



Distributed power generation *an opportunity for Schneider Electric*

July 11 th, 2001



Distributed power generation: an opportunity for Schneider Electric

■ *Part 1*

Due to an overall environment becoming favourable, the distributed generation market will be more and more attractive, driven by needs of any consumer using electricity.

■ *Part 2*

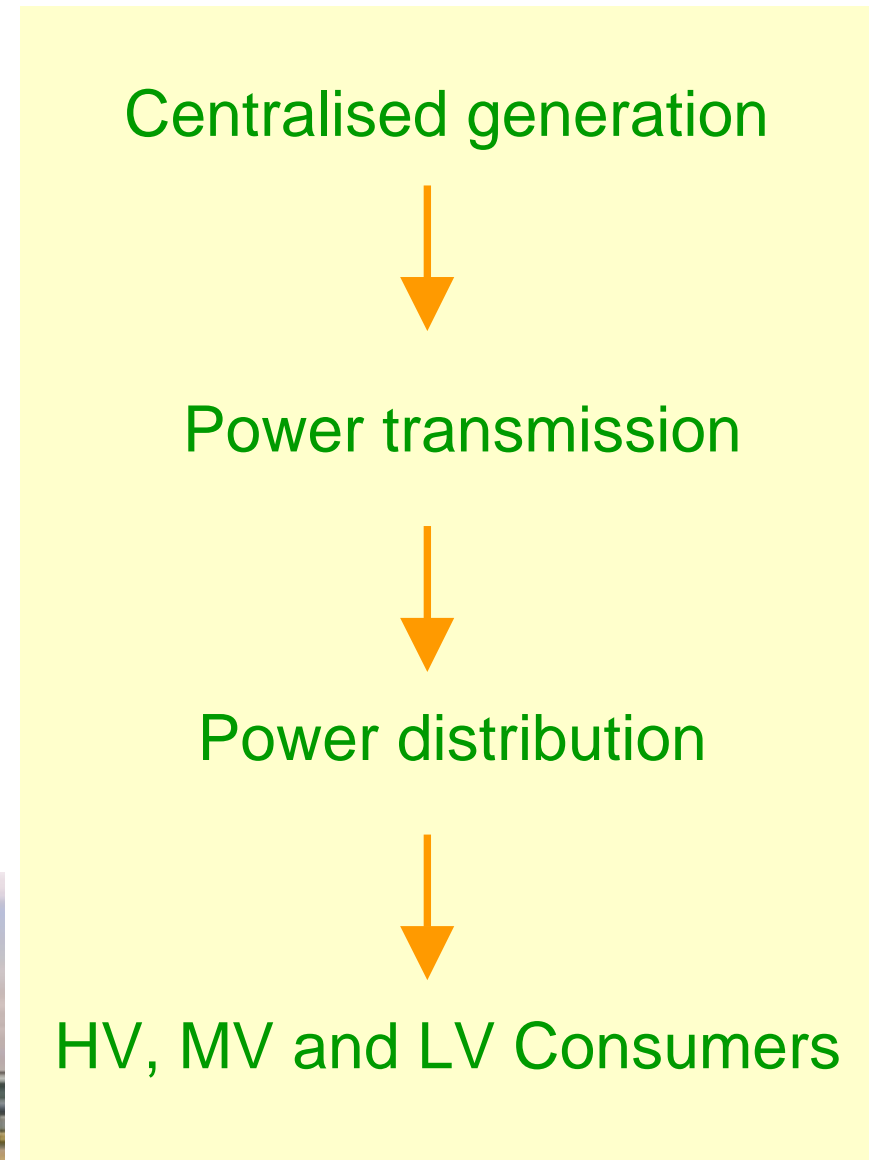
To consolidate the existing business as the world secured power specialist, Schneider Electric is enlarging its scope to the distributed generation business through a partner approach.

Terminology

Distributed generation, defined by opposition to Centralised generation, covers power sources which are not connected to the power system or are connected directly to the MV or a the LV electrical network.



From the stone age the power system has been so!



