# Patent Classification for "The CO2 Question: Technical Progress and the Climate Crisis"

## 1.1 Introduction

The Coopoerative Patent Classification (CPC) system has over 200,000 technology classes. Our goal is to identify technologies that address the global climate change issue and have the potential to reducing greenhouse gas emission. Specifically, we seek to identify technologies that enable the substitution of carbon dioxide emitting technologies and technologies that improve the efficiency of fossil-fuel based technologies. We gather cpc classification codes related to greenhouse gas emission reduction from four sources and recategorize them into the two main categories *pure green* technologies and *fuel efficiency* technologies[1]. Technologies that concern process efficiency improvements in general but are not clearly linked to renewable or fossil fuels are categorized as *unmatched*. The full list of classified cpc codes can be found in this csv file, which matches the full sets of classifications to the 2021-08 cpc classificaiton list.

**Definitions:**
*Pure green*: Technologies that substitute carbon dioxide emitting technologies for carbon dioxide-free technologies or make carbon dioxide-free technologies more accessible.
*Fuel efficiency*: Technologies that improve process efficiencies of fossil fuel sources and therefore reduce carbon dioxide emissions per output.

## 1.2 Underlying classification sources

The four sources underlying environment-related technology classification sources are:

1. Environmental technologies classified by the Organization of Economic Co-opeartion and Development (OECD)[2]: The search strategy is described by Hascic & Migotto (2015) and has a broad coverage including technologies related to environmental pollution, water scarcity and climate change mitigation. We are using the 2020 version and call this the OECD classification.

2. Efficiency improving fossil fuel technology classes: Lanzi *et al.* (2011) search fuel-efficient technologies for electricity generation in fuel preparation technologies, furnaces and burners as well as boilers, turbines and engines. We call this the Fossil Fuel (FF) classification.

3. International Patent Classification (IPC) Green Inventory[3]: This classification is developped by the IPC Committee of Experts and captures Environmentally Sound Technologies (ESTs) defined as "technologies that have the potential to significantly improved environmental performance relative to other technologies"[4]. We call this the IPC classification.

4. Corporate Knights Clean 200 patents[5]: Corporate Knights identifies the top 200 companies based on the amount of revenue each company earns from products and services aligned with the Corporate

[1] Note: "Classes" refers to the underlying patent classification system class. "Classification" refers to the classification sources we build our categories on. "Categories" are the final three categories that we study in our paper.
[2] OECD env-tech source (accessed 18 January 2022)
[3] WIPO-IPC green inventory source (accessed 2 February 2022)
[4] UN Environment Programme. Environmentally sound technologies. (accessed 12 March 2023)
[5] Corporate Knights. Clean 200 Top publicly listed companies by clean revenue (accessed 19 February 2022)

Knights Clean Economy Taxonomy. For the corporate knights 200 firms' who have at least 70% of their patents classified as clean revenue, we gather all of their patents up to 5 years before the listing year. For the stock of patents we identify the CPC technology classes. To identify technology classes related to greenhouse gas reduction, we iteratively go through all classes aggregated at the 5th, 7th and 8th level of CPC classification. Finally we filter the lowest level for key words[6] and assess whether a technology class is related to greenhouse gas reduction. We call this the Corporate Knights (CK) classification.

### 1.3 Category classification procedure

We first clean each individual classification source document (e.g. OECD, FF, IPC, Corporate Knights) into the three defined categories *pure green*, *fuel efficiency* and *unmatched*. To classify the OECD and IPC classification, we go through the lowest available classification level within these classifications. For instance, the OECD has up to 4 levels. We thus use the fourth level if available and then move to the third, second and first level[7]. Within the lowest level OECD and IPC classifications, a few CPC codes occur multiple times, respectively at different levels such as the subclass, group and subgroup level. We aggregate the defined categories based on the highest CPC hierarchical system level if there are multiple matches. The final categories assigned are listed in Table 4. The IPC classification has up to 5 levels. While only very few topics go down to level 5, we start with classifying the fifth level and move up[8]. We list the final categories assigned to the IPC classifications in Table 5. All patent classifications from the Fossil Fuel technology are classified as "brown efficiency technologies" (see Table 6). Finally we classify the Corporate Knights classification based on the highest aggregate technology patent classification level suitable. All lower level classifications are assumed to be part of the given assigned classification. In Table 7 we report the CPC codes identified, the level of the CPC code identified and an assigned OECD env-tech category, which we use to sort and report the CPC codes.

Next, we merge the four classification sources into one master list. Several technology classifications are covered by multiple sources (compare Table 1). If a CPC code has been matched in multiple sources, we use the following order to assign a category: OECD $>$ FF $>$ IPC $>$ CK. We match these classification to the 2021-08 cpc classification list to create a final list of codes. We report a csv file with all cpc codes matched to a source here. This file reports by CPC code the final category assigned (column: BKWclassification), the category from the different classification sources, as well as necessary FF exclusion checks and OECD dual checks.

The CPC classification has up to 19 levels, but not all technology classes go down to 19 levels. Considering all technology classifications from Level 5 onwards, we have a total of 260,212 classification[9] Considering only the lowest level within a given classification path, there are a total of 186,016 classifications. We identified 7,698 (5,297 considering only the lowest level) classifications as *pure green* technologies and 6,631 (4,629) as *fuel efficiency* technologies. We leave 5,345 (3,730) *unmatched*, as they cannot be clearly assigned.

[6] Keywords include: solar, nuclear, water, wind, renewable, hydro, geothermal, fuel cell, greenhouse gas, efficiency, energy, hybrid, batter, fuel injection

[7] "2.1.1 Wind Energy" is an example classification where the lowest level is level 3. "9.2.1.1 Indoor water conservation" is an example classification that goes down to level 4.

[8] "Air quality management - treatment of waste gases - Combustion apparatus using recirculation of flue gases" is an example of a classification that goes down to level 5.

[9] This is as of the CPC classification of August 2021.

Table 1 documents the number of classifications from each of the four sources. Table 2 shows the number of technology classes by category and classification source. We show the percentage of technology classes from the various classification sources in a given category (pure green, fuel efficiency and unmatched) in Table 3. We derive most technology classes for *pure green* technologies from IPC and for *fuel efficiency* technologies from FF.

Lastly, we match the cpc codes to patents cpc codes at the respective level. As patents can have multiple cpc codes, patents may include cpc codes that are assigned to different categories. If a patent was matched to multiple categories, we classify a patent as fuel efficiency if it has been matched to at least one fuel efficiency cpc code. We classify a patent as pure green if it has been matched to pure green and an unmatched cpc code, but not fuel efficiency cpc code.

**TABLE 1: NO. OF TECHNOLOGY CLASSES BY CLASSIFICATION SOURCE**

| Classification source | All classes level 5 onwards | | Lowest class only | |
|---|---|---|---|---|
| | No. | Perc. | No. | Perc. |
| OECD | 2198 | 0.84 | 1514 | 0.81 |
| OECD & IPC | 1830 | 0.7 | 1328 | 0.71 |
| OECD & IPC & FF | 127 | 0.05 | 89 | 0.05 |
| OECD & FF | 24 | 0.01 | 14 | 0.01 |
| IPC | 9404 | 3.61 | 6375 | 3.43 |
| IPC & FF | 774 | 0.3 | 552 | 0.3 |
| FF | 3459 | 1.33 | 2420 | 1.3 |
| CK | 1867 | 0.72 | 1365 | 0.73 |
| none | 240529 | 92.44 | 172359 | 92.66 |

**TABLE 2: NO. OF TECHNOLOGY CLASSES BY CLASSIFICATION SOURCE AND CATEGORY**

| Category | Classification source | All classes level 5 onwards | | Lowest class only | |
|---|---|---|---|---|---|
| | | No. | Perc. | No. | Perc. |
| pure green | OECD | 153 | 0.06 | 121 | 0.07 |
| pure green | OECD & IPC | 296 | 0.11 | 208 | 0.11 |
| pure green | OECD & IPC & FF | 1 | 0 | 1 | 0 |
| pure green | IPC | 6418 | 2.47 | 4352 | 2.34 |
| pure green | CK | 830 | 0.32 | 615 | 0.33 |
| fuel efficiency | OECD | 1601 | 0.62 | 1091 | 0.59 |
| fuel efficiency | OECD & IPC | 113 | 0.04 | 76 | 0.04 |
| fuel efficiency | OECD & IPC & FF | 126 | 0.05 | 88 | 0.05 |
| fuel efficiency | OECD & FF | 24 | 0.01 | 14 | 0.01 |
| fuel efficiency | IPC | 59 | 0.02 | 41 | 0.02 |
| fuel efficiency | IPC & FF | 774 | 0.3 | 552 | 0.3 |
| fuel efficiency | FF | 3459 | 1.33 | 2420 | 1.3 |
| fuel efficiency | CK | 475 | 0.18 | 347 | 0.19 |
| efficiency - unmatched | OECD | 435 | 0.17 | 301 | 0.16 |
| efficiency - unmatched | OECD & IPC | 1421 | 0.55 | 1044 | 0.56 |
| efficiency - unmatched | IPC | 2927 | 1.12 | 1982 | 1.07 |
| efficiency - unmatched | CK | 562 | 0.22 | 403 | 0.22 |
| na | OECD | 9 | 0 | 1 | 0 |
| n.o.i. | none | 240529 | 92.44 | 172359 | 92.66 |

**TABLE 3: NO. OF TECHNOLOGY CLASSES IN CATEGORY BY CLASSIFICATION SOURCE**

| Classification source | Green | | Efficiency brown | | Efficiency general | |
|---|---|---|---|---|---|---|
| | No. | Perc. | No. | Perc. | No. | Perc. |
| OECD | 121 | 2.28 | 1091 | 23.57 | 301 | 8.07 |
| OECD & IPC | 208 | 3.93 | 76 | 1.64 | 1044 | 27.99 |
| OECD & IPC & FF | 1 | 0.02 | 88 | 1.9 | 0 | 0 |
| OECD & FF | 0 | 0 | 14 | 0.3 | 0 | 0 |
| IPC | 4352 | 82.16 | 41 | 0.89 | 1982 | 53.14 |
| IPC & FF | 0 | 0 | 552 | 11.92 | 0 | 0 |
| FF | 0 | 0 | 2420 | 52.28 | 0 | 0 |
| CK | 615 | 11.61 | 347 | 7.5 | 403 | 10.8 |

