

**LIVE WEBINAR**

# STRATEGIC ENERGY TRANSITION TOWARDS CARBON NEUTRALITY UNDER THE IMPACT OF COVID-19: LESSONS FROM JAPAN



**SPEAKER**

**Prof. Dr. Ken Koyama**

Chair in Energy Economics of  
Energy Commission at UNITEN



**MODERATOR**

**Ts. Dr. Siti Indati bt Mustapa**

Director Institute of Energy  
Policy and Research



**THURSDAY 26 AUGUST 2021**



**10.00 AM - 11.30 AM (GMT +8 KL)**

# STRATEGIC ENERGY TRANSITION TOWARDS CARBON NEUTRALITY UNDER THE IMPACT OF COVID-19: LESSONS FROM JAPAN



**Prof. Dr. Ken Koyama**

Chair in Energy Economics of  
Energy Commission at UNITEN

# Japan's Strategic Energy Transition: Voyage to Uncharted Water Toward Carbon Neutrality Under the Impacts of COVID-19

**Energy Talk Webinar**

**August 26<sup>th</sup>, 2021**

**Prof. Dr. Ken Koyama**

**Chair in Energy Economics of Energy Commission at UNITEN**

**Chief Economist & Senior Managing Director, Institute of Energy Economics, Japan**

# Emerging global energy landscape

---

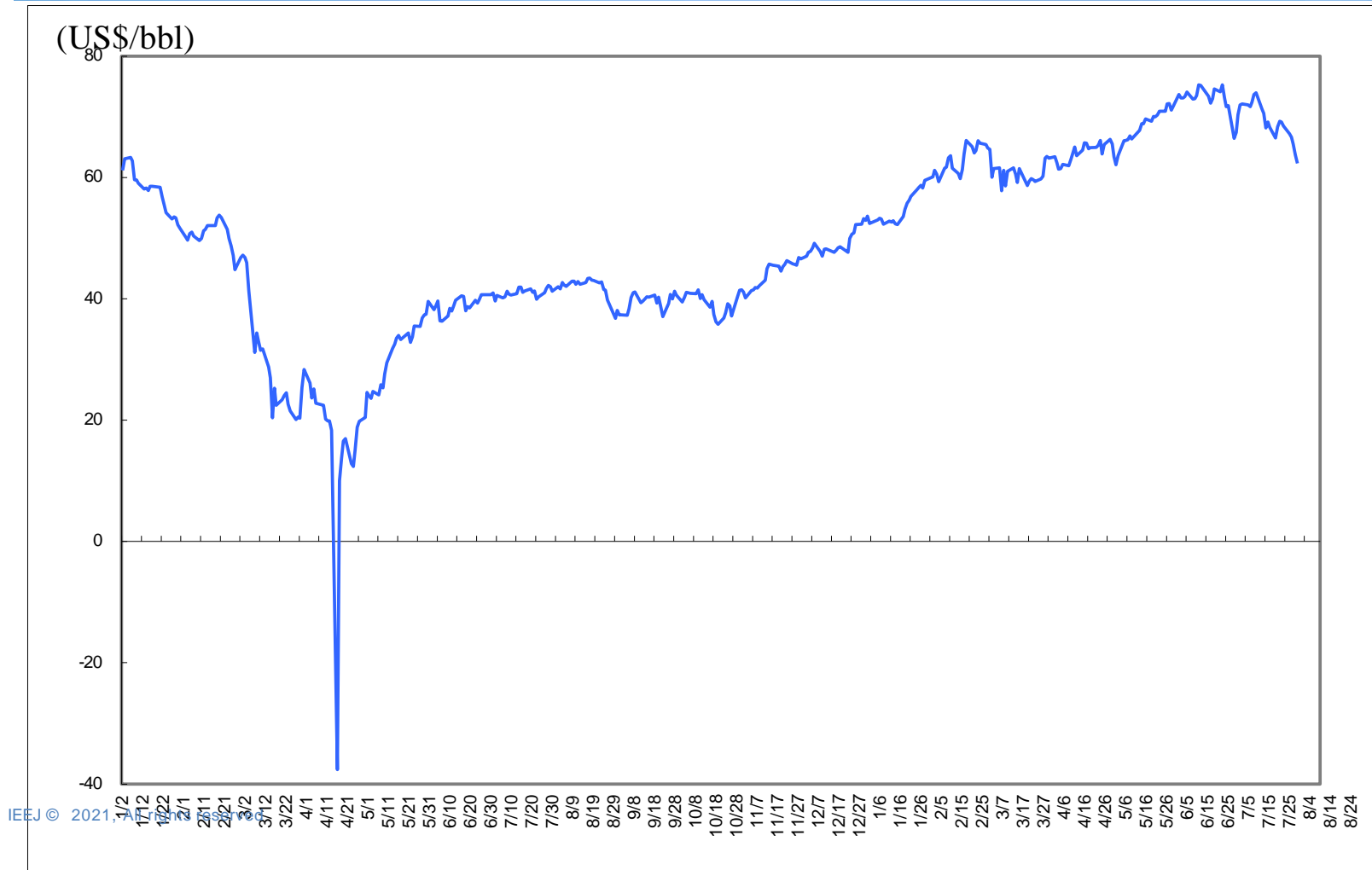
- Unprecedented impact of COVID-19 pandemic
- Energy price/market under uncertainty and volatility
- Global waves of carbon neutrality target
- Impact of Biden Administration
- Emerging US-China “Cold War”
- Energy Geopolitics revisited
- Expectation for advanced and innovative technology

