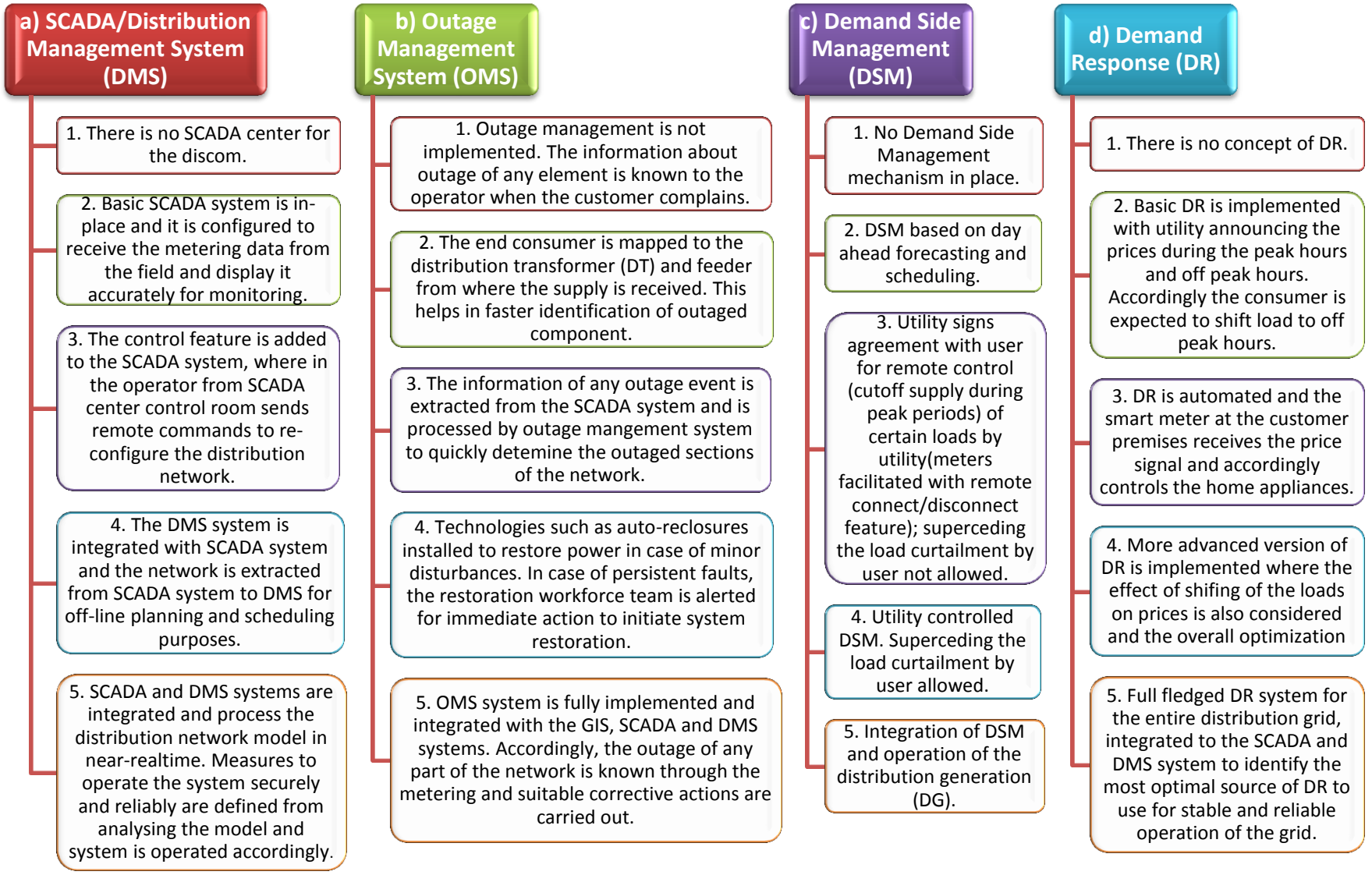
c) Power quality & Reliability - Power Quality Management (PQM)

1. No system
2. Voltage profile available for DTs
3. Voltage profile for all DTs and harmonics levels at select DTs
4. Corrective actions are taken manually on near real time basis
5. Automated system for quality control

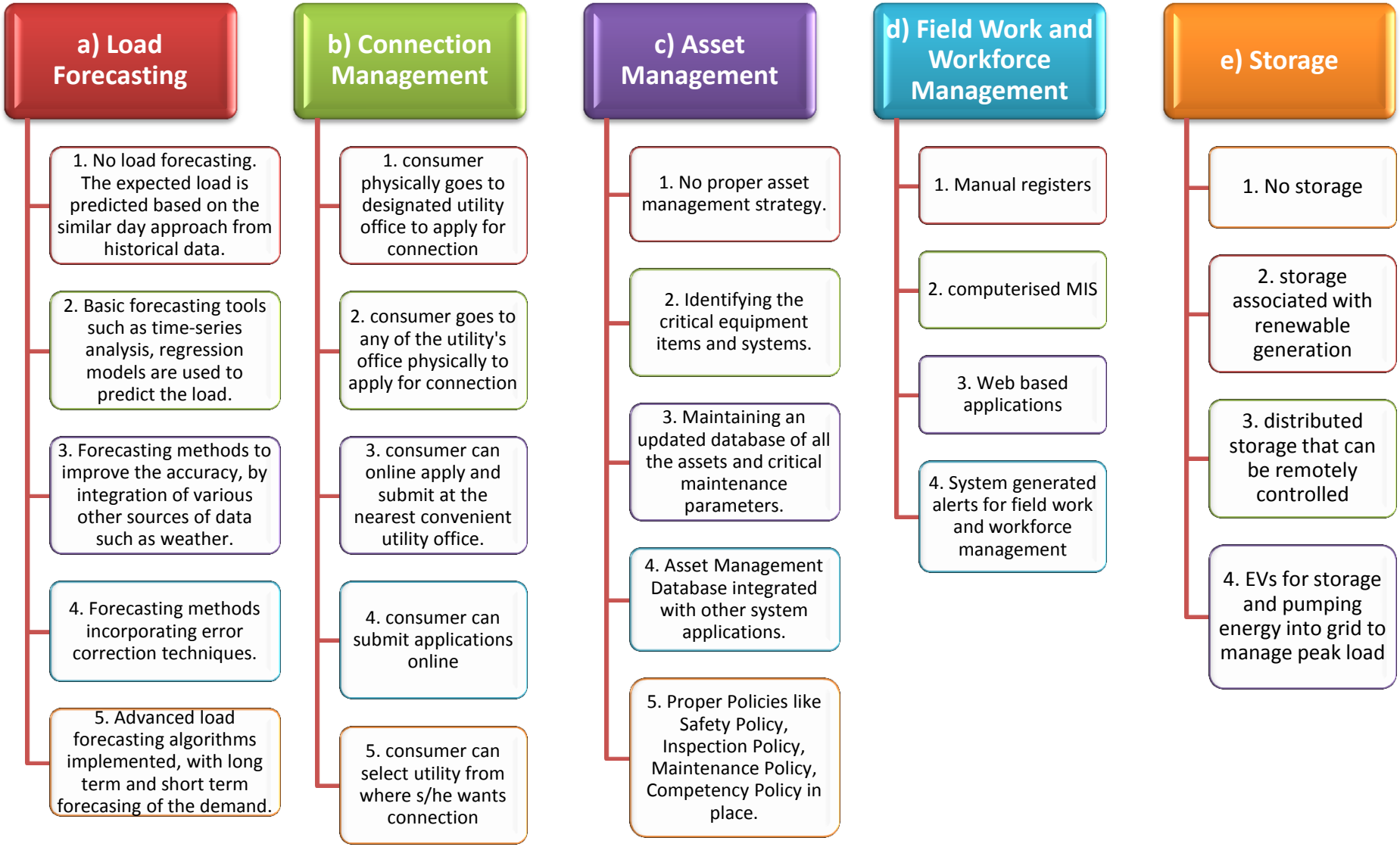
d) Energy Accounting/Audit (EA)

