WILL ASIA INTRODUCE SIGNIFICANT BIOENERGY WITHIN THE REGIONAL POWER SECTOR

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IEA BIOENERGY VIRTUAL CONFERENCE 3 DECEMBER 2021

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PRESENTATION OUTLINE

- ICSC TCP-who we are and what we do
- Asia context
- Scope for bioenergy utilisation in the power sector
- Key takeaways

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Technology Collaboration Programme
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WHO WE ARE NOW AND WHAT WE DO

INTERNATIONAL CENTRE FOR
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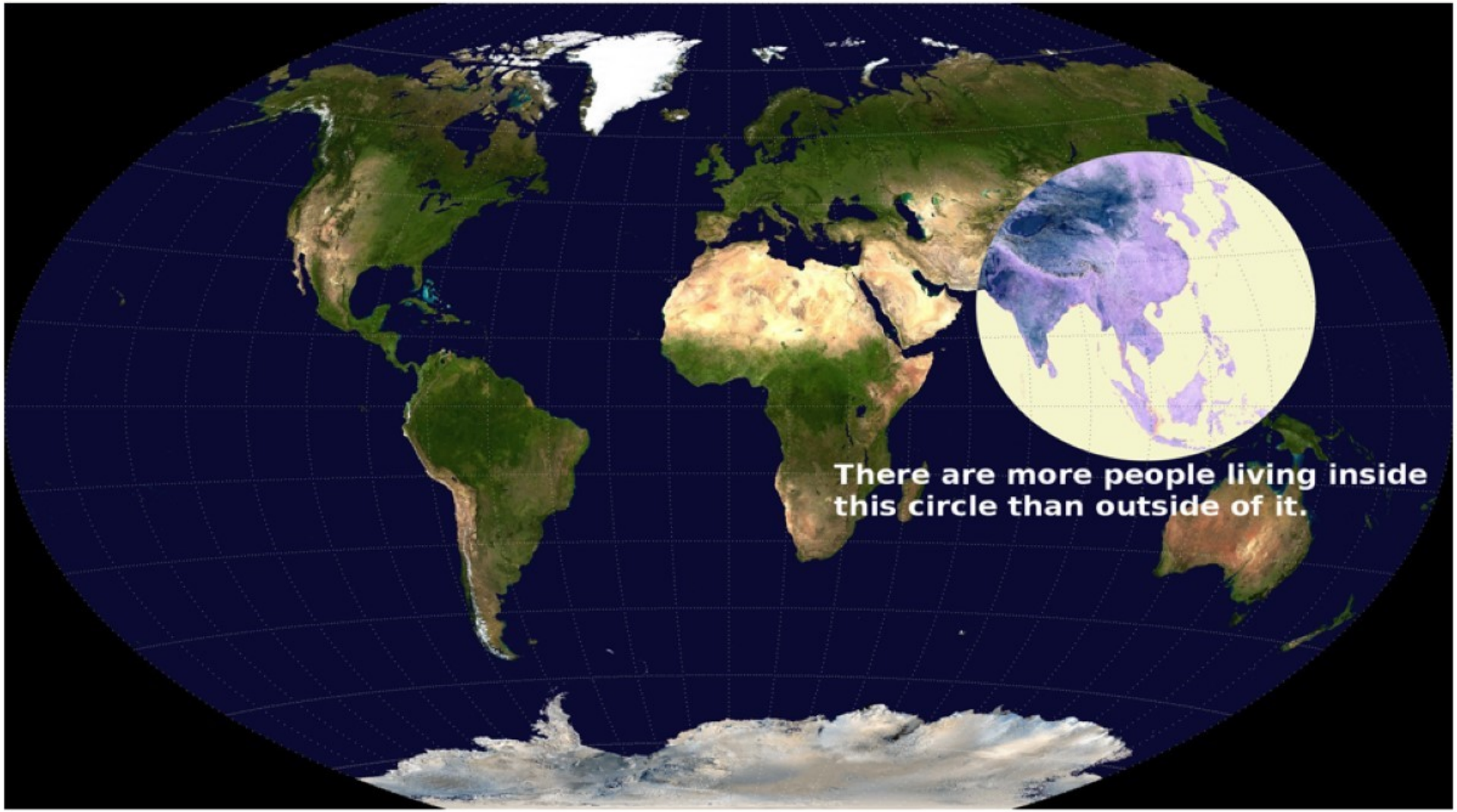
- **We are dedicated to providing independent information and analysis** on how biomass, coal and other carbon sources can become cleaner sources of energy, compatible with the UN Sustainable Development Goals

