



DRILLING & EXPLORATION WORLD

APRIL 2021

INTERNATIONAL EDITION
Volume 30 Number 05

DEW

THE COMPLETE ENERGY JOURNAL

IN PUBLICATION SINCE 1989

ISSN - 0971 - 7242

dewjournal.com

FLOATING SOLAR World's first RP by DNV



WORLD'S FIRST LNG FROM FLOATING FACILITIES

PETRONAS first global energy company

to produce LNG from floating facilities -

PFLNG SATU and PFLNG DUA

◆
**DNV combines Oil & Gas and
Power & Renewables
businesses into one new
business area - Energy System**

◆
**Drillship utilization surpasses
pre-pandemic levels, but
still room for improvement :
Westwood Study**

◆
**ssLNG for expanding
natural gas access in India**



PFLNG DUA currently located 140 kilometres offshore Sabah, Malaysia producing 1.5 million tonnes of LNG per year. LNG cargo loaded onto Seri Camar LNG carrier



DNV FORMS NEW BUSINESS AREA CALLED ENERGY SYSTEMS

'Merging the expertise will respond to a rapidly changing energy market in search of deeper decarbonization'

DNV's new business area, Energy Systems comprising Oil & Gas and Power & Renewables businesses will be the world's leading resource of independent energy experts and certification body. With acquisition of US based engineering consultancy Energy & Resource Solutions, Inc. DNV will increase energy management capabilities.

From once known as DNV to then DNV GL and now again to DNV. As an indisputable global assurance and risk management company why this change, what's in a name?

The present name has been in place since the 2013 merger between DNV (Det Norske Veritas) and GL (Germanischer Lloyd). The name simplification is a natural consequence of a successfully completed merger and of having operated as a fully integrated company for several years now.

We merged two leading companies with complementary strengths and market positions, and combining the two names was the right solution in 2013. However, it was not a name that rolled off the tongue, and many customers already refer to the company as DNV. Our brand is used by many of our customers to build trust towards their stakeholders, and a simpler name will be an even stronger trust mark for our customers in the future, but still carries with it all our strengths and proud 157-year-old legacy with a purpose to safeguard life, property and the environment.

Will the new set-up give an edge to DNV as the world's leading resource of independent energy experts and certification body?

The 2020s are the decade of transformation or the

"exponential decade", where the pace of the energy transition will be set and where food, health and transport systems will change immensely and digital technologies underpinning industry 4.0 will mature from experimentation into large-scale application. Most importantly, this is the decade where humanity will succeed or fail to deliver on the Sustainable Development Goals. As companies take on the complexities of digitalization and decarbonization, they need trust and assurance. Assurance is not only a service, but also the fundamental value created as a result of the services delivered by DNV. DNV's ambition is to shape the future of assurance with more digitalized services and by leading the assurance of digitalization in the form of assuring data, digital twins and digitized processes.

Our strategy not only positions us for significant growth in a world increasingly in need of a trusted voice, but also positions us to shape the future of assurance. DNV will offer the best, most efficient and digitalized ways of delivering services - be it classification, certification, verification, inspection, advisory, or digital solutions.

On January 26 of this year we combined our Oil & Gas and Power & Renewables businesses into one new business area called Energy Systems. Merging the expertise of these two organizations will allow us to more efficiently respond to a rapidly changing energy market

"Whilst renewable energy is increasing market share, DNV will continue to work with the oil and gas sector as it refocuses on decarbonization"



Brice Le Gallo, Regional Director, Energy Systems Asia Pacific, DNV talks to Arun Kumar Singhal, Chief Editor, DEW Journal on new energy realities, DNV's Energy Transition Report 2020 and merging Oil & Gas and Power & Renewables businesses by DNV into one in response to energy transition. Excerpts from the interview:

that is in search of deeper decarbonization. This puts us in a better position to serve our customers and help them tackle the energy transition faster.

There have been moves by DNV GL towards acquisition of US-based engineering consultancy Energy and Resource Solutions, Inc. (ERS). How will this integration help?

Energy and Resource Solutions, Inc. (ERS) helps organizations to manage and reduce energy costs through program design, outreach, implementation and evaluation services. The growing need to transform energy markets across all sectors and decarbonize energy supply makes this acquisition both timely and crucial. The combination of the two companies' expertise and services creates a unified team that will partner with global customers to address and accelerate the energy transition.

Energy and Resource Solutions, Inc. works with utilities, governments and large commercial and industrial end users to solve complex energy and resource problems. You need to see the acquisition of ERS as part of an ambitious strategy to grow in key markets both organically as well as through targeted acquisitions. The domain expertise and digital first approach demonstrated by ERS is aligned with our vision and services in Energy Management and therefore perfectly fits our strategic direction



Brice Le Gallo is the Regional Director for Energy Systems Asia Pacific at DNV.

