Ministry of Economic Affairs & Climate Policy

Dutch Nuclear New Build Program: Remuneration models & financing structures

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Amsterdam, 9 July 2024

Dutch Nuclear New Build Program: Remuneration Models & Financing Structures

Any person intending to read this summary document should first read this letter.

EY Strategy and Transactions ('us' or 'EY') was engaged by the Ministry of Economic Affairs and Climate Policy ('EZK') for the purpose of providing strategic advisory services to EZK in relation to the development of nuclear financing models in the Netherlands ('Services'), as specified in the engagement agreement between EZK and EY Strategy and Transactions dated 30 June 2023 ('Engagement Agreement'). The nature and scope of the services, including the basis and limitations, are detailed in the Engagement Agreement. We have prepared the Report outlining the outcome of our Services.

Purpose of the Summary and restrictions on its use

Our Report contains business sensitive information, which is subject to restrictions imposed by the Non-Disclosure Agreements with third parties and we did not receive the permission for it to be disclosed. This summary document (the Summary) was prepared on the specific instructions of EZK and for EZK to inform Dutch Parliament on the matters outlined in the Summary and should not be used or relied upon for any other purpose. Consequently, the Summary excludes certain business sensitive information, as referred above, gathered during our engagement. Such specific information was abbreviated and summarized to retain the support of our conclusions.

Whilst each part of the Summary addresses different aspects of the work we have agreed to perform, the entire Summary should be read for a full understanding of our findings and advice. Our work commenced on 3 July 2023 and was completed on 9 July 2024. Therefore, our Report and the Summary do not take account of events or circumstances arising after 9 July 2024 and we have no responsibility to update the Report or the Summary for such events or circumstances.

We prepared this Summary for the benefit of EZK and have considered only the interests of EZK. We have not been engaged to act, and have not acted, as advisor to any other party. Accordingly, we make no representations as to the appropriateness, accuracy or completeness of the Summary for any other party's purposes.

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We do not accept any claim or demand or any actions or proceedings that may be brought against us arising in connection with the contents of the Summary or disclosure of the Summary to the parties other than EZK.

Nature and scope of the services

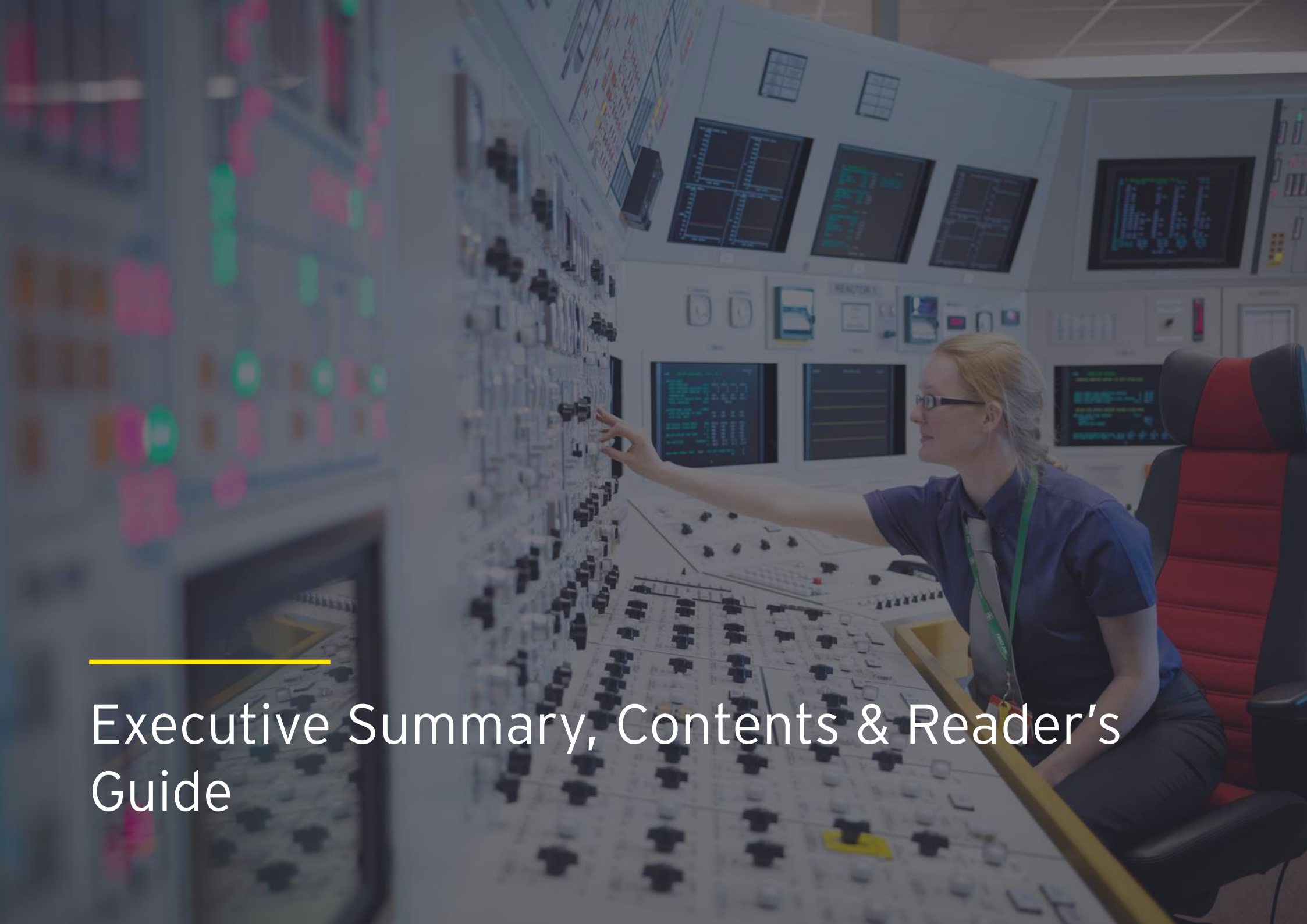
In preparing our Report and this Summary we have considered and relied upon information from a range of sources (as indicated throughout the Summary) believed to be reliable and accurate. We have not been notified that any information supplied to us, or obtained from public sources, was false or that any material information has been withheld from us. We do not undertake responsibility in any way whatsoever to any person in respect of errors in this Summary arising from incorrect or incomplete information provided by the information sources used.

We do not imply, and it should not be construed, that we have verified any of the information provided to us, or that our enquiries could have identified any matter that a more extensive examination might disclose. Our findings are based, in part, on the assumptions stated and on information provided by EZK and other information sources used during the course of the engagement.

We highlight that our analysis and Summary do not constitute investment advice. This Summary is protected by proprietary rights and may not be quoted, referred to or distributed without specific permission of EY Strategy and Transactions (or any other respective EY entity acting on its behalf).

Sincerely,

Errol Scholten
Partner, EY Strategy and Transactions, The Netherlands



Executive Summary, Contents & Reader's Guide

Executive Summary

New nuclear is expected to provide a significant share of the Netherlands' electricity in the coming decades. With the anticipated buildup of new capacity of two new reactors (and potentially up to four new reactors planned, in accordance with the new Coalition Agreement of 2024) by 2035, significant challenges lie ahead to ensure the successful development of the program.

Nuclear energy is a capital-intensive and highly complex technology, with significant upfront costs in its successive deployment phases, long lead times to commercial operation, and a complex risk matrix to address. However, nuclear energy assets are the cornerstone of a reliable, cost-effective, low-carbon energy system and have a proven track record of successful operations across decades in the world.

Recent announcements at the COP28 and the creation of the Nuclear Alliance within the European Union have reaffirmed the critical role that nuclear will play in the decarbonization of the economy and achieving net zero by 2050. A rapid scale-up of nuclear technology is therefore seen as a critical steppingstone to a successful energy transition.

However, the West at large and the Netherlands suffer from decades of attrition in their knowledge of nuclear newbuild development and the necessary tools to finance it. Market deregulation has created visible barriers for the installation of long-term baseload capacity by breaking up the traditional risk-sharing mechanisms that used to drive energy markets in Europe. In this challenging context, a new investment paradigm must be put in place to favor once again a balanced energy system that conforms to the needs of a carbon-free economy.

Today, nuclear energy, and mostly a first-of-a-kind (FOAK) program such as the planned reactors, is not economically competitive without significant government intervention. After decades of limited activity, the European nuclear supply chain has lost critical actors and resources, and needs time, committed orderbooks, and long-term planning to once again achieve economies of scale. To achieve a competitive cost of energy with new nuclear, a comprehensive Government Support Package (GSP) will be needed.

This GSP must be created to target the main risk factors that weigh on the economics of nuclear newbuild today such as a high cost of financing and the lack of available capital for the scale of nuclear, political and regulatory risk (by creating government buy-in), market risk, and long-term supply chain and industrial development risks.

We interviewed selected nuclear technology vendors over the course of successive rounds of market consultations, and their feedback was unanimous. They expect governments to help bridge the "funding gap" of nuclear energy and provide visibility for the industry. This can be achieved through long-term industrial planning, significant investment, and political support by the Dutch government, which will be critical to the materialization of new nuclear by 2035.

This is neither a novel nor a specific request of the nuclear industry, as renewables have also received significant government support to reach the scale they have today.

A successful GSP should provide (i) sufficient direct equity support to the project, (ii) a government-backed debt package (either through guarantees, or direct debt support), (iii) a fair and transparent revenue support mechanism, (iv) a clear allocation of risk between the various project stakeholders, and (v) long-term legal protection against changes in policy vis-à-vis nuclear.

Such a combination would ensure that critical risks are addressed and would signal to the nuclear energy industry that the Dutch government has a solid grasp of what means are needed to begin a nuclear renaissance.

Landmark precedents around the world were analyzed to provide a tentative view of what a Dutch GSP should provide. The exact scope of such a GSP is not provided in the Report and this Summary, as it necessitates additional consultations with the nuclear vendors in the upcoming procurement process, and complementary views and support from key Dutch stakeholders (such as the Ministry of Finance, or the Ministry of Infrastructure and Water Management).

The proposed GSP will also be analyzed and negotiated with the European Commission (DG Competition) under the guise of an in-depth state aid review, which could also provide adjustments to its final scope.

