Analysis on Korean ODA Cases for Renewable Energy

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Green Energy ODA in Developing Countries

(Poverty and Climate Change)

- The Millennium Development Goals (MDGs) – reduce extreme poverty by 50 % by 2015
  - It need a post-2015 poverty reduction program
- UNCED
  - Sustainable development to reduce CO_2 emissions

- Green economy with **Sustainable Development goals**
  - **Eradicating poverty** + sustained economic growth, …+ healthy Earth's ecosystems
  - **Sustainable modern energy services** contributes to poverty eradication, saves lives, improves health, and helps provide basic human needs.
  - **Integration** of **poverty eradication** and **sustainable development**

Green Energy ODA in Developing Countries

(Poverty and Climate Change)

- Mobilizing adequate financial resources to provide these services in **a reliable, affordable, economically viable, and socially & environmentally acceptable manner**.
- Increased use of **renewable energy sources** and other **low-emission technologies**, the more **efficient use of energy**, greater reliance on advanced energy technologies, including cleaner fossil fuel technologies, and the sustainable use of traditional energy resources.
- **Energy efficiency** measure in **urban planning, buildings, and transportation**, and in the production of goods and services and in the design of products
- "Sustainable Energy for All" initiated by the Secretary General

Green Energy ODA in DC
(Poverty and Climate Change)

Green Energy ODA in Developing Countries

(Energy and Poverty)

- Link between energy use and poverty (WEO 2002)
  - Time spent gathering fuel
    - Women and children, gathering fuelwood
  - Gender
    - Women, primary user of household energy
  - Environment
    - Gathering wood, ecological damage
  - Energy efficiency
    - Biomass stoves, less efficient
  - Health
    - Indoor smoke pollution, respiratory diseases: asthma and acute respiratory infections; obstetrical problems: stillbirth and low birth weight; blindness; and heart disease
  - Agricultural productivity
    - Use of biomass energy, reduction of fertilizer usage, and reduced agricultural productivity

- Low productivity of manufacturing industry due to low electrification

Green Energy ODA in Developing Countries

Access to Electricity (% of population)

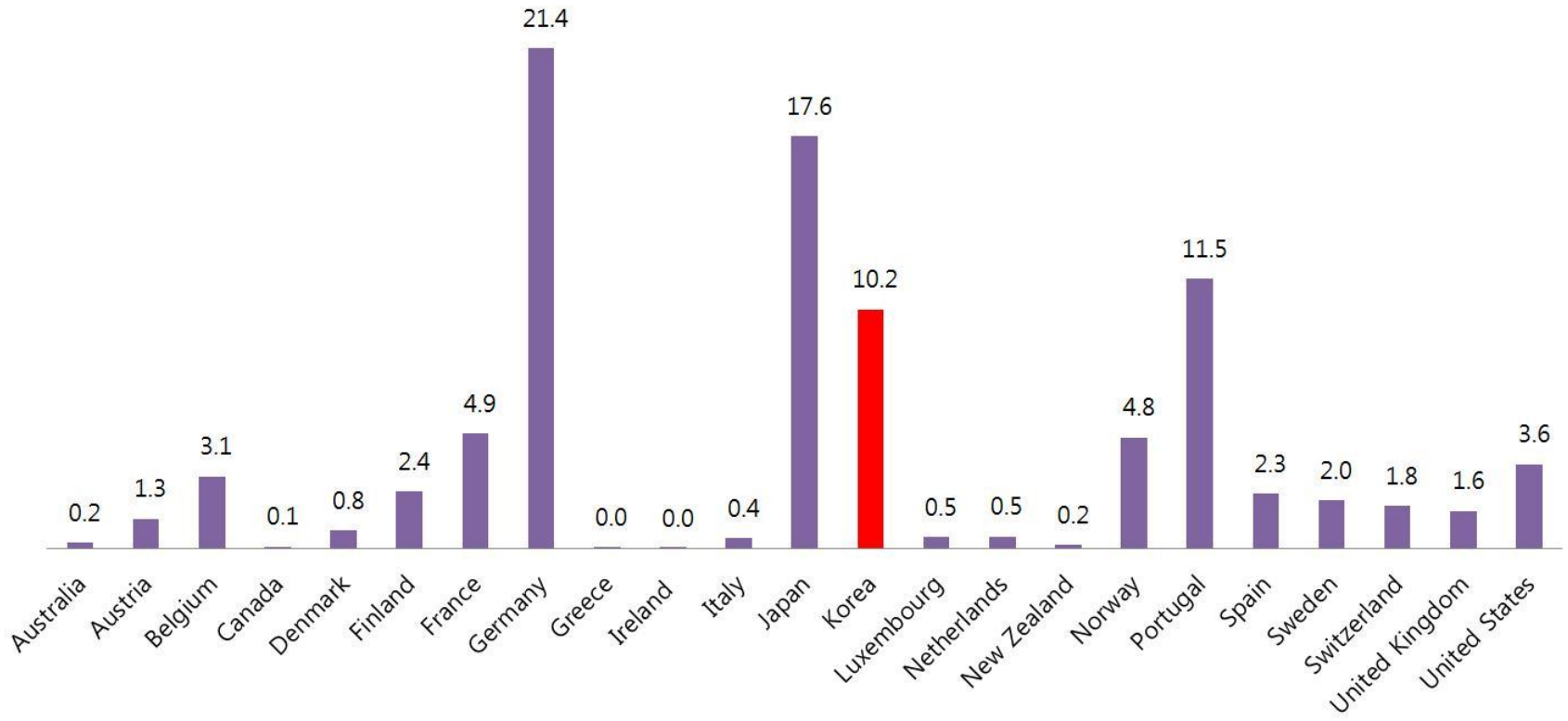
Country Name	2009
East Asia & Pacific (developing only)	90.77
Latin America & Caribbean (developing only)	93.42
Middle East & North Africa (developing only)	92.93
Sub-Saharan Africa (developing only)	32.42
Least developed countries: UN classification	24.69

Country Name	2009
Afghanistan	15.60
Bangladesh	41.00
Cambodia	24.00
India	66.30
Mongolia	67.00
Myanmar	13.00
Nepal	43.60
Pakistan	62.40
Philippines	89.70
Rwanda	Urban: 46 Rural: 5
Sri Lanka	76.60
Vietnam	97.60

Source: World Bank

Green Energy ODA in Developing Countries

Energy Sector Portion of Total ODA by State in percent (2010)