Brice has more than 18 years of experience in the Oil & Gas and Maritime Industry where he served in technical, R&D, business development, management and leadership roles. He joined DNV in 2013 and is currently based in Singapore. Brice held numerous executive and commercial positions in Asia Pacific over the last 15 years and has an outstanding record of success in leading energy transition and digitalization initiatives.

He graduated with a master's degree in Naval Architecture & Offshore Engineering and an MBA.

What will be DNV's priorities and thrust areas on the Energy front now?

The combined competence we have built in our Energy Systems business will deliver far more value for customers across the energy sector.

Decarbonizing today's electricity generation with renewables will significantly reduce emissions, but it is expanding the reach of renewables through the electrification of new sectors – from transport to manufacturing – that will reshape the world's energy system. It is the difference between the decarbonization we are seeing today and the deep decarbonization that is needed. This will require advances and scaling of technologies and infrastructure in solar, energy storage, grids, and other areas, and innovations in renewable energy production such as in floating offshore wind to



DNV Energy Transition Outlook 2020 - A global and regional forecast to 2050

SHORTER TERM

1. COVID-19 will reduce global energy demand by 8% this year

- Although energy demand will pick up again from 2021, it will be from a lower base, and for the remaining years to 2050, annual global energy demand will fluctuate some 6 to 8% lower than pre-pandemic forecast
- Pandemic-linked behavioural shifts, like remote working and reduced commuting, will have a lasting effect lowering energy use

2. Energy-related CO2 emissions have peaked, brought forward five years by the pandemic

- Transport energy use peaked in 2019
- COVID-19 has brought peak oil demand forward; oil use may never again exceed 2019 levels

3. Technology can deliver a Paris-compliant future, if scaled properly

- Encouraging progress has been made and is expected to continue for solar PV, wind and battery storage

4. Market forces alone will not fix hard-to-abate sectors; stronger policies and regulations are needed

- Decarbonization of high-heat processes in industry, the heating of buildings, and heavy transport is proceeding too slowly
- Solutions exist, including hydrogen, CCS, and further energy-efficiency improvements, but these need a policy push to scale

LONGER TERM

1. Rapid electrification will transform the energy mix by 2050

- The share of electricity in the final demand mix will more than double from today's level by 2050
- Half of the passenger vehicles sold worldwide will be EVs by 2032

2. Solar PV and wind – in equal shares – will dominate power generation

- Electrification, powered by renewables, drives decelerating energy intensity, which will see energy use peak worldwide in 2032
- Significant investment in connectivity and flexibility will enable a 62% variable renewable share by 2050

3. Natural gas will take over as the largest energy source this decade, and remain so until 2050

- However, only 13% of natural gas used in 2050 will be decarbonized

4. Despite flat energy demand and a growing renewable share, the energy transition is nowhere near fast enough to deliver on the Paris Agreement

- Most likely we are heading towards 2.3°C warming by the end of the century
- Lot more renewable power, decarbonization, energy-efficiency improvement, and carbon capture is needed
- The world will spend an ever-smaller share of GDP on energy, allowing for additional investment to further speed up the transition

keep up with the increasing demand.

From the oil and gas side, reducing emissions from production and distribution is a key focus in the short term, and so is switching to lower emissions-intensive fuels, such as from coal to natural gas (supported by growth in LNG). This will have a large impact on reducing emissions, but to deeply decarbonize, carbon must be removed from fossil fuel energy sources, before or at the point of combustion. We forecast that fossil fuels will still account for half the world's energy supply in 2050, and around three quarters of fossil fuel emissions come from combustion at the point of end use. The solutions are already available today, but they need to scale. To deeply

decarbonize, all stakeholders need to work together to scale carbon capture and storage, which is a solution for both the O&G sector and high heat manufacturing industries and hydrogen technologies, to support the development of a hydrogen economy that can fuel a wide array of hard-to-abate sectors.

Some sectors are easier to decarbonize than others. Airlines and shipping will take much longer. Therefore, we need to differentiate what decarbonization initiatives we can do immediately for some industries and assess where we need to spend more time and investments for others and have that differentiated view.