## Discussion on the next “Strategic Energy Plan”

---

- Previous SEP 2018 called for achievement of “2030 Energy Mix Target”
- METI Advisory Council continued to discuss the revision of 6<sup>th</sup> SEP, which is now in a final stage
- 2050 carbon neutral target sets a baseline
- 46% GHG reduction target in 2030 in place
- Comprehensive approach based on “3E+S concept” required
- ***Strategic emphasis on innovative technology***

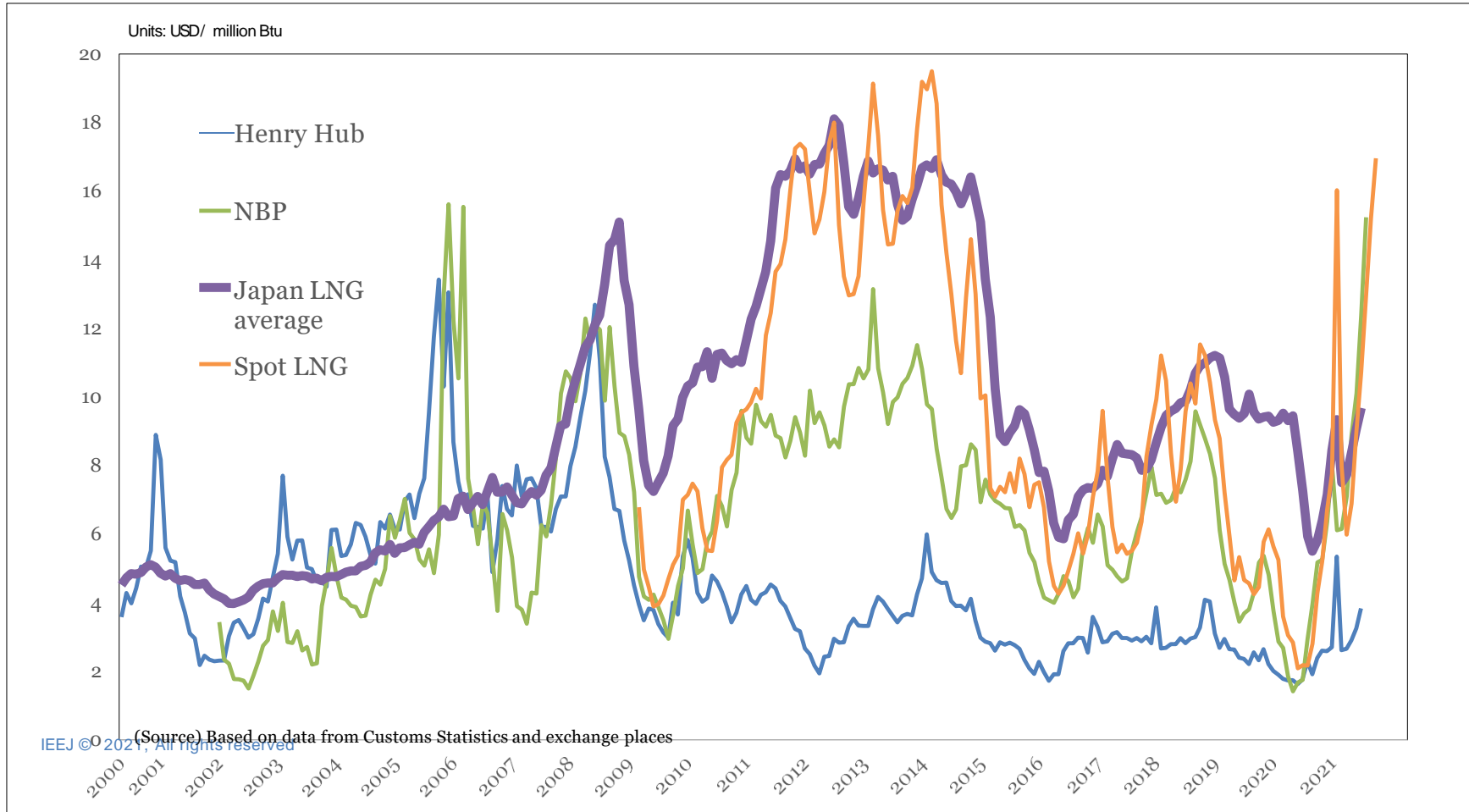
# Crude Oil Price Volatility



Source: NYMEX data, etc.

# Regional gas/LNG price in the world

## Extremely volatile Asia LNG spot price



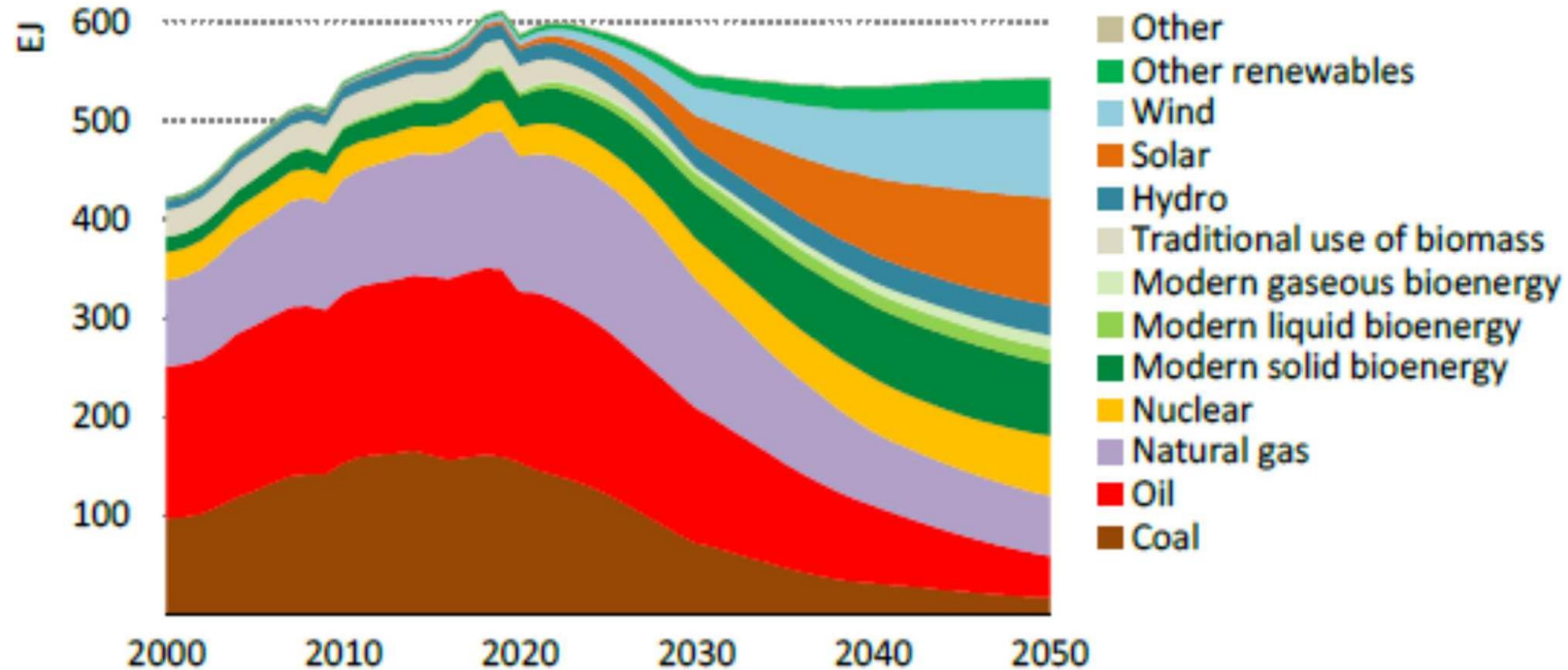
## Global waves of carbon neutrality target