Source: OECD

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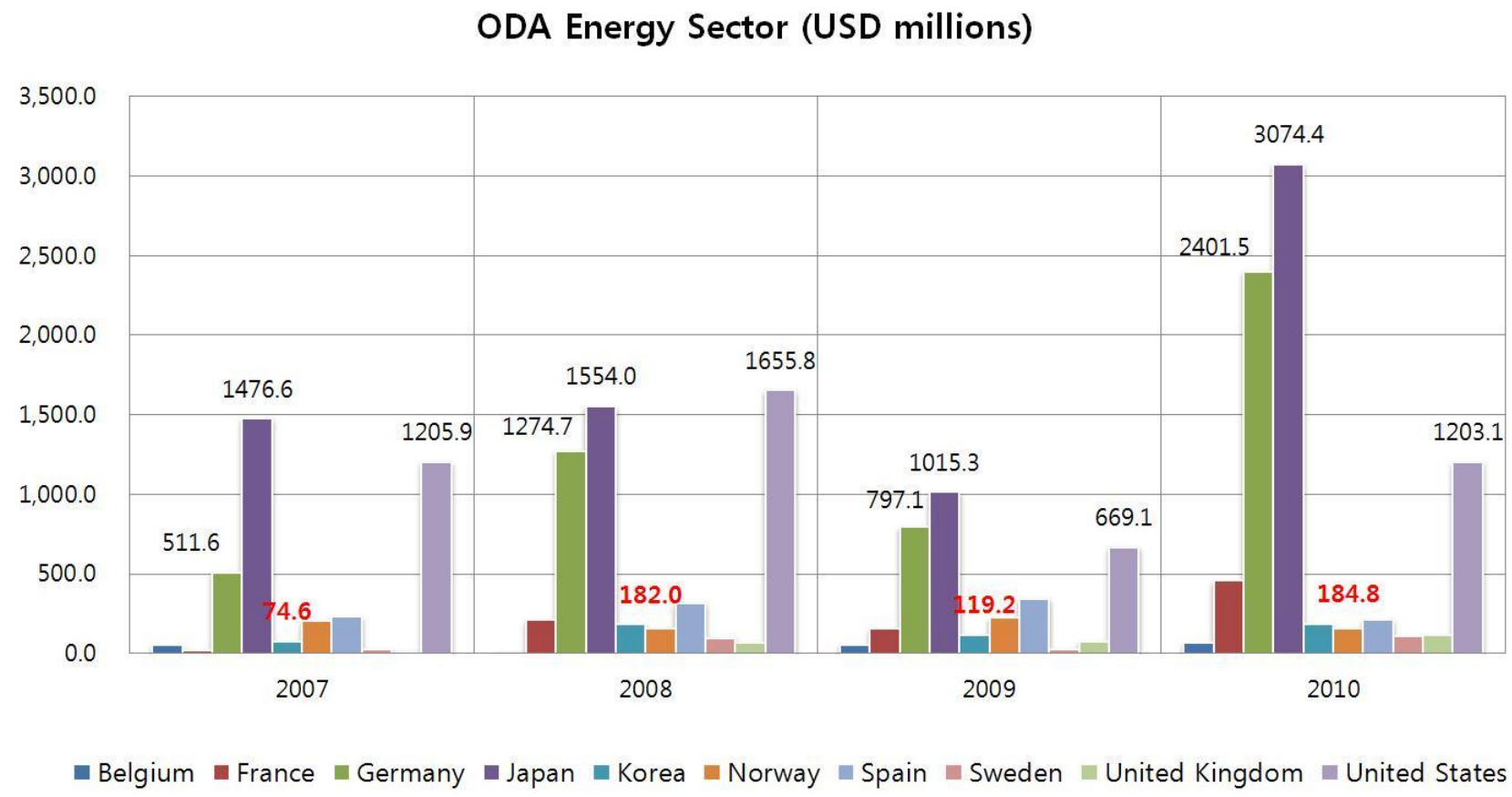

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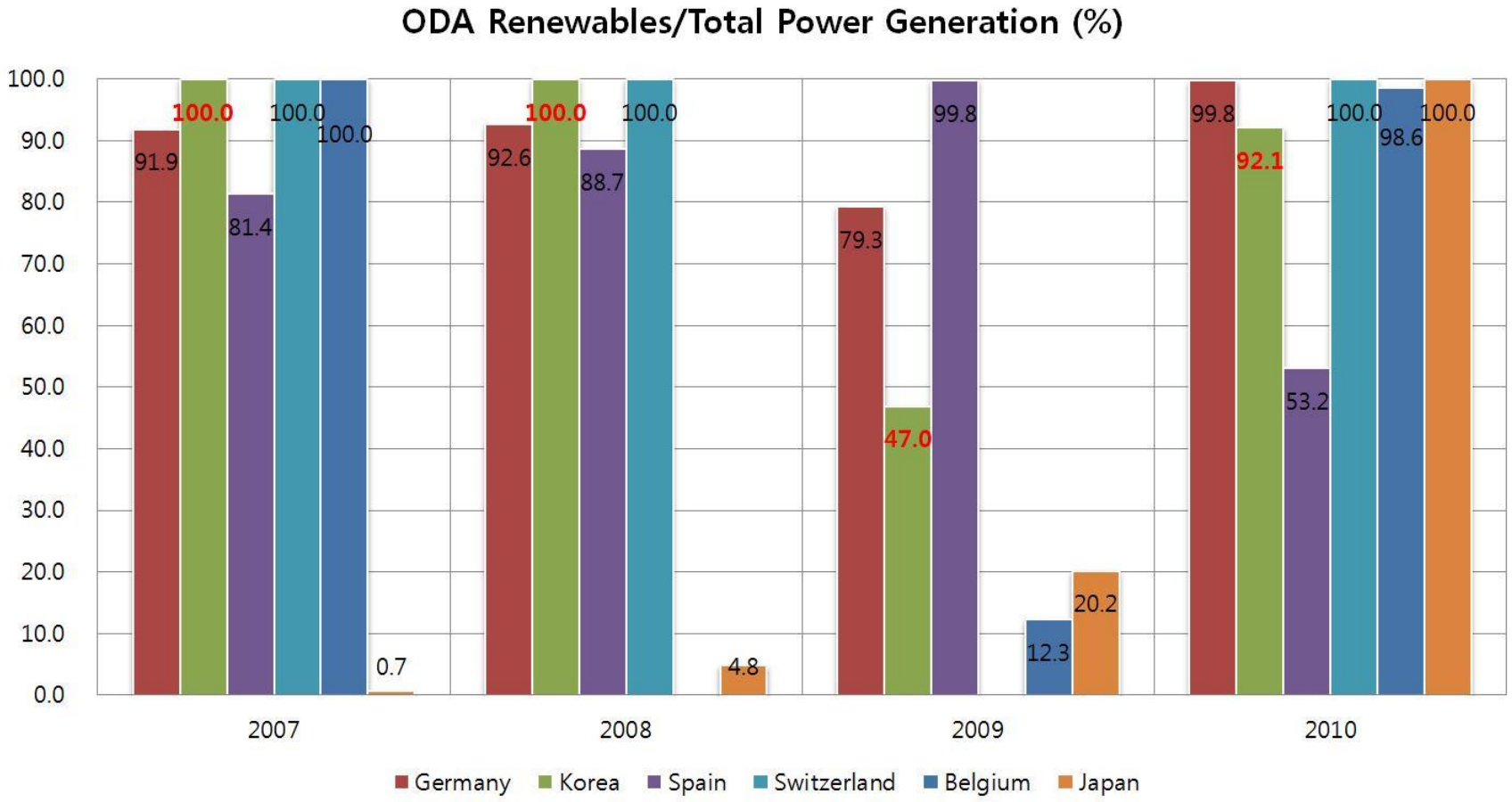