1. No mechanism
2. Ring fencing done for energy audit
3. Energy Audit on periodic basis
4. Energy Audit to identify theft on regular basis
5. System established for real time energy audit that captures the network reconfigurations

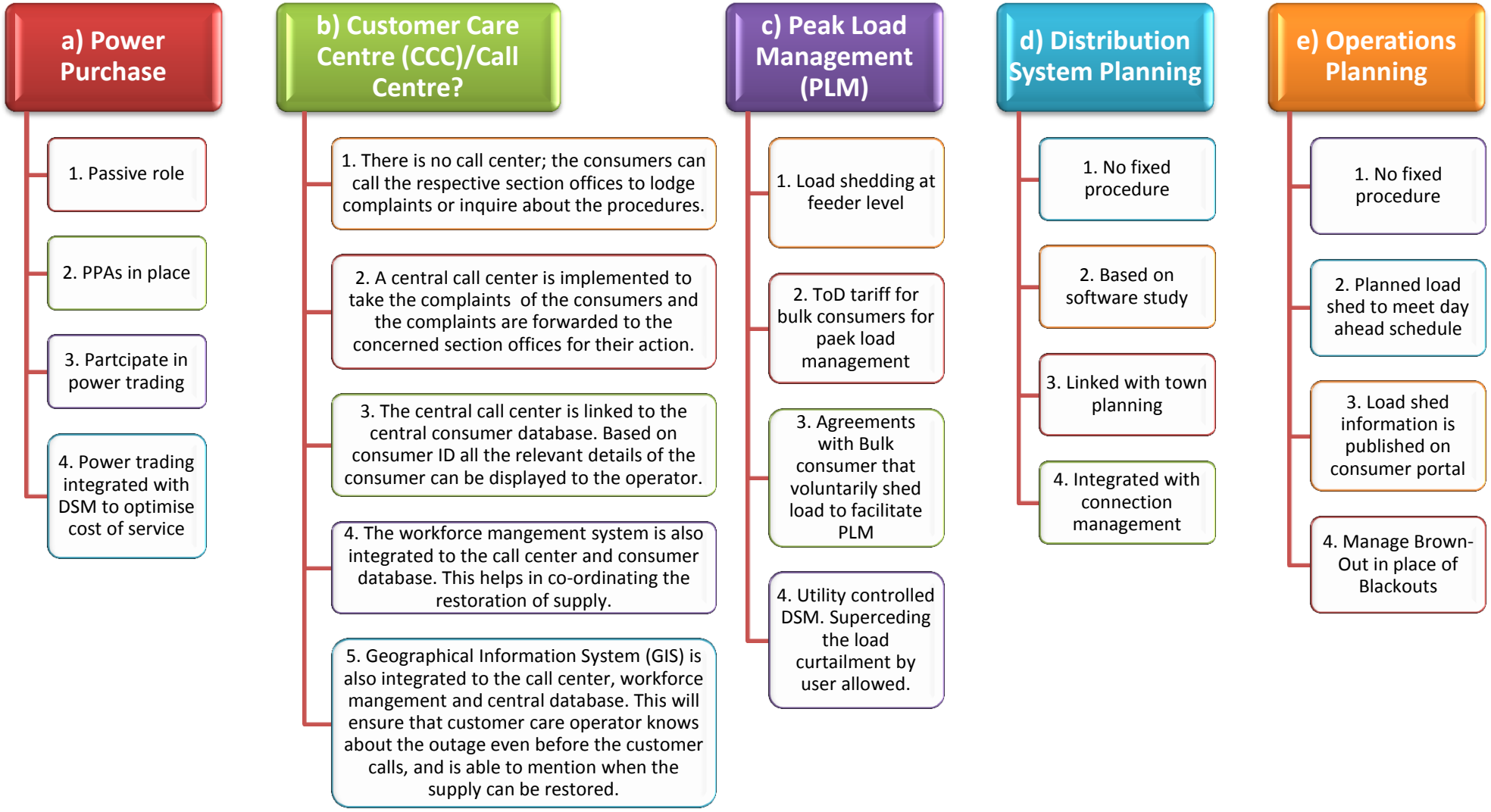
2.2 Distribution



2.3 Distribution



2.4 Distribution



Power Process Maturity

End Consumer Perspective

3.1 End Consumer Perspective

a) Connection Management

1. Consumer physically goes to designated utility office to apply for connection
2. Consumer goes to any of the utility's office physically to apply for connection
3. Consumer can go online to access application and submit the same at the nearest convenient utility office
4. Consumer can submit applications online.
5. Consumer can select utility from where s/he wants connection.

b) Commercial-billing and payment

1. Physically visit the discom and pay the bill at a cash counter.
2. Consumer can login to the discom secure website and view the current bill and the past few months bills.
3. Consumer can view and pay the bill online using various secure payment options.
4. The consumer can choose the billing cycle as per weekly, monthly or bi-monthly as per his/her convenience. The consumer can log-in, generate bill and pay.
5. Pre-paid payment of the bills, with meters equipped with remote disconnect and connect switch based on the amount of balance available.