- **The International Centre for Sustainable Carbon (ICSC)** is part of a network of autonomous collaborative partnerships focused on a wide range of energy technologies known as Technology Collaboration Programmes (TCPs)

- The TCPs are organised under the auspices of the International Energy Agency (IEA), but are functionally and legally autonomous

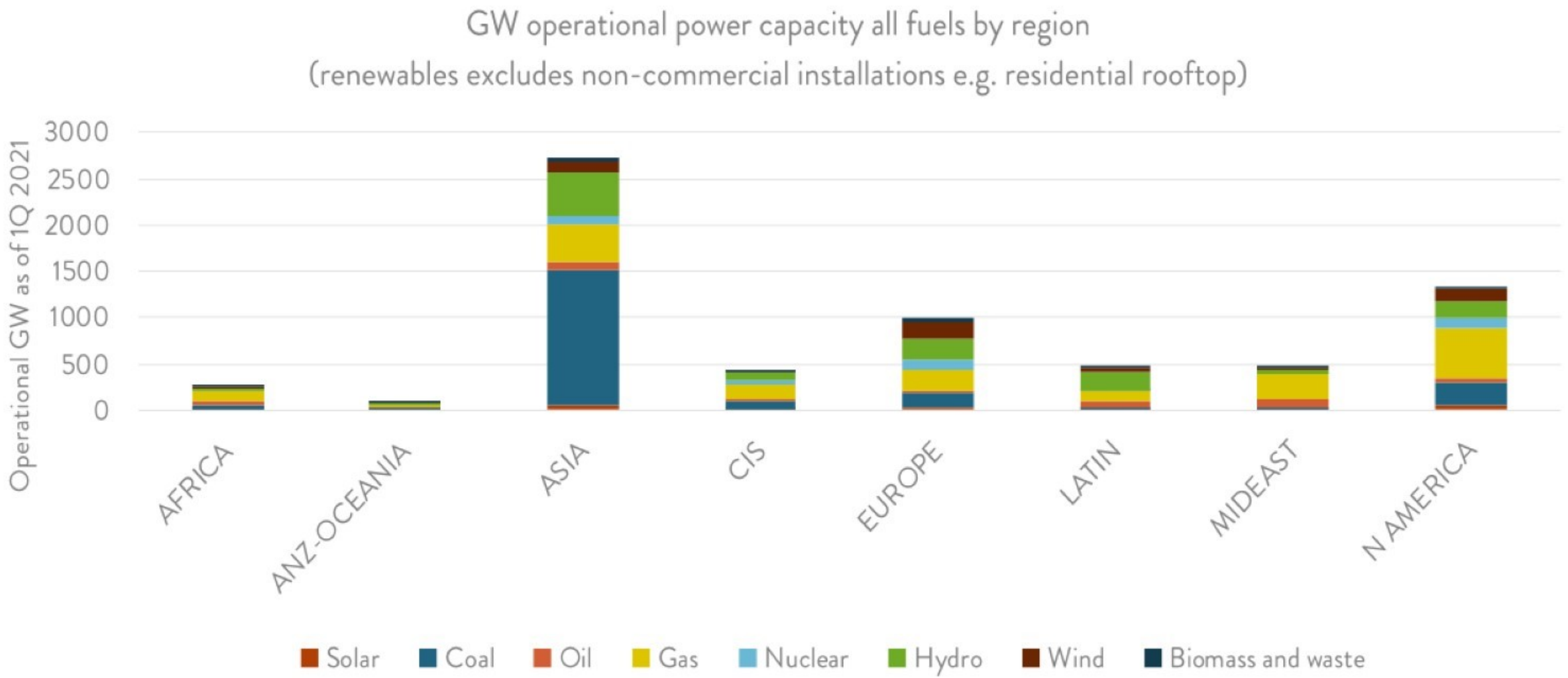
- We are a cost sharing TCP and are funded by national governments (contracting parties) and by corporate industrial organisations (sponsors)

