

1st revolution

Mechanization with non-concerns for energy efficiency. Renewables not recognized.

Human interaction null – consumer and supplier separated

2nd revolution

Large increase on electricity production and usage. No concerns for energy efficiency and renewables.

Human interaction null – consumer and supplier separated

3rd revolution

Oil crisis with high prices in 70's.

Additional concerns emerge: diversification (security of supply); environmental impacts (energy efficiency and renewables); competitiveness (low prices + internal energy resources)

Human interaction grows considerably – “prosumer” starts to emerge; domestic and distributed production – new business models for “prosumers”, suppliers of technology and ICT services and technologies providers; new regulation start to emerge. Social acceptance becomes an issue. “Smart energy” concept emerges.

4th revolution

Additional concerns are further highlighted: diversification (security of supply); environmental impacts (energy efficiency, renewables, new technologies – RES, CCS...); competitiveness (low prices + internal energy resources + smart energy management)

Human interaction becomes a large part of the system – “prosumer” (V2G, RES...); ICT is a crucial element for data management; new regulation of the system is defined. Social acceptance and consumer engagement in the system (and market) becomes well evident. “Smart energy” products, services, businesses ...