These two pathways towards deep decarbonization

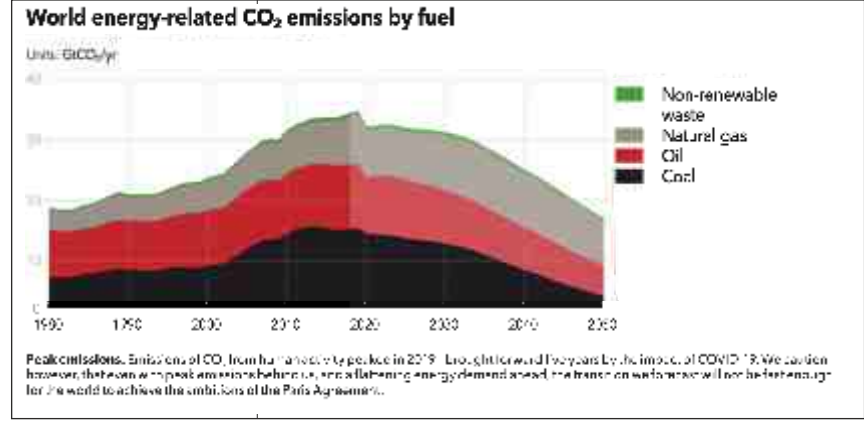
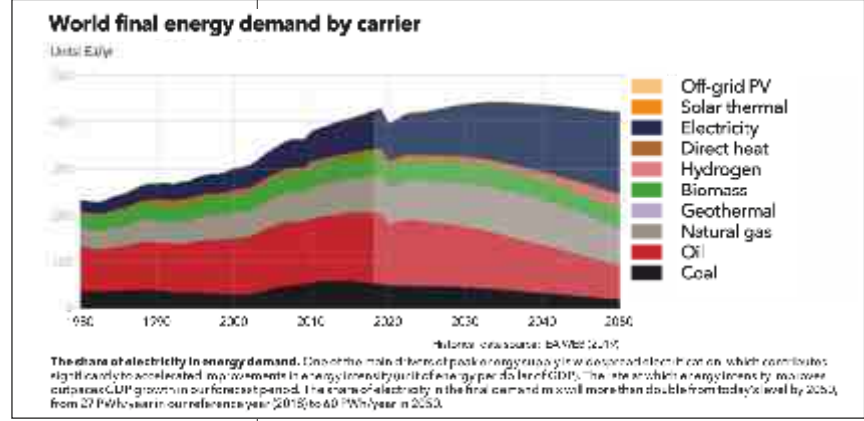
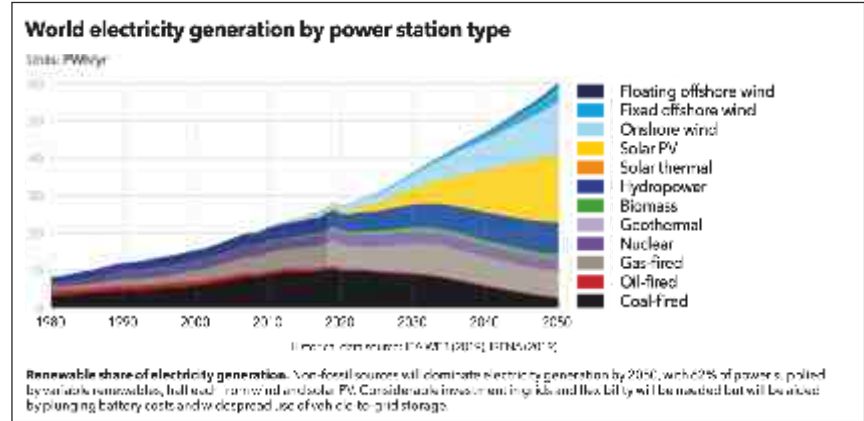
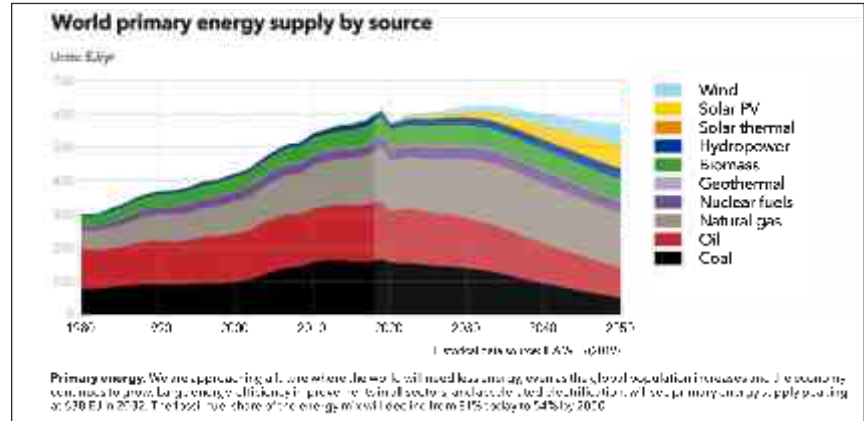
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should not be viewed in isolation. Renewable energy will power oil and gas assets, gas (increasingly decarbonized) will act as a back-up for renewables at times of peak demand, hydrogen from fossil fuels with CCS will lay the grounds for a hydrogen economy, hydrogen (and other low carbon fuels such as ammonia) produced with renewable energy will increase the reach into other sectors not easily electrified, such as shipping, and hydrogen will be used to store renewable energy.

