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)

Y02 TECHNOLOGIES OR APPLICATIONS FOR MITIGATION OR ADAPTATION AGAINST CLIMATE CHANGE (NOTES omitted)

Y02E REDUCTION OF GREENHOUSE GAS [GHG] EMISSIONS, RELATED TO ENERGY GENERATION, TRANSMISSION OR DISTRIBUTION

10/00 Energy generation through renewable energy sources
10/10 . . Geothermal energy
10/12 . . Earth coil heat exchangers
10/125 . . . Compact tube assemblies, e.g. geothermal probes
10/14 . . Systems injecting medium directly into ground, e.g. hot dry rock system, underground water
10/16 . . . Systems injecting medium into a closed well
10/18 . . . Systems exchanging heat with fluids in pipes, e.g. fresh water or waste water
10/20 . . Hydro energy
10/22 . . Conventional, e.g. with dams, turbines and waterwheels
10/223 . . . Turbines or waterwheels, e.g. details of the rotor
10/226 . . . Other parts or details
10/28 . . . Tidal stream or damless hydropower, e.g. sea flood and ebb, river, stream
10/30 . . . Energy from the sea (tidal stream Y02E 10/28)
10/32 . . . Oscillating water column [OWC]
10/34 . . . Ocean thermal energy conversion [OTEC]
10/36 . . . Salinity gradient
10/38 . . . Wave energy or tidal swell, e.g. Pelamis-type
10/40 . . Solar thermal energy
10/41 . . . Tower concentrators
10/42 . . . Dish collectors
10/43 . . . Fresnel lenses
10/44 . . . Heat exchange systems
10/45 . . . Trough concentrators
10/46 . . . Conversion of thermal power into mechanical power, e.g. Rankine, Stirling solar thermal engines
10/465 . . . Thermal updraft
10/47 . . . Mountings or tracking
10/50 . . . Photovoltaic [PV] energy
10/52 . . . PV systems with concentrators
10/54 . . . Material technologies
10/541 . . . CuInSe2 material PV cells
10/542 . . . Dye sensitized solar cells
10/543 . . . Solar cells from Group II-VI materials
10/544 . . . Solar cells from Group III-V materials
10/545 . . . Microcrystalline silicon PV cells
10/546 . . . Polycrystalline silicon PV cells
10/547 . . . Monocrystalline silicon PV cells
10/548 . . . Amorphous silicon PV cells
10/549 . . . organic PV cells
10/56 . . . Power conversion electric or electronic aspects
10/563 . . . for grid-connected applications
10/566 . . . concerning power management inside the plant, e.g. battery charging/discharging, economical operation, hybridisation with other energy sources
10/58 . . . Maximum power point tracking [MPPT] systems
10/60 . . . Thermal-PV hybrids
10/70 . . . Wind energy
10/72 . . . Wind turbines with rotation axis in wind direction
10/721 . . . Blades or rotors
10/722 . . . Components or gearbox
10/723 . . . Control of turbines
10/725 . . . Generator or configuration
10/726 . . . Nacelles
10/727 . . . Offshore towers
10/728 . . . Onshore towers
10/74 . . . Wind turbines with rotation axis perpendicular to the wind direction
10/76 . . . Power conversion electric or electronic aspects
10/763 . . . for grid-connected applications
10/766 . . . concerning power management inside the plant, e.g. battery charging/discharging, economical operation, hybridisation with other energy sources
20/00 Combustion technologies with mitigation potential
20/10 . . . Combined combustion
20/12 . . . Heat utilisation in combustion or incineration of waste
20/14 . . . Combined heat and power generation [CHP]
20/16 . . . Combined cycle power plant [CCPP], or combined cycle gas turbine [CCGT]
20/18 . . . . Integrated gasification combined cycle [IGCC]
20/185 . . . . combined with carbon capture and storage [CCS]
20/30 . . . Technologies for a more efficient combustion or heat usage
20/32 . . . Direct CO₂ mitigation
Arrangements for eliminating or reducing asymmetry in polyphase networks

Superconducting electric elements or equipment or power systems integrating superconducting elements or equipment

Superconducting generators

Superconducting synchronous generators

with a superconducting rotor

Superconducting homopolar generators

Superconducting transmission lines or power lines or cables or installations thereof

caracterised by their form

Films or wires on bases or cores

Multifilaments embedded in normal conductors

caracterised by the disposition of thermal insulation

caracterised by cooling

Installation of superconducting cables or lines

Superconducting transformers or inductors

Superconducting energy storage for power networks, e.g. SME, superconducting magnetic storage

Protective or switching arrangements for superconducting elements or equipment

Current limitation using superconducting elements, including multifunctional current limiters

Systems integrating technologies related to power network operation and communication or information technologies for improving the carbon footprint of electrical power generation, transmission or distribution, i.e. smart grids as climate change mitigation technology in the energy generation sector (smart grids relating to the energy generation sector in general, e.g. with no associated climate change mitigation effect)