ASIA IS THE KEY PLAYER IN THE GLOBAL ENERGY DEBATE

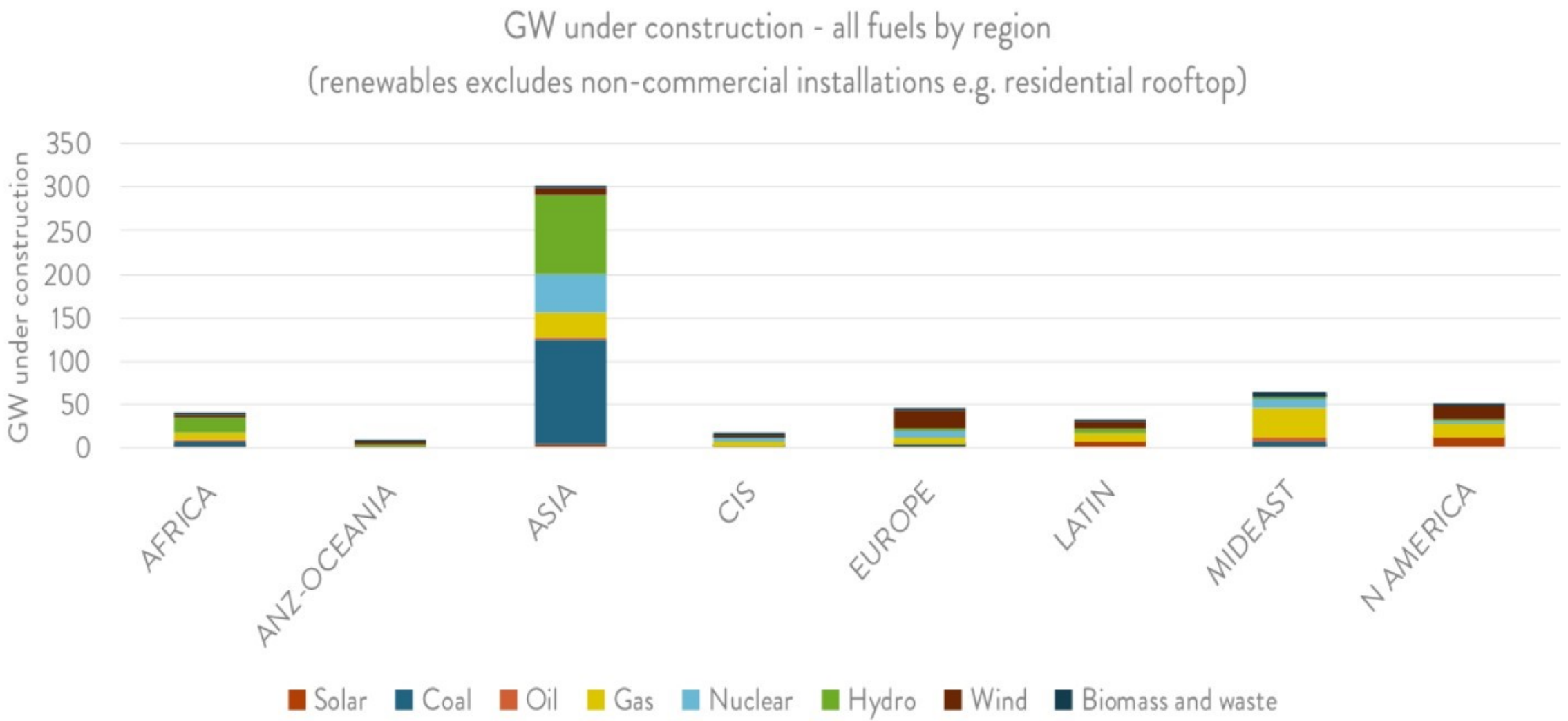


Population Density - (Via Imgur https://imgur.com/gallery/yci7C) Sep 2013

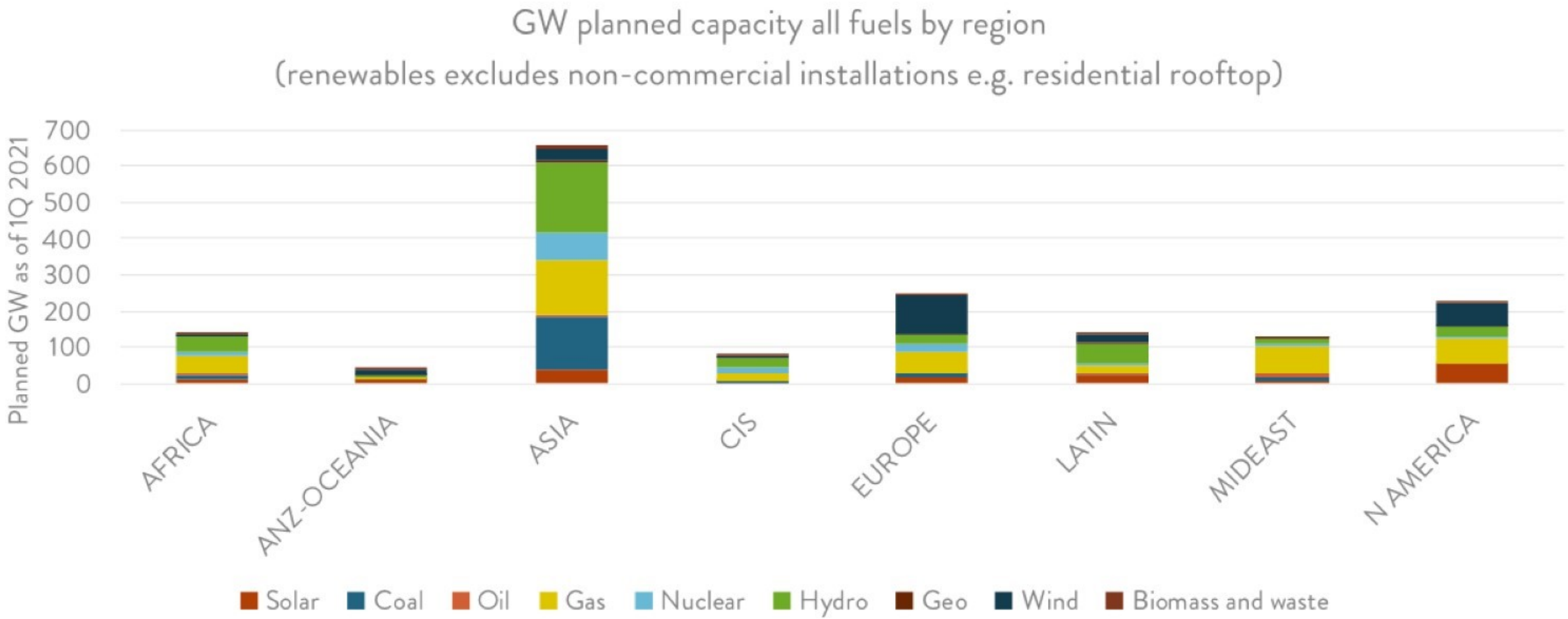