As next steps, the Dutch government should deepen its exploration of the GSP components, engage with market actors and public policy stakeholders, and develop an official stance to be included in the forthcoming tender. Further research is also necessary to identify the most effective development and investment risk allocation models that will guide the project to fruition. This approach will ensure that the nuclear power program not only contributes to the Netherlands' energy transition but also stands as a testament to the country's forward-thinking energy policy.

Dutch translation of the original Executive Summary presented on Page 5 (1/2).

Algemene samenvatting

Verwacht wordt dat in de komende decennia een aanzienlijk deel van de Nederlandse elektriciteitsvoorziening geleverd zal worden door nieuwe kernenergie. Met de verwachte opbouw van nieuwe capaciteit door middel van twee nieuwe reactoren (mogelijk vier, in overeenstemming met het nieuwe Coalitieakkoord van 2024) in 2035, liggen er aanzienlijke uitdagingen in het vooruitzicht om de succesvolle ontwikkeling van het programma te waarborgen.

Kernenergie is een kapitaalintensieve en zeer complexe technologie, met aanzienlijke aanloopkosten in achtereenvolgende uitrolfases, lange doorlooptijden tot commerciële exploitatie, gepaard met een complex risicomatrix. Echter, kernenergie assets zijn de hoeksteen van een betrouwbaar, kosteneffectief, koolstofarm energiesysteem en hebben wereldwijd decennia lang een bewezen staat van dienst van succesvolle activiteiten.

Recente aankondigingen op de COP28 en de oprichting van de Nuclear Alliance binnen de Europese Unie hebben de kritieke rol die kernenergie zal spelen in de decarbonisatie van de economie en het bereiken van net-zero in 2050 opnieuw bevestigd. Een snelle opschaling van kernenergietechnologie wordt daarom gezien als een cruciale factor binnen een succesvolle energietransitie.

Echter, Nederland en het Westen in het algemeen lijden onder decennia van erosie in hun kennis van de ontwikkeling van nieuwe kernenergie en de benodigde instrumenten om het te financieren. Marktliberalisatie heeft zichtbare barrières gecreëerd voor de installatie van lange termijn baseloadcapaciteit door het opbreken van de traditionele risicodelingsmechanismen die de energiemarkten in Europa voorheen voortdreven. In deze uitdagende context moet een nieuw investeringsparadigma worden ingevoerd om opnieuw een evenwichtig energiesysteem te bevorderen dat voldoet aan de behoeften van een koolstofvrije economie.

Vandaag de dag is kernenergie, en vooral een eerste soort (first-of-a-kind, FOAK) programma zoals de geplande reactoren, economisch niet concurrerend zonder aanzienlijke overheidsinterventie. Na decennia van beperkte activiteit heeft de Europese nucleaire toeleveringsketen kritieke actoren en middelen verloren, en heeft het tijd, toegewijde orderboeken en langetermijnplanning nodig om opnieuw schaalvoordelen te bereiken. Om concurrerende energiekosten te bereiken met nieuwe kernenergie, zal een uitgebreid staatssteunpakket (Government Support Package, GSP) nodig zijn.

Het GSP moet worden gecreëerd om de belangrijkste risicofactoren aan te pakken die momenteel drukken op de economie van nieuwe kernenergiebouw; zoals hoge financieringskosten en het gebrek aan beschikbaar kapitaal voor de schaal van kernenergie, politieke- en regelgevingsrisico (door het creëren van overheidsbetrokkenheid), marktrisico, en risico's vanuit de lange termijn toeleveringsketen en industriële ontwikkeling.

Tijdens meerdere rondes van marketconsultaties hebben we een selectie van leveranciers van nucleaire technologie geïnterviewd en hun feedback was unaniem; ze verwachten dat overheden helpen de "financieringskloof" van kernenergie te overbruggen en perspectief voor de industrie te bieden. Dit kan worden bereikt door lange termijn industriële planning, aanzienlijke investeringen en politieke steun van de Nederlandse overheid. Dit zal cruciaal zijn voor de materialisatie van nieuwe kernenergie in 2035.

Dit is noch een nieuw noch een specifiek verzoek van de kernenergie-industrie, aangezien ook hernieuwbare energiebronnen aanzienlijke overheidssteun hebben ontvangen om de schaal te bereiken die ze vandaag de dag hebben.

Een succesvol GSP zou moeten voorzien in (i) voldoende directe eigen vermogenssteun aan het project, (ii) een door de overheid gesteund schuldenpakket (hetzij door garanties, of directe schuldensteun), (iii) een eerlijk en transparant mechanisme voor inkomstenondersteuning, (iv) een duidelijke toewijzing van risico tussen de verschillende projectbelanghebbenden, en (v) lange termijn juridische bescherming tegen beleidswijzigingen ten aanzien van kernenergie.

Zo'n combinatie zou ervoor zorgen dat kritieke risico's worden aangepakt en zou aan de kernenergie-industrie signaleren dat de Nederlandse overheid een solide begrip heeft van welke middelen nodig zijn om een nucleaire renaissance te beginnen.

Leidende precedenten over de hele wereld werden geanalyseerd om een voorlopig beeld te geven van wat een Nederlands GSP zou moeten bieden. De exacte reikwijdte van zo'n GSP wordt in het Rapport en deze samenvatting niet verstrekt; dit vereist aanvullende consultaties met de nucleaire leveranciers in het komende aanbestedingsproces en aanvullende meningen en steun van belangrijke Nederlandse belanghebbenden (zoals het Ministerie van Financiën, of het Ministerie van Infrastructuur en Waterstaat).

Dutch translation of the original Executive Summary presented on Page 5 (2/2).

Algemene samenvatting

Het voorgestelde GSP zal ook worden geanalyseerd en onderhandeld met de Europese Commissie (DG Competition) in de vorm van een diepgaande staatssteunbeoordeling die ook kan leiden tot aanpassingen aan de uiteindelijke reikwijdte.

Als volgende stappen moet de Nederlandse overheid haar verkenning van de GSP-componenten verder uitbreiden, in gesprek gaan met marktactoren en beleidsbelanghebbenden, en een officieel standpunt ontwikkelen om op te nemen in de aanstaande aanbesteding. Verder onderzoek is ook nodig om de meest effectieve ontwikkelings- en investeringsrisicoallocatiemodellen te identificeren die het project tot een goed einde zullen leiden. Deze aanpak zal ervoor zorgen dat het kernenergieprogramma niet alleen bijdraagt aan de energietransitie van Nederland, maar ook staat als een getuigenis van het vooruitstrevende energiebeleid van het land.

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Reader's Guide

This Summary is divided into five chapters. The contents of each chapter and the way in which they should be read together is summarized below.

Section 1: Background & Purpose of the Report

Section 1 outlines the purpose, focus and scope of the Report (and this Summary), including the rationale for its commissioning by the Ministry of Economic Affairs and Climate Policy, in the context of the studies that precede it and broader Dutch energy transition goals and policy, including an introduction to the Dutch nuclear new build program.

Section 2: Nuclear Foundations

The complex nature of nuclear new build projects means that broad-ranging topics must be considered and analyzed, many of which are unique to nuclear energy. *Section 2* seeks to introduce such key topics and terminology.
As a first step, *Section 2.1* introduces and provides a summary of key concepts/terminology used throughout the document.

Section 2.2 provides an overview of the findings of preceding studies, with this study seeking to build on the breadth of knowledge accumulated to date.
Section 2.3 outlines the way in which government participation is typically considered in the context of nuclear energy (the Government Support Package) and what it should seek to achieve.

Section 2.4 provides an overview of the Nuclear Business Model, including the three main components, each of which are crucial for successful project completion; the Delivery Model, Funding Model and Revenue Model.

Section 3: Market Consultations

Consultations with vendors of nuclear technology were undertaken, in two rounds, to gain insight into market approaches and preferences with respect to key non-technical considerations for the nuclear new build program. The design of the market consultation process is outlined in *Section 3.1.*
Section 3.2 provides background/preliminary expectations regarding typical vendor bounding conditions (i.e. boundaries of their capabilities, the different roles they can play in nuclear new build programs and the subsequent impact on financing structures and risk allocation). It also summarizes the findings of preceding market studies.
Sections 3.3-3.4 present the findings of each consultation round, i.e. the firsthand insights provided by the vendors, including key takeaways and next steps. Due to confidentiality agreements, sensitive information has not been included.

Section 4: Preliminary Considerations for the Government Support Package

Section 4 presents a key output of this study, being considerations for the Dutch government to take forward to further develop the Government Support Package for the nuclear new build program. It identifies different government support options, drawing learnings and insights from international case studies for the Dutch context, including "basic", "moderate" and "comprehensive" Government Support Packages (i.e. increasing levels, and changing shape, of government participation, respectively). Given the findings presented in this section, the focus is on the "comprehensive" variant. See also *Section 6* below.

Section 5: Concluding Remarks & Next Steps

As the title suggests, *Section 5* provides final concluding remarks and next steps for consideration by the Ministry of Economic Affairs and Climate Policy and relevant stakeholders when further progressing the Dutch nuclear new build program.