---

- EU, as a front runner, targets Carbon Neutrality (CN) in 2050
- China announced CN target in 2060 (September 2020)
- Japan announced CN target in 2050 (October 2020)
- Biden administration has CN target in 2050
- Climate Summit further promotes global decarbonization
- But, CN achievement is extremely challenging
- Promotion of EE and non-fossil energy plus electrification with zero emission power is essential
- Innovative technology/approach such as hydrogen is needed
- Minimization of “transition costs” to CN is critically important



# An energy scenario in IEA's NZE Report



IEA. All rights reserved.

*Renewables and nuclear power displace most fossil fuel use in the NZE, and the share of fossil fuels falls from 80% in 2020 to just over 20% in 2050*

IEEJ © 2021, All rights reserved

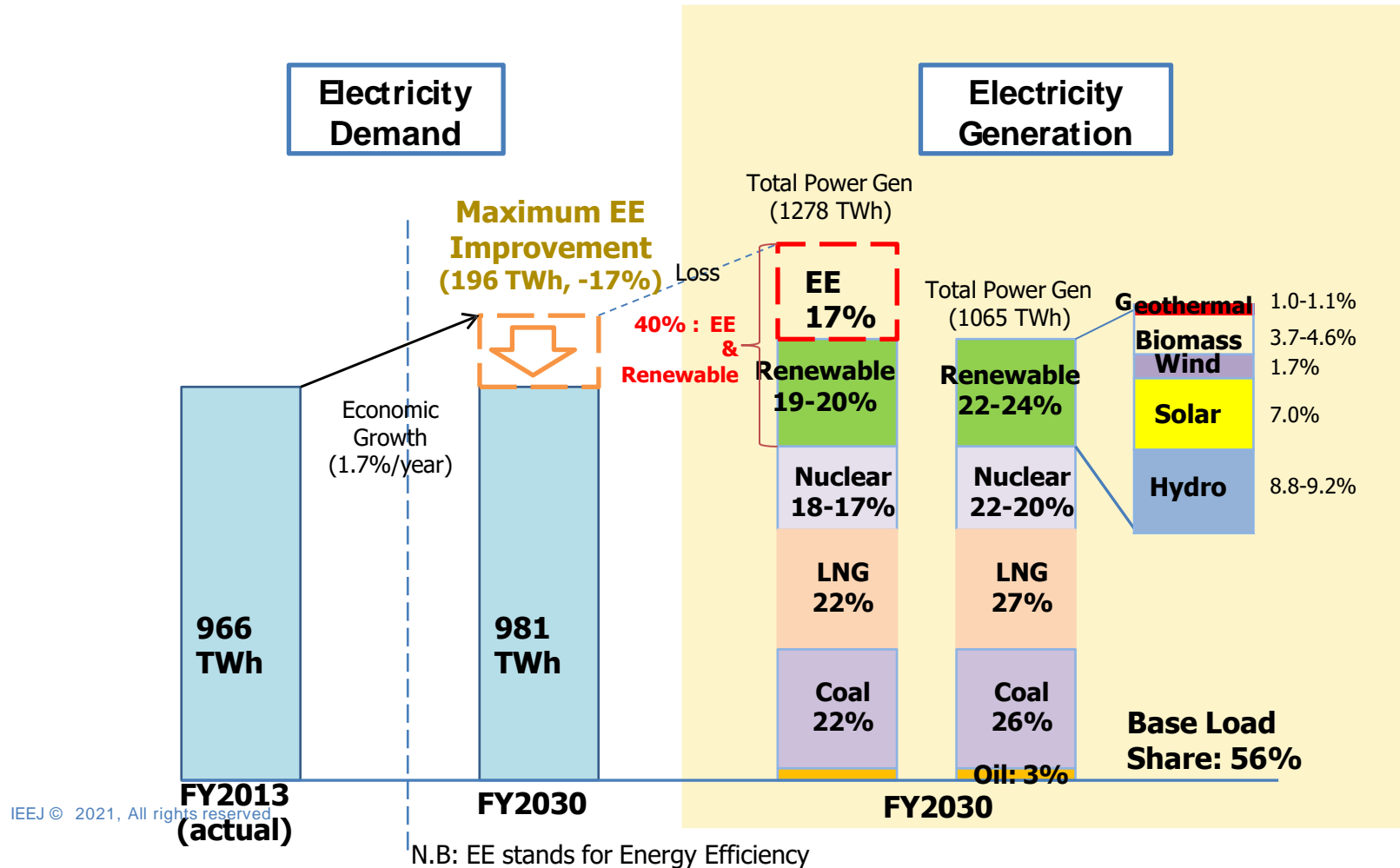
Source: IEA, "Net-Zero by 2050: A Roadmap for the Global Energy Sector"(May 2021)