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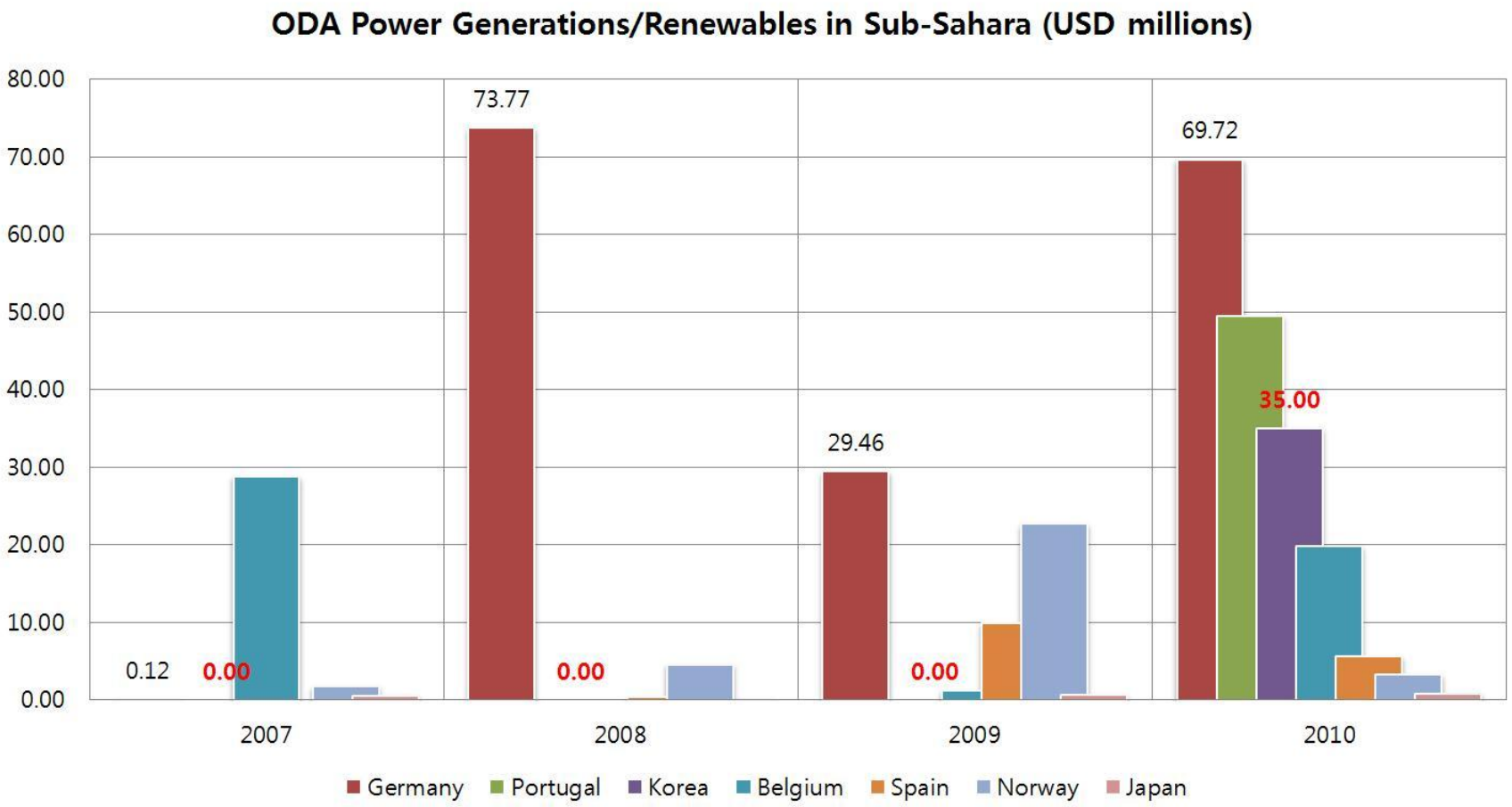