The power industry market requires additional power capacities with flexibility and reliability

1 Evolving needs of electricity users

- SOHO* development
- Security supply
- High power quality

2 Deregulated market consequences

- + : generation liberalization
- - : uncontrolled liberalization

3 Power demand exceeding capacities

- Economic growth
- Electricity usage increase
- Similar reserves in Oil & Gas
- Nuclear plant still an issue but unavoidable

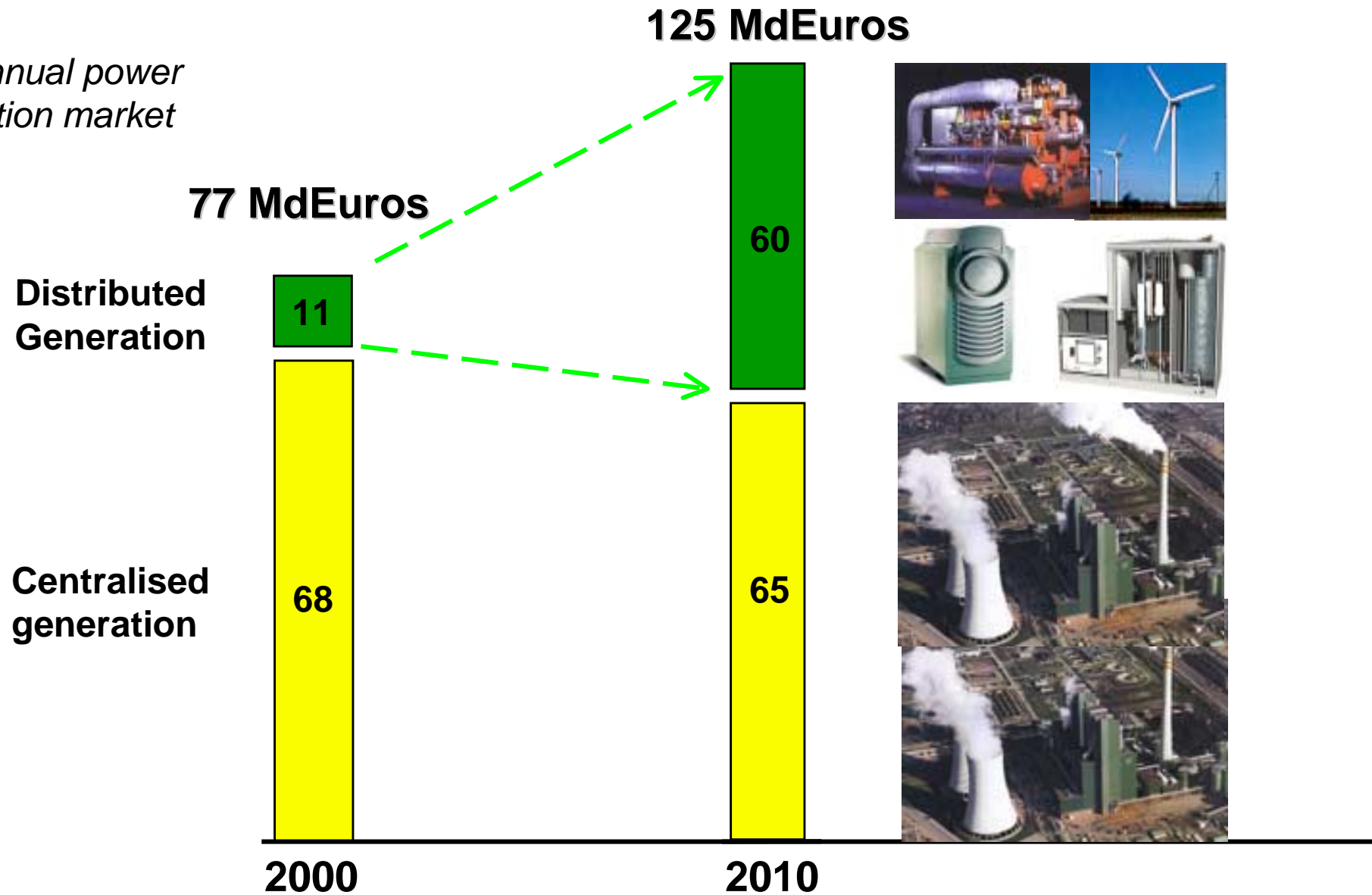
4 Centralised generation major issues

- Environment
- Investment leadtime
- Scalability

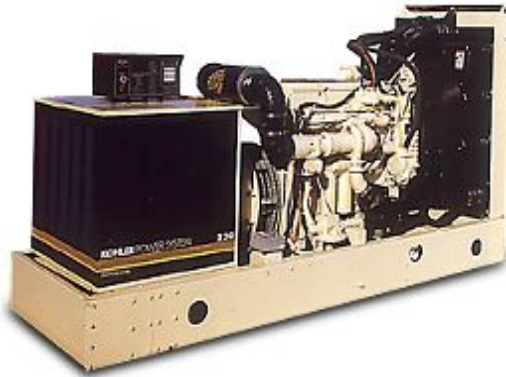
* SOHO=Small Office Home Office

Distributed power generation will take a major share up to half of the market

Total annual power generation market