## “3E+S” Policy Target in the 4<sup>th</sup> & 5<sup>th</sup> SEP

---

- **“Safety” as a top-priority precondition**
- **“Energy security”**: To increase energy self sufficiency rate from 6% to 25%
- **“Economic efficiency”**: To reduce electricity cost from current level
- **“Environment”**: To set GHG emission reduction goal comparable to those of US and EU (**26% reduction**)

# Japan's Energy Mix Target

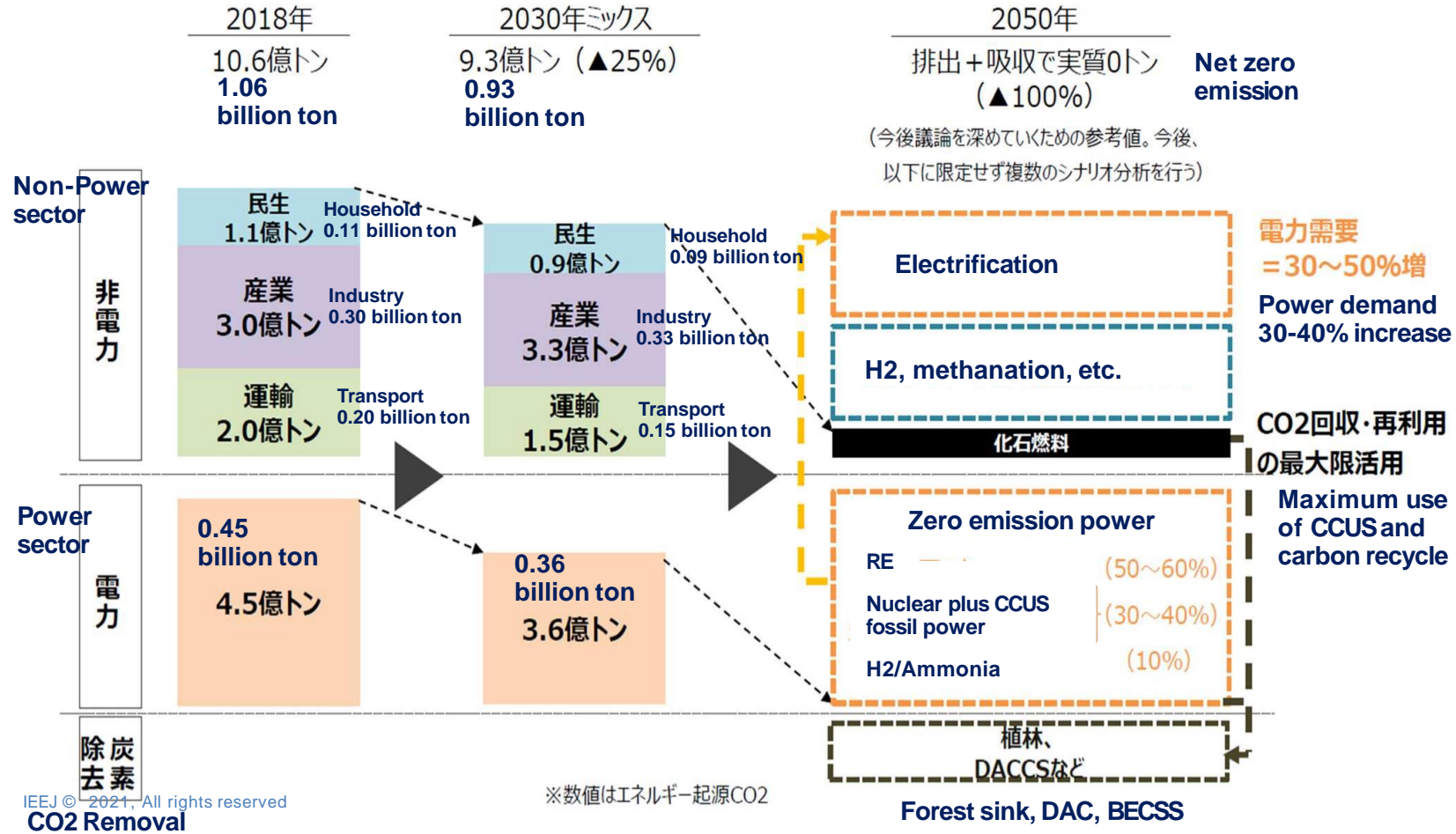


## New energy mix for 2030

---

- **Given condition of 46% GHG reduction (from 26% reduction)**
- **More ambitious EE/ES target of 53 MTOE**
- **Power generation at 930-940 Tera watt hour in 2030**
- **Nuclear target remain same at 20-22%**
- **RE target increased to 36-38% (from 22-24%)**
- **Two third of the RE increase expected from solar PV**
- **H2/Ammonia accounts for 1% (small, but for the first time ever)**
- **Reduced target of LNG at 20% (from 27%) and coal at 19% (from 26%)**
- **Energy security: energy self-sufficiency at 30% (from 25%)**
- **Economic efficiency: electricity cost up to be minimized**

# A 2050 Carbon neutral scenario for Japan



## 2050 Electricity cost analysis by scenario

	Power generation	RE : %	Nuclear : %	H2/Ammonia : %	CCUS power : %	Electricity cost JPY/kWh
Reference Case	1,350 TWh	54	10	13	23	24.9
RE 100%	1,050 TWh	100	0	0	0	53.4
RE innovation	1,500 TWh	63	10	2	25	22.4
High nuclear	1,350 TWh	53	20	4	23	24.1 <small>(max nuclear: 19.5)</small>
H2 innovation	1,350 TWh	47	10	23	20	23.5
High CCUS	1,350 TWh	44	10	10	35	22.7
Demand transformation	1,350 TWh	51	10	15	24	24.6