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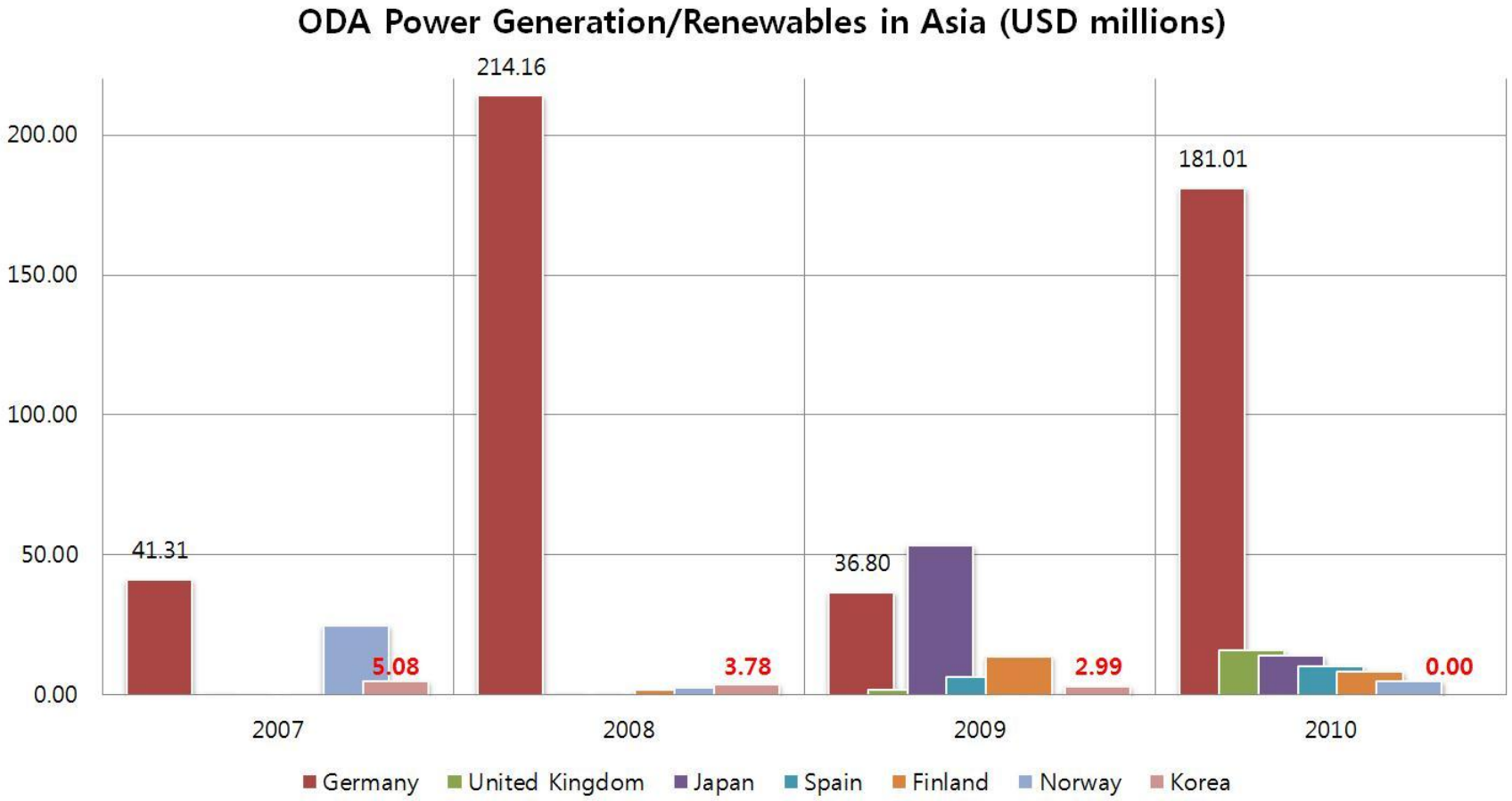

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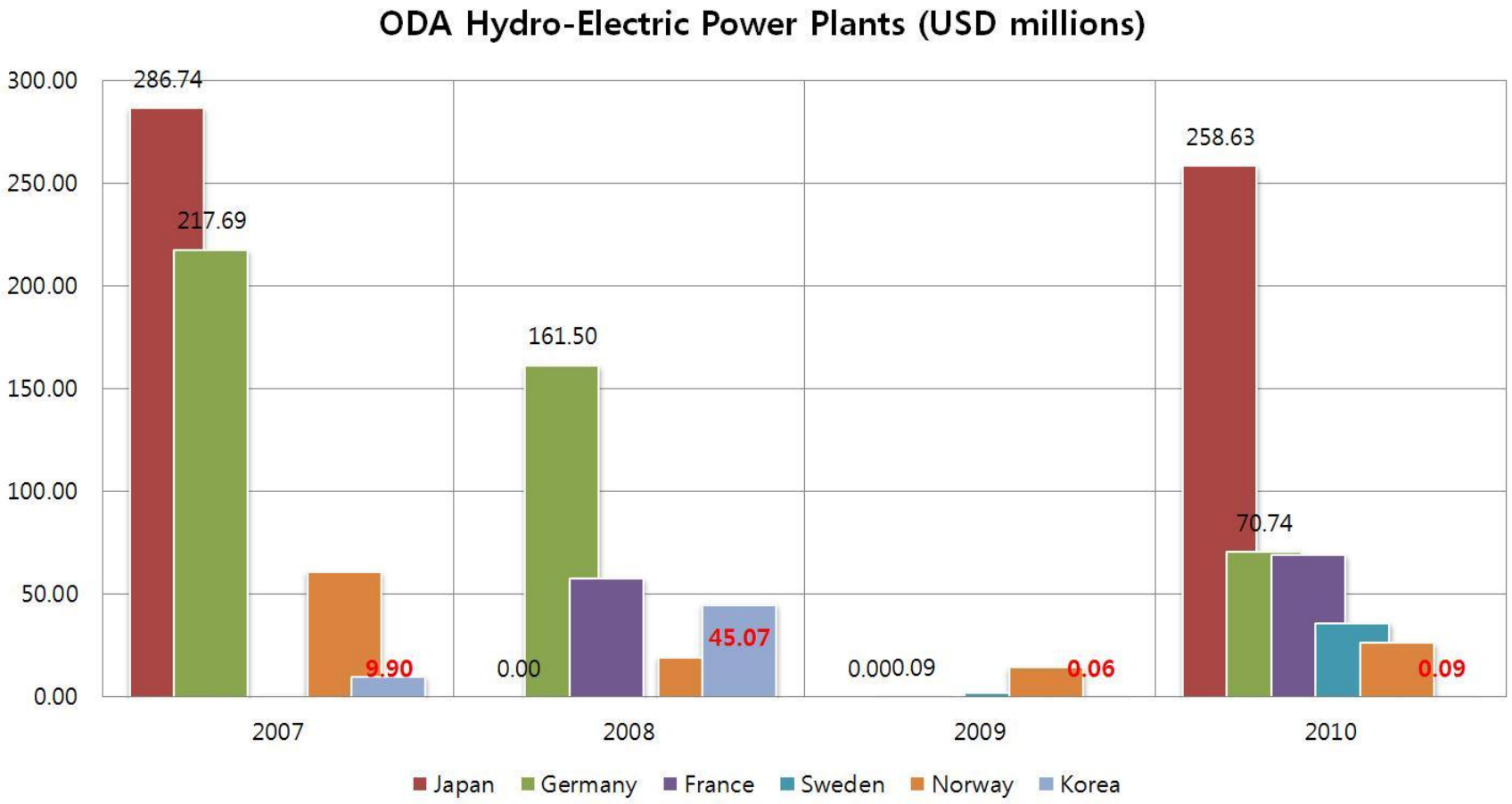