Section 6: Appendix

Section 6 provides a brief overview of the "basic" and "moderate" Government Support Packages discussed in *Section 4.*

Abbreviations

ANVS	Authority for Nuclear Safety and Radiation Protection
BBB	BoerBurgerBeweging (Farmer-Citizen Movement)
BIS	Bid Invitation Specifications
BP	Business plan
CDA	Christen-Democratisch Appèl (Christian Democratic Appeal)
CfD	Contract for Difference
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COD	Commercial Operations Date
COVRA	Central Organization for Radioactive Waste, Netherlands
D66	Democraten 66 (Democrats 66)
Dev.	Development
DG Competition	European Commission Directorate-General for Competition
DM	Delivery model
EC	European Commission
ECA	Export Credit Agency
EDF	Électricité de France
EPC	Engineering, procurement and construction
EPR	European Pressurized Reactor / Evolutionary Power Reactor
ESG	Environmental, social, governance
ETS	Emissions Trading Scheme
EU	European Union
EUR	euros
EWA	Early Works Agreement
EZK	Ministry of Economic Affairs and Climate Policy
FID	Final Investment Decision
FM	Funding model
FOAK	First-of-a-kind
GDP	Gross Domestic Product
GHG	Greenhouse gas
Gov.	Government
GroenLinks-PvdA	GroenLinks & Partij van de Arbeid (GreenLeft & Labour Party)
GSP	Government Support Package
GW	Gigawatt
HCSS	The Hague Centre for Strategic Studies
HMG	Her Majesty's Government
HPC	Hinkley Point C
IAEA	International Atomic Energy Agency
IEA	International Energy Agency
IenW	Ministry of Infrastructure and Water Management
IGA	Intergovernmental Agreement
IRR	Internal rate of return
KHNP	Korea Hydro & Nuclear Power
kW	Kilowatt
kWh	Kilowatt hours
LCOE	Levelized cost of electricity
MC	Market consultation
Mgmt	Management
MoF	Ministry of Finance
Mt	Metric tons
MW	Megawatt
MWe	Megawatt electrical
NECP	Czechia National Energy and Climate Plan
NNB	Nuclear new build
NOAK	Next-of-a-kind
NPE	National Energy System Plan
NPP	Nuclear power plant
NSC	Nieuw Sociaal Contract (New Social Contract)
O/O	Owner/operator
OECD-NEA	Organization for Economic Co-operation and Development - Nuclear Energy Agency
OL3	Olkiluoto 3
PPA	Power Purchase Agreement
PPP	Public-private partnership
PV	Photovoltaic
PVV	Partij voor de Vrijheid (Party for Freedom)
RAB	Regulated Asset Base
Rli	Dutch Council for the Environment and Infrastructure
RM	Revenue model
SDE	Sustainable Energy Production Incentive
SER	Social and Economic Council
SMR	Small modular reactors
SPV	Special Purpose Vehicle
SZC	Sizewell C
TBD	To be determined
TFS	Technical Feasibility Study
TNO	Dutch Organization for Applied Scientific Research
TWh	Terrawatt hours
UK	United Kingdom
US	United States
VVD	Volkspartij voor Vrijheid en Democratie (People's Party for Freedom & Democracy)
Westinghouse	Westinghouse Electric Corporation

1

Background & Purpose of the Report

1.1

Purpose of the Report

The Report presents analysis to support the Dutch government in planning and procuring two new large nuclear reactors in the Netherlands, supporting the country's climate goals

Background

The Netherlands aspires to be a European leader in the transition to a green economy. The Dutch government is seeking to achieve CO2 neutral electricity production by 2035, and climate neutrality by 2050, at the latest. The government sees nuclear energy playing an important role in realizing these outcomes; it can complement solar, wind and geothermal energy in the Netherlands energy mix and be used to produce hydrogen, while also reducing dependence on gas imports.[1]

The 2021 Coalition Agreement sparked new momentum in the Dutch nuclear program as the government committed to planning the construction of two new NPPs and extending operations of the existing Borssele NPP; key steps to enabling nuclear power to play its intended role in the Dutch energy transition. Additional support was provided in the high-level 2024 Coalition Agreement which reaffirmed the Netherlands' commitment to nuclear by targeting up to four new nuclear power plants in the future.

Purpose of the Report

The Report outlines the further development of potential Government Support Packages for the two new nuclear power units. The purpose of this process is to enable the Nuclear Energy Program Directorate of EZK to determine optimal arrangements across stakeholder groups, ahead of the tendering process, in order to successfully procure two new nuclear power units. Market and interdepartmental government consultations were undertaken to inform the analysis and findings and to gain critical insights across a range of related topics.

This represents a key part of the broader, lengthy preparation process required to develop NPPs, given the capital- and time-intensive, complex, and high-risk nature of such developments.

This summary document (the Summary) was prepared on the specific instructions of EZK and for EZK to inform Dutch Parliament on the matters outlined in the Summary and should not be used or relied upon for any other purpose. Refer to Pages 2 and 3 for important details regarding the Report and the Summary.

Key studies and decision points leading up to the Report

July 2021	KPMG released findings from nuclear energy market consultations with Dutch and international market participants across the value chain
Dec 2021	Coalition Agreement stipulated plans for two new nuclear power plants in the Netherlands
July 2022	Minister for Climate and Energy Policy issued a Letter to Parliament outlining actions for implementation of the Coalition Agreement in the field of nuclear energy
July 2022	TNO & University of Groningen released a paper analyzing the techno-economic role of nuclear power in the Dutch net-zero energy transition
Dec 2022	Minister for Climate and Energy Policy issued a Letter to Parliament providing an update on decisions made, and supporting studies, in relation to nuclear energy and a roadmap forward to 2035
Sept 2022	Dutch Council for the Environment and Infrastructure (Rli) published the advisory report *'Splitting the atom, splitting opinion? Decision-making on nuclear energy based on values,'* which identified the issues that should be addressed in the decision-making process relating to nuclear energy
Sept 2022	Witteveen+Bos, eRisk and HCSS completed a scenario study to investigate how nuclear energy can be part of the future energy mix of the Netherlands and Northwest Europe, and the associated costs
Sept 2022	Baringa released a report on financing models for nuclear power plants, with a focus on European nuclear power plant case studies
Feb 2023	KPMG completed a study on financing structures for nuclear energy in the Netherlands
June 2023	Minister for Climate and Energy Policy issued a Letter to Parliament providing an update on the state of play for the new nuclear power plants
July 2024	**EY Report issued, outlining further analysis on, and details of, remuneration models and financing structures for two nuclear power plants, including insights from market consultations**

(1) Letter to Parliament, Directorate-General for Climate Change and Energy, 1 July 2022

The Report focuses on providing detailed definition, and comparison, of potential Government Support Packages to enable a robust and informed decision-making process

Focus and scope of the Report

There are various interdependent workstreams conducting investigations that will ultimately inform the tender documentation that will invite nuclear technology providers to bid for the Dutch nuclear program (the Bid Invitation Specifications, BIS). The Report focuses on the commercial and financial workstream, specifically providing a detailed overview of potential Government Support Packages across important indicators that will enable the Dutch government to make informed, evidence-based decisions on the commercial and financial arrangements to be brought forward to the tendering process and ultimately into delivery and operations of the new power plant.

Government Support Packages are financial designs that can fund, remunerate, and allocate risks between a nuclear power plant owner and operator, and other various project stakeholders to bring a nuclear power plant to life.

Different mechanisms can be used by public authorities to promote the development of new electricity production powers, by reducing risk and facilitating financing for project owners.

In nuclear new build (NNB), given the capital-intensive nature of the assets and the level of risks surrounding projects, an optimized funding model is key to ensure bankability and the most competitive cost of generation. Direct equity contributions or investments in the plant can support the initial development phase of a program and be complemented by varying degrees of support across the debt supply chain (sovereign debt backing through either guarantees or direct bond/loan issuances).
Revenue models with stable and predictable cash flows provide an additional layer of support for nuclear new build and are a minimum requirement for external capital providers. The financial structure is the mode of transmission of project risks to the various classes of financiers. The more robust (protective) the remuneration model, the lower the financial risk to the project (and greater acceptability inter alia for lenders).

A revenue model may support a wide range of capital structures depending on its characteristics and other key considerations such as the strength of the delivery and operational arrangements. In each iteration/scenario for the remuneration models assessed, a relevant efficient funding model can be developed. The two must be jointly considered, as is done in this report.

A clear delivery model (i.e. the contracting structure between vendor and owner) must also ensure optimal technical implementation of the project. This includes clear definition of the risk allocation between the various stakeholders of the project and will be based on both the vendor's risk appetite and the owner specifications. Further observations on existing potential structures for a delivery model are discussed in this report.

1.2

Unlocking the Value of Nuclear Energy in the Dutch Energy Landscape

Numerous challenges must be overcome to enable the Dutch energy mix to continue to evolve towards low-carbon sources and achieve ambitious climate targets

The Dutch electricity mix is evolving towards low-carbon energy sources off the back of regulatory developments and increased competitiveness of renewable options. The observed increase in renewable energy capacity is expected to continue into the foreseeable future, aligned with ambitious government plans and favorable market conditions.

Nonetheless, electricity production in the Netherlands is still heavily reliant on high-carbon sources such as natural gas (56.5TWh or 46.5% of total production) and coal (17.3TWh or 14.3%), while low-carbon sources such as wind (18TWh, 14.8%) or solar PV (11.3TWh, 9.3%) have experienced rapid growth but still account for a fraction of what is needed to achieve carbon neutrality.

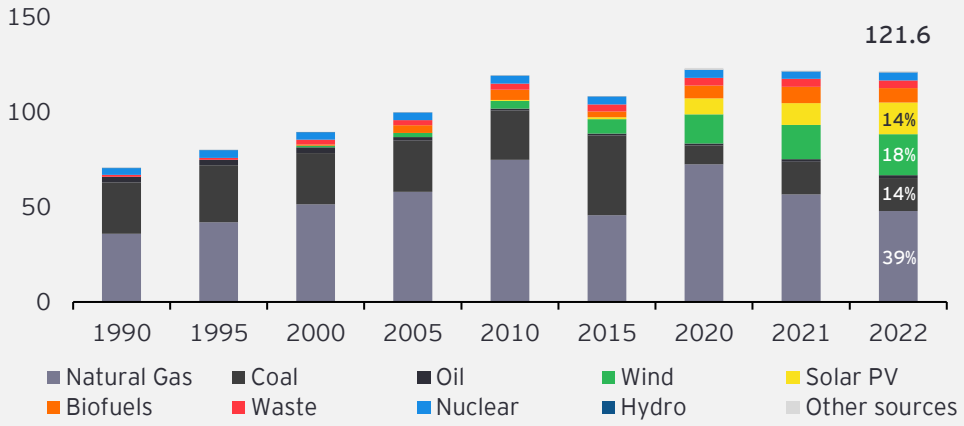
Key challenges for the Dutch energy system

The energy transition in the Netherlands must occur in the context of numerous challenges, including:

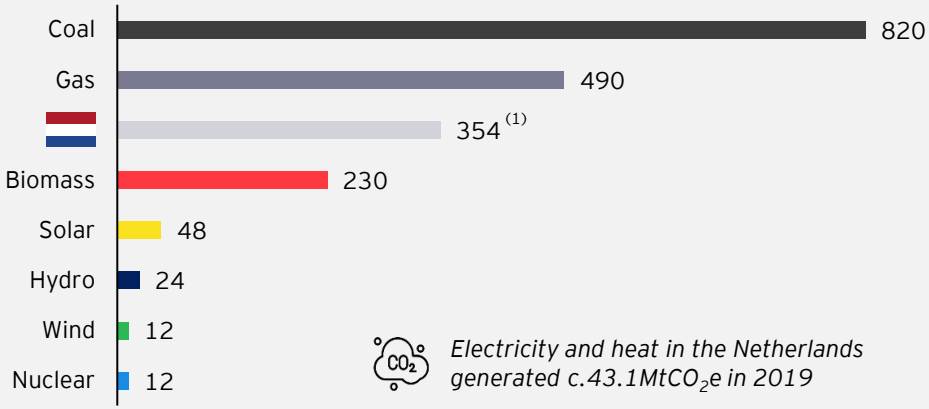
- **Non-diversified production**: Historical overdependence on natural gas together with a declining domestic natural gas industry can possibly jeopardize the country's energy security.
- **Ageing natural gas and coal-fired fleet**: With over 10.4 GW of installed capacity based on ageing natural gas plants, total capacity withdrawal will be high. Climate policy focused on phasing out such sources also contributes to this trend.
- **Growing electricity demand**: In the coming years, electricity demand will increase due to the energy transition (electric vehicles, decarbonization efforts) and population growth (20 million people by 2055 vs. 17.5 million today in the Netherlands).
- **European Union (EU) regulatory framework**: According to the European Green Deal, net zero CO_2 emissions must be achieved by 2050. The fit-for-55 proposal imposes a 55% reduction by 2030.
- **Price dynamics of CO_2 allowances**: Growing price of EU ETS allowances (by 170% throughout 2021 alone) contributes to a significant increase in the cost of electricity, especially that produced in natural gas and coal-fired power plants.