# TABLE 4: CATEGORIES ASSIGNED TO OECD CLASSIFICATION

| Level | Topic L1 | Topic L2 | Topic L3 | Topic L4 | CPC codes | Category |
|---|---|---|---|---|---|---|
| 3 | 1. Environmental Management | 1.1. Air pollution abatement | 1.1.1. Emissions abatement from stationary sources (e.g. SOx, NOx, PM emissions from combustion plants) | | B01D53/34-965; F23G7/06; F23J15; F27B1/18 | fuel efficiency |
| 3 | | | | | C21B7/22; C21C5/38; F23B80; F23C9 | fuel efficiency |
| 3 | | | | | F23C10 | fuel efficiency |
| 3 | 1. Environmental Management | 1.1. Air pollution abatement | 1.1.2. Emissions abatement from mobile sources (e.g. NOx, CO, HC, PM emissions from motor vehicles) | | B01D53/92; B01D53/94; B01D53/96; B01J23/38-468 | fuel efficiency |
| 3 | | | | | F01M13; F01M2013; F02B47/08-10; F02D21/06-10 | fuel efficiency |
| 3 | | | | | F02M26; F02M2026; G01M15/10; F02B47/06 | fuel efficiency |
| 3 | | | | | F02D41; F02D43; F02D45; F02M3/02-055 | fuel efficiency |
| 3 | | | | | F02M23; F02M25; F02M27; F02M31/02-186 | fuel efficiency |
| 3 | | | | | F02M39-71; F02P5 | fuel efficiency |
| 3 | 1. Environmental Management | 1.1. Air pollution abatement | 1.1.3. Air pollution abatement - Not elsewhere classified | | B01D46; B01D47; B01D49; B01D50 | efficiency - unmatched |
| 3 | | | | | B01D51; B03C3; F01N3; F01N5 | efficiency - unmatched |
| 3 | | | | | F01N13; F01N9; F01N11; C10L10/02 | efficiency - unmatched |
| 3 | | | | | C10L10/06 | efficiency - unmatched |
| 3 | 1. Environmental Management | 1.2. Water pollution abatement | 1.2.1. Water and wastewater treatment | | B63J4; C02F; C09K3/32; E03C1/12 | efficiency - unmatched |
| 3 | | | | | E03F | efficiency - unmatched |
| 3 | 1. Environmental Management | 1.2. Water pollution abatement | 1.2.2. Fertilizers from wastewater | | C05F7 | pure green |
| 3 | 1. Environmental Management | 1.2. Water pollution abatement | 1.2.3. Oil spill and pollutant clean-up | | E02B15/04-10; E02B2015/005; B63B35/32; C09K 3/32 | fuel efficiency |
| 3 | 1. Environmental Management | 1.3. Waste management | 1.3.1. Solid waste collection | | E01H15; B65F | efficiency - unmatched |
| 3 | 1. Environmental Management | 1.3. Waste management | 1.3.2. Material recovery, recycling and re-use | | A23K10/26-28; A23K10/32-33; A23K10/37-38; A43B1/12 | pure green |
| 3 | | | | | B03B9/06; B22F8; B29B7/66; B29B17 | pure green |
| 3 | | | | | B30B9/32; B62D67; B65H73; B65D65/46 | pure green |
| 3 | | | | | C03B1/02; C04B7/24-30; C04B11/26; C04B18/04-305 | pure green |
| 3 | | | | | C04B33/132; C08J11; C09K11/01; C10M175 | pure green |
| 3 | | | | | C22B7; C22B19/28-30; C22B25/06; D01G11 | pure green |
| 3 | | | | | D21B1/08-10; D21B1/32; D21C5/02; D21H17/01 | pure green |
| 3 | | | | | H01B 15/00; H01J 9/52; H01M 6/52; H01M 10/54 | pure green |
| 3 | 1. Environmental Management | 1.3. Waste management | 1.3.3. Fertilizers from waste | | C05F | pure green |
| 3 | 1. Environmental Management | 1.3. Waste management | 1.3.4. Incineration and energy recovery | | C10L5/46-48; F23G5; F23G7 | efficiency - unmatched |
| 3 | 1. Environmental Management | 1.3. Waste management | 1.3.5. Landfilling | | n.a. | efficiency - unmatched |
| 3 | 1. Environmental Management | 1.3. Waste management | 1.3.6. Waste management - Not elsewhere classified | | B09B; C10G1/10; A61L11; B02C19/0075 | efficiency - unmatched |
| 2 | 1. Environmental Management | 1.4. Soil remediation | | | B09C | efficiency - unmatched |
| 2 | 1. Environmental Management | 1.5. Environmental monitoring | | | F01N11; G08B21/12-14 | efficiency - unmatched |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.1. Renewable energy generation | 2.1.1. Wind energy | | Y02E10/70-76 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.1. Renewable energy generation | 2.1.2. Solar thermal energy | | Y02E10/40-47 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.1. Renewable energy generation | 2.1.3. Solar photovoltaic (PV) energy | | Y02E10/50-56 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.1. Renewable energy generation | 2.1.4. Solar thermal-PV hybrids | | Y02E10/60 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.1. Renewable energy generation | 2.1.5. Geothermal energy | | Y02E10/10 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.1. Renewable energy generation | 2.1.6. Marine energy, e.g. using wave energy or salinity gradient | | Y02E10/30 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.1. Renewable energy generation | 2.1.7. Hydro energy | | Y02E10/20 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.2. Energy generation from fuels of non-fossil origin | 2.2.1. Biofuels, e.g. bio-diesel | | Y02E50/10 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.2. Energy generation from fuels of non-fossil origin | 2.2.2. Fuel from waste, e.g. synthetic alcohol or diesel | | Y02E50/30 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.2. Energy generation from fuels of non-fossil origin | 2.3.1. Technologies for improved output efficiency (combined heat and power, combined cycles, etc.) | | Y02E20/12-18 | fuel efficiency |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.2. Energy generation from fuels of non-fossil origin | 2.3.2. Technologies for improved input efficiency (efficient combustion or heat usage) | | Y02E20/30-34 | fuel efficiency |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.4. Nuclear energy | 2.4.1. Nuclear fusion reactors | | Y02E30/10 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.4. Nuclear energy | 2.4.2. Nuclear fission reactors | | Y02E30/30 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.5. Technologies for an efficient electrical power generation, transmission or distribution | 2.5.1. Superconducting electric elements or equipment | | Y02E40/60 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.5. Technologies for an efficient electrical power generation, transmission or distribution | 2.5.2. Smart grids as CCM technology in the energy generation sector | | Y02E40/70 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.5. Technologies for an efficient electrical power generation, transmission or distribution | 2.5.3. Not elsewhere classified | | Y02E40/10-50 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.6. Enabling Technologies (Technologies with potential or indirect contribution to GHG emission mitigation) | 2.6.1. Energy storage | | Y02E60/10-16 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.6. Enabling Technologies (Technologies with potential or indirect contribution to GHG emission mitigation) | 2.6.2. Hydrogen technology | | Y02E60/30-36 | efficiency - unmatched |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.6. Enabling Technologies (Technologies with potential or indirect contribution to GHG emission mitigation) | 2.6.3. Fuel cells | | Y02E60/50 | pure green |
| 3 | 2. CCM technologies related to energy generation, transmission or distribution | 2.6. Enabling Technologies (Technologies with potential or indirect contribution to GHG emission mitigation) | 2.6.4. High-voltage direct current transmission | | Y02E60/60 | efficiency - unmatched |
| 2 | 2. CCM technologies related to energy generation, transmission or distribution | 2.7. Other energy conversion or management systems reducing GHG emissions | | | Y02E70 | efficiency - unmatched |
| 1 | 3. Capture, storage, sequestration or disposal of GHG | 3. Capture, storage, sequestration or disposal of GHG | | | Y02C | Adaptation/ No GHG |
| 2 | 3. Capture, storage, sequestration or disposal of GHG | 3.1. Capture or disposal of nitrous oxide (N2O) | | | Y02C20/10 | pure green |
| 2 | 3. Capture, storage, sequestration or disposal of GHG | 3.2. Capture or disposal of methane (CH4) | | | Y02C20/20 | pure green |
| 2 | 3. Capture, storage, sequestration or disposal of GHG | 3.3. Capture or disposal of perfluorocarbons [PFC], hydrofluorocarbons [HFC] or sulfur hexafluoride [SF6] | | | Y02C20/30 | pure green |
| 2 | 3. Capture, storage, sequestration or disposal of GHG | 3.4. Capture or disposal of carbon dioxide (CO2) | | | Y02C20/40 | pure green |
| 1 | 4. CCM technologies related to transportation | 4. CCM technologies related to transportation | | | Y02T | Adaptation/ No GHG |
| 3 | 4. CCM technologies related to transportation | 4.1. Road transport | 4.1.1. Conventional vehicles (based on internal combustion engine) | | Y02T10/10-40 | fuel efficiency |
| 3 | 4. CCM technologies related to transportation | 4.1. Road transport | 4.1.2. Hybrid vehicles | | Y02T10/62 | pure green |
| 3 | 4. CCM technologies related to transportation | 4.1. Road transport | 4.1.3. Electric vehicles | | Y02T10/64-72 | pure green |
| 3 | 4. CCM technologies related to transportation | 4.1. Road transport | 4.1.4. Fuel efficiency-improving vehicle design (common to all road vehicles) | | Y02T10/80 | efficiency - unmatched |
| 2 | 4. CCM technologies related to transportation | 4.2. Rail Transport | 4.2. RAIL Transport | | Y02T30/00 | efficiency - unmatched |
| 2 | 4. CCM technologies related to transportation | 4.3. Aeronautics or air transport | | | Y02T50 | efficiency - unmatched |
| 2 | 4. CCM technologies related to transportation | 4.4. Maritime or waterways transport | | | Y02T70 | efficiency - unmatched |
| 3 | 4. CCM technologies related to transportation | 4.5. Enabling Technologies in transport | 4.5.1. Electric vehicle charging | | Y02T90/10-167 | pure green |
| 3 | 4. CCM technologies related to transportation | 4.5. Enabling Technologies in transport | 4.5.2. Application of hydrogen technology to transportation, e.g. using fuel cells | | Y02T90/40 | pure green |
| 2 | 5. CCM technologies related to buildings | 5.1. Integration of renewable energy sources in buildings | | | Y02B10 | pure green |
| 3 | 5. CCM technologies related to buildings | 5.2. energy efficiency in buildings | 5.2.1. Energy efficient lighting | | Y02B20 | efficiency - unmatched |
| 3 | 5. CCM technologies related to buildings | 5.2. energy efficiency in buildings | 5.2.2. Energy efficient heating, ventilation or air conditioning [HVAC] | | Y02B30 | efficiency - unmatched |
| 3 | 5. CCM technologies related to buildings | 5.2. energy efficiency in buildings | 5.2.3. Energy efficiency in home appliances | | Y02B40 | efficiency - unmatched |
| 3 | 5. CCM technologies related to buildings | 5.2. energy efficiency in buildings | 5.2.4. Energy efficient elevators, escalators and moving walkways, e.g. energy saving or recuperation technologies | | Y02B50 | efficiency - unmatched |
| 3 | 5. CCM technologies related to buildings | 5.2. energy efficiency in buildings | 5.2.5. End-user side | | Y02B70 | efficiency - unmatched |
| 2 | 5. CCM technologies related to buildings | 5.3. Architectural or constructional elements improving the thermal performance of buildings | | | Y02B80 | pure green |
| 2 | 5. CCM technologies related to buildings | 5.4. Enabling technologies in buildings | | | Y02B90 | pure green |
| 2 | 6. CCM technologies related to wastewater treatment or waste management | 6.1. wastewater treatment | | | Y02W10 | efficiency - unmatched |
| 3 | 6. CCM technologies related to wastewater treatment or waste management | 6.2. Solid waste management | 6.2.1. Waste collection, transportation, transfer or storage | | Y02W30/10 | efficiency - unmatched |
| 3 | 6. CCM technologies related to wastewater treatment or waste management | 6.2. Solid waste management | 6.2.2. Waste processing or separation | | Y02W30/20 | efficiency - unmatched |
| 3 | 6. CCM technologies related to wastewater treatment or waste management | 6.2. Solid waste management | 6.2.3. Landfill technologies aiming to mitigate methane emissions | | Y02W30/30 | efficiency - unmatched |
| 3 | 6. CCM technologies related to wastewater treatment or waste management | 6.2. Solid waste management | 6.2.4. Bio-organic fraction processing; Production of fertilisers from the organic fraction of waste or refuse | | Y02W30/40 | pure green |
| 3 | 6. CCM technologies related to wastewater treatment or waste management | 6.2. Solid waste management | 6.2.5. Reuse, recycling or recovery technologies | | Y02W30/50-91 | pure green |
| 2 | 6. CCM technologies related to wastewater treatment or waste management | 6.3. Enabling technologies or technologies with a potential or indirect contribution to GHG mitigation | | | Y02W90 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.1. Technologies related to metal processing | 7.1.1. Reduction of GHG [GHG] emissions | | Y02P10/10-146 | fuel efficiency |
| 3 | 7. CCM technologies in the production or processing of goods | 7.1. Technologies related to metal processing | 7.1.2. Process efficiency | | Y02P10/20-32 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.2. Technologies relating to the chemical industry | 7.2.1. Process efficiency in chemical industry | | Y02P20/10-133 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.2. Technologies relating to the chemical industry | 7.2.2. Feedstock | | Y02P20/141-145 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.2. Technologies relating to the chemical industry | 7.2.3. Reduction of GHG [GHG] emissions, e.g. CO2 | | Y02P20/151-156 | fuel efficiency |
| 3 | 7. CCM technologies in the production or processing of goods | 7.2. Technologies relating to the chemical industry | 7.2.5. Improvements relating to adipic acid or caprolactam production | | Y02P20/30 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.2. Technologies relating to the chemical industry | 7.2.6. Improvements relating to fluorochloro hydrocarbon, e.g. chlorodifluoromethane [HCFC-22] production | | Y02P20/40 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.3. Technologies relating to oil refining and petrochemical industry | 7.3.1. Bio-feedstock | | Y02P30/20 | fuel efficiency |
| 3 | 7. CCM technologies in the production or processing of goods | 7.3. Technologies relating to oil refining and petrochemical industry | 7.3.2. Ethylene production | | Y02P30/40 | fuel efficiency |
| 3 | 7. CCM technologies in the production or processing of goods | 7.4. Technologies relating to the processing of minerals | 7.4.1. Production of cement | | Y02P40/10-18 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.4. Technologies relating to the processing of minerals | 7.4.2. Production or processing of lime | | Y02P40/40-45 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.4. Technologies relating to the processing of minerals | 7.4.3. Glass production | | Y02P40/50-57 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.4. Technologies relating to the processing of minerals | 7.4.4. Production of ceramic materials or ceramic elements | | Y02P40/60 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.5. Technologies relating to agriculture, livestock or agroalimentary industries | 7.5.1. Using renewable energies, e.g. solar water pumping | | Y02P60/12 | pure green |
| 3 | 7. CCM technologies in the production or processing of goods | 7.5. Technologies relating to agriculture, livestock or agroalimentary industries | 7.5.2. Measures for saving energy, e.g. in green houses | | Y02P60/14 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.5. Technologies relating to agriculture, livestock or agroalimentary industries | 7.5.3. Reduction of GHG [GHG] emissions in agriculture | | Y02P60/20-22 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.5. Technologies relating to agriculture, livestock or agroalimentary industries | 7.5.4. Land use policy measures | | Y02P60/30 | efficiency - unmatched |