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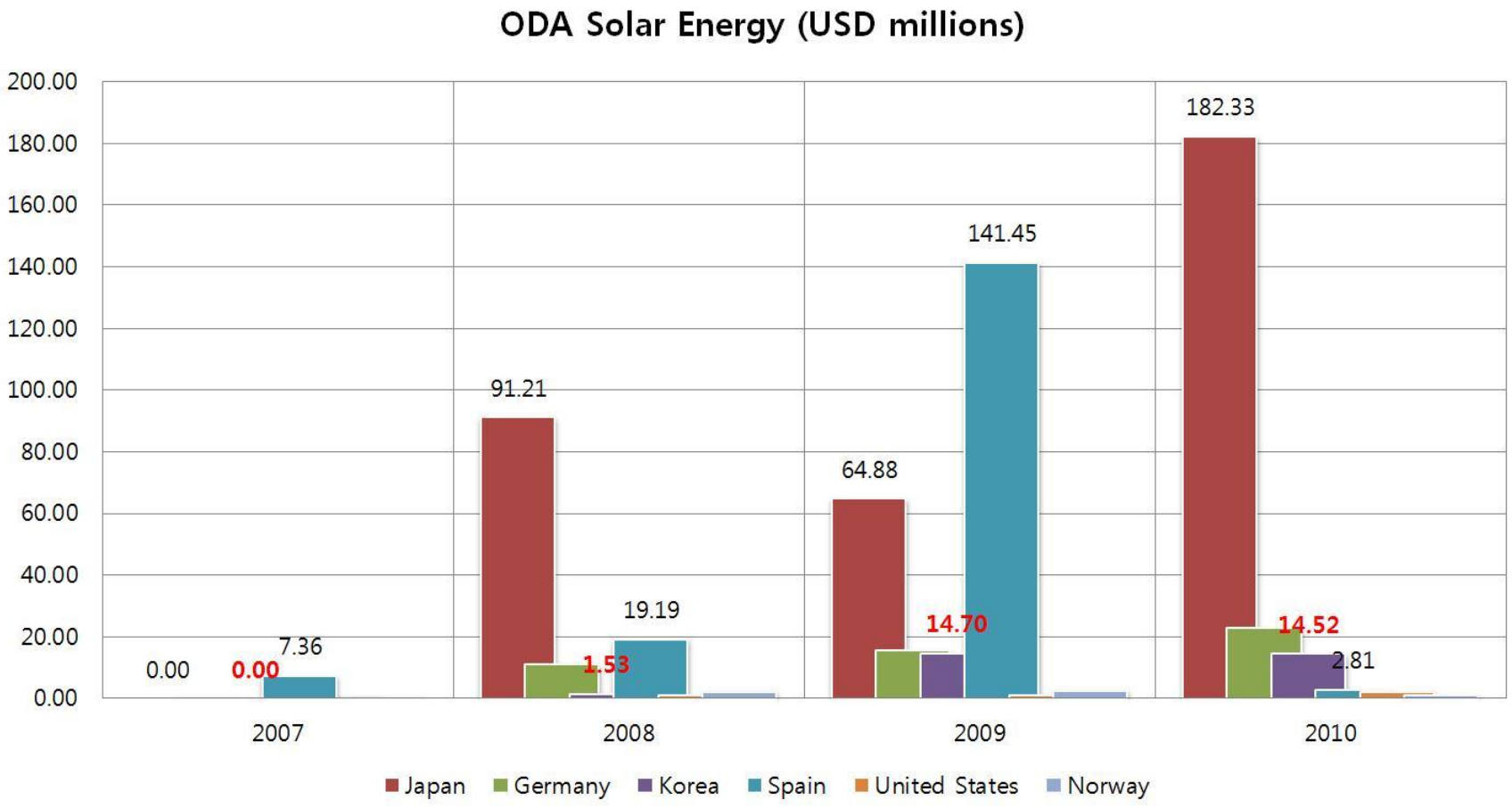