GLOBAL OPERATIONAL CAPACITY (GW) ALL FUELS BY REGION



GLOBAL CAPACITY UNDER CONSTRUCTION (GW) ALL FUELS BY REGION



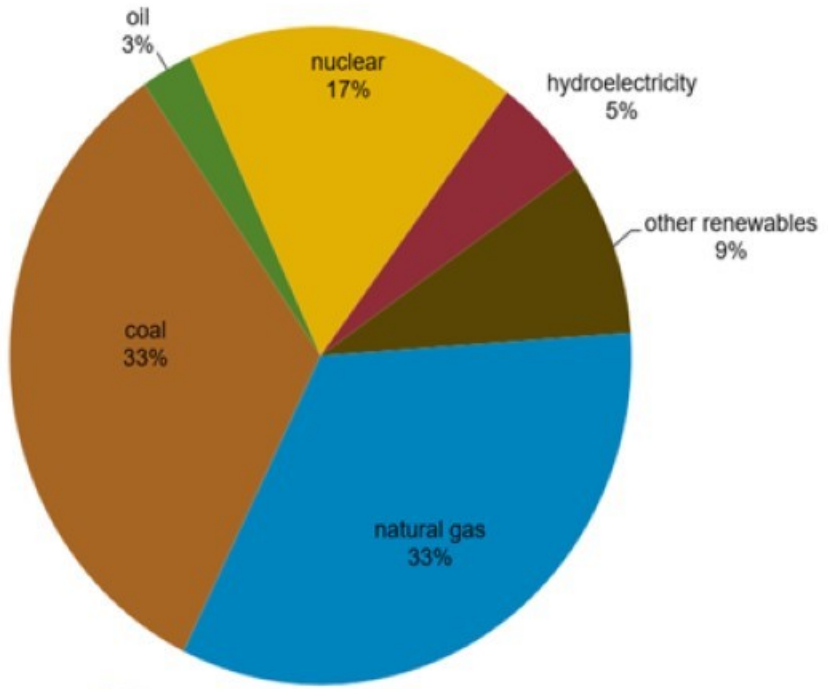
GLOBAL PLANNED CAPACITY (GW) ALL FUELS BY REGION