| Level | Topic L1 | Topic L2 | Topic L3 | Topic L4 | CPC codes | Category |
|---|---|---|---|---|---|---|
| 3 | 7. CCM technologies in the production or processing of goods | 7.5. Technologies relating to agriculture, livestock or agroalimentary industries | 7.5.5. Afforestation or reforestation | | Y02P60/40 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.5. Technologies relating to agriculture, livestock or agroalimentary industries | 7.5.6. Livestock or poultry management | | Y02P60/50-52 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.5. Technologies relating to agriculture, livestock or agroalimentary industries | 7.5.7. Fishing; Aquaculture; Aquafarming | | Y02P60/60 | efficiency - unmatched |
| 3 | 7. CCM technologies in the production or processing of goods | 7.5. Technologies relating to agriculture, livestock or agroalimentary industries | 7.5.8. Food processing, e.g. use of renewable energies or variable speed drives in handling, conveying or stacking | | Y02P60/80-87 | efficiency - unmatched |
| 2 | 7. CCM technologies in the production or processing of goods | 7.6. technologies in the production process for final industrial or consumer products | | | Y02P70 | efficiency - unmatched |
| 2 | 7. CCM technologies in the production or processing of goods | 7.7. CCM technologies for sector-wide applications | | | Y02P80 | efficiency - unmatched |
| 2 | 7. CCM technologies in the production or processing of goods | 7.8. Enabling technologies with a potential contribution to GHG emissions mitigation | | | Y02P90 | efficiency - unmatched |
| 2 | 8. CCM in information and communication technologies | 8.1. Energy efficient computing | | | Y02D10 | efficiency - unmatched |
| 2 | 8. CCM in information and communication technologies | 8.2. Energy efficiency in communication networks | | | Y02D30 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.1. Adaptation at coastal zones or river basins | 9.1.1. Hard structures, e.g. dams, dykes or breakwaters | | Y02A10/11 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.1. Adaptation at coastal zones or river basins | 9.1.2. Dune restoration or creation; cliff stabilisation | | Y02A10/23 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.1. Adaptation at coastal zones or river basins | 9.1.3. Artificial reefs or seaweed; restoration or protection of coral reefs | | Y02A10/26 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.1. Adaptation at coastal zones or river basins | 9.1.4. Flood prevention; flood or storm water management | | Y02A10/30 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.1. Adaptation at coastal zones or river basins | 9.1.5. Controlling, monitoring or forecasting | | Y02A10/40 | efficiency - unmatched |
| 4 | 9. Climate change adaption technologies | 9.2. Water resource management | 9.2.1. Demand-side technologies (water conservation) | 9.2.1.1. Indoor water conservation | F16K21/06-12; F16K 21/16-20; F16L55/07; E03C1/084 | efficiency - unmatched |
| 4 | | | | | E03D3/12; E03D1/14; A47K11/12; A47K11/02 | efficiency - unmatched |
| 4 | | | | | E03D13/007; E03D5/016; E03B1/041; Y02A20/146-148 | efficiency - unmatched |
| 4 | 9. Climate change adaption technologies | 9.2. Water resource management | 9.2.1. Demand-side technologies (water conservation) | 9.2.1.2. Irrigation water conservation | A01G25/02; A01G25/06; A01G 25/16; C12N15/8273 | efficiency - unmatched |
| 4 | 9. Climate change adaption technologies | 9.2. Water resource management | 9.2.1. Demand-side technologies (water conservation) | 9.2.1.3. Water conservation in thermoelectric power production | F01K23/06-108; F01D11; Y02A20/30 | fuel efficiency |
| 4 | 9. Climate change adaption technologies | 9.2. Water resource management | 9.2.2. Supply-side technologies (water availability) | 9.2.2.1. Water collection (rain, surface and ground-water) | E03B3/02; E03B3/03; Y02A20/108; E03B9 | efficiency - unmatched |
| 4 | | | | | E03B3/04; E03B3/30; E03B3/36; E03B5 | efficiency - unmatched |
| 4 | | | | | E03B3/06-26; E03B3/28; E03B3/32-34; E03B3/38-40 | efficiency - unmatched |
| 4 | 9. Climate change adaption technologies | 9.2. Water resource management | 9.2.2. Supply-side technologies (water availability) | 9.2.2.2. Water desalination | Y02A20/124-144; C02F1/265 | efficiency - unmatched |
| 4 | 9. Climate change adaption technologies | 9.2. Water resource management | 9.2.2. Supply-side technologies (water availability) | 9.2.2.3. Water storage and distribution | E03B11; Y02A20/15 | efficiency - unmatched |
| 4 | | | | | [F17D5/02; F16L55/16; G01M3/08] and [E03B; E03C; E03D] | efficiency - unmatched |
| 4 | | | | | [G01M3/14; G01M3/18; G01M3/22; G01M3/28] and [E03B; E03C; E03D] | efficiency - unmatched |
| 4 | 9. Climate change adaption technologies | 9.2. Water resource management | 9.2.2. Supply-side technologies (water availability) | 9.2.2.4. Water filtration; Water and wastewater treatment | Y02A20/152; Y02A20/20-212 | efficiency - unmatched |
| 4 | 9. Climate change adaption technologies | 9.2. Water resource management | 9.2.2. Supply-side technologies (water availability) | 9.2.2.5. Protecting water resources | Y02A20/40-411 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.3. Adapting or protecting infrastructure or their operation | 9.3.1. Extreme weather resilient electric power supply systems | | Y02A30/14 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.3. Adapting or protecting infrastructure or their operation | 9.3.2. Structural elements or technology for improving thermal insulation | | Y02A30/24-254 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.3. Adapting or protecting infrastructure or their operation | 9.3.3. Relating to heating, ventilation or air conditioning [HVAC] technologies | | Y02A30/27-274 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.3. Adapting or protecting infrastructure or their operation | 9.3.4. In transportation | | Y02A30/30 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.3. Adapting or protecting infrastructure or their operation | 9.3.5. Planning or developing urban green infrastructure | | Y02A30/60 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.4. Adaption technologies in agriculture, forestry, livestock or agroalimentary production | 9.4.1. In agriculture | | Y02A40/10-58 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.4. Adaption technologies in agriculture, forestry, livestock or agroalimentary production | 9.4.2. Ecological corridors or buffer zones | | Y02A40/60 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.4. Adaption technologies in agriculture, forestry, livestock or agroalimentary production | 9.4.3. In livestock or poultry | | Y02A40/70-76 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.4. Adaption technologies in agriculture, forestry, livestock or agroalimentary production | 9.4.4. In fisheries management | | Y02A40/80-818 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.4. Adaption technologies in agriculture, forestry, livestock or agroalimentary production | 9.4.5. In food processing or handling, e.g. food conservation | | Y02A40/90-966 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.5. Adaptation technologies in human health protection, e.g. against extreme weather | 9.5.1. Air quality improvement or preservation | | Y02A50/20-2351 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.5. Adaptation technologies in human health protection, e.g. against extreme weather | 9.5.2. Against vector-borne diseases whose impact is exacerbated by climate change | | Y02A50/30 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.6. Technologies having an indirect contribution to adaption to climate change | 9.6.1. Information and communication technologies [ICT] supporting adaptation to climate change, e.g. for weather forecasting or climate simulation | | Y02A90/10 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.6. Technologies having an indirect contribution to adaption to climate change | 9.6.2. Assessment of water resources | | Y02A90/30 | efficiency - unmatched |
| 3 | 9. Climate change adaption technologies | 9.6. Technologies having an indirect contribution to adaption to climate change | 9.6.3. Monitoring or fighting invasive species | | Y02A90/40 | efficiency - unmatched |
| 3 | 10. Ocean Economy | 10.1 Ocean renewable energy generation | 10.1.2. Offshore solar energy | | B63B 2035/4453 | pure green |
| 3 | 10. Ocean Economy | 10.1 Ocean renewable energy generation | 10.1.3. Tide, wave, current and other marine energy | | E02B 9/08; F03B 13/12-268; B63B 2035/4466; Y02E 10/30 | pure green |
| 3 | | | | | F03G 7/05 | pure green |
| 3 | 10. Ocean Economy | 10.2. Ocean pollution abatement | 10.2.1. Ballast water treatment | | C02F 2103/008; B63J 4/002-006; B63B13 | efficiency - unmatched |
| 3 | 10. Ocean Economy | 10.2. Ocean pollution abatement | 10.2.2. Oil spill (and other floating debris) prevention and cleanup | | B63B 25/082; B63B 17/0036; B63B 27/34; B63B 35/32 | fuel efficiency |
| 3 | | | | | C09K 3/32; E21B 43/0122; E02B 15/04-108; Y02A 20/204 | fuel efficiency |
| 3 | 10. Ocean Economy | 10.3. Climate change mitigatoin in maritime transport | 10.3.1. Improved vessel design | | Y02T 70/10 | efficiency - unmatched |
| 3 | 10. Ocean Economy | 10.3. Climate change mitigatoin in maritime transport | 10.3.2. Fuel-efficient propulsion or fuel substitution | | Y02T 70/50-5236 | fuel efficiency |
| 2 | 10. Ocean Economy | 10.4. CCM & adaption in fishing, aquaculture and aquafarming | | | Y02P 60/60; Y02A 40/80-818 | efficiency - unmatched |
| 2 | 10. Ocean Economy | 10.5. Desalination of sea water | | 10.5. desalination of SEA water | Y02A 20/124-144; C02F 1/265 | pure green |
| 2 | 10. Ocean Economy | 10.6. Climate change adaption in coastal zones | | | Y02A 10/00-40; Y02A 20/404; Y02A 30/14 | efficiency - unmatched |