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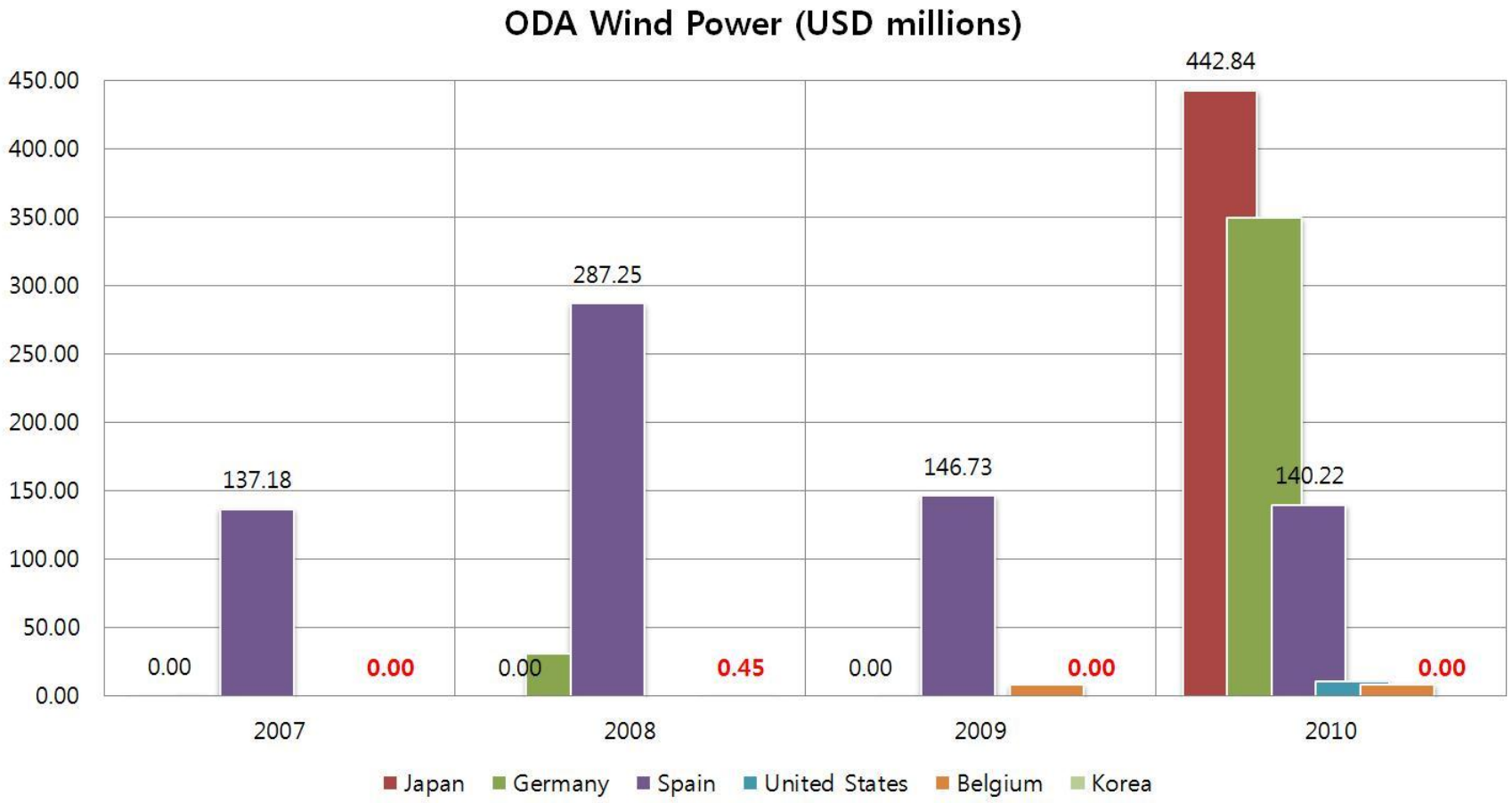

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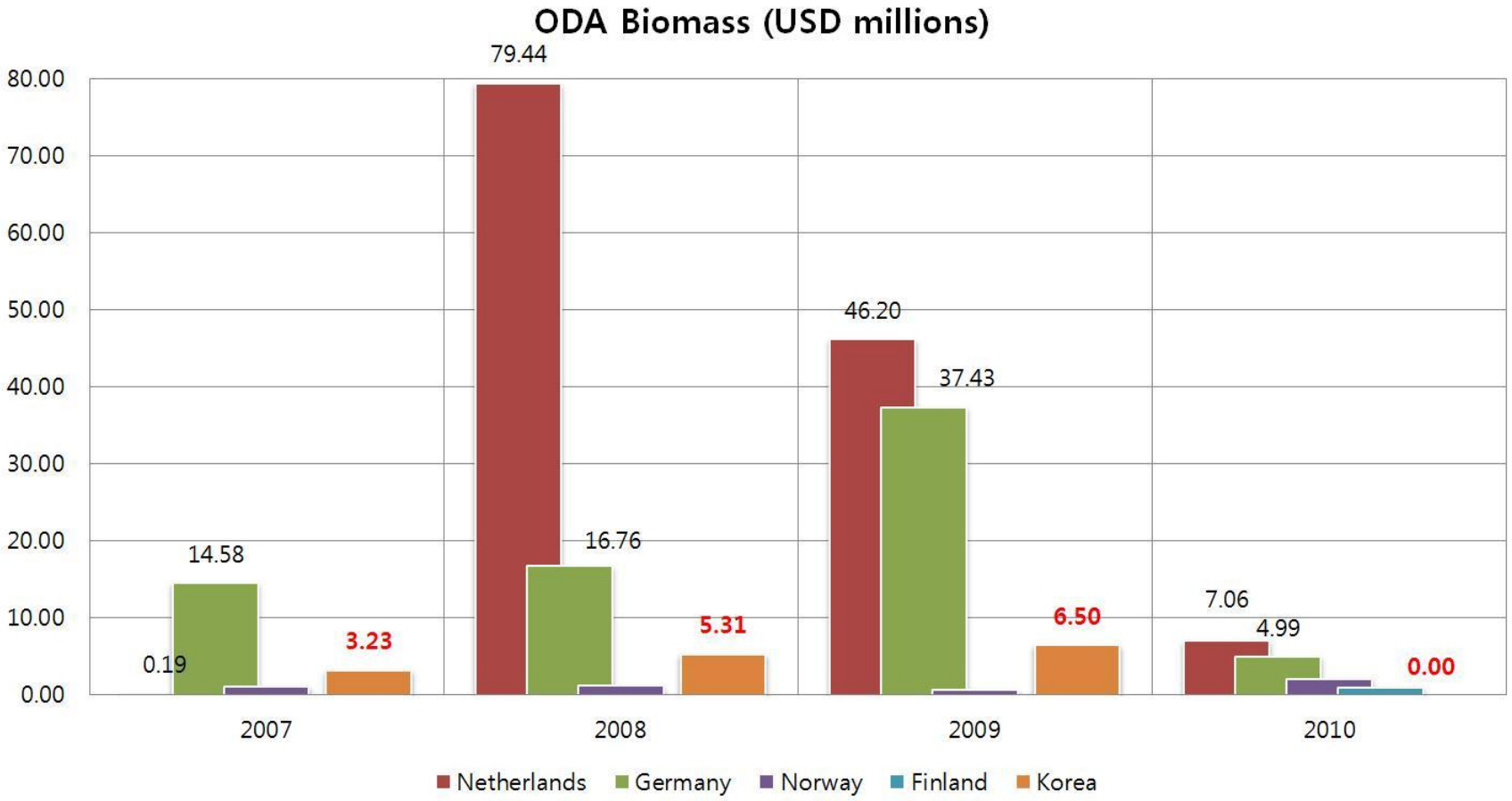

