環保生態

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???????IEA?????????????????????????????????IEA

?????????????????????????????????????2030????? 61%?? 2050 ????

88%?2050 ?????????????????????? 10%??

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8%????????????2022??406GW??2030????515GW?2050????812GW????OECD???

(NEA)??????????????????????????2050??????????????479GW???IEA

??????????????60%???

??????????????IEA?NEA????????????????????2022???**??????????????Lawrence Livermore National Laboratory, LLNL?????????National Ignition Facility, NIF?**????????????????????2.05MJ??????????????????3.15 MJ ????????????????????300MJ

????????????????????????????????

???????????2060?2070?????IEA??????????(Technology Readiness Levels)????2??????????????????????????2050????????????????????????????????????**Eric Wesoff**??

??????????????????????(advanced reactor)??????????????????????????????????50~300MW

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?1. ?????????

	第三代+		第四代		
	大型輕水式反應爐	輕水式小型核能機組	高溫氣化反應爐	溶鹽式反應爐	微型
裝置容量	1GW	70~300	80~270	200~800	1~50

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燃料類別	LEU	LEU	HALEU	HALEU	HALEU
冷卻劑	水	水	氣，氦氣	金屬或鹽	多樣
機組案例	Vogtle 3,4號	NuScale	X-energy	TerraPower	BWTX

整理自DOE 2023

????????SMR

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??????????????????????NuScale?VOYGR????????SMR????????????

NuScale的教訓 – 延遲與昂貴

NuScale?2000???????SMR???????????Utah Associated Municipal Power Systems

(UAMPS) ????????????????????????????6?77MW

??????????????????462MW

????????????????????????????(certification)

??????????????????2016???50MW?????????????77MW?????2023?1

??????????????Standard Design Approval (SDA)

Application?????????????????????????5??????NuScale?????2029

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????????????????????NuScale?????????????SMR?????????????????

?2. NuScale??????????

NuScale??????	??????
2008	2015~2016
2010	2018
2018	2026
2020	2029

IEEFA, 2022

SMR???(The Institute for Energy Economics and Financial Analysis, IEEFA)??NuScale????????????????NuScale?2020??????????12?60MW ??????????720?????????????????61?????2021 ?????????????????????462MW????????????53??????2023?1 ?????????????????????93??????IEEFA???NuScale?????????2021??? 58USD/MWh????89USD/MWh?????????40??????????????????

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120USD/MWh????????????????????????

????????????????????????????????Environment Working Group???????????Arjun Makhijani????????????????????????M.V. Ramana???????????????????NuScale??NRC???????????????NuScale ??NRC???????????????Vesna Dimitrijevic???????????????????NuScale ??????????????????????NuScale???????????????NuScale ??(Ed Lyman) ???NuScale ??NuScale????????

??????????????NuScale???????????????????UAMPS????NuScale??2024 ????????subscription level????????????????80%???????UAMPS???????????25%?????NuScale ????????????????????????????NuScale?????????????????????

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NuScale??????????????SMR????????????????????????????????

??????????????Allison

M. Macfarlane ??????????????????????(PNAS)??????????????????(Nuclear waste from

small modular reactors

)????????????????????????????????2?30??????????????????????-129??-79

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??????????SMR?????????SMR??????????????????????????10??????????EPZ?????

SMR???????????EPZ????SMR??????????????????EPZ?????SMR

Generation

mPower???????EPZ???????1000??????????????????????????SMR??????????????????????

?SMR???????NRC???53????????????????????????????Part 53 – Risk Informed, Technology-

Inclusive Regulatory Framework for Advanced

Reactors

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???????????53??NRC???????

??53??????????SMR

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SMR????????

SMR

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??2022

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????????????????????9000????5000??????????3000

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??CCS??????????

????????? CCS ?????????????IEA

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???????????????????? 2050 ?????????????60%?????5%

??????????????????????10%??????? 2040 ?????????

????SMR??????????????????????2050

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參考文獻：

Questions for NuScale VOYGR Reactor Certification: When Will It Be Done? And then, Will It Be Safe?

https://ieer.org/resource/reports/questions-for-nuscale-voygr-reactor-certification-when-will-it-be-done-and-then-will-it-be-safe/

IEEFA U.S.: Small modular reactor “too late, too expensive, too risky and too uncertain”

https://ieefa.org/articles/ieefa-us-small-modular-reactor-too-late-too-expensive-too-risky-and-too-uncertain

Eye-popping new cost estimates released for NuScale small modular reactor

https://ieefa.org/resources/eye-popping-new-cost-estimates-released-nuscale-small-modular-reactor

The misguided push to weaken nuclear safety standards is gaining steam

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https://thehill.com/opinion/energy-environment/4116386-the-misguided-push-to-weaken-nuclear-safety-standards-is-gaining-steam/

The Department of Energy. 2023. Pathways to Commercial Liftoff: Advanced Nuclear.

International Energy Agency (IEA), 2021. Net Zero by 2050: A Roadmap for the Global

Energy Sector. OECD:Paris

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