The pressure is mounting to decarbonize, spurred on by society, governments, investors, and from people within energy industries. This has led to the proliferation of net-zero targets, which have accelerated the realization that the energy transition must go deeper, and that there is no single path to a decarbonized energy mix. Further, traditional energy challenges remain, and energy industries and governments will need to balance deep decarbonization with the need to provide a secure, affordable supply of energy.

This complexity requires collaboration and partnerships, and understanding and expertise across the full energy value chain, to support the multiple energy transitions taking place today and to accelerate the timeline for the many transitions to come.

Hence, we will focus on delivering services around:



Cross-sector energy market and technology insights

- Cross-sector advisory
- Energy transition and energy storage expertise

Energy generation and production

- Upstream offshore oil and gas
- Offshore wind
- Onshore renewables

Energy transport

- Midstream pipelines and LNG terminals
- Electric transmission & distribution
- Downstream process plant and refineries

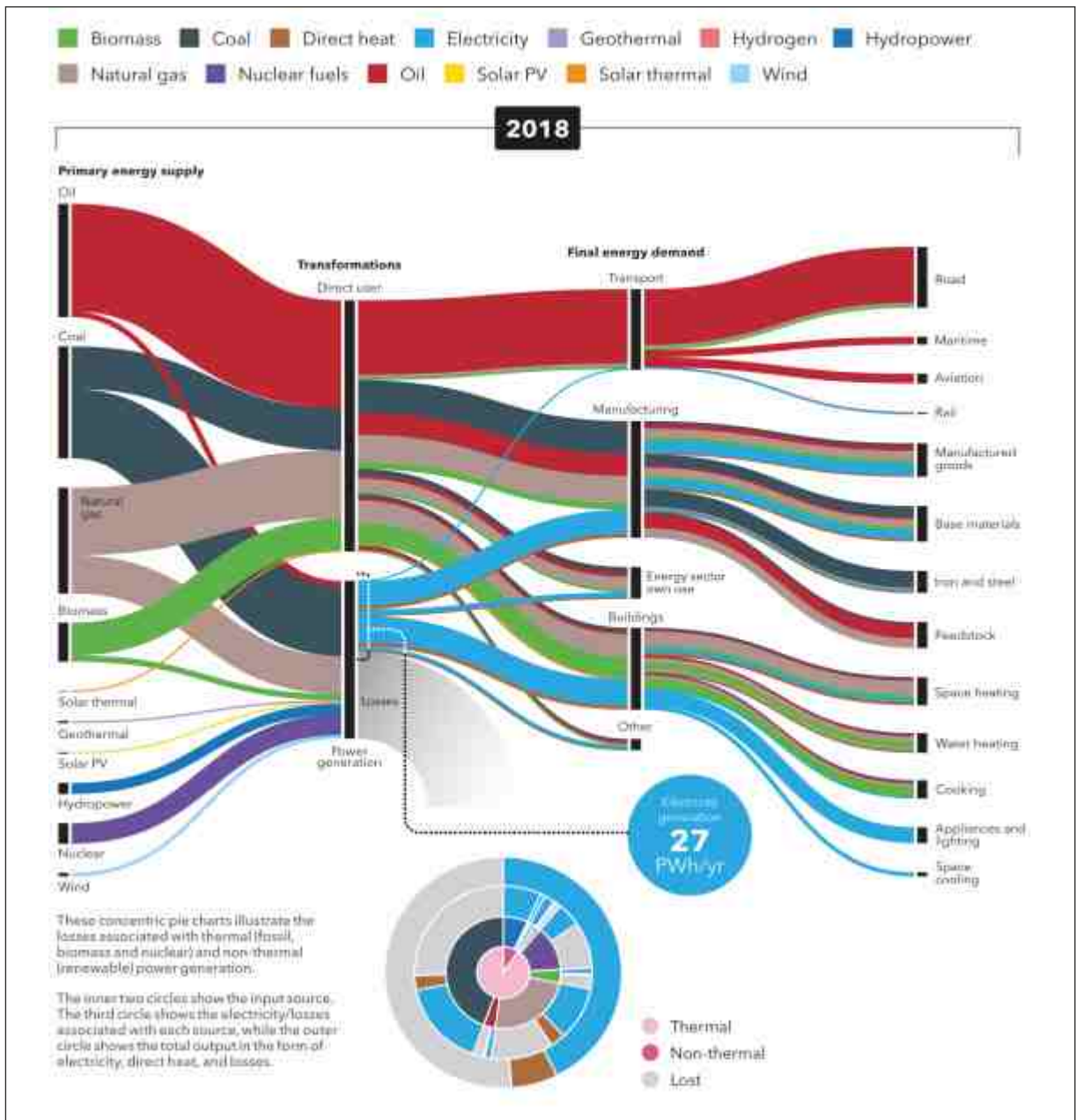
Energy use

- Energy efficiency and energy management

Supported by strong capabilities and services in digitalization

What are the new energy realities? How can we bring the benefits of new energy reality sooner?