Substantial investment, effective policy and rapid action from industry and government are just a few of the critical elements needed to overcome these challenges and to achieve the targets set out by the Netherlands and the EU.

Evolution of electricity production in the Netherlands (in TWh)



Energy-intensity of electricity generation (in g CO_2eq/kWh)



Sources: IEA, EZK (1) Average carbon intensity of Netherlands electricity production

The Dutch government is heavily investing in low-carbon energy sources through its dedicated climate fund, on the back of ambitious policy set locally and across the EU

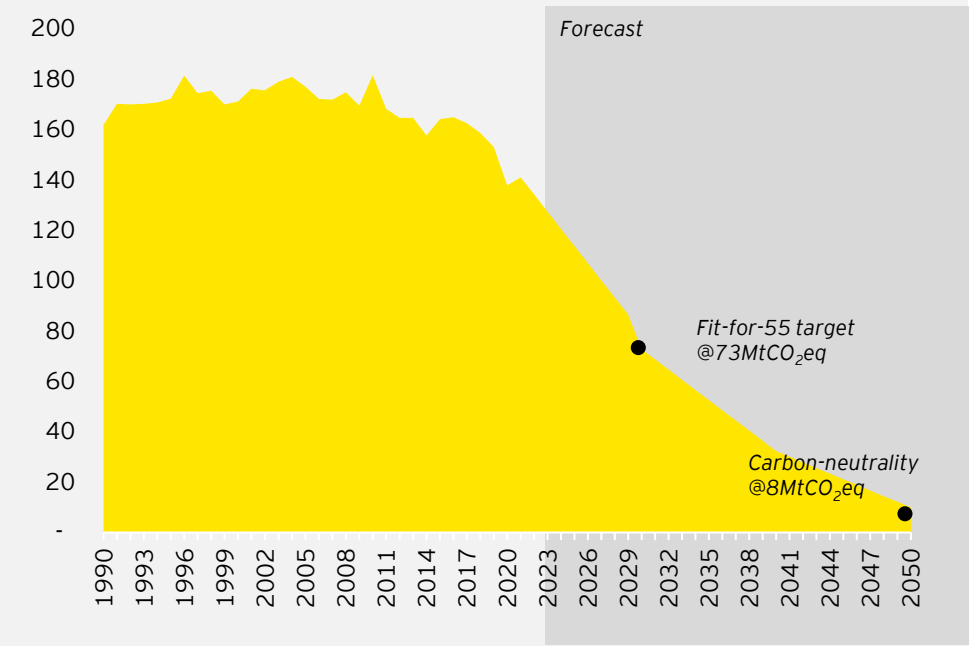
Following the government's commitment to make electricity production CO_2-neutral by 2035, and its subsequent ambition to achieve carbon-neutrality by 2050, the Netherlands has adopted an ambitious plan to decarbonize its economy through:

- Switching to alternative energy sources for transport and heating (households, greenhouses)
- Ceasing the national gas production (notably the permanent shutdown of the Groningen gas fields in October 2024)
- Greater focus on electrification of the energy mix through high investment in renewables and other low-carbon energy sources
- Programs for saving energy, demand-side management, and related strategies.

To reach those goals the government has set aside €35 billion for the coming 10 years in a dedicated climate fund ('Climate and Transition Fund') which will finance:

- Offshore windfarms and power lines to land
- Onshore energy infrastructure transport network (power lines)
- Hydrogen production and transport network
- CO_2 capture and storage
- **Renewed nuclear power program.**

GHG emissions of the Netherlands ($MtCO_2eq$/year)



Key policy defining the energy landscape

Klimaatakkoord (2019)	National Energy and Climate Plan (2021-2030)	Paris Agreement (2015)	Fit for 55 (2021)	EU Taxonomy (2020)
-55%(1) vs. 1990 level by 2030	Reduction of GHG emissions with renewable energy & energy saving	Limit rise in global temperatures to 2°C	-55% vs. 1990 level by 2030	Climate change adaptation & mitigation through sustainable finance
Annual additional investments of <0.5% of GDP to lower GHGs	Combat climate change with a climate-neutral electricity system	Mobilization of international finance to combat climate change effects	Expansion of EU Emissions Trading Scheme	Nuclear energy conformity with climate change legislation

(1) Initially -49% prior to the Fit for 55 legislation

The 2021 Coalition Agreement advanced the development of new nuclear power in the Netherlands, supported by subsequent nuclear policy developments

Following a period in the 1990s centered around phasing out nuclear power operations in the Netherlands, in 2006, the contract to enable Borssele NPP operations until 2034 was signed and the parliamentary document Conditions for New Nuclear Power Plants was tabled. In 2010, on the back of advice from the Social and Economic Council (SER) in 2008, the Dutch government declared it would be open to issuing permits for new nuclear power plants in line with efforts to ensure a secure energy supply and reduce CO_2 emissions. Subsequent Coalition Agreements and supporting policy has since recognized a role for nuclear energy, including the 2021 Coalition Agreement placing significant emphasis on nuclear power in the context of the energy transition and reducing reliance on imported gas. Additional support was provided to new nuclear by the new high-level Coalition Agreement of 2024, which reaffirms the role of nuclear as a key source of electricity for the Netherlands in the future.

Nuclear policy has been supported by recent funding allocations, namely €5 billion up to 2030 for construction of the new nuclear power plants committed in the 2021 Coalition Agreement, noting that the NPPs may not be constructed by that time, including €500 million up to 2025, as part of the Climate and Transition Fund. The Minister for Energy and Climate Policy has highlighted the importance of direction from the central government (for all parties) for optimal integration of nuclear energy into the system, in the context of the complexity and urgency of the energy transition. The National Energy System Plan (NPE), launched in December 2023, aims to enable a more coordinated approach to the energy transition in the Netherlands. The NPE speaks of 3.5-7GW of nuclear energy in the Netherlands energy mix by 2050.

> "Nuclear power plants require substantial investments and the total development period in which there is no income is long. That is why stable and consistent policy on nuclear energy is an important precondition for private financiers, as shown by the KPMG market consultation. Baringa's research on the different financing models also shows that it leads to lower costs for consumers if the government actively participates in the development phases.
>
> Minister for Climate and Energy Policy, Letter to Parliament, July 2022

Key current nuclear policy[1]

2021 Coalition Agreement

VVD CDA D66 ChristenUnie

Main points of the agreement include:

- Nuclear energy can complement solar, wind and geothermal energy in the energy mix, and can be used to produce hydrogen. It also makes the Netherlands less dependent on imported gas
- The Borssele nuclear power plant will therefore be kept operational for longer, with all due consideration given to safety
- The government will take the necessary steps for the construction of two new nuclear power plants
- The government will strengthen the nuclear knowledge base and infrastructure
- Safe, permanent storage of nuclear waste will be ensured

International commitments

- The Netherlands joined the recently formed Nuclear Alliance in Europe, which will formulate a roadmap for 150GW of nuclear power in Europe by 2050 (vs. 100GW installed currently) and the construction of 30 to 45 new large reactors as well as the development of small modular reactors (SMR)
- Active participation through various international agencies: OECD-NEA, IAEA, IEA, Euratom, etc.
- EZK is looking towards international cooperation to strengthen the nuclear knowledge base and infrastructure, reinforce the nuclear supply chain and to share lessons learned in new nuclear power programs

(1) The basis of the Report and Summary is the 2021 Coalition Agreement. The main principles for nuclear development in the Netherlands are upheld in the 2024 high-level Coalition Agreement

Following the 2023 general elections, vendors will require further assurance that the ongoing nuclear technology procurement process will move ahead uninterrupted

After the collapse of the 2021 coalition government, new elections were scheduled on 22 November 2023 to elect the members of the Tweede Kamer. The ensuing results delivered a split Parliament putting the PVV ahead with a plurality of the vote (23.5%) and 37 seats out of 150.

Most parties are in favor of expanding nuclear energy (see exhibit on the right) and in March 2024 the Dutch parliament voted in favor of a motion to explore the construction of four, rather than two, nuclear power plants. Nonetheless, continuity of government policy – regardless of majority changes – will be a critical component of the vendors' assessment of the nuclear energy undertaking started in 2021.

Policy setbacks suffered by the industry over recent decades have led to cost overruns, project delays, and limited supply chain development. It is thus critical for the Dutch government to pursue a constant policy direction for nuclear to draw in the interest of the industry.

Given the long-term planning involved in industrial policy and nuclear energy development, vendors were reassured by EZK that policy would remain unaffected as of now.

Market consultations and technical feasibility studies were launched according to the schedule available on the next page, and progress on all items progressed unabated.

As of writing, the 2024 high-level Coalition Agreement has been released by PVV, VVD, NSC and BBB and cabinet is still to be formally sworn in. The basis of this report is the 2021 Coalition Agreement. The main principles for nuclear development in the Netherlands are upheld in the 2024 high-level Coalition Agreement.