Distributed power generation is going to change some rules in the power industry market



Centralised generation



Power transmission



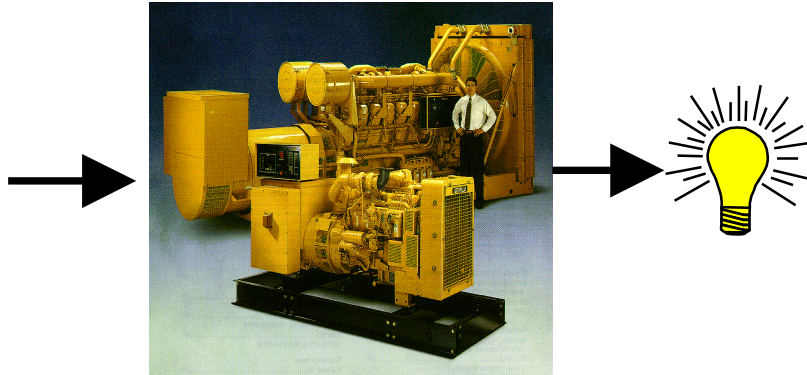
Power distribution



HV, MV and LV Consumers

Some technologies are already available...

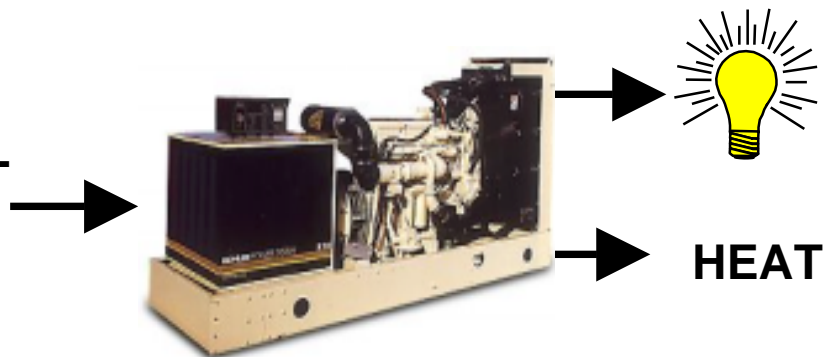
FUEL
or
GAS



■ Genset

- Investment: 350 \$/KW
- Pollution
- Noise
- Maintenance
- Mostly used as back-up power

FUEL
or
GAS



■ Cogeneration

- Combined generation of Heat and Power
- Investment: 600 \$ / kW
- Linked to resale of electricity with optimized heat generation

Some technologies are already available...



■ Wind power farm

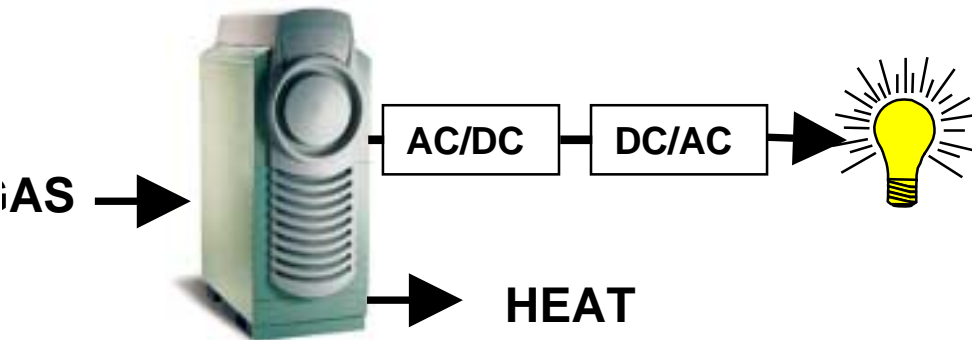
- typical 15/50MW
- 1 to 100 wind turbines: 750kW to 3 MW