We need to urgently respond to the threats of climate change as we have a very tight window so we need to reduce our energy consumption on a global scale by 8% every year and this cannot happen on a standalone basis,



Comparison of Energy Flows: 2018 and 2050

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it needs to happen with very close public/private partnerships.

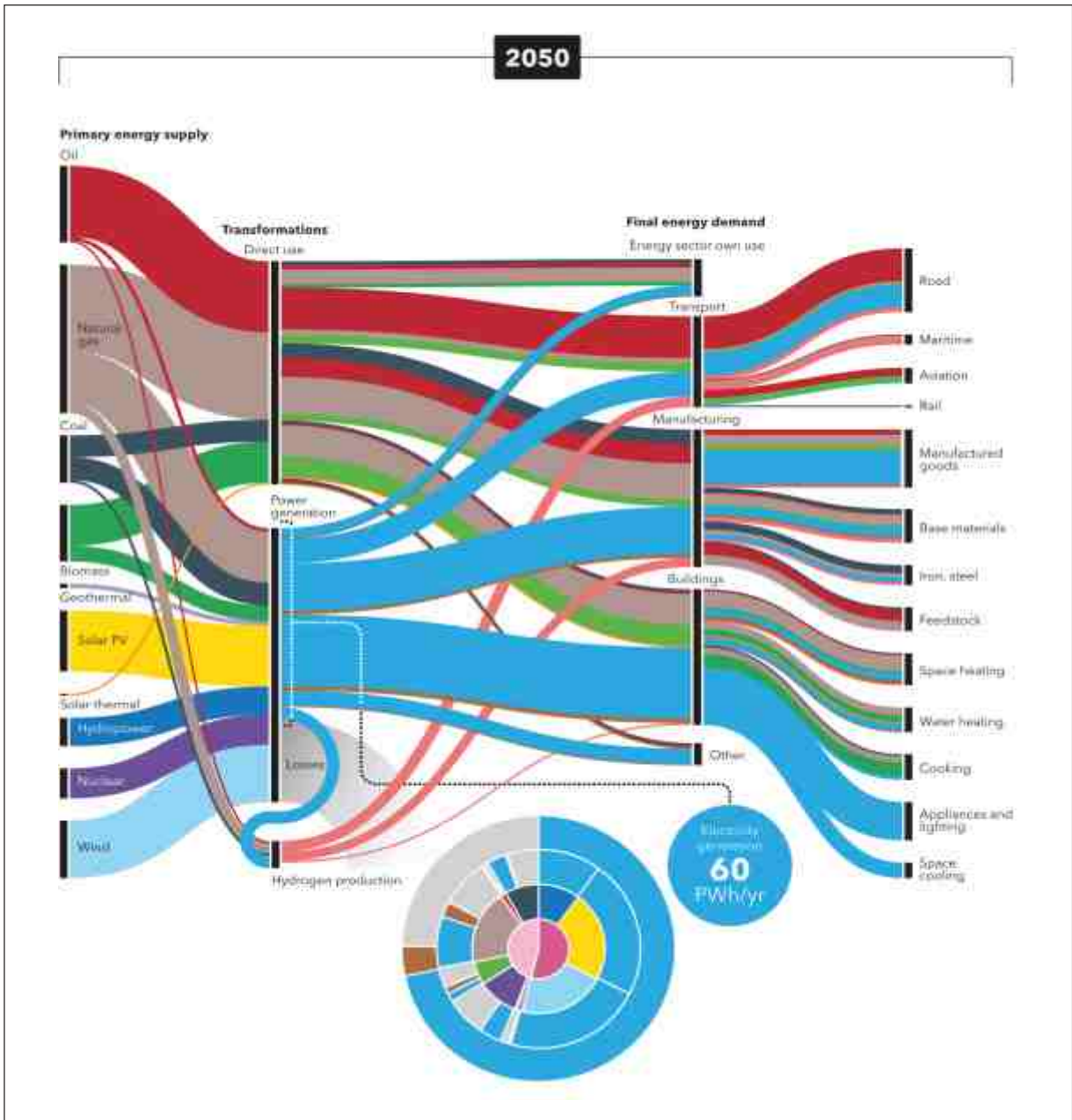
More specifically, we need to scale down our consumption of the fuels which have a very high carbon footprint such as coal, scale up our consumption of renewables such as wind and solar and increase our investments in upgrading our grids in order to integrate and balance these systems in the overall energy mix. We can bring the benefits of the new energy reality sooner by

(1) Continuing robust government policy and financial incentives that promote renewables

(2) Developing strategies and governance structures to implement national decarbonization plans

(3) Promoting global and regional cooperation to commercialize and bring down the LCOE of new technologies that can accelerate the energy transition such as energy storage, CCUS and hydrogen

With environment regulations getting stricter, how do you plan to take on the decarbonisation drive in the energy sector in Asia and globally especially since DNV now has a Centre of Excellence dedicated