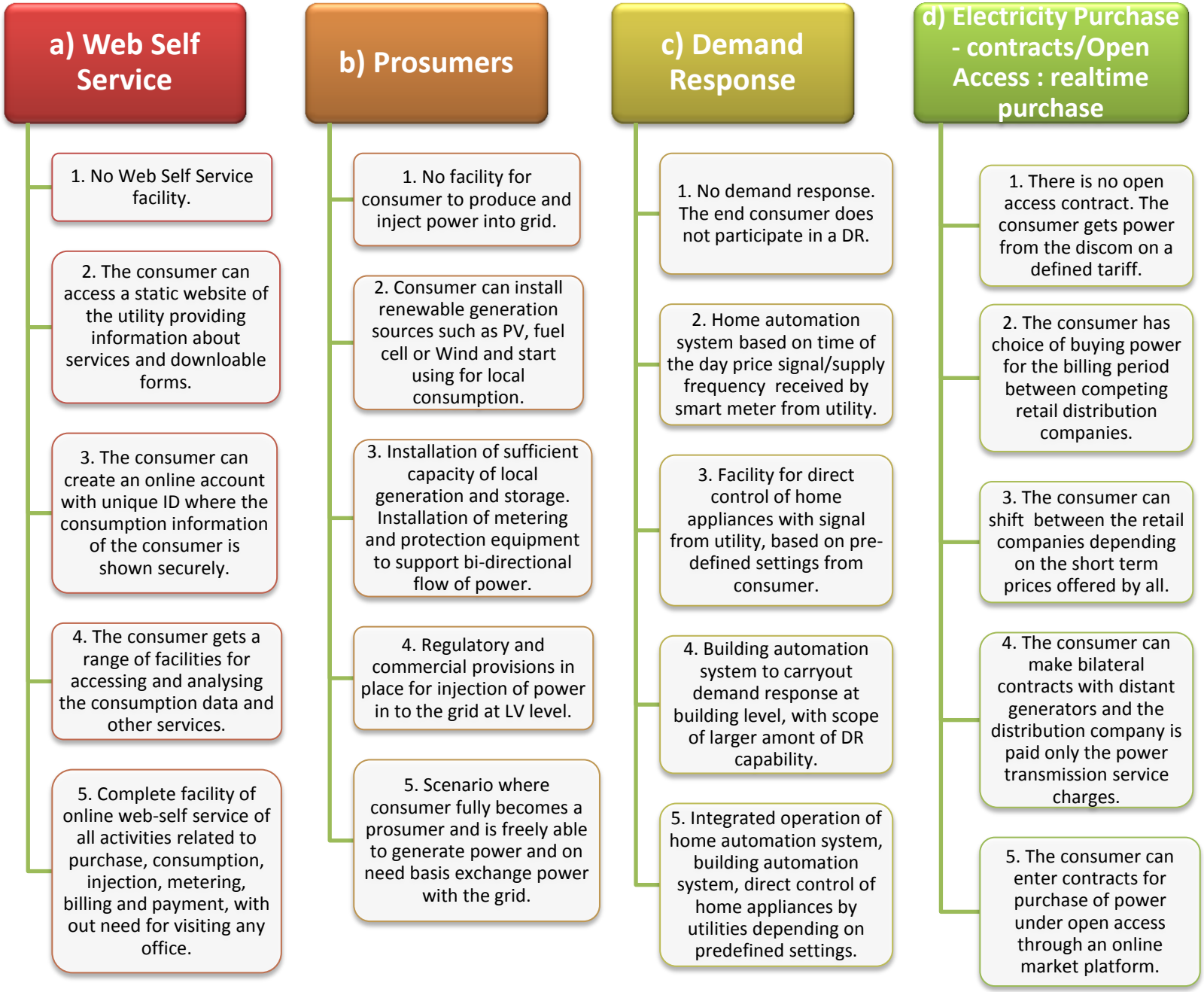
c) Electricity supply reliability and Quality

1. There are no reliability or quality parameters assigned to the supply except for the minimum and maximum parameters.
2. Reliability and quality parameters are identified and being calculated.
3. Stricter grid codes introduced with tighter limits on quality parameters such as voltage, total harmonic distortion (THD), flickers, dips etc.
4. Reliability indicies such as SAIFI and SAIDI(including load shedding),voltage profiles at DT are evaluated based on the historical data and reported from time to time.
5. The reliability and quality of supply are continously monitored in realtime and the stakeholder is alerted when a predefined quality parameter limit has been crossed.

d) Energy efficiency-and consumption pattern management

1. Consumer receives a monthly bill which is the only source of information on total units consumed, bill amount and due date.
2. Consumer gets detailed report of consumption at the end of the month.
3. Consumer gets weekly, daily, and even real-time consumption information on dynamic and secure webpages after logging in.
4. Consumer can buy / subscribe to various third party energy efficiency analytics applications to manage his/her electicity consumption for minimizing the bill.
5. When the consumer moves from one house to other house, s/he can retain the consumer ID and hence the past data follows to the new house and new meter.

3.2 End Consumer Perspective



3.3 End Consumer Perspective

a) Local Storage (Inverter/Battery)

1. The consumer does not have any storage.
2. The consumer has inverter & battery to meet household demand during power cuts.
3. The consumer has excess capacity of inverter & battery and can also supply to a few neighbours during power cuts.
4. The consumer can enter into contract with discom to supply stored energy back to the grid to meet the peak demand.
5. The consumer also adds local renewable generation to the inverter & battery to achieve self sufficiency and have limited exchange with the grid.

b) Load Research

1. The consumer only sees the total consumption as a single number in the electricity bill generated at the end of the month.
2. The consumer gets a detailed report of the daily / hourly consumption with the electricity bill.
3. The consumer carries out certain scheduling and planning activities based on the consumption pattern to reduce the bill.
4. The consumer receives realtime data of consumption pattern on an in-home display panel along with the meter.
5. The consumer runs realtime analytics on the consumption of power with objective of optimizing the energy usage of the household in a most cost effective way.