■ Cost

- investment: 1000 \$ / kW
- cost of kWh: 3-6 cents

■ +25% growth per year in terms of MW capacity, in Europe, USA and ASIA.

... and new micro gas turbine technologies are coming ...



■ A micro-turbine

- from 10KW to 500KW
- includes:
 - compressor,
 - turbine,
 - generator,
 - power conditioner,
 - control panel.

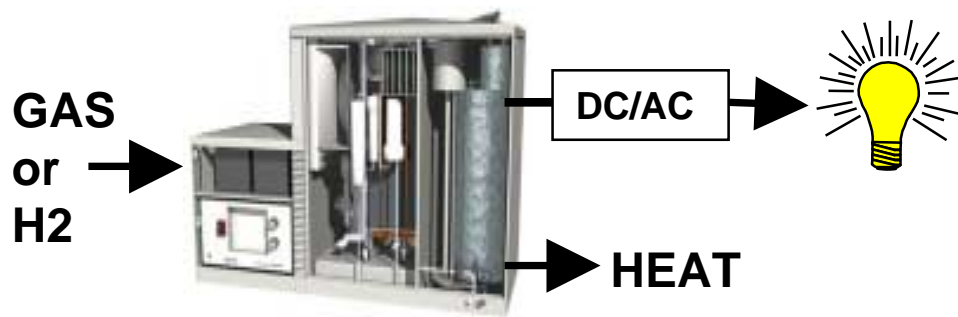
■ Cost

- investment: 200-500 \$ / kW,
- cost of kWh: 3-4 cents,
- competitive above 20kW.

■ Production is starting

DC-AC= Direct and Alternative Current

... and new Fuel cell technologies are coming



■ Fuel cell

- from 10KW to 1MW
- includes PEMFC, SOFC,.. technologies,
- includes:
 - reformer to H2,
 - cells (core),
 - power conditioner,
 - control panel.

■ Decreasing cost:

- investment: 500-700 \$ / kW,
- cost of kWh: 7 cents,
- competitive above 10kw.

■ Production: prototype stage

H2=Hydrogen

PEMC=Proton Exchange Membran Fuell Cell
SOFC=Solid Oxyd Fuell Cell

Schneider Electric is ready for this market.

- To reinforce Schneider Electric position as the world's Power & Control specialist.
- To be a world-leader in secured power by having the best optimised solution for any electricity user's need.
- Schneider Electric assets:
 - knowledge of users (current customers),
 - comprehensive offering,
 - power source versatility,
 - partnering ability.

Schneider Electric is already involved

- **In existing generation technologies (for the electrical distribution and control part)**
 - Wind power
 - Cogeneration

- **With dedicated offers:**
 - Uninterruptible Power Supply with MGE UPS,
 - New interfacing functions between the grid and alternative power sources,
 - Power management solutions with Web technologies through Transparent Energy™ .

- **With partnership approaches**
 - with Fuel cells manufacturers
 - with μ -Turbines manufacturers