Overview of nuclear policy in the manifestos (*verkiezingsprogramma*) of the six largest parties based on the 2023 election results

✓ PARTIJ VOOR DE VRIJHEID	▸ The PVV is in favour of rapidly constructing new nuclear power stations.
✗ GROENLINKS PvdA	▸ Nuclear energy is neither sustainable nor safe and therefore unsuitable for our future energy supply. ▸ It creates a waste problem for hundreds of thousands of years to come, in addition to problems with security and the proliferation of nuclear weapons and/or nuclear weapons technology (nuclear proliferation). ▸ There will be no new investments in nuclear power plants and the Borssele NPP should close as planned.
✓ VVD	▸ Nuclear energy is necessary to achieve our climate goals. ▸ We want to have at least four large nuclear power plants and several smaller nuclear power plants by 2035. ▸ We will also keep the nuclear power plant in Borssele open. That nuclear power plant will be able to provide clean electricity for decades to come.
✓ nsc	▸ Nuclear energy provides an indispensable contribution to a continuous and CO2-free energy supply. ▸ We are preparing for the construction of at least two new nuclear power plants and are also actively exploring the possibilities for Small Modular Reactors (SMRs).
✓ D66	▸ To have a stable CO2-free energy supply, we cannot exclude any technologies. This includes nuclear energy. ▸ While nuclear energy is expensive, not renewable and produces dangerous waste, it also provides a lot of CO2-free energy with minimal spatial usage. We will continue with the preparations for the construction of two new power plants. ▸ Additionally, we will promote the development of new technologies, such as thorium reactors and small power plants (SMRs).
✓ BBB	▸ We are investing in nuclear energy as a source of renewable energy by accelerating the current construction of planned nuclear power plants and supplementing them with small SMR (small modular reactors), so that we can produce electricity, hydrogen and heat 24 hours a day, placing reactors in strategic locations to keep the transport of this energy to a minimum.

The Dutch nuclear new build program, considering the two generation III+ reactors first under consideration, will be executed across four key stages, with targeted completion of 2035

Overview of the program

At the time of developing the Report and Summary, the Dutch government indicated that two generation III+ reactors, each with capacity in the range of 1,000 to 1,650MW, were the preferred options for the nuclear new build program (as noted, a motion has since been passed by the Dutch parliament to explore the construction of four new nuclear power plants). Borssele is the current preferred location due to the presence of existing infrastructure, including for waste disposal at COVRA. These decisions are subject to further technical investigations and local support. Based on preliminary plans, the two plants would be completed by approximately 2035 and are predicted to provide 9-13% of the Netherlands' electricity production.

Plan of action

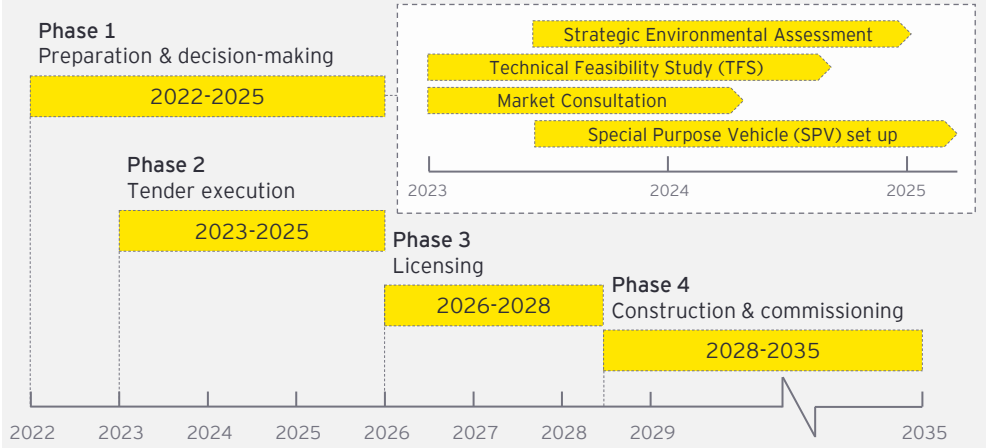
The 2021 Coalition Agreement committed the government to making the necessary steps for construction of the two new nuclear reactors. This included, among other things, assisting nuclear vendors in their exploratory studies, supporting innovation, carrying out tender procedures, considering the contribution (financial or otherwise) to be provided by public authorities, and preparing legislation where necessary. A key focus was also ensuring safe, permanent storage of nuclear waste.

A roadmap has been developed to ensure a rigorous and calculated process is followed to achieve a successful build of two new nuclear reactors. The roadmap, designed in collaboration with the Ministry of Infrastructure and Water Management (IenW), the Ministry of Finance (MoF), and the Authority for Nuclear Safety and Radiation Protection (ANVS), consists of four phases (see adjacent). The present focus is Phase 1.

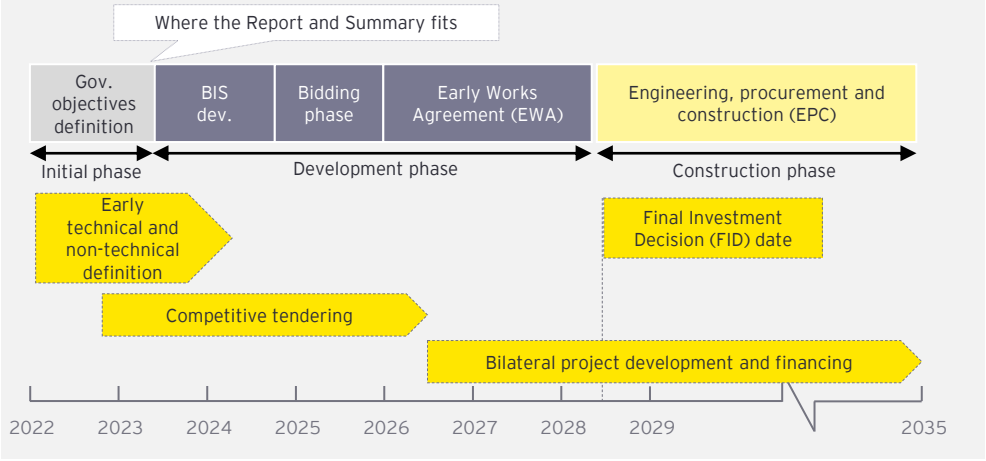
An indicative timeline of a typical nuclear power plant development process is also presented to the right. To move forward with any tendering, licensing, or construction, important decisions must be made regarding technology, location, and financing. The ultimate choice of technology will be informed by the location of the power plant, considering requirements from the perspective of safety, licensing and environmental approvals, security, delivery, operations, decommissioning, costs, schedule, and public acceptance. The more information is made available to the prospective vendors/contractors about the primary and (if relevant) secondary locations, ideally before issuance of the tender (BIS), the more project technical and non-technical definition will improve. These site-specific parameters are fundamental to develop and refine in order to inform the business models that will establish the most efficient commercial/financial framework.

When it comes to development of the non-technical requirements of the sponsor/owners, financing arrangements are critical, often with the longest lead times. Risks (and rewards) are ultimately financial, and the financing arrangements are their mode of transmission to the various project parties and stakeholders.

Roadmap for realizing new nuclear power in the Netherlands



Indicative timeline of a nuclear power plant development process



2

Nuclear Foundations

2.1

Introduction to Key Nuclear Energy Concepts

The following concepts/terms represent key items for consideration in any nuclear program and are used regularly throughout the Report and Summary

- **Bankability:** the capacity of a given project to draw in external finance.
- **Bid Invitation Specifications (BIS**): documentation inviting nuclear technology providers to tender for the Dutch nuclear program. It includes requirements and specifications of both technical (e.g. engineering design) and non-technical (e.g. commercial/financial contractual arrangements) nature.
- **Business Plan (BP) for nuclear new builds**: A nuclear new build business plan can be split into three main (yet interrelated) components that are each crucial for the successful completion of a nuclear project:
  - **Delivery Model (DM):** Refers to the contracting model for delivery of the project, which plays a key part in allocating risk between vendor and owner. Common forms include turnkey contract, split package ("island") and multi-contract. The choice of delivery model must consider how to efficiently deliver an optimal technical offering, while responding to owner specifications.
  - **Funding Model (FM**): Refers to the way the project is financed, utilizing a mix of funding sources, determined by the amount of risk each actor is willing to bear. It may be government-led, vendor-led or owner-led. The choice of funding model must consider how to best mobilize capital sources to address the funding gap that can be created by project uncertainty and to ensure completion, while minimizing overall cost of delivery.
  - **Revenue Model (RM**): Refers to the remuneration mechanism for the project, impacting project economic viability and bankability, and providing a means of balancing risk allocation between offtakers, regulators, vendors and owners. Key models under consideration in the nuclear context include Regulated Asset Base (RAB), Contract for Difference (CfD), Mankala and Power Purchase Agreements (PPA).
- **Capital expenditures (Capex):** funds used by a company to acquire, upgrade, and maintain physical assets such as property, plants, buildings, technology, or equipment.
- **Developer Model**: The model required to support the delivery of all the necessary preconditions for financial close (external funding). Financial close is the realization and end-state of the investor model (see next page), however this point cannot be easily predicted at preferred bidder award date, hence the necessity of the developer model framework to organize, regulate and fund activities as long as it may take to achieve financial close. The developer model must incentivize bidders to deliver value throughout the pre-FID/pre-construction phase of the project.
- **Engineering, procurement and construction (EPC):** a contract whereby a designated contractor is fully responsible for project management, from design to procurement and then execution of the construction phase. It is a way to mitigate risk without getting involved in the project management.
- **Export Credit Agency (ECA):** An agency that offers trade finance and other services to facilitate domestic companies' international exports. Most countries have ECAs that provide loans, loan guarantees, and insurance to eliminate the uncertainty of exporting to other countries.
- **Final Investment Decision (FID)**: FID is the point in the capital project planning process when the decision to make major financial commitments is taken. At this stage, the project owners or shareholders sanction the estimated budget for the energy project after fulfilling all the preceding steps, thereby giving an official 'nod' to go ahead with the project.
- **First-in-a-while**: used to refer to a country that has experience building nuclear power plant/s but has not had recently developed projects. This results in a loss of experience that makes pursuing nuclear more difficult. In the case of the Netherlands, the country has not built any nuclear facilities in recent decades, which means a steep learning curve for all critical actors of the nuclear supply chain (government, operators, owners, regulators, financiers, and consumers) will need to be overcome for new nuclear to begin its comeback.
- **Government Investment Decision (GID**): similar to FID in that the government can greenlight its share of the financial package for the project. It usually comes before FID as market actors will wait for government support to be decided prior to making their final financial review.