SOUTH KOREA CURRENT POWER CAPACITY AND FUTURE PLANS

- Current capacity some 530 GWe
- Will limit future nuclear options and reduce coal use
- Will increase use of gas and variable renewable energy
- Has been heavily subsidised introduction of biomass power plants but future opportunities are uncertain
- Only declared role so far for bioenergy is possible use of forestry residues to produce bio-ethanol

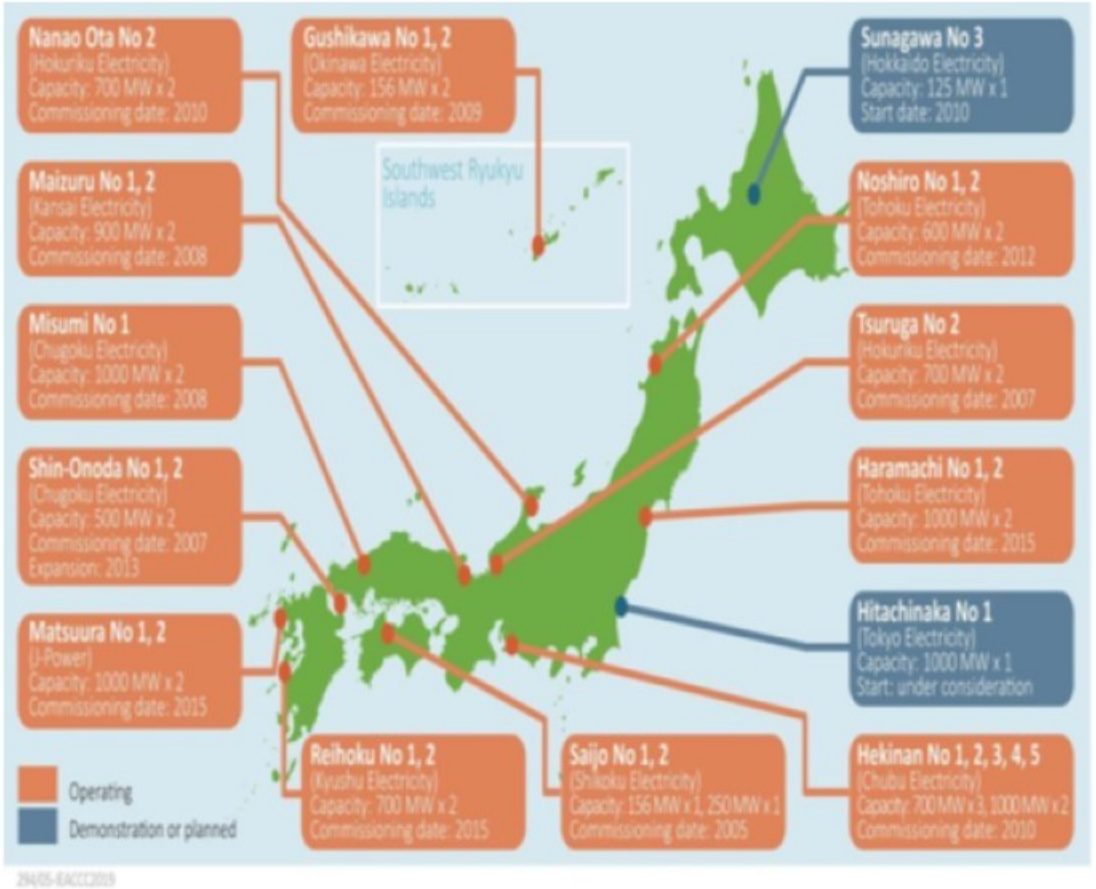
Figure 7. South Korea's installed electricity generating capacity by type, 2018