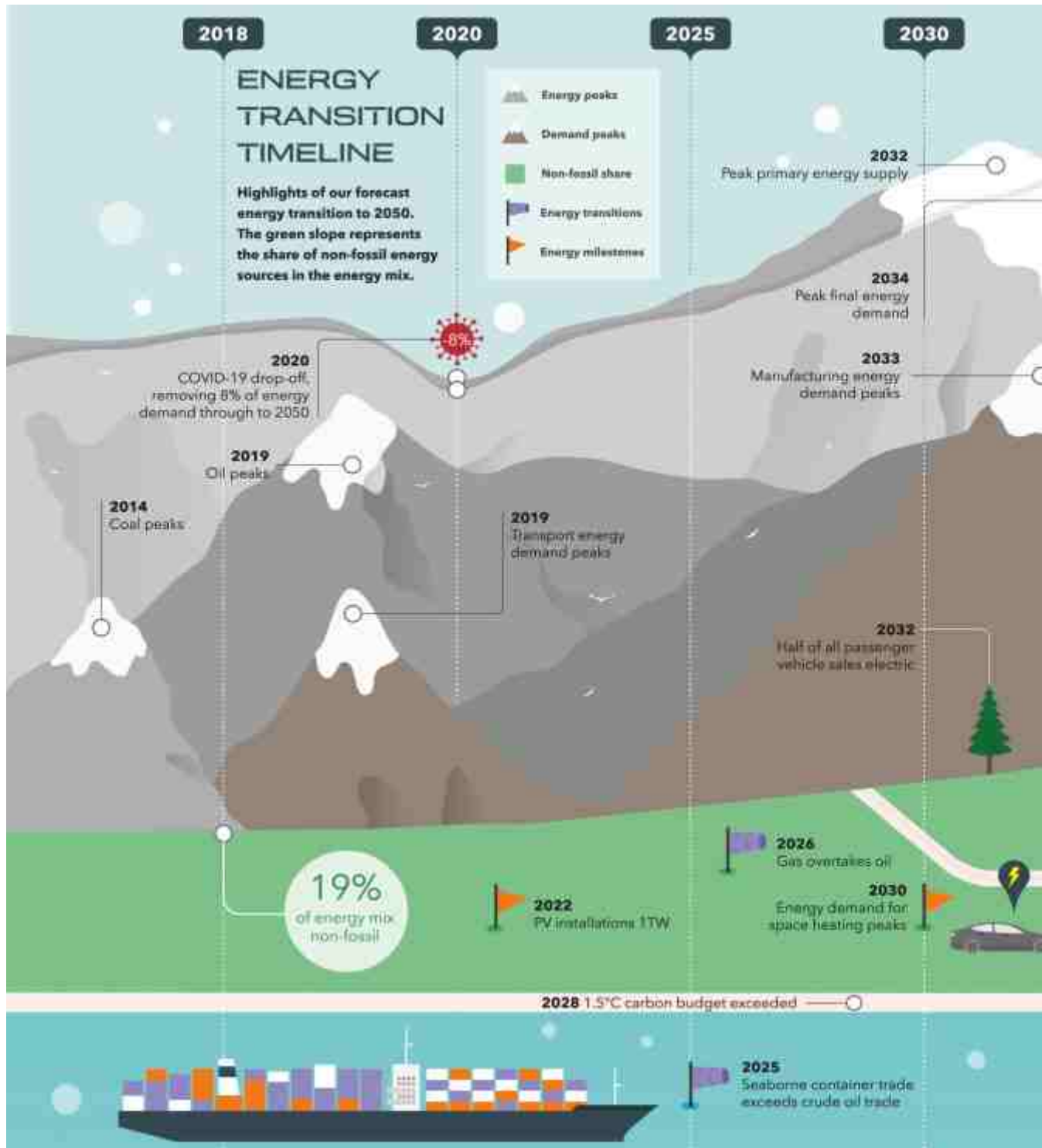
Comparison of Energy Flows: 2018 and 2050

to decarbonisation?

As shared in our previous answers, the decarbonization drive in the energy sector will come from different angles.