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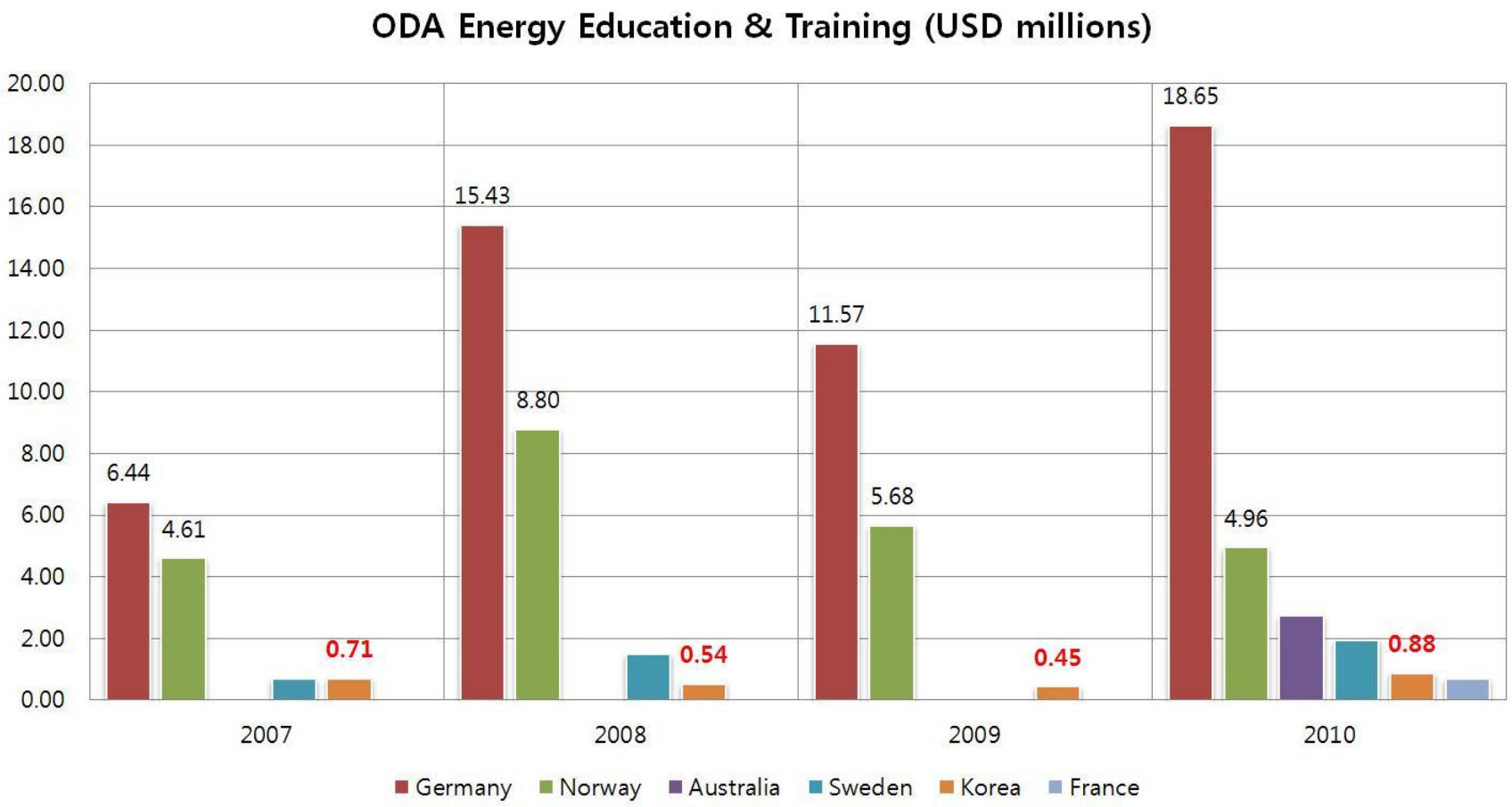


Source: OECD

Renewable Energy ODA flows in Ethiopia

- Major objectives of the energy policy
  - Ensure sustainable and reliable energy supply
  - Give priority to the development of indigenous energy resources
  - Set strategy for the faster development and supply of energy
  - Improve energy efficiency

- **Hydro power**, wind, geothermal, solar, biomass resources – a key part of climate resilient green economy by 2025
- Rural electrification for improved access to modern forms of energy, reliable energy supply, productive energy use

Renewable Energy ODA flows in Ethiopia

- ODA funding plays major role in executing and implementing many projects in Ethiopia.
  - Financial assistance
  - Technical assistance
  - Technology transfer
  - Capacity building
- JICA, GIZ, Samsung
- Public sector, private sector, and NGOs partnership

Solar-powered LED lanterns to 1,000 households and a rooftop solar panel in Oromia, Ethiopia

Source: Samsung Tomorrow

Renewable Energy ODA Flow in Uganda

- Main objectives of energy policy
  - Establish the availability of the various energy sources
  - Increase access to modern affordable and reliable energy services as a contribution to poverty eradication
  - Improve energy governance and administration
  - Stimulate economic growth
  - Manage energy related environmental impact