The following concepts/terms represent key items for consideration in any nuclear program and are used regularly throughout the Report and Summary

- **Government Support Package (GSP):** The package of support mechanisms provided by government to facilitate the project. The European Commission and external financiers typically consider that GSPs for nuclear new builds comprise of five main components:
  - **Owner Financial Support**: Direct financial investment from the government
  - **Lender Support**: Government guarantees provided to secure lenders against financial risk
  - **Revenue Support**: Government ensures a stable revenue stream for the project, shielding it from market volatility
  - **Project Risk Allocation**: Methodical distribution of diverse risks among stakeholders, accompanied by clear frameworks and agreements
  - **Indemnities**: Compensation from the government for losses incurred due to identified risks and unforeseen adverse events.
- **IAEA**: International Atomic Energy Agency.
- **Internal Rate of Return (IRR)**: a metric used in financial analysis to estimate the profitability of potential investments. IRR is a discount rate that makes the net present value of all cash flows equal to zero in a discounted cash flow analysis.
- **Investor/Investment Model**: The investment framework for the project, providing the basis for FID, bankability and investability. Composed of multiple project subsections that collectively must achieve economic equilibrium.
- **Levelized cost of electricity (LCOE)**: a metric used in the power sector to assess and compare alternative methods of energy production. The LCOE of a power plant is the average total cost of building and operating the asset per unit of total electricity generated over the plant's lifetime.
- **Non-technical requirements**: project requirements outside of (yet linked to) technical nuclear elements, key to the commercial/financial structuring of the project, such as contracting structure, owner/operator structure, risk acceptance, funding requirement etc.
- **Nuclear new build (NNB)**: the construction of a new nuclear unit or plant.
- **Operations & Maintenance (O&M)**: performance of day-to-day activities required to maintain assets (such as buildings, grounds, equipment, systems) to the maximum extent possible for the benefit of its owners and users.
- **Operating expenses (Opex)**: an expense that a business incurs through its normal business operations which include rent, equipment, inventory costs, marketing, payroll, insurance, step costs and funds allocated for research and development.
- **Overnight cost**: capital cost exclusive of financing costs accrued during the construction period. Provides a simplistic way to compare costs across nuclear projects.
- **Owner/Operator (O/O):** a nuclear company that both holds the nuclear power plant and operates it.
- **"…"-of-a-Kind**: in the context of nuclear energy:
  - **First-of-a-Kind (FOAK)**: first nuclear project to be developed and constructed in a given country
  - **Next-of-a-Kind (NOAK)**: the next nuclear project to be developed and constructed in a given country after the first has been completed
  - **Nth-of-a-Kind**: subsequent nuclear projects to be developed and constructed in a given country, after the first and second projects have been completed.

The following concepts/terms represent key items for consideration in any nuclear program and are used regularly throughout the Report and Summary

Focus on specific revenue mechanisms

- **Contract for Difference (CfD):**
  - A CfD is a mechanism to incentivize investment in energy production assets with a high upfront cost, by providing stable prices over a long period, while protecting consumers from high electricity costs.
  - It is a two-way long-term electricity supply agreement backed by the State, which shields the producer from market volatility. The contract enables the producer to stabilize its revenues at a pre-agreed level (the Strike Price) for the duration of the contract, with the State taking the risk of compensating the producer in case of prices below the Strike Price, but also of benefitting from higher-than-expected market prices through a clawback mechanism when market prices rise above the Strike Price.
  - When designing CfDs, policymakers and regulators typically pursue two overarching goals: (1) to incentivize investment in energy according to political deployment targets, and (2) to integrate new power sources into power markets with as little distortion as possible.
  - In the case of new nuclear, CfD has become the preferred revenue mechanism of the European Commission, because it has the advantage of operating outside the market, and so does not introduce any exogenous disturbance to market dynamics. Ceteris paribus, the CfD mechanism does not modify the wholesale price of electricity and is thus not a factor distorting the market.
  - A recent example of such nuclear CfD was adopted by Czechia and the European Commission for the Dukovany-5 NPP, with a 40-year contract put in place following an in-depth state aid review.
  - Nonetheless, risk-sharing with CfDs does not extend beyond revenue risk, therefore nuclear power plant operators will have to design a financial risk sharing system for other aspects of their overall business plan.
- **Power Purchase Agreement (PPA):**
  - A PPA is a long-term electricity supply agreement between two parties, usually between a power producer and a customer (an electricity consumer or trader), usually with a set power price and a specific amount of electricity to be supplied.
  - Unlike CfDs, which are ruled by public law, a PPA is a private contract and generally led by private actors that seek price certainty and have very large energy needs (such as data centers, or manufacturers). Thus, such a contract is not limited by a potential state aid review by the European Commission.
  - These contracts generally have three main advantages: (i) a competitive, and adaptable cost of energy for the customer, (ii) a high liquidity of the energy generated, and (iii) are usually good supporting instruments for financing new capacity through market-led efforts.
  - Nonetheless, they also provide limited risk-sharing for nuclear, and require a deep pool of heavy energy consumers that would be willing to be offtakers for the output of the NPP, which is unlikely to be the case in the Netherlands.
- **Regulated Asset Base (RAB):**
  - A RAB is a method of funding large infrastructure projects, providing support for their design, construction, commissioning, and operation by providing a revenue mechanism that takes into account real costs incurred during all phases of the project, as well as a set return on investment for shareholders. For nuclear, it was first introduced in the UK for the Sizewell C NPP.
  - Under a RAB model a company receives a license from an economic regulator to charge a regulated price to consumers in exchange for providing the infrastructure in question.
  - The model enables investors to share some of the project's construction and operating risks with consumers, significantly lowering the cost of capital, which is the main driver of a nuclear project's cost to consumers.
  - This charge is set by the independent regulator, who will ensure that any money spent is done in the interest of users. For a nuclear RAB, suppliers will be charged as the users of the electricity system toward the cost of the construction of the nuclear project.
  - RAB is likely to be the most cost-effective financing solution for new nuclear, however it is a legally complex instrument, with high political implications as consumers share in the cost of building an asset that will produce electricity in the future, while not benefitting from it now.

2.2

Precedent Literature Review

Several studies have investigated the role of nuclear power in the Netherlands' energy mix and informed the Dutch government's decision to proceed with the new nuclear program

Precedent studies cover a wide breadth of critical topics, each playing an important role in the pathway towards the realization of new nuclear power generation in the Netherlands. The studies summarized below provide a 'big-picture' view on the role of nuclear energy in the Dutch energy system and key related considerations.

Study	Purpose	Key considerations relating to the role of nuclear power in the Netherlands
Analyzing the techno-economic role of nuclear power in the Dutch net-zero energy system transition, University of Groningen and TNO Energy Transition, July 2022	Analyze the role of nuclear power in an integrated energy system, using the IESA-Opt-N cost minimization model, focusing on four key themes: system-wide impacts of nuclear power, uncertain technological costs, flexible generation, and cross-border electricity trade.	▸ Nuclear power can play a complementary role (to wind and solar) in supporting the Dutch energy transition solely from a techno-economic point of view, based on the specific assumptions of the study. ▸ Nuclear power investments can reduce demand for variable renewable energy sources in the short term and lead to higher energy independence (i.e. lower imports of natural gas, biomass, and electricity) in the long term. ▸ Investing in nuclear power can reduce the mitigation costs of the Dutch energy system, however this reduction is not considered significant given the probability of higher nuclear financing costs and longer construction times. ▸ With a 3% interest rate value (e.g. EU taxonomy support), high cost nuclear (€10 billion/GW) can be cost-effective in the Netherlands. ▸ LCOE in isolation should not be used to demonstrate the economic feasibility of a power producing technology.

Splitting the atom, splitting opinion? Decision-making on nuclear energy based on values, Dutch Council for the Environment and Infrastructure, September 2022	Outline key considerations for decision-making on the role of new NPPs within the Dutch energy system and to provide recommendations for government decision-making processes.	▸ Decision-making with respect to nuclear energy must:
		  ▸ Include ethical consideration and reflection
		  ▸ Involve citizens
		  ▸ Be explicitly linked to values
		  ▸ Consider the influence of nuclear energy on the pace of the energy transition.
		▸ Five key values define the public debate on nuclear energy; energy supply certainty, affordability, safety and security, sustainability and justice. These can be used to examine trade-offs during policy development and decision-making.
		▸ The report analyzes the role of nuclear in a comparison of total system costs for Northwestern European markets and concludes that the majority of studies find that nuclear reduces total system costs.

Scenario study nuclear energy, Witteveen+Bos, eRisk and HCSS, September 2022	Determine how nuclear energy can be part of the future energy mix of the Netherlands and Northwest Europe and associated cost, raw material and space requirements.	▸ The impact of nuclear energy on the total cost of the Northwest European energy system is less than 1%, based on the assumptions of the study. ▸ Without nuclear energy in the Netherlands electricity generation mix, dependence on energy imports will increase, while integrating nuclear power can reduce dependence on imports of rare raw materials. ▸ Nuclear reduces the required space to produce electricity in Northwest Europe. ▸ Active participation by central government is essential for the development of nuclear energy.

Key considerations from previous studies covering remuneration models and financing structures

The findings of precedent studies in relation to remuneration models and financing structures, as summarized below and on the pages to follow, are particularly relevant in this case, as they inform the analysis conducted in the Report. RAB, CfD, Mankala and PPA are the main revenue models explored and applied historically for nuclear new builds to attract external capital providers. The studies consider the applicability of such models, amongst others, to the Dutch context, informed by the views of key stakeholders. Key considerations highlighted below express the owners' view under each study undertaken.