- Despite historically low fossil fuel prices and a temporary decline in global energy demand due to the pandemic, the pace of the energy transition is

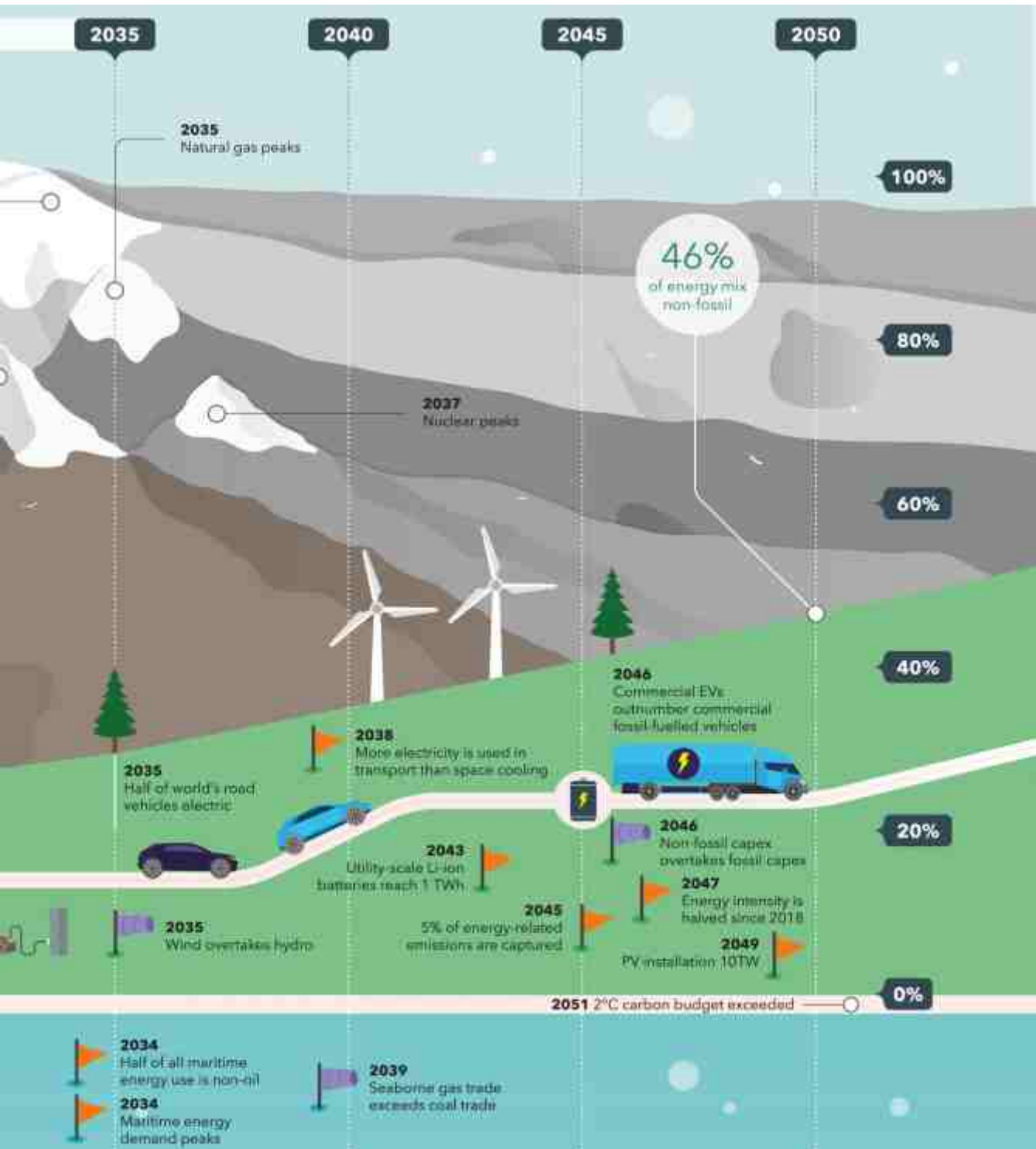
accelerating, as governments and corporations around the world recognize the impacts of climate change and the substantial economic costs of inaction. Renewable energy is a key part of this trend. We predict that wind and solar energy will grow from an 8% share of the of the global electricity generation



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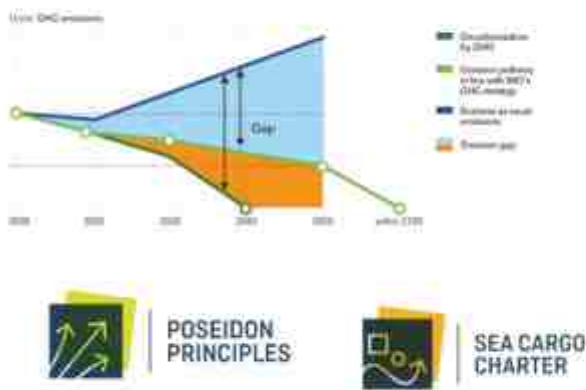
today, to more than 60% by 2050. With the growing cost competitiveness of these technologies, clean energy is already dominating newly installed power capacities winning over traditional fossil fuel generation. If we are to meet the goals of the Paris Climate agreement, this is not enough. To meet the

diverse needs and challenges of different markets around the world, we expect to undergo multiple energy transitions at varying paces and spanning different industries and technologies, from LNG fuelled ships and electric vehicles, to blended hydrogen networks, and carbon capture for heavy industry. The

