

# CPC COOPERATIVE PATENT CLASSIFICATION

## Y GENERAL TAGGING OF NEW TECHNOLOGICAL DEVELOPMENTS; GENERAL TAGGING OF CROSS-SECTIONAL TECHNOLOGIES SPANNING OVER SEVERAL SECTIONS OF THE IPC; TECHNICAL SUBJECTS COVERED BY FORMER USPC CROSS-REFERENCE ART COLLECTIONS [XRACs] AND DIGESTS

(NOTES omitted)

### Y04 INFORMATION OR COMMUNICATION TECHNOLOGIES HAVING AN IMPACT ON OTHER TECHNOLOGY AREAS

### Y04S SYSTEMS INTEGRATING TECHNOLOGIES RELATED TO POWER NETWORK OPERATION, COMMUNICATION OR INFORMATION TECHNOLOGIES FOR IMPROVING THE ELECTRICAL POWER GENERATION, TRANSMISSION, DISTRIBUTION, MANAGEMENT OR USAGE, i.e. SMART GRIDS

#### Systems supporting electrical power generation, transmission or distribution

#### **10/00 Systems supporting electrical power generation, transmission or distribution**

- 10/10 . Systems characterised by the monitored, controlled or operated power network elements or equipment
- 10/12 . . the elements or equipment being or involving energy generation units, including distributed generation [DER] or load-side generation
- 10/123 . . . the energy generation units being or involving renewable energy sources
- 10/126 . . . the energy generation units being or involving electric vehicles [EV] or hybrid vehicles [HEV], i.e. power aggregation of EV or HEV, vehicle to grid arrangements [V2G] ([remote or cooperative charging Y04S 30/12](#); details associated with the interoperability in the section of transportation, e.g. vehicle recognition, authentication, identification or billing [Y04S 30/14](#))
- 10/14 . . the elements or equipments being or involving energy storage units ([for systems comprising uninterruptible power supplies or standby generators Y04S 20/12](#))
- 10/16 . . the elements or equipments being or involving electric power substations
- 10/18 . . the elements or equipments being or involving switches, relays or circuit breakers, e.g. intelligent electronic devices [IED]
- 10/20 . . the elements or equipments being or involving protection elements, arrangements or systems
- 10/22 . . the element or elements being flexible AC transmission systems [FACTS] or power factor or reactive power compensating or correcting units
- 10/24 . . the elements or equipments being or involving voltage regulating units
- 10/26 . . the elements or equipments being or involving measuring units
- 10/265 . . . the measuring units being or involving phasor measuring units [PMU]
- 10/30 . Systems characterised by state monitoring, e.g. fault, temperature monitoring, insulator monitoring, corona discharge

- 10/40 . Systems characterised by the display of information, e.g. of data or controls
- 10/50 . Systems or methods supporting the power network operation or management, involving a certain degree of interaction with the load-side end user applications
- 10/52 . . Outage or fault management
- 10/522 . . . Fault detection or location
- 10/525 . . . Power restoration
- 10/527 . . . Power quality monitoring
- 10/54 . . Management of operational aspects
- 10/542 . . . Planning, load or production forecast
- 10/545 . . . Computing methods or systems for efficient or low carbon management or operation of electric power systems
- 10/547 . . . Maintenance, construction or extension
- 10/56 . . Supply chain or logistics, e.g. warehousing, distribution, inventory, stock management, order filling, procurement or balancing against orders
- 10/58 . . Financial or economic aspects related to the network operation
- 10/60 . . Reporting; Information providing; Statistics or analysis

#### Systems supporting the management or operation of end-user stationary applications, including also the last stages of power distribution and the control, monitoring or operating management systems at local level

- 20/00 Systems supporting the management or operation of end-user stationary applications, including also the last stages of power distribution and the control, monitoring or operating management systems at local level** ([the energy generation units being or involving electricity based vehicles Y04S 10/126](#); [remote or cooperative charging of electric or hybrid vehicles Y04S 30/12](#))
- 20/10 . System characterised by the monitored, controlled or operated end-user elements or equipments
- 20/12 . . the elements or equipments being or involving energy storage units, uninterruptible power supply [UPS] systems or standby or emergency generators involved in the last power distribution stages