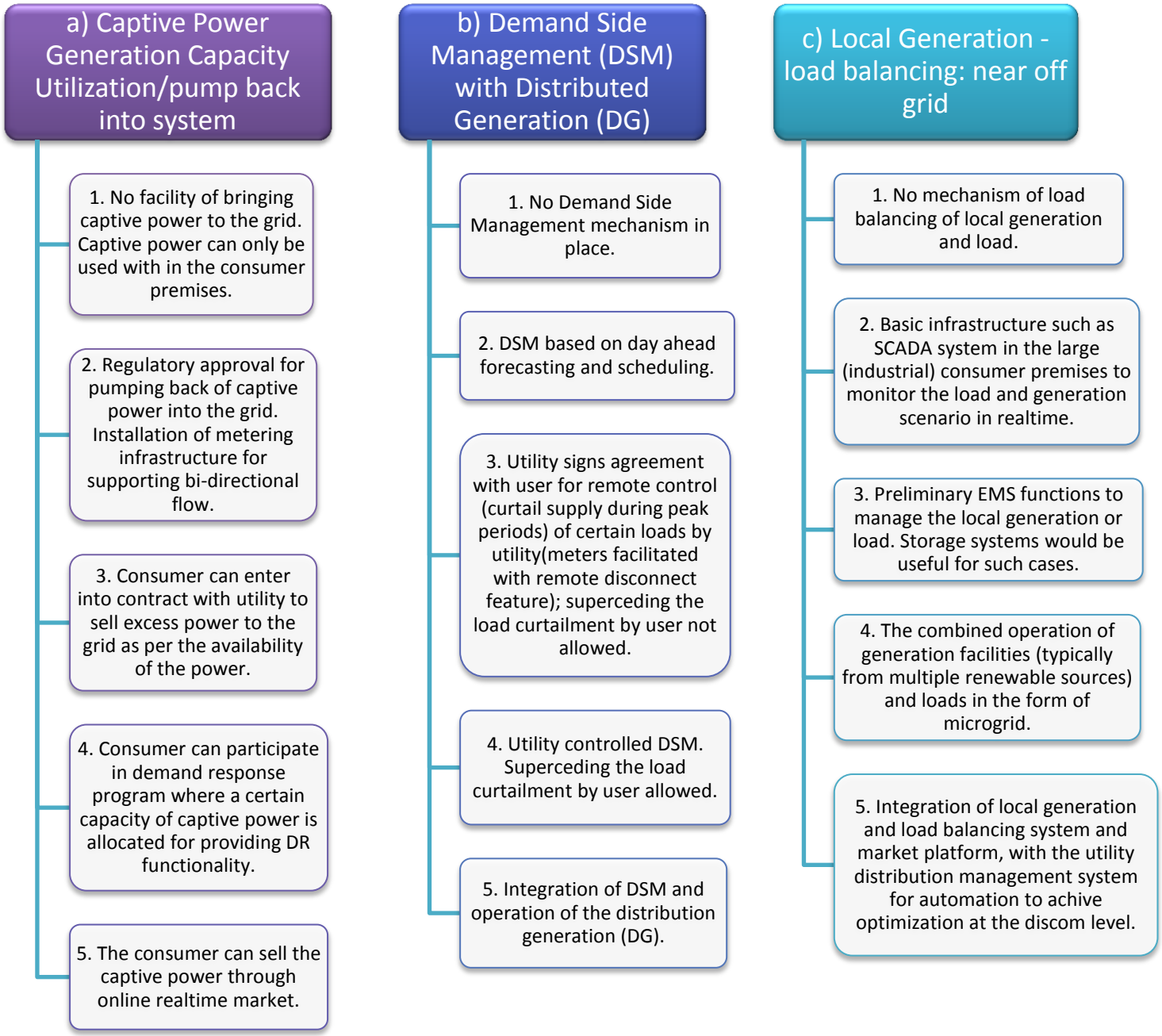
c) Electrification

1. Access of power to less than 50% of households.
2. Various programs in implementation to extend electrification to remote areas in phased manner.
3. Use of micro grids and renewable sources for supplying remote villages far from grid.
4. Provision of connectivity of the isolated microgrids to the grid for increased reliability.
5. 100% elecrification of all villages and households with power supply for more than 22hrs each day.

d) Pre-payment

1. No facility of pre-payment.
2. Pre-payment facility available for select consumers.
3. Pre-payment facility available for all consumers.
4. Switching between pre-payment and post payment options.
5. The consumer can pre-pay online and the smart meter monitors consumption against the balance and disconnects when the balance expires.