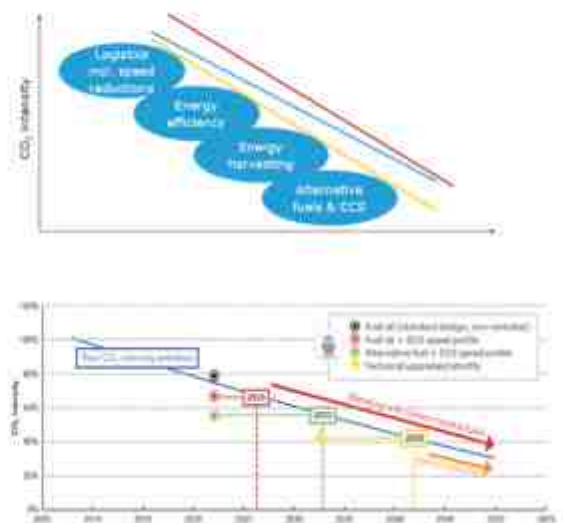


How do we support shipping companies? A three-step approach

First, we support owners to set sound GHG targets, aligned with their ambition level (e.g. best in class, compliance).



Second, we explore the available GHG reduction measures and develop roadmaps for how the targets can be met.



key is to understand the dynamics of how these various energy systems interact with one another.

- DNV has indeed set up a regional Maritime Decarbonization & Autonomy (MDA) Centre of Excellence in Singapore, focusing on shipping industry. We are dedicated to establish decarbonization roadmaps to help the industry on this journey and we believe that among other means, we can achieve significant results by harnessing data from digitalization.
- We need to highlight the importance of establishing higher carbon pricing and scaling up our decarbonization efforts at a much faster speed. We need to encourage every company to evaluate and measure their own carbon footprint. Many companies are already incorporating these costs into their business plans in parallel with the expectation of an increase in carbon prices.

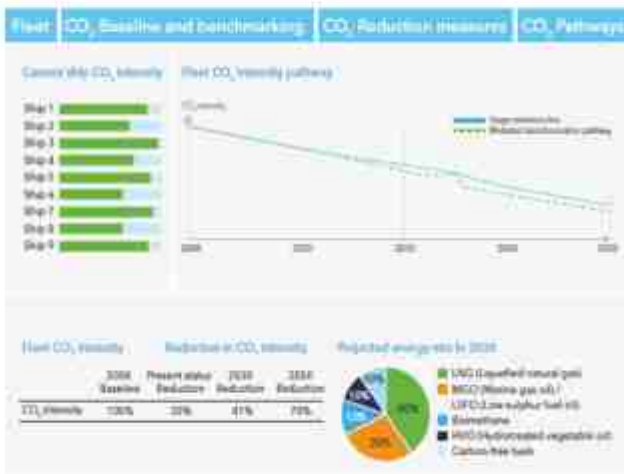
I my last interaction with DNV it was emphasised, “we

must recognise the cyber security challenge raised by digitalisation. With some systems we might have to eschew the benefits of digitalisation because the impact of a small risk is simply too great”. With digitalisation grown into all walks of life and businesses, what now is your belief? How does DNV as a certification body analyze this aspect for a full proof security.

IT environments have already faced active attacks and information security threats for decades. By contrast, operational technology (OT) environments – the systems that control critical industrial assets such as windfarms, floating vessels, and pipelines – have traditionally been less vulnerable to cyber-attacks because they have operated with little or no connection to other networks.

That’s all changing now. Industry’s need for more powerful data analytics and more advanced automation has caused the gap between OT and IT systems to close quickly over the past decade, exposing the energy

Third, we develop GHG dashboards for visualizing performance and robustness testing of strategies.



industry’s critical assets and infrastructure to the threat of more frequent and more severe cyber-attacks.

The energy sector accounted for 16% of all cyber-attacks in 2019. The ramp up of renewable energy adoption and the growth of transmission networks will create a wider and vastly more connected power system that is even more vulnerable to disruption.

DNV has established a dedicated Cyber Security unit to help the energy industry assess and mitigate cyber risks facing critical infrastructure along the entire value-chain of the energy industry. Our experts reduce the probability and consequences of attacks by building a complete picture of our customers’ systems and uncovering vulnerabilities. We prioritize and fix exploitable gaps before hackers find them, and we create programmes to help everyone in an organization to play a role in outsmarting cyber terrorists.

With new cyber threats and prevention technologies entering the market every day, we bring our customers the latest insight on what to watch out for and why it is relevant to their business. We help our customers to comply with the latest standards and regulatory requirements and to meet cyber security best practice. dewjournal.com

A 'maritime renaissance' is emerging, helping to reach the environmental goals
Four key elements shaping the new era of shipping



Digitalization
Turbo-charged by half a decade since the pandemic



Openness to new Ideas
An explorative mindset is key



Innovation
The old way of doing things is constantly being tested



Collaboration
Universities, tech giants, start-ups