# TABLE 5: CATEGORIES ASSIGNED TO IPC CLASSIFICATION

| Level | Topic L1 | Topic L2 | Topic L3 | Topic L4 | Topic L5 | IPC codes | Category |
|---|---|---|---|---|---|---|---|
| 3 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | SOLID FUELS | | | C10L 5/00, 5/40-5/48 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | SOLID FUELS | TORREFACTION OF BIOMASS | | C10B 53/02 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | SOLID FUELS | TORREFACTION OF BIOMASS | | C10L 5/40, 9/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | | | C10L 1/00, 1/02, 1/14 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | VEGETABLE OILS | | C10L 1/02, 1/19 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | BIODIESEL | | C07C 67/00, 69/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | BIODIESEL | | C10G | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | BIODIESEL | | C10L 1/02, 1/19 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | BIODIESEL | | C11C 3/10 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | BIODIESEL | | C12P 7/649 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | BIOETHANOL | | C10L 1/02, 1/182 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | BIOETHANOL | | C12N 9/24 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | LIQUID FUELS | BIOETHANOL | | C12P 7/06-7/14 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | BIOGAS | | | C02F 3/28, 11/04 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | BIOGAS | | | C10L 3/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | BIOGAS | | | C12M 1/107 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | BIOGAS | | | C12P 5/02 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | FROM GENETICALLY ENGINEERED ORGANISMS | | | C12N 1/13, 1/15, 1/21, 5/10, 15/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | BIO-FUELS | FROM GENETICALLY ENGINEERED ORGANISMS | | | A01H | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | INTEGRATED GASIFICATION COMBINED CYCLE (IGCC) | | | | C10L 3/00 | fuel efficiency |
| 2 | ALTERNATIVE ENERGY PRODUCTION | INTEGRATED GASIFICATION COMBINED CYCLE (IGCC) | | | | F02C 3/28 | fuel efficiency |
| 2 | ALTERNATIVE ENERGY PRODUCTION | FUEL CELLS | | | | H01M 4/86-4/98, 8/00-8/24, 12/00-12/08 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | FUEL CELLS | ELECTRODES | | | H01M 4/86-4/98 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | FUEL CELLS | ELECTRODES | INERT ELECTRODES WITH CATALYTIC ACTIVITY | | H01M 4/86-4/98 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | FUEL CELLS | NON-ACTIVE PARTS | | | H01M 8/00-8/24, 50/00-50/171 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | FUEL CELLS | WITHIN HYBRID CELLS | | | H01M 12/00-12/08 | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | PYROLYSIS OR GASIFICATION OF BIOMASS | | | | C10B 53/00 | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | PYROLYSIS OR GASIFICATION OF BIOMASS | | | | C10J | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | AGRICULTURAL WASTE | | | C10L 5/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | AGRICULTURAL WASTE | FUEL FROM ANIMAL WASTE AND CROP RESIDUES | | C10L 5/42, 5/44 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | AGRICULTURAL WASTE | INCINERATORS FOR FIELD, GARDEN OR WOOD WASTE | | F23G 7/00, 7/10 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | GASIFICATION | | | C10J 3/02, 3/46 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | GASIFICATION | | | F23B 90/00 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | GASIFICATION | | | F23G 5/027 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | CHEMICAL WASTE | | | B09B 3/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | CHEMICAL WASTE | | | F23G 7/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | INDUSTRIAL WASTE | | | C10L 5/48 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | INDUSTRIAL WASTE | | | F23G 5/00, 7/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | INDUSTRIAL WASTE | USING TOP GAS IN BLAST FURNACES TO POWER PIG-IRON PRODUCTION | | C21B 5/06 | fuel efficiency |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | INDUSTRIAL WASTE | PULP LIQUORS | | D21C 11/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | INDUSTRIAL WASTE | ANAEROBIC DIGESTION OF INDUSTRIAL WASTE | | A62D 3/02 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | INDUSTRIAL WASTE | ANAEROBIC DIGESTION OF INDUSTRIAL WASTE | | C02F 11/04, 11/14 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | INDUSTRIAL WASTE | INDUSTRIAL WOOD WASTE | | F23G 7/00, 7/10 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | HOSPITAL WASTE | | | B09B 3/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | HOSPITAL WASTE | | | F23G 5/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | LANDFILL GAS | | | B09B | fuel efficiency |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | LANDFILL GAS | SEPARATION OF COMPONENTS | | B01D 53/02, 53/04, 53/047, 53/14, 53/22, 53/24 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | MUNICIPAL WASTE | | | C10L 5/46 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HARNESSING ENERGY FROM MANMADE WASTE | MUNICIPAL WASTE | | | F23G 5/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HYDRO ENERGY | WATER-POWER PLANTS | | | E02B 9/00-9/06 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HYDRO ENERGY | WATER-POWER PLANTS | TIDE OR WAVE POWER PLANTS | | E02B 9/08 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HYDRO ENERGY | MACHINES OR ENGINES FOR LIQUIDS | | | F03B | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HYDRO ENERGY | MACHINES OR ENGINES FOR LIQUIDS | | | F03C | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | HYDRO ENERGY | MACHINES OR ENGINES FOR LIQUIDS | USING WAVE OR TIDE ENERGY | | F03B 13/12-13/26 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HYDRO ENERGY | REGULATING, CONTROLLING OR SAFETY MEANS OF MACHINES OR ENGINES | | | F03B 15/00-15/22 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | HYDRO ENERGY | PROPULSION OF MARINE VESSELS USING ENERGY DERIVED FROM WATER MOVEMENT | | | B63H 19/02, 19/04 | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | OCEAN THERMAL ENERGY CONVERSION (OTEC) | | | | F03G 7/05 | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | WIND ENERGY | | | | F03D | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | WIND ENERGY | STRUCTURAL ASSOCIATION OF ELECTRIC GENERATOR WITH MECHANICAL DRIVING MOTOR | | | H02K 7/18 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | WIND ENERGY | STRUCTURAL ASPECTS OF WIND TURBINES | | | B63B 35/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | WIND ENERGY | STRUCTURAL ASPECTS OF WIND TURBINES | | | E04H 12/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | WIND ENERGY | STRUCTURAL ASPECTS OF WIND TURBINES | | | F03D 13/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | WIND ENERGY | PROPULSION OF VEHICLES USING WIND POWER | | | B60K 16/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | WIND ENERGY | PROPULSION OF VEHICLES USING WIND POWER | ELECTRIC PROPULSION OF VEHICLES USING WIND POWER | | B60L 8/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | WIND ENERGY | PROPULSION OF MARINE VESSELS BY WIND-POWERED MOTORS | | | B63H 13/00 | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | | | | F24S | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | | | | H02S | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | DEVICES ADAPTED FOR THE CONVERSION OF RADIATION ENERGY INTO ELECTRICAL ENERGY | | H01L 27/142, 31/00-31/078 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | DEVICES ADAPTED FOR THE CONVERSION OF RADIATION ENERGY INTO ELECTRICAL ENERGY | | H01G 9/20 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | DEVICES ADAPTED FOR THE CONVERSION OF RADIATION ENERGY INTO ELECTRICAL ENERGY | | H02S 10/00 | pure green |
| 5 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | DEVICES ADAPTED FOR THE CONVERSION OF RADIATION ENERGY INTO ELECTRICAL ENERGY | USING ORGANIC MATERIALS AS THE ACTIVE PART | H01L 27/30, 51/42-51/48 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | ASSEMBLIES OF A PLURALITY OF SOLAR CELLS | | H01L 25/00, 25/03, 25/16, 25/18, 31/042 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | SILICON; SINGLE-CRYSTAL GROWTH | | C01B 33/02 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | SILICON; SINGLE-CRYSTAL GROWTH | | C23C 14/14, 16/24 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | SILICON; SINGLE-CRYSTAL GROWTH | | C30B 29/06 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | REGULATING TO THE MAXIMUM POWER AVAILABLE FROM SOLAR CELLS | | G05F 1/67 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | ELECTRIC LIGHTING DEVICES WITH, OR RECHARGEABLE WITH, SOLAR CELLS | | F21L 4/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | ELECTRIC LIGHTING DEVICES WITH, OR RECHARGEABLE WITH, SOLAR CELLS | | F21S 9/03 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | CHARGING BATTERIES | | H02J 7/35 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | DYE-SENSITISED SOLAR CELLS (DSSC) | | H01G 9/20 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PHOTOVOLTAICS (PV) | DYE-SENSITISED SOLAR CELLS (DSSC) | | H01M 14/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | USE OF SOLAR HEAT | | | F24S | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | USE OF SOLAR HEAT | FOR DOMESTIC HOT WATER SYSTEMS | | F24D 17/00, 18/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | USE OF SOLAR HEAT | FOR SPACE HEATING | | F24D 3/00, 5/00, 11/00, 19/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | USE OF SOLAR HEAT | FOR SWIMMING POOLS | | F24S 90/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | USE OF SOLAR HEAT | SOLAR UPDRAFT TOWERS | | F03D 1/04, 9/00, 13/20 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | USE OF SOLAR HEAT | SOLAR UPDRAFT TOWERS | | F03G 6/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | USE OF SOLAR HEAT | FOR TREATMENT OF WATER, WASTE WATER OR SLUDGE | | C02F 1/14 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | USE OF SOLAR HEAT | GAS TURBINE POWER PLANTS USING SOLAR HEAT SOURCE | | F02C 1/05 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | HYBRID SOLAR THERMAL-PV SYSTEMS | | | H01L 31/0525 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | HYBRID SOLAR THERMAL-PV SYSTEMS | | | H02S 40/44 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PROPULSION OF VEHICLES USING SOLAR POWER | | | B60K 16/00 | pure green |
| 4 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PROPULSION OF VEHICLES USING SOLAR POWER | ELECTRIC PROPULSION OF VEHICLES USING SOLAR POWER | | B60L 8/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | PRODUCING MECHANICAL POWER FROM SOLAR ENERGY | | | F03G 6/00-6/06 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | ROOF COVERING ASPECTS OF ENERGY COLLECTING DEVICES | | | E04D 13/00, 13/18 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | STEAM GENERATION USING SOLAR HEAT | | | F22B 1/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | STEAM GENERATION USING SOLAR HEAT | | | F24V 30/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | REFRIGERATION OR HEAT PUMP SYSTEMS USING SOLAR ENERGY | | | F25B 27/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | USE OF SOLAR ENERGY FOR DRYING MATERIALS OR OBJECTS | | | F26B 3/00, 3/28 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | SOLAR CONCENTRATORS | | | F24S 23/00 | pure green |