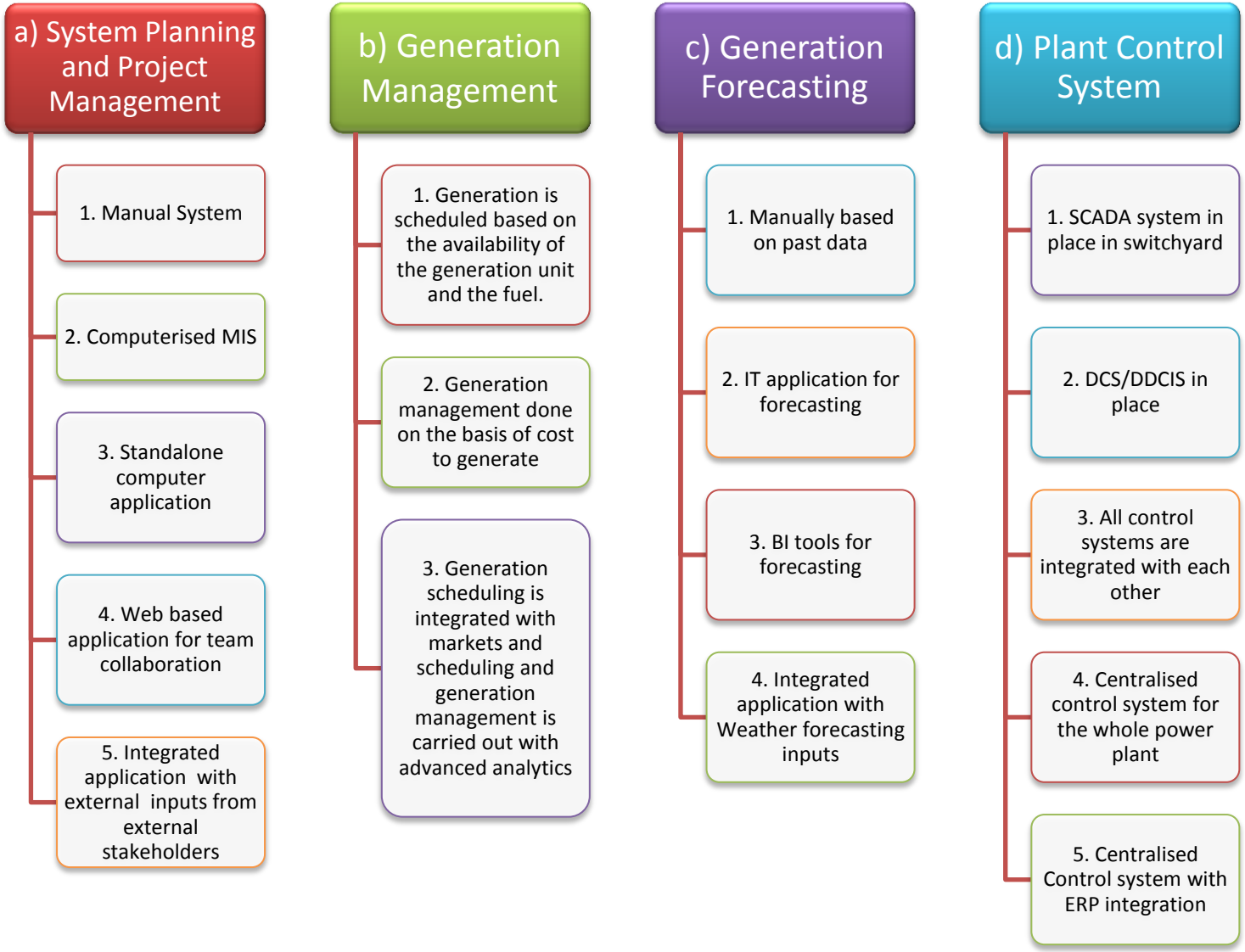
3.4 End Consumer Perspective



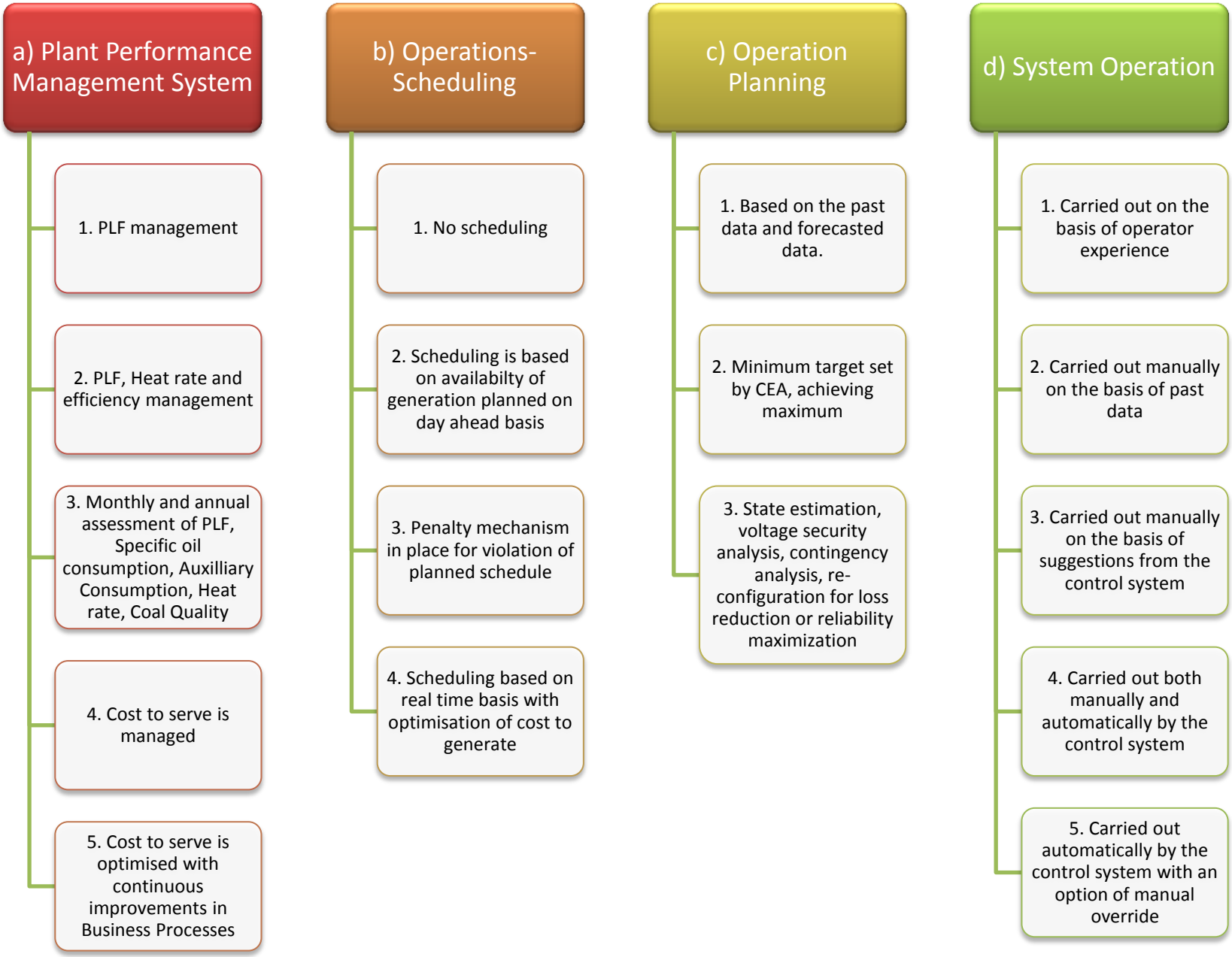
Power Process Maturity

Bulk Generation

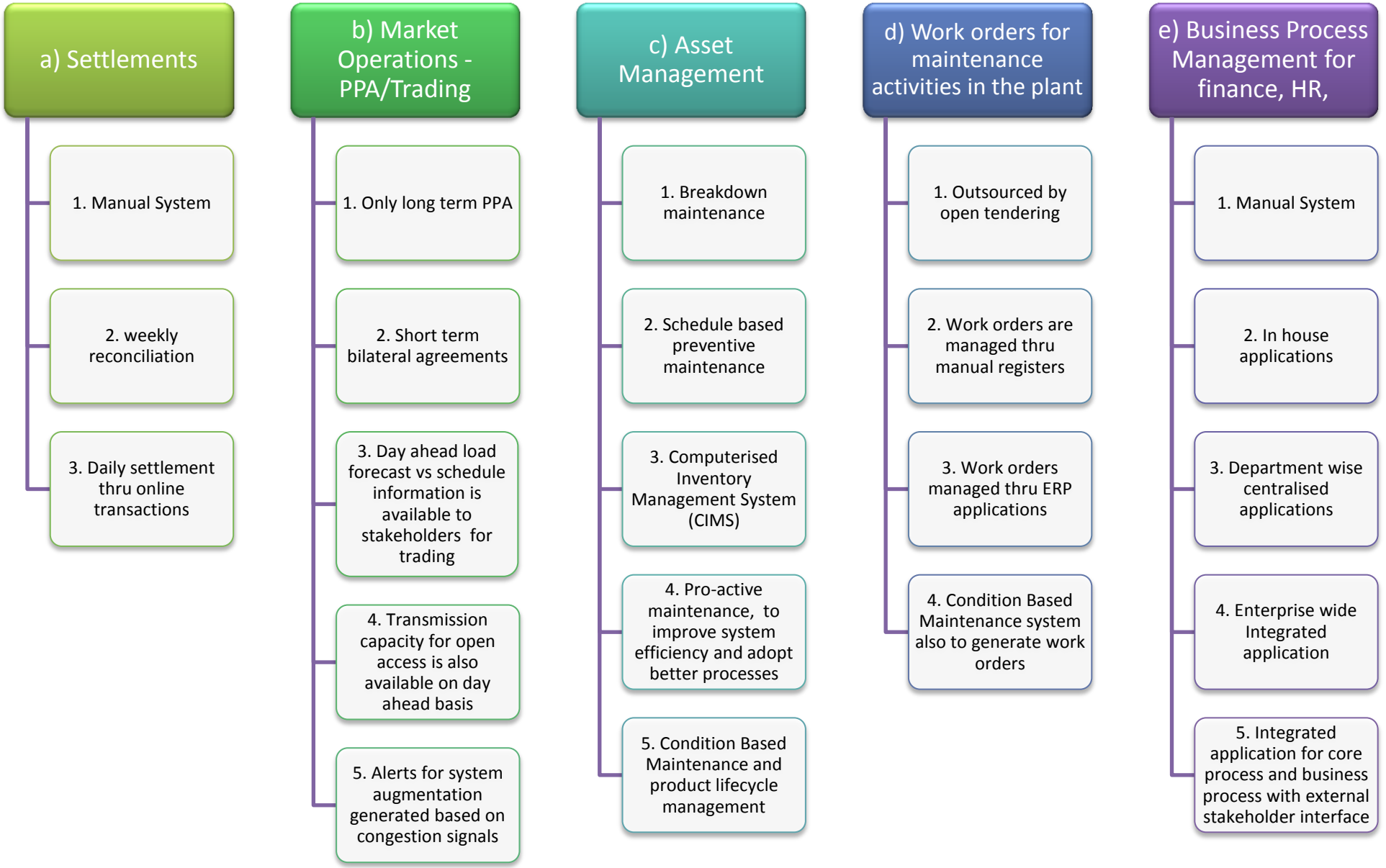
4.1 Bulk Generation



4.2 Bulk Generation

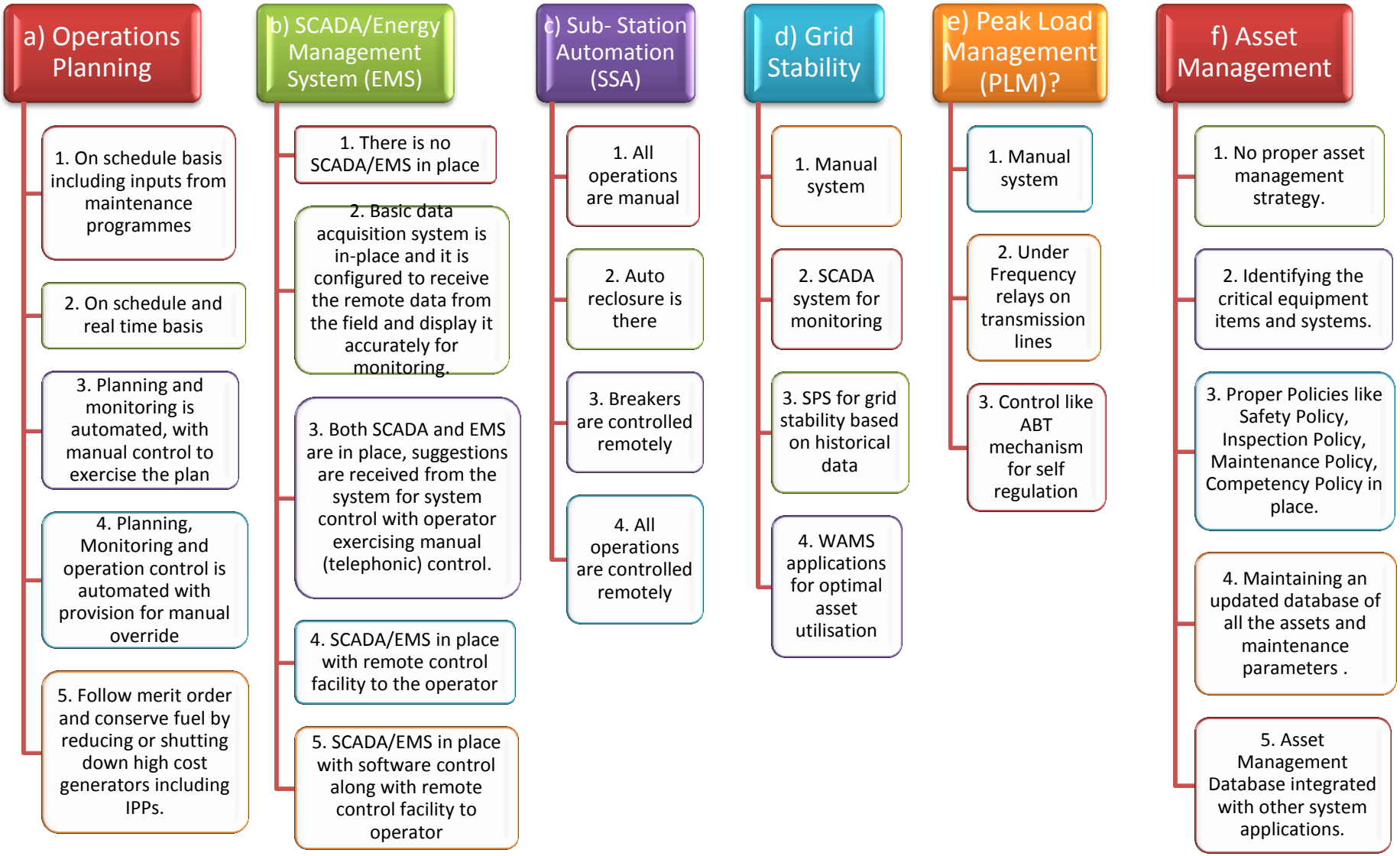


4.3 Bulk Generation

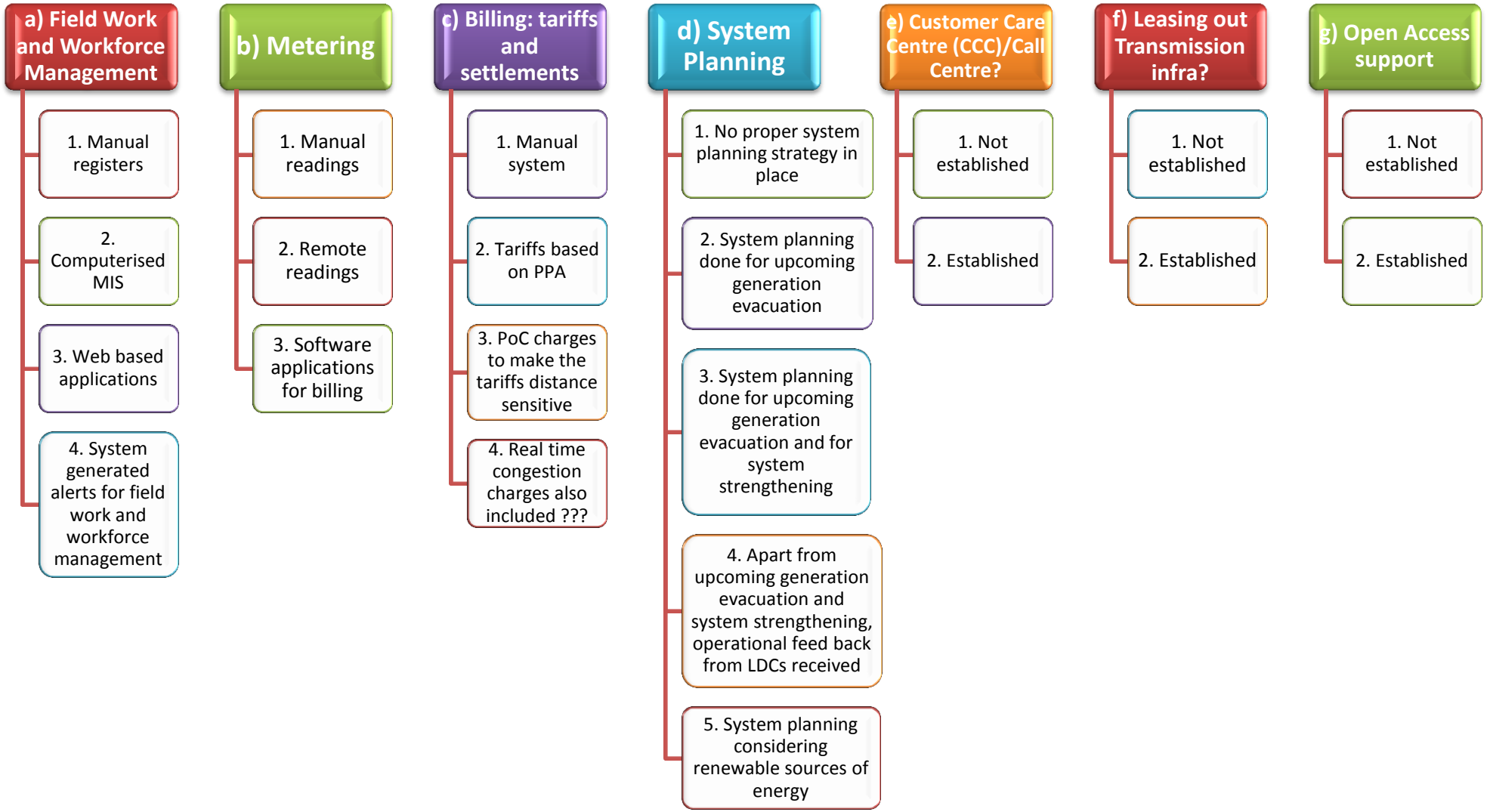

a) Settlements
1. Manual System
2. weekly reconciliation
3. Daily settlement thru online transactions
b) Market Operations - PPA/Trading
1. Only long term PPA
2. Short term bilateral agreements
3. Day ahead load forecast vs schedule information is available to stakeholders for trading
4. Transmission capacity for open access is also available on day ahead basis
5. Alerts for system augmentation generated based on congestion signals
c) Asset Management
1. Breakdown maintenance
2. Schedule based preventive maintenance
3. Computerised Inventory Management System (CIMS)