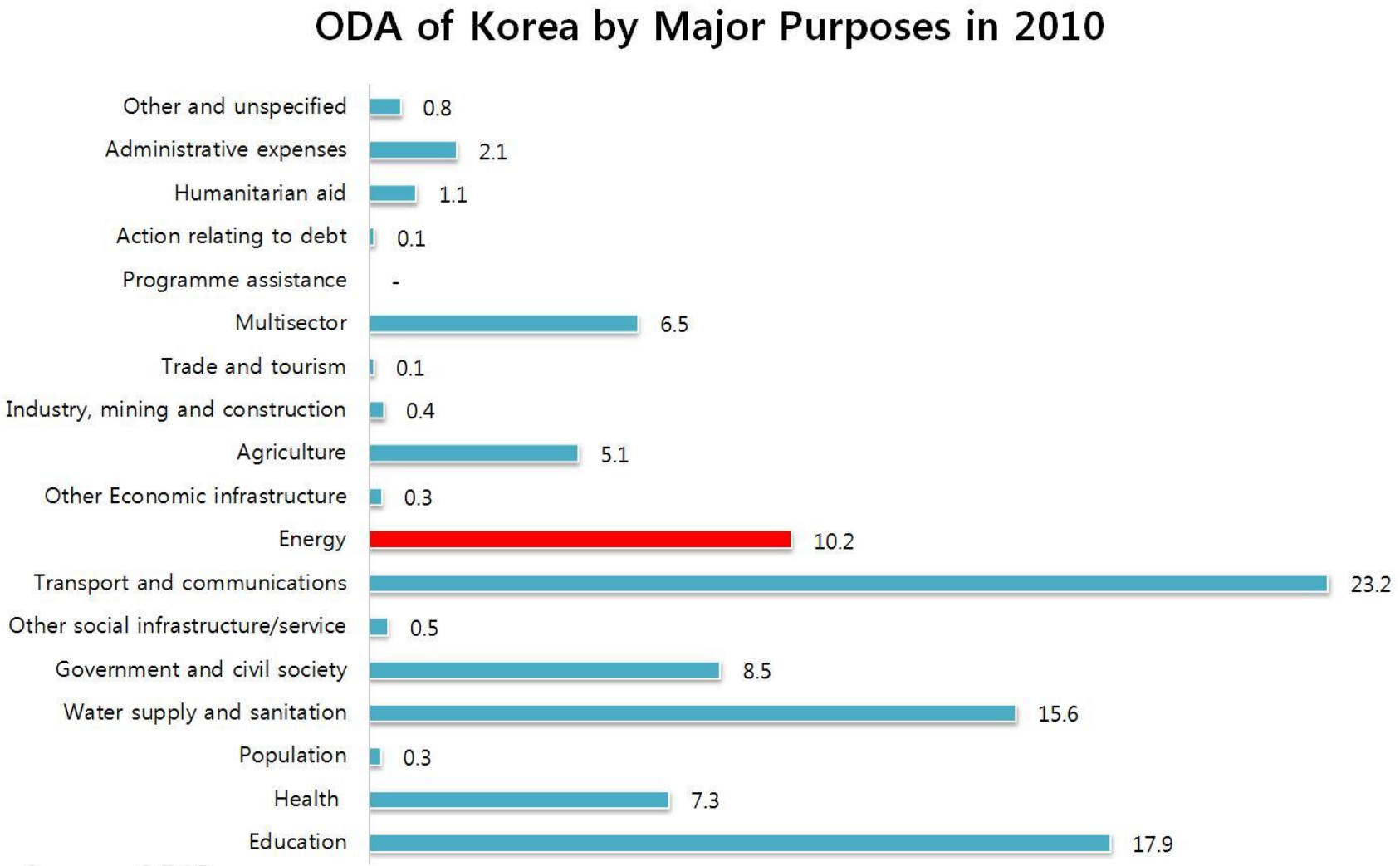
- Several project in developing renewable energy resources
  - To replace diesel and fuel oil electricity with renewables
  - Hydro power construction by Germany and Norway

- Key strategies
  - Decentralized power systems for electrification in rural areas
  - Improving energy efficiency for stoves
  - Capacity building of different stakeholders: NGOs and Private firms
  - **Integration of various renewables by** German Development Coop.
    - Installation of photovoltaic systems + improving cooking methods

Barriers to Modern Energy in Developing Countries

- A few barriers to electrification
  - Technology and Education
    - Lack of locally developed and adapted technologies
    - Lack of job training experiences
    - Lack of technology transfer
  - Affordability
    - People cannot afford monthly electricity bill even though they can get access to electricity
    - High cost of renewable energy technologies
  - Lack of investment in infrastructure
    - Official development aid to Africa from foreign government has fallen by some 6% a year since 1995.
  - Power loss
    - unmetered and unauthorized power connections, and stealing power (20~40%)

Renewable Energy ODA by Korea



Source: OECD

Renewable Energy ODA by Korea

- Economic Development Cooperation Fund (EDCF) loan
  - Since 1987, focusing on the construction of transmission and distribution systems → which Korea can do better than others
- KOICA
  - Since 2008 after establishing Climate Change Office
  - Based on recipients needs, Small-scale renewable energy projects: solar power, bio-energy, and micro-hydro power
- Private sector and NGO
  - Weak links: at the beginning stage
  - A representative case is LED lantern by Samsung

- There should be partnership among these stakeholders

Renewable Energy ODA by Korea

(EDCF loan by export-import bank)

Energy Sub-sector	# of Projects	Approved Amount (USD million)	Percent
Transmission System	16	426.33	60.39
Thermal Power	3	57.88	8.20
Hydro Power	4	186.70	26.45
Solar Power	1	35.00	4.96
Total	24	705.91	100.00

Source: The Export-Import Bank of Korea (2011)

Renewable Energy ODA by Korea
(Off-Grid Power Plant Technologies)

Technology	Applications	Pros	Cons
Diesel engines	Water pumps Mills Refrigeration Lighting and communication	Easy maintenance Continuous energy service (24 hours a day) Allows for income – generating activities	High fuel costs Noxious and CO2 emissions
Small biomass plants	Water pumps Mills Refrigeration Lighting and communication	Allows for income-generating activities Base load operation, continuous operation possible	Noxious emissions
Mini-hydro	Mills Lighting, communication and other	Long life, high reliability Allows for income-generating activities	Site-specific Intermittent Water availability
Wind	Lighting and communication Mills Pumps	No fuel cost	Expensive batteries Intermittent energy services
PV/Solar	Basic lighting and electronic equipment	No fuel cost	High capital costs High cost of battery replacement Needs further R&D

Source: World Energy Outlook (2002)

Renewable Energy ODA by Korea

(Community-Based Green Energy Policy)

- **Low-carbon development or industrialization**
  - Growth means manufacturing, factories, new buildings and apartments, hundreds of millions of household appliances, new roads and new grid for electricity, natural gas and water, etc.
  - First of all, change of lifestyles of developed countries
    - Korea need to transform from energy-intensive to low-carbon based industrial structure
  - Encouraging energy-efficiency-based model for development in developing countries

- **Green energy technology depends on the climate of the region**
  - Appropriate technology adapted to the local areas: agricultural productivity
  - Rwanda: abundant wind and solar energy, and natural gas discovered
    - But costs of installing them are expensive.

- **Need a understanding of human behavior in developing countries (micro level)**
  - Different roles of gender in rural areas
  - Research on links between poverty and energy use
  - Biomass: large share of energy use in Africa and South Asia in near future

Renewable Energy ODA by Korea

(Community-Based Green Energy Policy)

- **Off-grid small power systems using renewables (meso level)**
  - Small power systems for agricultural productivity
  - Saving costs incurred by constructing centralized power systems and transmission lines
  - Reducing carbon emissions

- **Integrated approaches with consideration of appropriate measures on urban planning, building construction, transportation systems, etc.**

- **Centralized power systems for manufacturing industries (macro level)**

- **Developing partnership among KOICA and other ODA related organizations** including international institutions, private firms, and NGOs