eia Source: International Energy Agency

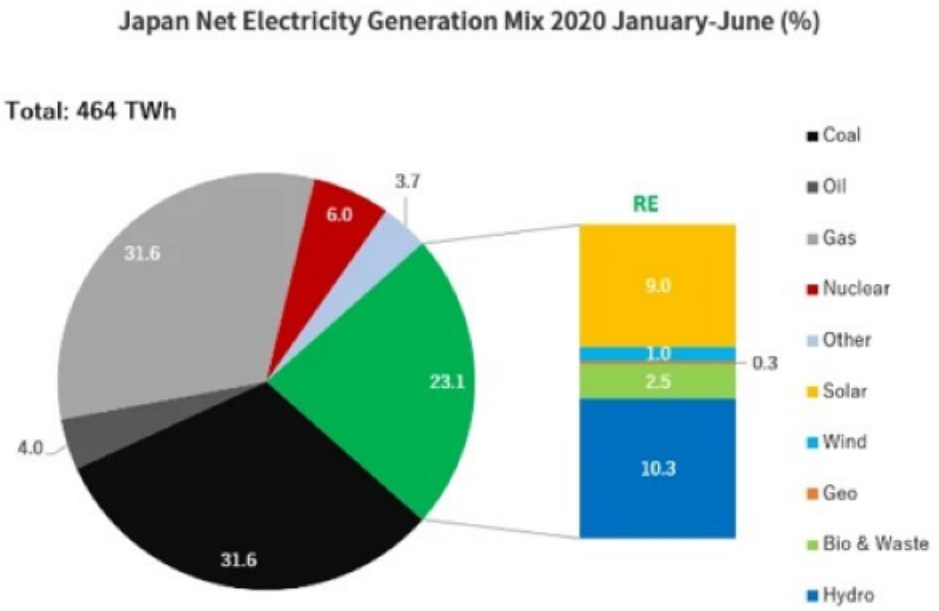
JAPAN POWER SECTOR CHALLENGES AND OPPORTUNITIES

- Currently thermal fuels use is very significant
- Co firing of waste wood pellets has been extensive at various scales of operation
- Co-firing helps older plants meet national efficiency targets



JAPAN'S INTENDED 2030 POWER GENERATION SECTOR TRANSFORMATION

- Renewable energy increases to over 50% of capacity
- Coal cut back significantly, with older units being closed
- Introduction of hydrogen/ ammonia co-firing to lower carbon emissions
- Co-firing wood seen as a medium term measure
- Gas use limited to summer period
- Nuclear use maintained



BIOMASS PROSPECTS IN CHINA

- Avoid major pollution by using crop residues such as rice stalks, rice husks, corn stalks, as well as wood waste arising from logging and forest management
- Options have been introduced to gain useful energy from agricultural waste disposal, including cofiring in existing coal fired power plants.
- However, the State Government has not provided financial support to compensate for the low calorific value of the waste compared to coal. This has to date limited applications.

FURTHER CHINA POSSIBILITIES

- Interest in replacing coal with close to 100% biomass fired units but this would require major wood pellet import arrangements, which doesn't meet the government's current guidelines

- BECCS may be an interesting option but at present, given the disappointingly slow deployment of CCUS elsewhere, is not yet a viable way forward in Asia. That may change when China's CCUS demonstration project is completed successfully, which is led by Huaneng Power who have a justified reputation for engineering innovation

FURTHER OPPORTUNITIES IN ASIA (ZHANG 2019)

INDONESIA

- Indonesia has established mandatory plans to cofire biomass in 52 of its larger power stations as part of its efforts to phase out 100% unadulterated coal power plants. Estimates suggest 9 Mt/y coal savings by replacement with biomass
- Longer term, Indonesia plans to add CCUS to its coal/biomass cofired power plants, delivering negative carbon emissions

INDIA

- India's National Action Plan on Climate Change includes increasing the installed capacity of biomass power to 10 GW by 2022 from the current capacity of 4.4 GW

VIETNAM

- Substantial biomass resources comprising agricultural wastes, firewood and wood residues. Studies being undertaken but no firm plans

KEY TAKEAWAYS

- Opportunities for increased biomass addition in many Asian countries to offset coal use and achieve lower carbon emissions
- Associated opportunities to gain useful energy from agricultural wastes that otherwise cause significant health issues when burned in the fields in developing countries
- Drivers for implementation vary between developing nations and OECD countries
- In both cases, the key to successful implementation is the application of supporting financial policies and regulations

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THANK YOU FOR LISTENING

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