4. Pro-active maintenance, to improve system efficiency and adopt better processes
5. Condition Based Maintenance and product lifecycle management
d) Work orders for maintenance activities in the plant
1. Outsourced by open tendering
2. Work orders are managed thru manual registers
3. Work orders managed thru ERP applications
4. Condition Based Maintenance system also to generate work orders
e) Business Process Management for finance, HR,
1. Manual System
2. In house applications
3. Department wise centralised applications
4. Enterprise wide Integrated application
5. Integrated application for core process and business process with external stakeholder interface

Power Process Maturity

5.1 Transmission



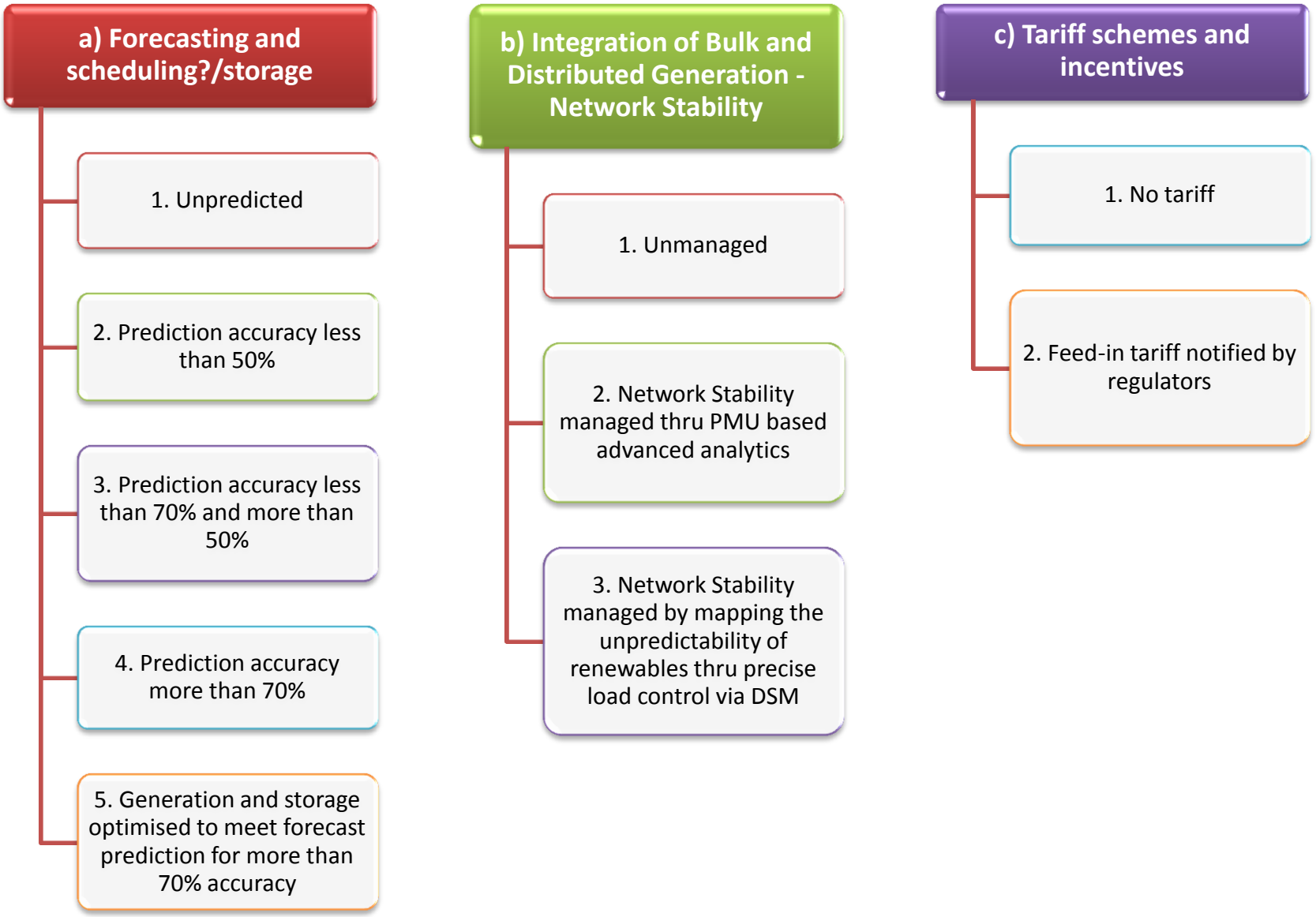
5.2 Transmission


a) Field Work and Workforce Management
1. Manual registers
2. Computerised MIS
3. Web based applications
4. System generated alerts for field work and workforce management
b) Metering
1. Manual readings
2. Remote readings
3. Software applications for billing
c) Billing: tariffs and settlements
1. Manual system
2. Tariffs based on PPA
3. PoC charges to make the tariffs distance sensitive
4. Real time congestion charges also included ???
d) System Planning
1. No proper system planning strategy in place
2. System planning done for upcoming generation evacuation
3. System planning done for upcoming generation evacuation and for system strengthening
4. Apart from upcoming generation evacuation and system strengthening, operational feed back from LDCs received
5. System planning considering renewable sources of energy
e) Customer Care Centre (CCC)/Call Centre?
1. Not established
2. Established
f) Leasing out Transmission infra?
1. Not established
2. Established
g) Open Access support
1. Not established
2. Established