| Level | Topic L1 | Topic L2 | Topic L3 | Topic L4 | Topic L5 | IPC codes | Category |
|---|---|---|---|---|---|---|---|
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | SOLAR CONCENTRATORS | | | G02B 7/183 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | SOLAR ENERGY | SOLAR PONDS | | | F24S 10/10 | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | GEOTHERMAL ENERGY | | | | F24T | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | GEOTHERMAL ENERGY | USE OF GEOTHERMAL HEAT | | | F01K | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | GEOTHERMAL ENERGY | USE OF GEOTHERMAL HEAT | | | F24F 5/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | GEOTHERMAL ENERGY | USE OF GEOTHERMAL HEAT | | | F24T 10/00-50/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | GEOTHERMAL ENERGY | USE OF GEOTHERMAL HEAT | | | H02N 10/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | GEOTHERMAL ENERGY | USE OF GEOTHERMAL HEAT | | | F25B 30/06 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | GEOTHERMAL ENERGY | PRODUCTION OF MECHANICAL POWER FROM GEOTHERMAL ENERGY | | | F03G 4/00-4/06, 7/04 | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | OTHER PRODUCTION OR USE OF HEAT, NOT DERIVED FROM COMBUSTION, E.G.Â NATURAL HEAT | | | | F24T 10/00-50/00 | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | OTHER PRODUCTION OR USE OF HEAT, NOT DERIVED FROM COMBUSTION, E.G.Â NATURAL HEAT | | | | F24V 30/00-50/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | OTHER PRODUCTION OR USE OF HEAT, NOT DERIVED FROM COMBUSTION, E.G.Â NATURAL HEAT | HEAT PUMPS IN CENTRAL HEATING SYSTEMS USING HEAT ACCUMULATED IN STORAGE MASSES | | | F24D 11/02 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | OTHER PRODUCTION OR USE OF HEAT, NOT DERIVED FROM COMBUSTION, E.G.Â NATURAL HEAT | HEAT PUMPS IN OTHER DOMESTIC- OR SPACE-HEATING SYSTEMS | | | F24D 15/04 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | OTHER PRODUCTION OR USE OF HEAT, NOT DERIVED FROM COMBUSTION, E.G.Â NATURAL HEAT | HEAT PUMPS IN DOMESTIC HOT-WATER SUPPLY SYSTEMS | | | F24D 17/02, 18/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | OTHER PRODUCTION OR USE OF HEAT, NOT DERIVED FROM COMBUSTION, E.G.Â NATURAL HEAT | AIR OR WATER HEATERS USING HEAT PUMPS | | | F24H 4/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | OTHER PRODUCTION OR USE OF HEAT, NOT DERIVED FROM COMBUSTION, E.G.Â NATURAL HEAT | HEAT PUMPS | | | F25B 30/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | TO PRODUCE MECHANICAL ENERGY | | | F01K 27/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | OF COMBUSTION ENGINES | | | F01K 23/06-23/10 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | OF COMBUSTION ENGINES | | | F01N 5/00 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | OF COMBUSTION ENGINES | | | F02G 5/00-5/04 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | OF COMBUSTION ENGINES | | | F25B 27/02 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | OF STEAM ENGINE PLANTS | | | F01K 17/00, 23/04 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | OF GAS-TURBINE PLANTS | | | F02C 6/18 | fuel efficiency |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | AS SOURCE OF ENERGY FOR REFRIGERATION PLANTS | | | F25B 27/02 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | FOR TREATMENT OF WATER, WASTE WATER OR SEWAGE | | | C02F 1/16 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | RECOVERY OF WASTE HEAT IN PAPER PRODUCTION | | | D21F 5/20 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | FOR STEAM GENERATION BY EXPLOITATION OF THE HEAT CONTENT OF HOT HEAT CARRIERS | | | F22B 1/02 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | RECUPERATION OF HEAT ENERGY FROM WASTE INCINERATION | | | F23G 5/46 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | ENERGY RECOVERY IN AIR CONDITIONING | | | F24F 12/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | ARRANGEMENTS FOR USING WASTE HEAT FROM FURNACES, KILNS, OVENS OR RETORTS | | | F27D 17/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | REGENERATIVE HEAT-EXCHANGE APPARATUS | | | F28D 17/00-20/00 | pure green |
| 3 | ALTERNATIVE ENERGY PRODUCTION | USING WASTE HEAT | OF GASIFICATION PLANTS | | | C10J 3/86 | pure green |
| 2 | ALTERNATIVE ENERGY PRODUCTION | DEVICES FOR PRODUCING MECHANICAL POWER FROM MUSCLE ENERGY | | | | F03G 5/00-5/08 | pure green |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | HYBRID VEHICLES, E.G. HYBRID ELECTRIC VEHICLES (HEVS) | | | B60K 6/00, 6/20 | pure green |
| 4 | TRANSPORTATION | VEHICLES IN GENERAL | HYBRID VEHICLES, E.G. HYBRID ELECTRIC VEHICLES (HEVS) | CONTROL SYSTEMS | | B60W 20/00 | pure green |
| 4 | TRANSPORTATION | VEHICLES IN GENERAL | HYBRID VEHICLES, E.G. HYBRID ELECTRIC VEHICLES (HEVS) | GEARINGS THEREFOR | | F16H 3/00-3/78, 48/00-48/30 | pure green |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | BRUSHLESS MOTORS | | | H02K 29/08 | efficiency - unmatched |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | ELECTROMAGNETIC CLUTCHES | | | H02K 49/10 | efficiency - unmatched |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | REGENERATIVE BRAKING SYSTEMS | | | B60L 7/10-7/22 | efficiency - unmatched |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | ELECTRIC PROPULSION WITH POWER SUPPLY FROM FORCE OF NATURE, E.G.Â SUN, WIND | | | B60L 8/00 | pure green |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | ELECTRIC PROPULSION WITH POWER SUPPLY EXTERNAL TO VEHICLE | | | B60L 9/00 | pure green |
| 4 | TRANSPORTATION | VEHICLES IN GENERAL | ELECTRIC PROPULSION WITH POWER SUPPLY EXTERNAL TO VEHICLE | WITH POWER SUPPLY FROM FUEL CELLS, E.G. FOR HYDROGEN VEHICLES | | B60L 50/50-58/40 | pure green |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | COMBUSTION ENGINES OPERATING ON GASEOUS FUELS, E.G. HYDROGEN | | | F02B 43/00 | fuel efficiency |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | COMBUSTION ENGINES OPERATING ON GASEOUS FUELS, E.G. HYDROGEN | | | F02M 21/02, 27/02 | fuel efficiency |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | POWER SUPPLY FROM FORCE OF NATURE, E.G.Â SUN, WIND | | | B60K 16/00 | pure green |
| 3 | TRANSPORTATION | VEHICLES IN GENERAL | CHARGING STATIONS FOR ELECTRIC VEHICLES | | | H02J 7/00 | pure green |
| 3 | TRANSPORTATION | VEHICLES OTHER THAN RAIL VEHICLES | DRAG REDUCTION | | | B62D 35/00, 35/02 | efficiency - unmatched |
| 3 | TRANSPORTATION | VEHICLES OTHER THAN RAIL VEHICLES | DRAG REDUCTION | | | B63B 1/34-1/40 | efficiency - unmatched |
| 3 | TRANSPORTATION | VEHICLES OTHER THAN RAIL VEHICLES | HUMAN-POWERED VEHICLE | | | B62K | pure green |
| 3 | TRANSPORTATION | VEHICLES OTHER THAN RAIL VEHICLES | HUMAN-POWERED VEHICLE | | | B62M 1/00, 3/00, 5/00, 6/00 | pure green |
| 2 | TRANSPORTATION | RAIL VEHICLES | | | | B61 | efficiency - unmatched |
| 3 | TRANSPORTATION | RAIL VEHICLES | DRAG REDUCTION | | | B61D 17/02 | efficiency - unmatched |
| 3 | TRANSPORTATION | MARINE VESSEL PROPULSION | PROPULSIVE DEVICES DIRECTLY ACTED ON BY WIND | | | B63H 9/00 | pure green |
| 3 | TRANSPORTATION | MARINE VESSEL PROPULSION | PROPULSION BY WIND-POWERED MOTORS | | | B63H 13/00 | pure green |
| 3 | TRANSPORTATION | MARINE VESSEL PROPULSION | PROPULSION USING ENERGY DERIVED FROM WATER MOVEMENT | | | B63H 19/02, 19/04 | pure green |
| 3 | TRANSPORTATION | MARINE VESSEL PROPULSION | PROPULSION BY MUSCLE POWER | | | B63H 16/00 | pure green |
| 3 | TRANSPORTATION | MARINE VESSEL PROPULSION | PROPULSION DERIVED FROM NUCLEAR ENERGY | | | B63H 21/18 | pure green |
| 2 | TRANSPORTATION | COSMONAUTIC VEHICLES USING SOLAR ENERGY | | | | B64G 1/44 | pure green |
| 2 | ENERGY CONSERVATION | STORAGE OF ELECTRICAL ENERGY | | | | B60K 6/28 | pure green |
| 2 | ENERGY CONSERVATION | STORAGE OF ELECTRICAL ENERGY | | | | B60W 10/26 | pure green |
| 2 | ENERGY CONSERVATION | STORAGE OF ELECTRICAL ENERGY | | | | H01M 10/44-10/46 | pure green |
| 2 | ENERGY CONSERVATION | STORAGE OF ELECTRICAL ENERGY | | | | H01G 11/00 | pure green |
| 2 | ENERGY CONSERVATION | STORAGE OF ELECTRICAL ENERGY | | | | H02J 3/28, 7/00, 15/00 | pure green |
| 2 | ENERGY CONSERVATION | POWER SUPPLY CIRCUITRY | | | | H02J | pure green |
| 3 | ENERGY CONSERVATION | POWER SUPPLY CIRCUITRY | WITH POWER SAVING MODES | | | H02J 9/00 | pure green |
| 2 | ENERGY CONSERVATION | MEASUREMENT OF ELECTRICITY CONSUMPTION | | | | B60L 3/00 | pure green |
| 2 | ENERGY CONSERVATION | MEASUREMENT OF ELECTRICITY CONSUMPTION | | | | G01R | pure green |
| 2 | ENERGY CONSERVATION | STORAGE OF THERMAL ENERGY | | | | C09K 5/00 | pure green |
| 2 | ENERGY CONSERVATION | STORAGE OF THERMAL ENERGY | | | | F24H 7/00 | pure green |
| 2 | ENERGY CONSERVATION | STORAGE OF THERMAL ENERGY | | | | F28D 20/00, 20/02 | pure green |
| 3 | ENERGY CONSERVATION | LOW ENERGY LIGHTING | ELECTROLUMINESCENT LIGHT SOURCES (E.G. LEDS, OLEDS, PLEDS) | | | F21K 99/00 | efficiency - unmatched |
| 3 | ENERGY CONSERVATION | LOW ENERGY LIGHTING | ELECTROLUMINESCENT LIGHT SOURCES (E.G. LEDS, OLEDS, PLEDS) | | | F21L 4/02 | efficiency - unmatched |
| 3 | ENERGY CONSERVATION | LOW ENERGY LIGHTING | ELECTROLUMINESCENT LIGHT SOURCES (E.G. LEDS, OLEDS, PLEDS) | | | H01L 33/00-33/64, 51/50 | efficiency - unmatched |
| 3 | ENERGY CONSERVATION | LOW ENERGY LIGHTING | ELECTROLUMINESCENT LIGHT SOURCES (E.G. LEDS, OLEDS, PLEDS) | | | H05B 33/00 | efficiency - unmatched |
| 2 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | | | | E04B 1/62, 1/74-1/80, 1/88, 1/90 | efficiency - unmatched |
| 3 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | | | E04C 1/40, 1/41, 2/284-2/296 | efficiency - unmatched |
| 4 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | FOR DOOR OR WINDOW OPENINGS | | E06B 3/263 | efficiency - unmatched |
| 4 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | FOR WALLS | | E04B 2/00 | efficiency - unmatched |
| 4 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | FOR WALLS | | E04F 13/08 | efficiency - unmatched |
| 4 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | FOR FLOORS | | E04B 5/00 | efficiency - unmatched |
| 4 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | FOR FLOORS | | E04F 15/18 | efficiency - unmatched |
| 4 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | FOR ROOFS | | E04B 7/00 | efficiency - unmatched |
| 4 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | FOR ROOFS | | E04D 1/28, 3/35, 13/16 | efficiency - unmatched |
| 4 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | FOR CEILINGS | | E04B 9/00 | efficiency - unmatched |
| 4 | ENERGY CONSERVATION | THERMAL BUILDING INSULATION, IN GENERAL | INSULATING BUILDING ELEMENTS | FOR CEILINGS | | E04F 13/08 | efficiency - unmatched |
| 2 | ENERGY CONSERVATION | RECOVERING MECHANICAL ENERGY | | | | F03G 7/08 | pure green |
| 3 | ENERGY CONSERVATION | RECOVERING MECHANICAL ENERGY | CHARGEABLE MECHANICAL ACCUMULATORS IN VEHICLES | | | B60K 6/10, 6/30 | pure green |
| 3 | ENERGY CONSERVATION | RECOVERING MECHANICAL ENERGY | CHARGEABLE MECHANICAL ACCUMULATORS IN VEHICLES | | | B60L 50/30 | pure green |
| 2 | WASTE MANAGEMENT | WASTE DISPOSAL | | | | B09B | efficiency - unmatched |
| 2 | WASTE MANAGEMENT | WASTE DISPOSAL | | | | B65F | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | TREATMENT OF WASTE | DISINFECTION OR STERILISATION | | | A61L 11/00 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | TREATMENT OF WASTE | TREATMENT OF HAZARDOUS OR TOXIC WASTE | | | A62D 3/00, 101/00 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | TREATMENT OF WASTE | TREATING RADIOACTIVELY CONTAMINATED MATERIAL; DECONTAMINATION ARRANGEMENTS THEREFOR | | | G21F 9/00 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | TREATMENT OF WASTE | REFUSE SEPARATION | | | B03B 9/06 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | TREATMENT OF WASTE | RECLAMATION OF CONTAMINATED SOIL | | | B09C | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | TREATMENT OF WASTE | MECHANICAL TREATMENT OF WASTE PAPER | | | D21B 1/08, 1/32 | efficiency - unmatched |
| 2 | WASTE MANAGEMENT | CONSUMING WASTE BY COMBUSTION | | | | F23G | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | USE OF RUBBER WASTE IN FOOTWEAR | | | A43B 1/12, 21/14 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | MANUFACTURE OF ARTICLES FROM WASTE METAL PARTICLES | | | B22F 8/00 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | PRODUCTION OF HYDRAULIC CEMENTS FROM WASTE MATERIALS | | | C04B 7/24-7/30 | efficiency - unmatched |