# Challenges for RE and EE/ES

---

## ■ RE

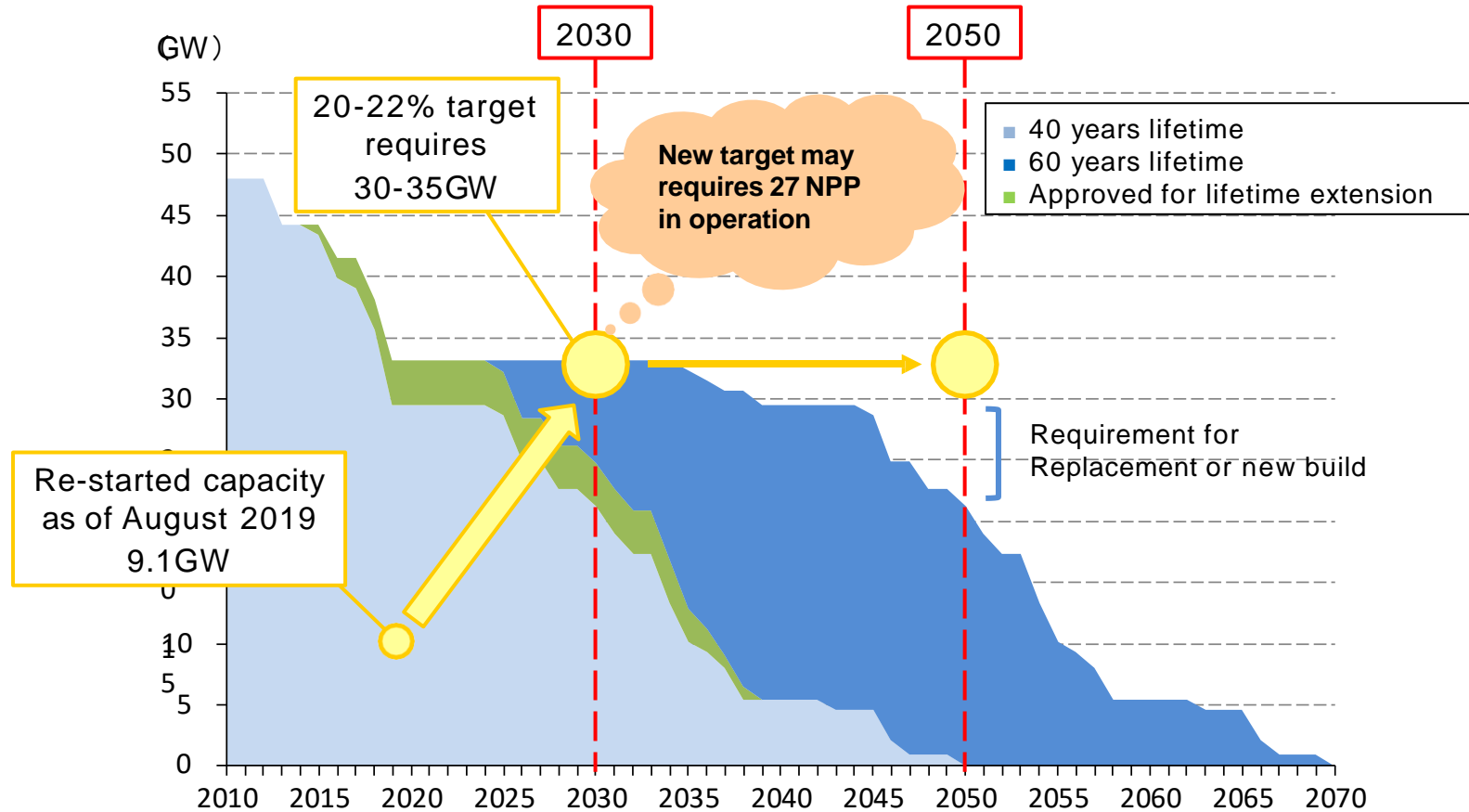
- Still higher costs and economic burdens in Japan
- Limited availability of appropriate/suitable site/land
- Japan's natural/weather conditions
- Intermittency and integrated costs
- Issues related to Inertia force

## ■ EE/ES

- Low hanging fruits are gone
- Current EE target (in 2018 SEP) met at about 30%, but now the target further enhanced
- Further enhanced EE/ES may end up cost increase

# Challenge to secure a 20-22% nuclear share

❖ Extension of lifetime or construction of new reactors is required





# Challenges for H2/Ammonia and fossil fuels

---

## ■ H2/Ammonia

- Establishment of international/domestic supply chain
- International cooperation
- Cost reduction
- Infrastructure development
- Promotion of increased use of H2/Ammonia

## ■ Fossil fuels

- Market volatility and security of supply
- Diminishing share/presence of Japan
- Strong “headwind” for fossil fuel use

# Conclusion

---

- Japan continues to face “3E+S” challenges
- Discussion on “Strategic Energy Plan” revision in a final stage
- GOJ announced “2050 carbon neutral target” and 46% GHG reduction target for 2030
- Increasingly ambitious new energy mix target
- Japan need to overcome difficulties and challenges
- Innovative technology needs to play critical role
- Technology development, cost reduction, infrastructure development, etc. will be the key
- International cooperation can play a key role to achieve “3E+S” goals respectively and globally

A low-angle, upward-looking photograph of several modern skyscrapers with glass facades, set against a clear blue sky. The image is partially obscured by several thick, white diagonal lines that create a sense of movement and depth.

# **STRATEGIC ENERGY TRANSITION TOWARDS CARBON NEUTRALITY UNDER THE IMPACT OF COVID-19: LESSONS FROM JAPAN**

**DISCUSSION SESSION**



**SESSION**

# Thank You

Join Our Next Event!



Institute of Energy Policy and Research  
Universiti Tenaga Nasional  
Putrajaya Campus  
Jalan IKRAM-UNITEN  
43000 Kajang, Selangor

 +603 8921 3400

 [iepre@uniten.edu.my](mailto:iepre@uniten.edu.my)