Study	Purpose	Model	Key considerations relating to remuneration models and financing structures

Nuclear energy market consultation, KPMG, July 2021	Market consultation to address the three key questions posed by the Dijkhoff motion;
	(i) Under what conditions would Dutch and international market participants be prepared to invest in nuclear power plants in the Netherlands?
	(ii) What public support would be required?
	(iii) In which regions is there interest in the construction of a nuclear power plant?
		▸ RAB
		▸ CfD
		▸ Mankala
		▸ PPA
			▸ Vendors are expected to have very little willingness or ability to provide financing, hence government would have a significant financial role to play in any Dutch nuclear project.
			▸ Private financiers are expected to require a range of guarantees from government, such as:
			  ▸ Revenue certainty provided via the financing model and/or government guarantees
			  ▸ Guarantees covering substantial cost increases
			  ▸ Guarantees covering licensing risks during construction.
			▸ Many market participants have a preference for the RAB model. Application of the RAB model in the Dutch context would present significant challenges.
			▸ The Mankala model appears to be less suitable for use in the Netherlands, partly due to lack of sufficient participants (large industrial consumers).
			▸ In addition to guarantees, government is expected to participate in the project and provide a significant portion of the equity financing, as the large size and time horizon of a nuclear project is too great for many private investors.
			▸ While several existing projects involve a significant degree of financing by the nuclear technology supplier, this is not realistic for new projects due to the financial capacity of these vendors.
			▸ Numerous market participants suggested government should build a new reactor and largely provide the financing itself (through equity, loans, or a combination thereof), with a sale considered after commissioning/start of operations, after which the risk profile for private financiers has decreased.
			▸ The development of an SMR could offer greater opportunities for private financing, if the right preconditions, technology and design are in place.

Key considerations from previous studies covering remuneration models and financing structures (cont.)

Study	Purpose	Model	Key considerations relating to remuneration models and financing structures
Scenario study nuclear energy, Witteveen+Bos, eRisk and HCSS, September 2022	Determine how nuclear energy can be part of the future energy mix of the Netherlands and Northwest Europe and associated cost, raw material and space requirements.	▸ RAB ▸ Public-private partnership (PPP) ▸ CfD ▸ Mankala ▸ PPA ▸ SaHo ▸ Other (e.g. export credits, government loans)	▸ Government co-investment can increase market confidence and reduce financing costs, leading to lower energy prices. Even so, it is important to offer some form of revenue guarantee to address uncertainty in energy prices during operations. ▸ Leveraging government funding through RAB, PPP and combinations thereof can lead to the lowest cost of capital (and subsequent relative cost savings for end-users). These models can generate revenue during construction and enable relative clarity on compensation, risk distribution and returns, making this option attractive to private financiers. ▸ The PPP model is suitable, however, risk/return distribution between private and public parties must be considered. Using a regulator may prompt private parties to have a greater focus on the creation of long-term social value (security of supply, social and welfare results). ▸ The application of the Mankala and SaHo (Polish variant of Mankala) models is likely to be difficult, given the "necessary mutual trust and dependency in the competitive Dutch business environment and uncertainty in the electricity market." For the Mankala model, achieving low cost of capital relies on cheap external capital (e.g. vendor and export credit). SaHo model has not been tested in practice, and may be viewed by the EU as a mechanism for granting unlawful state aid. ▸ The RAB model or a combination of RAB and PPP seem best suited for the Netherlands, aside from the volume and price risk, due to the relatively low capital costs and the possibility of government adjustments. ▸ For an NPP to be profitable, power purchase contracts are essential in the operating phase. The CfD model is well suited to this, including in the Dutch context.

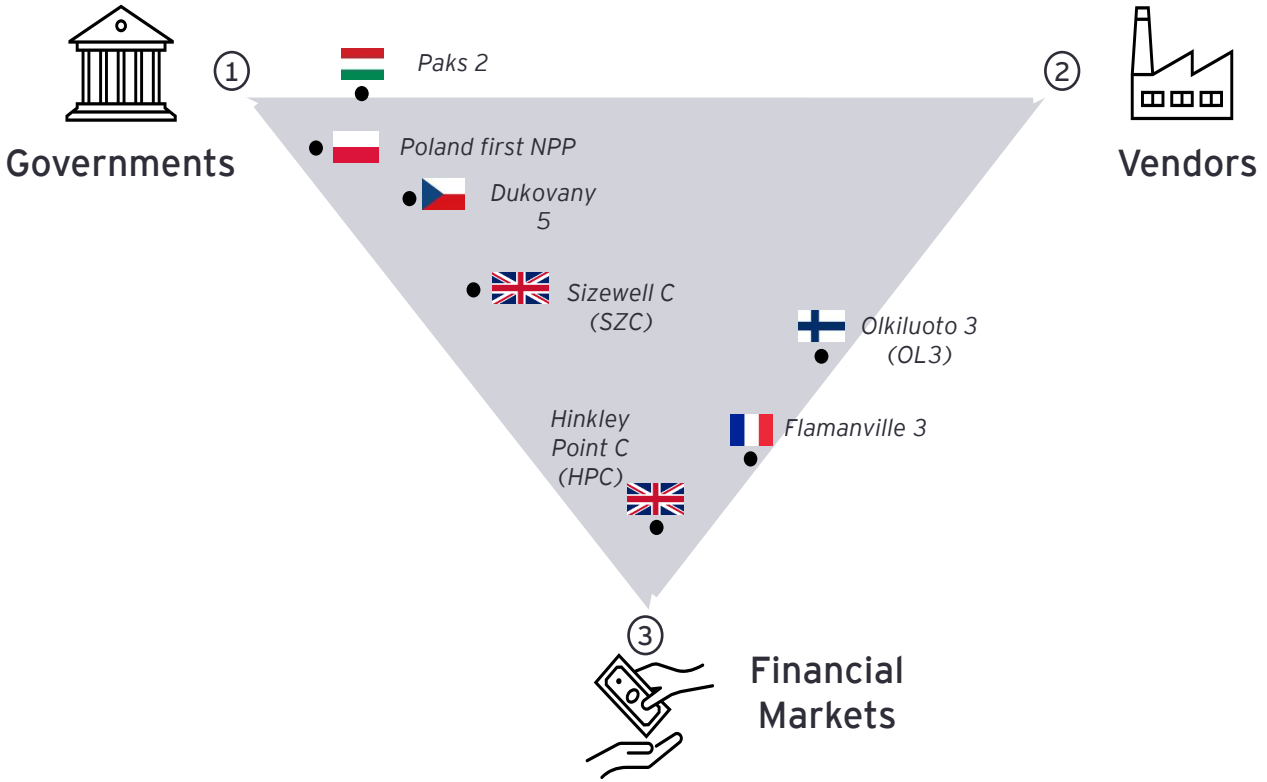
Key considerations from previous studies covering remuneration models and financing structures (cont.)

Study	Purpose	Model	Key considerations relating to remuneration models and financing structures
Financing models for nuclear power plants, European nuclear power plant case studies, Baringa, September 2022	To provide EZK with relevant insights with respect to the various NPP financing model options and the potential role the Dutch government could play through the presentation of European case studies.	▸ RAB ▸ CfD ▸ Mankala ▸ State participation or (full) government financing, including the SaHo model	▸ A financial model in which the various parties, including the State, manage and share construction and market risks, appears to be a precondition for all NPP new build projects. ▸ The Dutch government should consider some form of public guarantee irrespective of the financial model adopted. ▸ The Dutch government will need to implement policies and strategies that provide assured revenue to investors, reduce risk and provide low cost of capital. ▸ A state-owned special purpose vehicle (SPV) model could be a viable option for the Netherlands to encourage the timely construction of NPPs, given the NPP project size and risk profile. ▸ Successful application of a cooperative (Mankala) model in the Dutch nuclear context is unlikely, with collaborations amongst large industrial power consumers being scarce and often unsuccessful in the Netherlands.
Investigation of financing structures for nuclear energy, KPMG, February 2023	To map out the possible structures for financing nuclear energy in the Netherlands, together with the (budgetary) risks and implications for the State.	▸ RAB ▸ CfD ▸ Mankala ▸ PPA ▸ State participation or (full) government financing, including the SaHo model	▸ State involvement is necessary to enable construction of two new power plants in the Netherlands, particularly in the construction phase due to the associated risks, as well as in relation to permit risk and political risk. ▸ Use of a PPA is limited in the Dutch context, in part due to the illiquid market for PPAs with a distant start date and the lack of a state energy company, given the need for feasible allocation of risks. ▸ Use of the Mankala model is limited in the Dutch context, given the limited number of large and clustered buyers, and the need for feasible allocation of risks. ▸ The RAB model, a variation of the existing models noted, or a combination thereof, is likely to be the most appropriate option for the Dutch context.

2.3

Government Support Package for Nuclear New Builds

Three main groups can be involved in bridging the financing gap of a nuclear new build, with governments being historically large capital providers and vendors limiting equity exposures



- ► Commercially-contracted owner/offtaker cooperative
- ► Government equity 100% + debt guarantee
- ► Government equity 100% + debt guarantee + revenue support
- ► Government debt guarantee + revenue support
- ► Revenue support (*HPC*)
- ► Government equity (20-80%) + revenue support (*SZC*)
- ► No direct government support

Governments, vendors and financial markets work together to provide complementary project support and achieve financial close

The triangular financing model is a commonly used method for financing large infrastructure projects, such as nuclear new builds. As depicted on the previous page, the model involves three main groups: the government, the vendors (technology only, or engineering, procurement and construction), and the financial markets (debt and equity investors), with each group representing a different corner of the triangle.

The model is structured in such a way that each group contributes financing arrangements to the project at different stages, depending on the availability of financing.

1. Governments:

Governments are the primary group, responsible for providing the initial financing for a project. Governments are seen as the most risk-tolerant group as they are willing to invest in long-term projects that may not yield immediate returns, and can support the project through various means:

- Direct funding: direct funding through national budgets or loans. This ensures that the project gets off the ground and provides support for the other actors who may be less risk-tolerant.
- Political support: political support for the project, making it a national priority. This ensures that the project receives adequate funding and buy-in from various stakeholders.
- Policy framework: legal and regulatory framework that facilitates the financing and execution of the project. It also ensures that the project is seen as a priority and given the necessary approvals and economic support (such as tax exemptions, subsidies, policy and legislative support, etc.).

2. Vendors:

After governments provide initial financing, vendors determine whether they can contribute additional financing to a project. This will depend on the specific contractual arrangements, which may include equity participation or vendor financing.

- Equity participation: Vendors could participate in the project through equity financing. This type of financing would be primarily provided by vendors that have an interest in acquiring a stake in the project and would be able to align incentives in the long-run for all groups.
- Vendor financing: Vendors could provide financing for the project in the form of loans or guarantees. This mobilization of resources (through a bond issuance, or additional risk mitigants) will enable vendors to support any upside potential of the project. They can also mobilize resources from their country's ECA to provide complementary financing to the transaction.