| Level | Topic L1 | Topic L2 | Topic L3 | Topic L4 | Topic L5 | IPC codes | Category |
|---|---|---|---|---|---|---|---|
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | USE OF WASTE MATERIALS AS FILLERS FOR MORTARS, CONCRETE | | | C04B 18/04-18/10 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | PRODUCTION OF FERTILISERS FROM WASTE OR REFUSE | | | C05F | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | | | C08J 11/00-11/28 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | | | C09K 11/01 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | | | C11B 11/00, 13/00-13/04 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | | | C14C 3/32 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | | | C21B 3/04 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | | | C25C 1/00 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | | | D01F 13/00-13/04 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | RECOVERY OF PLASTICS MATERIALS FROM WASTE | | B29B 17/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | DISASSEMBLY OF VEHICLES FOR RECOVERY OF SALVAGEABLE PARTS | | B62D 67/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | OF POLYMERS | | C08J 11/04-11/28 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | PRODUCTION OF LIQUID HYDROCARBONS FROM RUBBER WASTE | | C10G 1/10 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | SOLID FUELS DERIVED FROM WASTE | | C10L 5/46, 5/48 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | OBTAINING METALS FROM SCRAP | | C22B 7/00-7/04, 19/30, 25/06 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | DISINTEGRATING FIBROUS MATERIALS FOR REUSE | | D01G 11/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | WORKING-UP WASTE PAPER TO OBTAIN CELLULOSE | | D21C 5/02 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | RECLAIMING SALVAGEABLE COMPONENTS OR MATERIAL FROM ELECTRIC DISCHARGE TUBES OR LAMPS | | H01J 9/50, 9/52 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | REUSE OF WASTE MATERIALS | RECOVERY OR WORKING-UP OF WASTE MATERIALS | RECLAIMING SERVICEABLE PARTS OF WASTE CELLS, BATTERIES OR ACCUMULATORS | | H01M 6/52, 10/54 | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | POLLUTION CONTROL | CARBON CAPTURE AND STORAGE | | | B01D 53/14, 53/22, 53/62 | pure green |
| 3 | WASTE MANAGEMENT | POLLUTION CONTROL | CARBON CAPTURE AND STORAGE | | | B65G 5/00 | pure green |
| 3 | WASTE MANAGEMENT | POLLUTION CONTROL | CARBON CAPTURE AND STORAGE | | | C01B 32/50 | pure green |
| 3 | WASTE MANAGEMENT | POLLUTION CONTROL | CARBON CAPTURE AND STORAGE | | | E21B 41/00, 43/16 | pure green |
| 3 | WASTE MANAGEMENT | POLLUTION CONTROL | CARBON CAPTURE AND STORAGE | | | E21F 17/16 | pure green |
| 3 | WASTE MANAGEMENT | POLLUTION CONTROL | CARBON CAPTURE AND STORAGE | | | F25J 3/02 | pure green |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | | B01D 53/00-53/96 | efficiency - unmatched |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | EXHAUST APPARATUS FOR COMBUSTION ENGINES WITH MEANS FOR TREATING EXHAUST | F01N 3/00-3/38 | fuel efficiency |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | RENDERING EXHAUST GASES INNOCUOUS | B01D 53/92 | fuel efficiency |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | RENDERING EXHAUST GASES INNOCUOUS | F02B 75/10 | fuel efficiency |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | REMOVAL OF WASTE GASES OR DUST IN STEEL PRODUCTION | C21C 5/38 | fuel efficiency |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | COMBUSTION APPARATUS USING RECIRCULATION OF FLUE GASES | C10B 21/18 | fuel efficiency |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | COMBUSTION APPARATUS USING RECIRCULATION OF FLUE GASES | F23B 80/02 | fuel efficiency |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | COMBUSTION APPARATUS USING RECIRCULATION OF FLUE GASES | F23C 9/00 | fuel efficiency |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | COMBUSTION OF WASTE GASES OR NOXIOUS GASES | F23G 7/06 | fuel efficiency |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | TREATMENT OF WASTE GASES | ELECTRICAL CONTROL OF EXHAUST GAS TREATING APPARATUS | F01N 9/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | SEPARATING DISPERSED PARTICLES FROM GASES OR VAPOURS | | B01D 45/00-51/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | SEPARATING DISPERSED PARTICLES FROM GASES OR VAPOURS | | B03C 3/00 | efficiency - unmatched |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | SEPARATING DISPERSED PARTICLES FROM GASES OR VAPOURS | DUST REMOVAL FROM FURNACES | C21B 7/22 | efficiency - unmatched |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | SEPARATING DISPERSED PARTICLES FROM GASES OR VAPOURS | DUST REMOVAL FROM FURNACES | C21C 5/38 | efficiency - unmatched |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | SEPARATING DISPERSED PARTICLES FROM GASES OR VAPOURS | DUST REMOVAL FROM FURNACES | F27B 1/18 | efficiency - unmatched |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | SEPARATING DISPERSED PARTICLES FROM GASES OR VAPOURS | DUST REMOVAL FROM FURNACES | F27B 15/12 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | USE OF ADDITIVES IN FUELS OR FIRES TO REDUCE SMOKE OR FACILITATE SOOT REMOVAL | | C10L 10/02, 10/06 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | USE OF ADDITIVES IN FUELS OR FIRES TO REDUCE SMOKE OR FACILITATE SOOT REMOVAL | | F23J 7/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | ARRANGEMENTS OF DEVICES FOR TREATING SMOKE OR FUMES FROM COMBUSTION APPARATUS | | F23J 15/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | DUST-LAYING OR DUST-ABSORBING MATERIALS | | C09K 3/22 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | AIR QUALITY MANAGEMENT | POLLUTION ALARMS | | G08B 21/12 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | CONTROL OF WATER POLLUTION | TREATING WASTE-WATER OR SEWAGE | | B62J 4/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | CONTROL OF WATER POLLUTION | TREATING WASTE-WATER OR SEWAGE | | C02F | efficiency - unmatched |
| 5 | WASTE MANAGEMENT | POLLUTION CONTROL | CONTROL OF WATER POLLUTION | TREATING WASTE-WATER OR SEWAGE | TO PRODUCE FERTILISERS | C05F 7/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | CONTROL OF WATER POLLUTION | MATERIALS FOR TREATING LIQUID POLLUTANTS | | C09K 3/32 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | CONTROL OF WATER POLLUTION | REMOVING POLLUTANTS FROM OPEN WATER | | B63B 35/32 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | CONTROL OF WATER POLLUTION | REMOVING POLLUTANTS FROM OPEN WATER | | E02B 15/04 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | CONTROL OF WATER POLLUTION | PLUMBING INSTALLATIONS FOR WASTE WATER | | E03C 1/12 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | CONTROL OF WATER POLLUTION | MANAGEMENT OF SEWAGE | | C02F 1/00, 3/00, 9/00 | efficiency - unmatched |
| 4 | WASTE MANAGEMENT | POLLUTION CONTROL | CONTROL OF WATER POLLUTION | MANAGEMENT OF SEWAGE | | E03F | efficiency - unmatched |
| 3 | WASTE MANAGEMENT | POLLUTION CONTROL | MEANS FOR PREVENTING RADIOACTIVE CONTAMINATION IN THE EVENT OF REACTOR LEAKAGE | | | G21C 13/10 | efficiency - unmatched |
| 2 | AGRICULTURE / FORESTRY | FORESTRY TECHNIQUES | | | | A01G 23/00 | efficiency - unmatched |
| 2 | AGRICULTURE / FORESTRY | ALTERNATIVE IRRIGATION TECHNIQUES | | | | A01G 25/00 | efficiency - unmatched |
| 2 | AGRICULTURE / FORESTRY | PESTICIDE ALTERNATIVES | | | | A01N 25/00-65/00 | efficiency - unmatched |
| 2 | AGRICULTURE / FORESTRY | SOIL IMPROVEMENT | | | | C09K 17/00 | efficiency - unmatched |
| 2 | AGRICULTURE / FORESTRY | SOIL IMPROVEMENT | | | | E02D 3/00 | efficiency - unmatched |
| 3 | AGRICULTURE / FORESTRY | SOIL IMPROVEMENT | ORGANIC FERTILISERS DERIVED FROM WASTE | | | C05F | efficiency - unmatched |
| 2 | ADMINISTRATIVE, REGULATORY OR DESIGN ASPECTS | COMMUTING, E.G., HOV, TELEWORKING, ETC. | | | | G06Q | efficiency - unmatched |
| 2 | ADMINISTRATIVE, REGULATORY OR DESIGN ASPECTS | COMMUTING, E.G., HOV, TELEWORKING, ETC. | | | | G08G | efficiency - unmatched |
| 2 | ADMINISTRATIVE, REGULATORY OR DESIGN ASPECTS | CARBON/EMISSIONS TRADING, E.G. POLLUTION CREDITS | | | | G06Q | efficiency - unmatched |
| 2 | ADMINISTRATIVE, REGULATORY OR DESIGN ASPECTS | STATIC STRUCTURE DESIGN | | | | E04H 1/00 | efficiency - unmatched |
| 2 | NUCLEAR POWER GENERATION | NUCLEAR ENGINEERING | | | | G21 | pure green |
| 3 | NUCLEAR POWER GENERATION | NUCLEAR ENGINEERING | FUSION REACTORS | | | G21B | pure green |
| 3 | NUCLEAR POWER GENERATION | NUCLEAR ENGINEERING | NUCLEAR (FISSION) REACTORS | | | G21C | pure green |
| 3 | NUCLEAR POWER GENERATION | NUCLEAR ENGINEERING | NUCLEAR POWER PLANT | | | G21D | pure green |
| 2 | NUCLEAR POWER GENERATION | GAS TURBINE POWER PLANTS USING HEAT SOURCE OF NUCLEAR ORIGIN | | | | F02C 1/05 | pure green |