- 20/14 . . The elements or equipments being or involving protection elements, switches, relays or circuit breakers
- 20/16 . . The elements or equipments being or involving power plugs, sockets, adapters or power strips
- 20/18 . . The element or elements being a direct current power network, grid or distribution line
- 20/20 . End-user application control systems
- 20/22 . . characterised by the aim of the control
- 20/221 . . . General power management systems
- 20/222 . . . Demand response systems, e.g. load shedding, peak shaving
- 20/224 . . . . Curtailment; Interruptions; Retail price-responsive demand
- 20/225 . . . The system entering an energy saving mode, i.e. sleep, low-power or standby modes
- 20/227 . . . Domotics or building automation systems
- 20/228 . . . . Characterised by involving a home automation communication network
- 20/24 . . characterised by the end-user application
- 20/242 . . . the end-user application being or involving home appliances
- 20/244 . . . . the home appliances being or involving heating ventilating and air conditioning [HVAC] units
- 20/246 . . . . the system involving the remote operation of lamps or lighting equipment
- 20/248 . . . the end-user application involving UPS systems or standby or emergency generators
- 20/30 . Smart metering
- 20/32 . . Systems characterised by remote reading
- 20/322 . . . from a fixed location
- 20/325 . . . from a mobile location
- 20/327 . . . The remote reading system including mechanisms for turning on/off the supply
- 20/34 . . Systems which determine the environmental impact of user behavior
- 20/36 . . Methods or devices for detecting or reporting abnormalities, e.g. faults, outages, leaks
- 20/38 . . Identification of individual loads by analysing current or voltage waveforms
- 20/40 . . Displaying of usage with respect to time, e.g. monitoring evolution of usage, relating usage and weather conditions
- 20/42 . . Utility meters which are networked together, e.g. within a single building
- 20/44 . . Displaying utility price or cost
- 20/46 . . Remote display of meters readings
- 20/48 . . Methods for determining the topology of meters in a network
- 20/50 . . Retrofitting of installed meters
- 20/52 . . Systems oriented to metering of generated energy or power
- 20/525 . . . Monitoring the performance of renewable electricity generating systems, i.e. of solar panels

**Systems supporting specific end-user applications in the sector of transportation**

- 30/00 **Systems supporting specific end-user applications in the sector of transportation**
- 30/10 . Systems supporting the interoperability of electric or hybrid vehicles

- 30/12 . . Remote or cooperative charging
- 30/14 . . Details associated with the interoperability, e.g. vehicle recognition, authentication, identification or billing

**Communication or information technology specific aspects supporting electrical power generation, transmission, distribution or end-user application management**

- 40/00 **Systems for electrical power generation, transmission, distribution or end-user application management characterised by the use of communication or information technologies, or communication or information technology specific aspects supporting them**
- 40/10 . characterised by communication technology
- 40/12 . . characterised by data transport means between the monitoring, controlling or managing units and monitored, controlled or operated electrical equipment
- 40/121 . . . Using the power network as support for the transmission
- 40/122 . . . . Using pulsed signals
- 40/123 . . . . Using modification of a parameter of the network power signal
- 40/124 . . . using wired telecommunication networks or data transmission busses
- 40/125 . . . Using phone lines
- 40/126 . . . Using wireless data transmission
- 40/127 . . . . by means of mobile telephony
- 40/128 . . . involving the use of Internet protocol
- 40/14 . . Communication technology specific aspects
- 40/143 . . . using dedicated transmission supports
- 40/146 . . . using power networks as support for transmission
- 40/16 . . Details of management of the overlaying communication network between the monitoring, controlling or managing units and monitored, controlled or operated electrical equipment
- 40/162 . . . related to configuration or provisioning
- 40/164 . . . related to network topology
- 40/166 . . . related to fault management
- 40/168 . . . for performance monitoring
- 40/18 . . Network protocols supporting networked applications, e.g. including control of end-device applications over a network
- 40/20 . Information technology specific aspects
- 40/22 . . Computer aided design [CAD]; Simulation; Modelling
- 40/24 . . Arrangements for network security or for protecting computers or computer systems against unauthorised activity, e.g. cyber security

**Market activities related to the operation of systems integrating technologies related to power network operation and communication or information technologies**

- 50/00 **Market activities related to the operation of systems integrating technologies related to power network operation or related to communication or information technologies**
- 50/10 . Energy trading, including energy flowing from end-user application to grid
- 50/12 . Billing, invoicing, buying or selling transactions or other related activities, e.g. cost or usage evaluation

- 50/14      . Marketing, i.e. market research and analysis, surveying, promotions, advertising, buyer profiling, customer management or rewards
- 50/16      . Energy services, e.g. dispersed generation or demand or load or energy savings aggregation