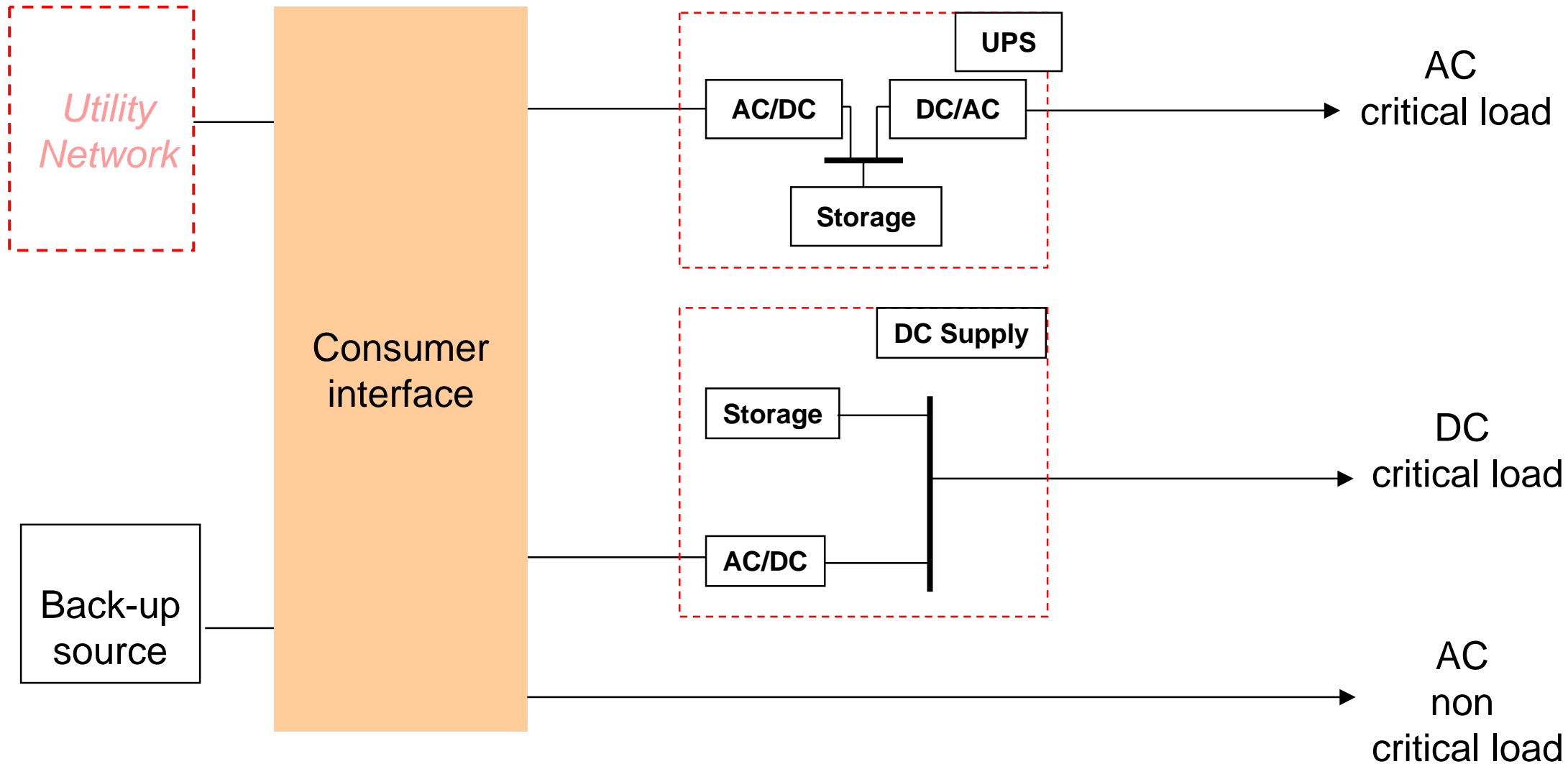
Schneider Electric is already involved

*Schneider is part of an advanced research laboratory «**IDEA**»*

- EDF, Schneider Electric and INPG (Institut National Polytechnique de Grenoble) have formed a business interest grouping (GIE)
- “IDEA” means : “Invent the Electrical Distribution system of the future” (Inventons la Distribution Electrique de l’Avenir)
- These 3 partners have decided to pool their resources in order to invent innovative solutions
- IDEA will reinforce various industrial and technological initiatives under way in the Rhône Alpe region of France, which has become one of the forerunners in the Energy Technologies sector (ET’s) in Europe