## TABLE 6: CATEGORIES ASSIGNED TO FF CLASSIFICATION

| Main Category | Description | IPC codes | Exclusion IPC codes | Category |
|---|---|---|---|---|
| COAL GASIFICATION | Production of combustible gases containing carbon monoxide from solid carbonaceous fuels | C10J3 | | efficiency brown |
| IMPROVED BURNERS | Combustion apparatus specially adapted for combustion of two or more kinds of fuel simultaneously or alternately, at least one kind of fuel being fluent | F23C1 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED BURNERS | Combustion apparatus characterized by the arrangement or mounting of burners; Disposition of burners to obtain a loop flame. | F23C5/24 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED BURNERS | Combustion apparatus characterized by the combination of two or more combustion chambers (using fluent fuel) | F23C6 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED BURNERS | Combustion apparatus characterized by the combination of two or more combustion chambers (using only solid fuel) | F23B10 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED BURNERS | Combustion apparatus with driven means for agitating the burning fuel; Combustion apparatus with driven means for advancing the burning fuel through the combustion chamber | F23B30 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED BURNERS | Combustion apparatus characterized by means for returning solid combustion residues to the combustion chamber | F23B70 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED BURNERS | Combustion apparatus characterized by means creating a distinct flow path for flue gases or for noncombusted gases given off by the fuel | F23B80 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED BURNERS | Burners for combustion of pulverulent fuel | F23D1 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED BURNERS | Burners in which drops of liquid fuel impinge on a surface | F23D7 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED BURNERS | Burners for combustion simultaneously or alternatively of gaseous or liquid or pulverulent fuel | F23D17 | B60, B68, F24, F27 | efficiency brown |
| FLUIDIZED BED COMBUSTION | Chemical or physical processes (and apparatus therefor) conducted in the presence of fluidised particles, with liquid as a fluidising medium | B01J8/20-22 | | efficiency brown |
| FLUIDIZED BED COMBUSTION | Chemical or physical processes (and apparatus therefor) conducted in the presence of fluidised particles, according to fluidised-bed technique | B01J8/24-30 | | efficiency brown |
| FLUIDIZED BED COMBUSTION | Fluidised-bed furnaces; Other furnaces using or treating finely-divided materials in dispersion | F27B15 | | efficiency brown |
| FLUIDIZED BED COMBUSTION | Apparatus in which combustion takes place in a fluidised bed of fuel or other particles | F23C10 | | efficiency brown |
| IMPROVED BOILERS FOR STEAM GENERATION | Modifications of boiler construction, or of tube systems, dependent on installation of combustion apparatus; Arrangements or dispositions of combustion apparatus | F22B31 | | efficiency brown |
| IMPROVED BOILERS FOR STEAM GENERATION | Steam generation plants, e.g. comprising steam boilers of different types in mutual association; Combinations of low- and high-pressure boilers | F22B33/14-16 | | efficiency brown |
| IMPROVED STEAM ENGINES | Plants characterised by the use of steam or heat accumulators, or intermediate steam heaters, therein | F01K3 | | efficiency brown |
| IMPROVED STEAM ENGINES | Plants characterised by use of means for storing steam in an alkali to increase steam pressure, e.g. of Honigmann or Koenemann type | F01K5 | | efficiency brown |
| IMPROVED STEAM ENGINES | Plants characterised by more than one engine delivering power external to the plant, the engines being driven by different fluids | F01K23 | | efficiency brown |
| SUPERHEATERS | Superheating of steam | F22G | | efficiency brown |
| IMPROVED GAS TURBINES | Gas turbine plants - Heating air supply before combustion, e.g. by exhaust gases | F02C7/08-105 | | efficiency brown |
| IMPROVED GAS TURBINES | Cooling of gas turbine plants | F02C7/12-143 | | efficiency brown |
| IMPROVED GAS TURBINES | Gas turbine plants - Preventing corrosion in gas-swept spaces | F02C7/30 | | efficiency brown |
| COMBINED CYCLES | Plants characterised by more than one engine delivering power external to the plant, the engines being driven by different fluids | F01K23/02-10 | | efficiency brown |
| COMBINED CYCLES | Gas turbine plants characterised by the use of combustion products as the working fuel | F02C3/20-36 | | efficiency brown |
| COMBINED CYCLES | Combinations of gas-turbine plants with other apparatus; Supplying working fluid to a user, e.g. a chemical process, which returns working fluid to a turbine of the plant | F02C6/10-12 | | efficiency brown |
| IMPROVED COMPRESSED-IGNITION ENGINES | Engines characterised by fuel-air mixture compression ignition | F02B1/12-14 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED COMPRESSED-IGNITION ENGINES | Engines characterised by air compression and subsequent fuel addition; with compression ignition | F02B3/06-10 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED COMPRESSED-IGNITION ENGINES | Engines characterised by the fuel-air charge being ignited by compression ignition of an additional fuel | F02B7 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED COMPRESSED-IGNITION ENGINES | Engines characterised by both fuel-air mixture compression and air compression, or characterised by both positive ignition and compression ignition, e.g. in different cylinders | F02B11 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED COMPRESSED-IGNITION ENGINES | Engines characterised by the introduction of liquid fuel into cylinders by use of auxiliary fluid; Compression ignition engines using air or gas for blowing fuel into compressed air in cylinder | F02B13/02-04 | B60, B68, F24, F27 | efficiency brown |
| IMPROVED COMPRESSED-IGNITION ENGINES | Methods of operating air-compressing compression-ignition engines involving introduction of small quantities of fuel in the form of a fine mist into the air in the engine's intake. | F02B49 | B60, B68, F24, F27 | efficiency brown |
| COGENERATION | Use of steam or condensate extracted or exhausted from steam engine plant; Returning energy of steam, in exchanged form, to process, e.g. use of exhaust steam for drying solid fuel of plant | F01K17/06 | | efficiency brown |
| COGENERATION | Plants for converting heat or fluid energy into mechanical energy | F01K27 | | efficiency brown |
| COGENERATION | Using the waste heat of gas-turbine plants outside the plants themselves, e.g. gas-turbine power heat plants | F02C6/18 | | efficiency brown |
| COGENERATION | Profiting from waste heat of combustion engines | F02G5 | | efficiency brown |
| COGENERATION | Machines, plant, or systems using waste heat, e.g. from internal-combustion engines | F25B27/02 | | efficiency brown |
| TRADITIONAL FOSSIL FUELS | Production of fuel gases by carburetting air or other gases without pyrolysis | C10J | | efficiency brown |
| TRADITIONAL FOSSIL FUELS | Hydraulic Engineering | E02B | | efficiency brown |
| TRADITIONAL FOSSIL FUELS | Steam engine plants; steam accumulators; engine plants not otherwise provided for; engines using special working fluids or cycles | F01K | | efficiency brown |
| TRADITIONAL FOSSIL FUELS | Gas-turbine plants; air intakes for jet-propulsion plants; controlling fuel supply in air-breathing jet-propulsion plants | F02C | | efficiency brown |
| TRADITIONAL FOSSIL FUELS | Steam generation | F22 | | efficiency brown |
| TRADITIONAL FOSSIL FUELS | Combustion apparatus; combustion processes | F23 | | efficiency brown |
| TRADITIONAL FOSSIL FUELS | Production or use of heat not otherwise provided for | F24J | | efficiency brown |
| TRADITIONAL FOSSIL FUELS | Furnaces; kilns; ovens; retorts | F27 | | efficiency brown |
| TRADITIONAL FOSSIL FUELS | Heat exchange in general | F28 | | efficiency brown |