Systems characterised by the monitoring, control or operation of energy generation units, e.g. distributed generation [DER] or load-side generation

the energy generation units being or involving renewable energy sources

Systems characterised by the monitoring, control or operation of flexible AC transmission systems [FACTS] or power factor or reactive power compensating or correcting units

Computing methods or systems for efficient or low carbon management or operation of electric power systems

Technologies for the production of fuel of non-fossil origin

Biofuels

CHP turbines for biofeed

Gas turbines for biofeed

Bio-diesel

Bio-pyrolysis

Torrefaction of biomass

Cellulosic bio-ethanol

Grain bio-ethanol

Bio-alcohols produced by other means than fermentation

Fuel from waste
Enabling technologies or technologies with a potential or indirect contribution to GHG emissions mitigation

- Energy storage
- Battery technologies with an indirect contribution to GHG emissions mitigation (battery technologies specific to electromobility Y02T 10/7005)
- Lithium-ion batteries
- Alkaline secondary batteries, e.g. NiCd or NiMH
- Lead-acid batteries
- Hybrid cells composed of a half-cell of a fuel-cell type and a half-cell of the secondary-cell type
- Ultracapacitors, supercapacitors, double-layer capacitors
- Thermal storage
- Sensible heat storage
- Latent heat storage
- Cold storage
- Pressurised fluid storage
- Mechanical energy storage, e.g. flywheels
- Pumped storage
- Hydrogen technology
- Hydrogen storage
- Storage of liquefied, solidified, or compressed hydrogen in containers
- Storage in caverns
- Reversible uptake of hydrogen by an appropriate medium
- the medium being carbon
- the medium being a metal or rare earth metal, an intermetallic compound or a metal alloy
- the medium being an organic compound or a solution thereof
- Hydrogen distribution
- Hydrogen production from non-carbon containing sources
- by chemical reaction with metal hydrides, e.g. hydrolysis of metal borohydrides
- by decomposition of inorganic compounds, e.g. splitting of water other than electrolysis, ammonia borane, ammonia
- by electrolysis of water
- by photo-electrolysis
- Fuel cells
- characterised by type or design
- Proton Exchange Membrane Fuel Cells [PEMFC]
- Direct Alcohol Fuel Cells [DAFC]
- Direct Methanol Fuel Cells [DMFC]
- Solid Oxide Fuel Cells [SOFC]
- Molten Carbonate Fuel Cells [MCFC]
- Bio Fuel Cells
- Regenerative or indirect fuel cells, e.g. redox flow type batteries

- integrally combined with other energy production systems
- Cogeneration of mechanical energy, e.g. integral combination of fuel cells and electric motors
- Production of chemical products inside the fuel cell; incomplete combustion
- Arrangements for transfer of electric power between AC networks via a high-tension DC link, HVDC transmission
- Systems integrating technologies related to power network operation and communication or information technologies mediating in the improvement of the carbon footprint of electrical power generation, transmission or distribution, i.e. smart grids as enabling technology in the energy generation sector (smart grids relating to the energy generation sector in general, e.g. with no associated climate change mitigation effect Y04S 10/00)
- Systems characterised by the monitored, controlled or operated power network elements or equipments
- the elements or equipments 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 Y02T 90/168; details associated with the interoperability in the section of transportation, e.g. vehicle recognition, authentication, identification or billing Y02T 90/169)
- the elements or equipments being or involving energy storage units (for systems comprising uninterruptible power supplies or standby generators Y04S 20/12)
- the elements or equipments being or involving electric power substations
- the elements or equipments being or involving switches, relays or circuit breakers, e.g. intelligent electronic devices [IED]
- the elements or equipments being or involving protection elements, arrangements or systems
- the elements or equipments being or involving voltage regulating units
- the elements or equipments being or involving measuring units
- the measuring units being or involving phasor measuring units [PMU]
- Systems characterised by state monitoring, e.g. fault, temperature monitoring, insulator monitoring, corona discharge
- Computer aided design [CAD]; Simulation; Modelling
- Communication technology specific aspects
- characterised by data transport means between the monitoring, controlling or managing units and monitored, controlled or operated electrical equipment
- using the power network as support for the transmission
- using pulsed signals
- using modification of a parameter of the network power signal
- using a wired telecommunication network or a data transmission bus
using phone lines
using wireless data transmission
By means of mobile telephony
involving the use of Internet protocol
Communication technology specific aspects
using dedicated transmission supports
using the power network as support for the transmission

70/00 Other energy conversion or management systems reducing GHG emissions

70/10 Hydrogen from electrolysis with energy of non-fossil origin, e.g. PV, wind power, nuclear

70/20 Systems combining fuel cells with production of fuel of non-fossil origin

70/30 Systems combining energy storage with energy generation of non-fossil origin

70/40 Energy efficient batteries, ultracapacitors, supercapacitors or double-layer capacitors charging or discharging systems or methods, e.g. auxiliary power consumption reduction, resonant chargers or dischargers, resistive losses minimisation