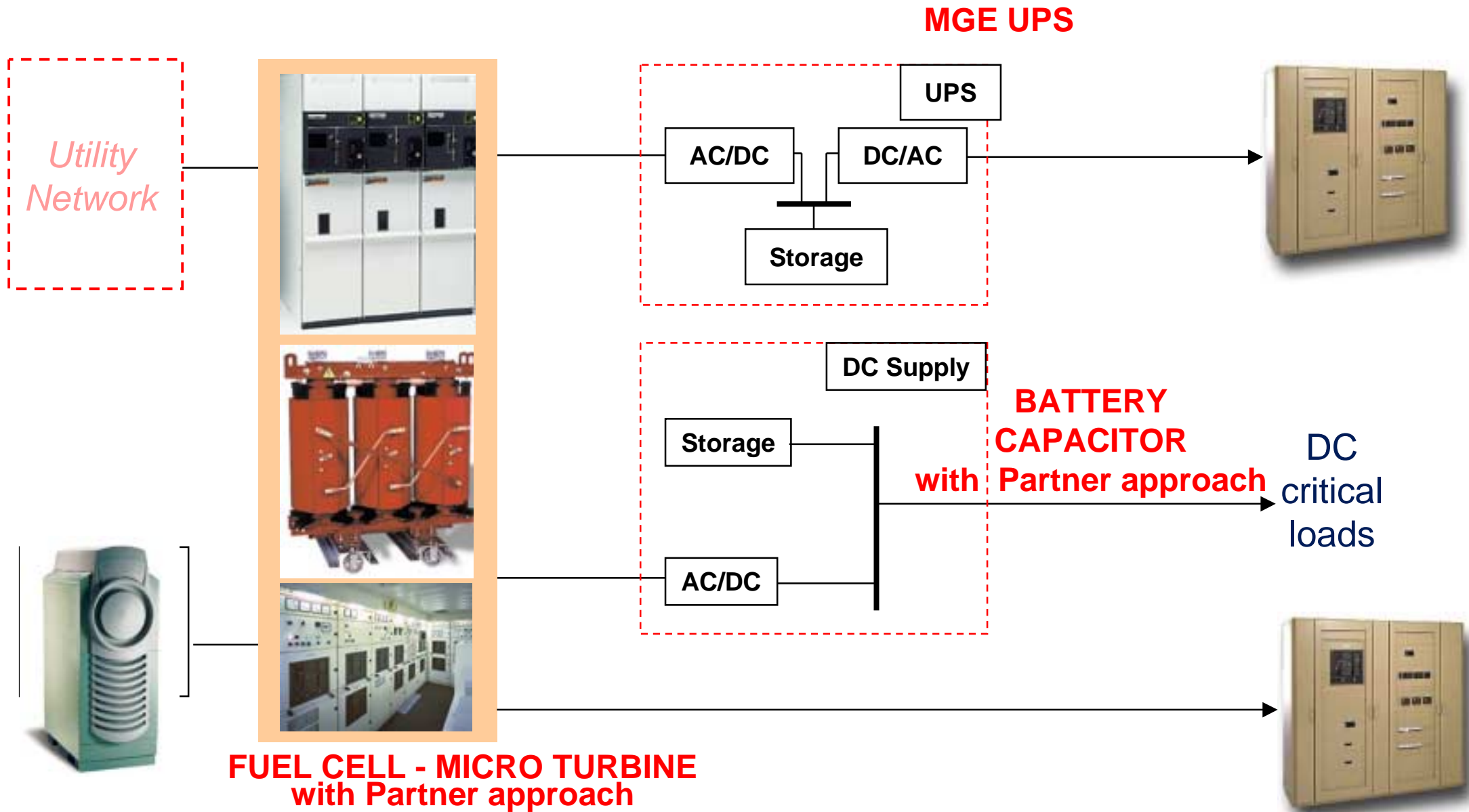
Schneider Electric is already involved

Need example: a telecom centre



Schneider Electric is already involved

Need example: a telecom centre



After **IT's** (Information Technologies)

the world economy is investing in **ET's**
(Energy Technologies)



*To consolidate its existing business
as the **W**orld **S**ecured **P**ower **S**pecialist,
Schneider Electric is enlarging its scope*

- to the distributed generation business*
- through a partner approach*
- by targeting each of its 4 markets*

Schneider
 **Electric**



Schneider
 **Electric**