Power Process Maturity

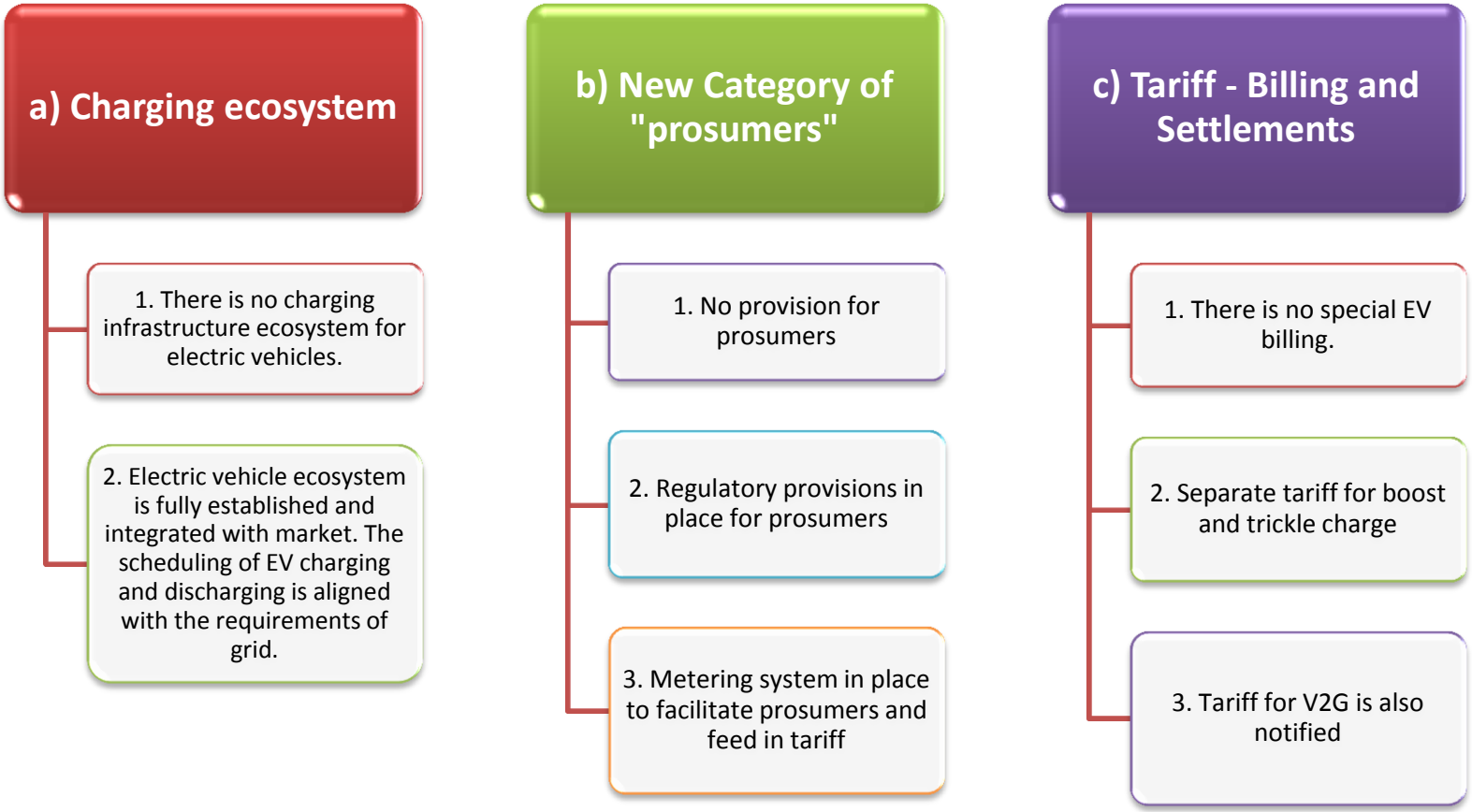
Renewable Integration

6.1 Renewable Integration



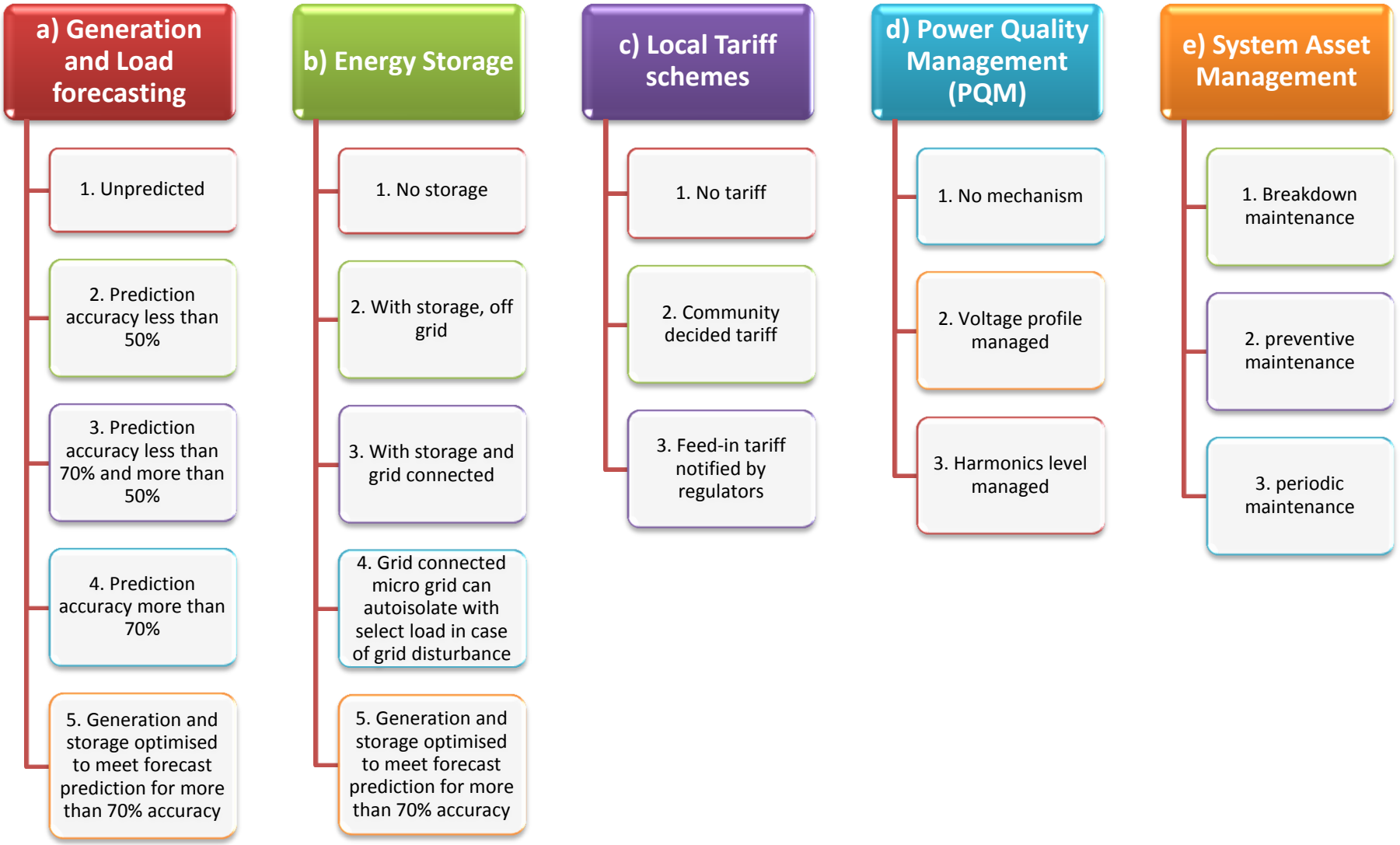
6.2 Renewable Integration

Electric Vehicles



6.3 Renewable Integration

Micro-Grids



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