## TABLE 7: CATEGORIES ASSIGNED TO CK CLASSIFICATION

| OECD-env tech Categories assigned | Classified CPC level | CPC codes | Category |
|---|---|---|---|
| 1. Environmental Management | 8 | C03C2213/02; D06F2105/02; D21F1/66 | efficiency - unmatched |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 6 | C10L1/00; C10L10/00; E21B37/00; E21B44/00; E21B49/00 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 8 | C09K8/52; C10K1/002; C10K1/02; C10K3/06; C10L2250/06; C10L2270/04; C10L2290/02; C10L2290/04 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | C10L2290/06; C10L2290/10; C10L2290/24; C10L2290/26; C10L2290/28; C10L2290/30; C10L2290/58; C10L2300/20 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | C10L3/003; C10L9/08; C10L9/10; C10M2211/02; C12M21/04; E21B17/003; E21B23/02; E21B36/008 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | E21B36/02; E21B43/16; E21B43/34; E21B47/002; E21B47/008; E21B47/04; E21B7/04; E21C41/16 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | F16H57/04; F22B37/008; F23R2900/03281; F25J2260/60 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 9 | C09K8/592; C09K8/62; C10B49/04; C10K3/023; C10K3/04; C10L2200/029; C10L2290/141; C10L2290/146 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | C10L2290/543; C10L2290/544; C10L2290/545; C10L2290/547; C10L2290/567; C10L3/08; C10L3/10; C10L5/44 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | C10M2207/021; C10M2207/046; C10M2207/283; C10M2207/34; E21B43/26; E21B47/13; E21F17/06; F01C11/008 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | F22B1/18; F22B37/003 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 10 | C09K8/035; C10B49/22; C10K1/101; C10L2200/0213; C10M129/74; C10M129/76; C10M2207/125; C10M2207/129 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | C10M2207/289; C10M2215/042; E21B17/1021; E21B33/04; E21B33/134; E21B43/128; E21B47/0228; F01C1/084 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | F01C1/107 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 11 | C10L5/363; C10L5/366; E21B43/127; F23R3/20 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 12 | E21B33/0385 | fuel efficiency |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 6 | H02K13/00; H02K33/00; H02K55/00; H02K7/00 | efficiency - unmatched |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 8 | H02K15/04; H02K15/06; H02K15/10; H02K15/12; H02K2203/15; H02K2213/09; H02K3/46; H02N2/18 | efficiency - unmatched |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 9 | H02K21/04; H02K21/44; H02K3/18; H02K3/28; H02N1/006 | efficiency - unmatched |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 10 | H02K1/26; H02K17/165; H02K19/24 | efficiency - unmatched |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 11 | H02K15/0093 | efficiency - unmatched |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 6 | H01M2008/00; H01M2250/00; H01M8/00; H05K9/00; Y04S10/00; Y04S40/00 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 8 | B63B77/10; B63C11/52; F21S8/006; F22B1/006; H01M14/005; H01M16/003; H01M6/42; H02P2101/15 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | Y04S20/12; Y04S50/10; Y10S136/291; Y10S323/906; Y10T436/24 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 9 | B01D2258/0208; B29L2031/3468; B63J2003/043; B66C1/108; B66C23/185; C01B2203/84; F16N2210/025; F17C2270/0763 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | F22B1/023; F28D2021/0054; G05D3/105; H01M10/0422; H01M10/049; H01M10/056; H01M10/66; H01M4/36 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | H01M4/64; H01M50/502; H01M50/531; H01M50/691; Y10S376/904; Y10T137/4757 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 10 | B29L2031/085; B66C23/207; C10L2200/0469; C25D7/126; F16H2057/02078; G05B2219/2619; H01L27/1421; H01L31/0445 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | H01L31/0475; H01L31/068; H01L31/188; H01M10/465; H01M2010/4271; H01M2010/4278; H01M4/131; H01M4/136 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | H01M4/9016; H01M50/1385; H01M50/358; H01M50/529; H01M6/185; H05K2201/10037; Y10S977/948; Y10T29/49108 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | Y10T29/49355; Y10T29/53135 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 11 | H01L25/042; H01L27/3227; H01L31/02008; H01L31/02021; H01L31/02167; H01L31/022425; H01L31/0504; H01L31/0725 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | | H01L31/073; H01L31/074; H01L31/0745; H01L31/0749; H01L31/076; H01M10/6571; H01M4/1391; H01M4/1397 | pure green |
| 2. Climate change mitigation technologies related to energy generation, transmission or distribution | 12 | H01M50/555 | pure green |
| 4. Climate change mitigation technologies related to transportation | 8 | B01D2258/01; B01D2279/60; B01D35/005; B60W2710/06; B60Y2300/42; B60Y2300/52; G01K2205/04; G01M15/14 | fuel efficiency |
| 4. Climate change mitigation technologies related to transportation | 9 | B60K2015/03236; B60L2260/12; B60L2270/12; B60W2510/0638; B60W2510/0657; B60W2510/0676; B60W2710/021 | fuel efficiency |
| 4. Climate change mitigation technologies related to transportation | 10 | B60L2270/142; B60L2270/145 | fuel efficiency |
| 4. Climate change mitigation technologies related to transportation | 6 | B60W2030/00; B60W2040/00; B60W2552/00; B60W2554/00; B60W2556/00; B60W30/00; B60W40/00 | efficiency - unmatched |
| 4. Climate change mitigation technologies related to transportation | 8 | B60L2270/40; B60L9/005; B60L9/32; B60M1/36; B60W2420/42; B60W2420/52; B60W2420/54; B60W2520/06 | efficiency - unmatched |
| 4. Climate change mitigation technologies related to transportation | | B60W2520/10; B60W2540/043; B60W2540/10; B60W2540/16; B60W2540/18; B60W2540/215; B60W2540/221; B60W2555/20 | efficiency - unmatched |
| 4. Climate change mitigation technologies related to transportation | | B60W2555/60; B60W2710/18; B60W2710/20; B60W2720/10; B60W2756/10; B60W50/0097; B60W50/06; B60W50/08 | efficiency - unmatched |
| 4. Climate change mitigation technologies related to transportation | | B60W60/001 | efficiency - unmatched |
| 4. Climate change mitigation technologies related to transportation | 9 | B60K17/043; B60K17/16; B60M1/14; B60M1/28; B60M1/307; B60M1/34; B60W2050/0075; B60W2420/403 | efficiency - unmatched |
| 4. Climate change mitigation technologies related to transportation | | B60W2510/305; B60W2720/403; B60W2754/30; B60W60/0053 | efficiency - unmatched |
| 4. Climate change mitigation technologies related to transportation | 10 | B60K17/08; B60L2270/147; B60W2050/0008; B60W2050/0018 | efficiency - unmatched |
| 4. Climate change mitigation technologies related to transportation | 11 | B60W2050/0005 | efficiency - unmatched |
| 4. Climate change mitigation technologies related to transportation | 6 | B60L1/00; B60L13/00; B60L15/00; B60L3/00; B60L5/00; B60L50/00; B60L53/00; B60L55/00 | pure green |
| 4. Climate change mitigation technologies related to transportation | | B60L58/00; B60L7/00; B60M3/00; B60M7/00; B60W10/00; B60W20/00; B64D2211/00; B64D2221/00 | pure green |
| 4. Climate change mitigation technologies related to transportation | 8 | B60K2001/003; B60K2016/003; B60K7/0007; B60L2200/10; B60L2200/12; B60L2200/18; B60L2200/22; B60L2200/26 | pure green |
| 4. Climate change mitigation technologies related to transportation | | B60L2200/30; B60L2200/32; B60L2200/40; B60L2210/10; B60L2210/20; B60L2210/30; B60L2210/40; B60L2240/60 | pure green |
| 4. Climate change mitigation technologies related to transportation | | B60L2240/70; B60L2240/80; B60L2250/10; B60L2250/12; B60L2250/16; B60L2250/20; B60L2250/24; B60L2250/26 | pure green |
| 4. Climate change mitigation technologies related to transportation | | B60L2260/20; B60L2270/20; B60L8/003; B60L8/006; B60L9/16; B60Y2300/91; B60Y2306/01; B63H21/12 | pure green |
| 4. Climate change mitigation technologies related to transportation | | B63H21/21; B64C3/32; B64D29/02; H01M2220/20; H02P2101/45; Y10S903/902 | pure green |
| 4. Climate change mitigation technologies related to transportation | 9 | B60H1/00385; B60L2220/12; B60L2220/14; B60L2220/16; B60L2220/42; B60L2220/44; B60L2220/46; B60L2220/58 | pure green |
| 4. Climate change mitigation technologies related to transportation | | B60L2240/12; B60L2240/34; B60L2240/36; B60L2260/16; B60L2260/46; B60L2260/50; B60L2270/32; B60L2270/34 | pure green |
| 4. Climate change mitigation technologies related to transportation | | B60W2510/081; B60W2510/083; B60Y2200/92; B60Y2400/112; B60Y2400/114; B64C2201/042 | pure green |
| 4. Climate change mitigation technologies related to transportation | 10 | B60K6/32; B60L2240/16; B60L2240/18; B60L2240/20; B60L2240/421; B60L2240/423; B60L2240/425; B60L2240/429 | pure green |
| 4. Climate change mitigation technologies related to transportation | | B60L2240/441; B60L2240/443; B60L2240/445; B60L2240/461; B60L2240/463; B60L2240/486; B60L2240/507; B60L2240/525 | pure green |
| 4. Climate change mitigation technologies related to transportation | | B60L2240/526; B60L2240/527; B60L2240/529; B60L2240/545; B60L2240/547; B60L2240/549; B60W2510/244; B63H2021/207 | pure green |
| 5. Climate change mitigation technologies related to buildings | 8 | F24D2200/04 | fuel efficiency |
| 5. Climate change mitigation technologies related to buildings | 8 | E04B9/001; F24D11/002; F24D12/02; F25D2201/10; F25D23/06 | efficiency - unmatched |
| 5. Climate change mitigation technologies related to buildings | 9 | F24F11/46; F24F12/002; F24F12/006 | efficiency - unmatched |
| 5. Climate change mitigation technologies related to buildings | 10 | E04D13/1643; E04D13/1681; E05Y2400/452; F24H3/0405 | efficiency - unmatched |
| 5. Climate change mitigation technologies related to buildings | 8 | F24D17/0005; F24D2200/12; F24D2200/14; F24F5/0046; F24H1/0018; F24H3/002; F27D17/004; Y10S315/07 | pure green |
| 5. Climate change mitigation technologies related to buildings | 9 | E06B2009/2476; F24D17/0063; F24H1/185 | pure green |
| 5. Climate change mitigation technologies related to buildings | 11 | E04C2/525 | pure green |
| 6. Climate change mitigation technologies related to wastewater treatment or waste management | 8 | Y10S588/90 | pure green |
| 7. Climate change mitigation technologies in the production or processing of goods | 8 | B60K15/01 | fuel efficiency |
| 7. Climate change mitigation technologies in the production or processing of goods | 9 | B60K15/04; G01M15/042; G01M15/06; G01M15/08 | fuel efficiency |

| OECD-env tech Categories assigned | Classified CPC level | CPC codes | Category |
|---|---|---|---|
| 7. Climate change mitigation technologies in the production or processing of goods | 6 | B32B2457/00; F28D2015/00 | efficiency - unmatched |
| 7. Climate change mitigation technologies in the production or processing of goods | 8 | B65G15/60; F28D15/02; G05D1/0005; H03K19/0008; H03K2217/0036 | efficiency - unmatched |
| 7. Climate change mitigation technologies in the production or processing of goods | 9 | B22D25/04; B29L2031/7146; F28D2021/0043; H03F2201/3215 | efficiency - unmatched |
| 7. Climate change mitigation technologies in the production or processing of goods | 10 | B29D11/00817; G03F7/70433; G05B2219/25387; G05B2219/2639; G05D23/1923; G09G2330/023; H04B2201/70707 | efficiency - unmatched |
| 7. Climate change mitigation technologies in the production or processing of goods | 11 | H04B1/1615; H04B2001/045 | efficiency - unmatched |
| 7. Climate change mitigation technologies in the production or processing of goods | 12 | G05B23/0294 | efficiency - unmatched |
| 7. Climate change mitigation technologies in the production or processing of goods | 13 | G09G3/2965 | efficiency - unmatched |
| 7. Climate change mitigation technologies in the production or processing of goods | 6 | H02P15/00; H02P21/00; H02P31/00; H02P5/00; H05H1/00; H05H11/00; H05H13/00; H05H15/00 | pure green |
| 7. Climate change mitigation technologies in the production or processing of goods | 8 | F26B23/001; H02P2203/03; H02P2203/11; H02P2207/01; H02P2207/05; H02P23/14; H05H2242/20 | pure green |
| 7. Climate change mitigation technologies in the production or processing of goods | 9 | C01B2203/066; C04B2111/00853; F26B3/283; F26B3/30; H02P1/029; H02P1/04; H02P1/24; H02P1/46 | pure green |
| 7. Climate change mitigation technologies in the production or processing of goods | 10 | B60H1/143; H02P1/28; H02P1/30; H02P1/423 | pure green |
| 7. Climate change mitigation technologies in the production or processing of goods | 11 | C01B2203/0822 | pure green |
| 8. Climate change mitigation in information and communication technologies | 8 | A61B5/0002; G06F2119/06; G06F2119/08; H04L69/04 | efficiency - unmatched |
| 8. Climate change mitigation in information and communication technologies | 9 | G06F2212/1028; G11C5/141 | efficiency - unmatched |
| 8. Climate change mitigation in information and communication technologies | 10 | G06F2212/1044; G11B2005/0021; H01H2003/3057; H01H2003/3068; H01H2085/025; H01L27/301; H04L27/3405; H04M1/73 | efficiency - unmatched |
| 8. Climate change mitigation in information and communication technologies | | H04Q2209/886 | efficiency - unmatched |
| 8. Climate change mitigation in information and communication technologies | 11 | H01L51/5028; H04L12/1886; H04L41/0833 | efficiency - unmatched |
| 8. Climate change mitigation in information and communication technologies | 12 | H01L21/263 | efficiency - unmatched |

# References

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