3. Financial Markets:

Finally, after vendors have exhausted their financing options, the financial markets will be approached for additional financing. The financial markets are typically the last resort, as they are viewed as the most risk-averse. Financial markets include commercial and institutional debt and equity investors who are willing to provide financing under specific conditions, including acceptable risk and expected returns.

- Debt financing: Financial markets provide debt financing for the project. Debt financing for the project would depend on the creditworthiness of the entity responsible for the project. If the entity is deemed creditworthy, the financial markets would be willing to provide financing at a competitive rate.
- Equity financing: Financial markets provide equity financing, which would be provided by investors that have significant risk appetites and are willing to invest in a long-term project. These investors would require a significant return on their investment and may demand a measure of control over the project.

Each of these groups could be mobilized through the various consultations and simultaneous processes:

- Vendors through the Vendor Market Consultations (MC) (see *Section 3*).
- Government through consultations with the Ministry of Finance, and other relevant stakeholders.
- Financial markets through a financial market consultation/project roadshow.

Past global experience and preceding studies analyzing nuclear energy in the Netherlands confirm that government involvement is necessary for the realization of a nuclear new build

Why the role of sovereign-backed finance is crucial in the success of nuclear new builds

- The experience of the past 20 years shows that nuclear projects are not "naturally occurring" in competitive markets, with commercial nuclear projects requiring government enablement.
- In particular, governments must recognize and accommodate the specificities of the nuclear business model, including:
  - A delivery model featuring high upfront costs, a long schedule and significant right-side skewing of out-turn cost/schedule
  - Extremely complex project interfaces amongst main role-holders across the asset lifecycle (vendor, contractor, owner, site owner, operator/licensee, safety regulator, end-users and multiple government oversight bodies)
  - Very long asset lifecycle providing benefits beyond the financial horizons of "mortal" commercial sponsors/owners.
- The broad dispersion of project benefits over time contrasts with the clustering of costs/risks that typically sit with the owner/shareholder, making traditional approaches to financing challenging.
- In the EU, the role of government is constrained by (i) state aid limitations, and (ii) government balance sheet/fiscal limitations.
- The cases of Finland, UK, France, Hungary and, more recently Czechia and Poland, have created/are creating precedents for acceptable Government Support Packages.
  - However, the different market structures and high-impact socio-economics of nuclear energy have resulted in countries adopting very different approaches.
- OECD governments have typically developed their GSPs after extensive market consultation.
- GSPs are iterated and calibrated across wide-ranging combinations of five typical market "asks":
  - Government equity/owner financial support
  - Government debt or guarantees
  - Revenue support
  - Risk allocation
  - Indemnities.

State involvement through a Government Support Package can address specific market failures and bring nuclear energy projects closer to completion through targeted support

The Dutch government is most likely to support a nuclear new build program that minimizes taxpayer liabilities and costs while meeting the demands of the competitive energy market in its transition to net-zero. Government support at any level will be carefully calibrated in terms of value-for-money. The European Commission and external financiers typically consider Government Support Packages for nuclear new builds with five main components, as presented below. Market consultation outputs on the business model will inform gaps that may need to be filled by the Government (through the Government Support Package).

1

Owner Financial Support

Direct financial investment from the government

- Helps in attracting additional investments and enhances project credibility and financial stability.

2

Lender Support

Government guarantees provided to secure lenders against financial risk

- Encourages lenders to finance projects by mitigating risks and to increase the financial stability of the project.

3

Revenue Support

The government ensures a stable revenue stream for the project, shielding it from market volatility

- Guarantees economic viability and longevity of the project, attracting further investments.

4

Project Risk Allocation

Methodical distribution of diverse risks among stakeholders, accompanied by clear frameworks and agreements

- Promotes harmonious collaboration and ensures a fair and equitable distribution of responsibilities and risks between project developers.

5

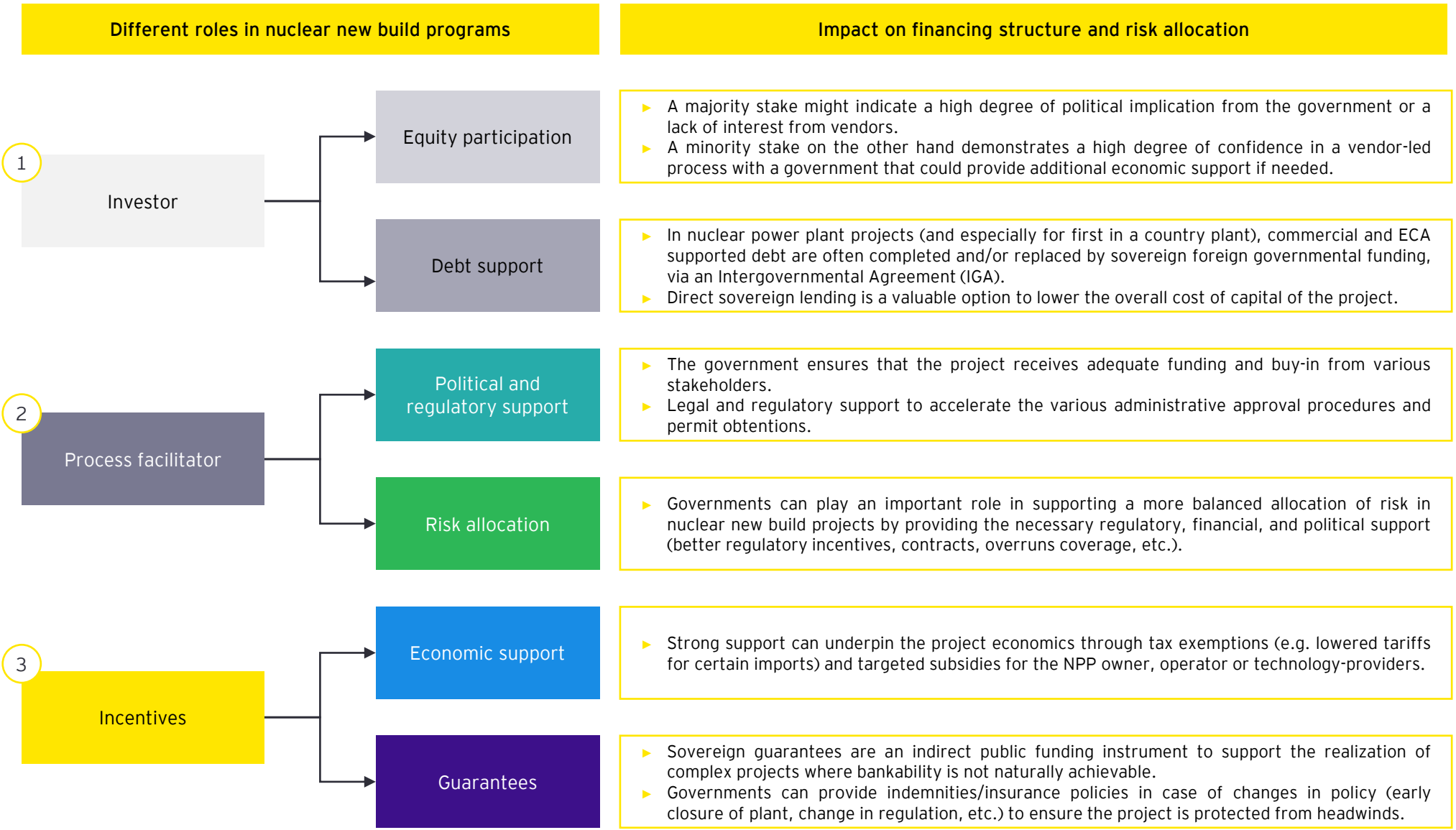
Indemnities

Compensation from the government for losses incurred due to identified risks and unforeseen adverse events

- Mitigates substantial risks and legal liabilities arising from government action such as early plant closure or program cancellation.

- The GSP required for a successful project must be translated into policy instruments and ultimately, transaction term sheets.
- The GSP is expected to be subject to a two-step European Commission approval process that must fully clear in order for external finance to be available/drawable. This two-step process includes a pre-notification/notification period to the DG Competition, which will trigger a preliminary investigation to decide whether (i) the state aid falls under its jurisdiction, and (ii) the aid is compatible with EU rules or whether it warrants further investigation. In case of the latter, a formal investigation will be launched in order to provide a clear assessment of the legality of the aid, with the final decision published in the EU's Official Journal.
- As the balancing variable of a competitive business model, the GSP is typically the longest lead item in EU nuclear new builds.

The State can also take on additional roles to de-risk nuclear new build programs and enhance project bankability



While previous Dutch government support can set a degree of precedence, the unique characteristics of a nuclear new build requires a bespoke approach to developing the GSP

Precedent Dutch government support mechanisms

As noted in the Dutch government participation policy guidance, government can intervene in various ways, and the instrument(s) for intervention must be carefully selected for the specific situation.

Many factors play a role in determining whether state participation is necessary and the most suitable instruments if so, including whether public interest is sufficiently safeguarded by the market or society itself without an intervention, the extent to which there is a need for greater or different influence beyond that applied through legislation and regulation, whether the relevant activities are suitable to be performed by a corporation, and whether the intervention is lawful, effective, efficient, feasible and proportionate.

Typically, private parties cannot bear all the risk associated with major infrastructure investments. To address this, as demonstrated in past Dutch infrastructure projects, the Dutch government has provided a range of support mechanisms across projects over time, through a variety of known/common instruments and arrangements based on the challenge at hand, such as:

- Providing state guarantees to attract financing and/or lower financing costs
- Providing loans
- Injecting equity, or providing milestone payments
- Subsidy schemes, such as SDE
- Contractual mechanisms to support risk sharing
- Establishing enabling policy and regulatory frameworks.

Due to the size and characteristics of past projects, government support was in those instances required over only one/some of the GSP pillars to enable the projects to proceed. In other cases, the size of the investment and the high-risk nature of the projects meant substantial government involvement was required.

Learnings for the nuclear context

While past Dutch infrastructure projects can set a degree of precedence/reference points regarding the various means by which government support can be provided, it is clear from the characteristics of nuclear power projects (i.e. capital-intensive, long lead times, high risk, etc.) that extensive government support is required for a feasible and successful project.

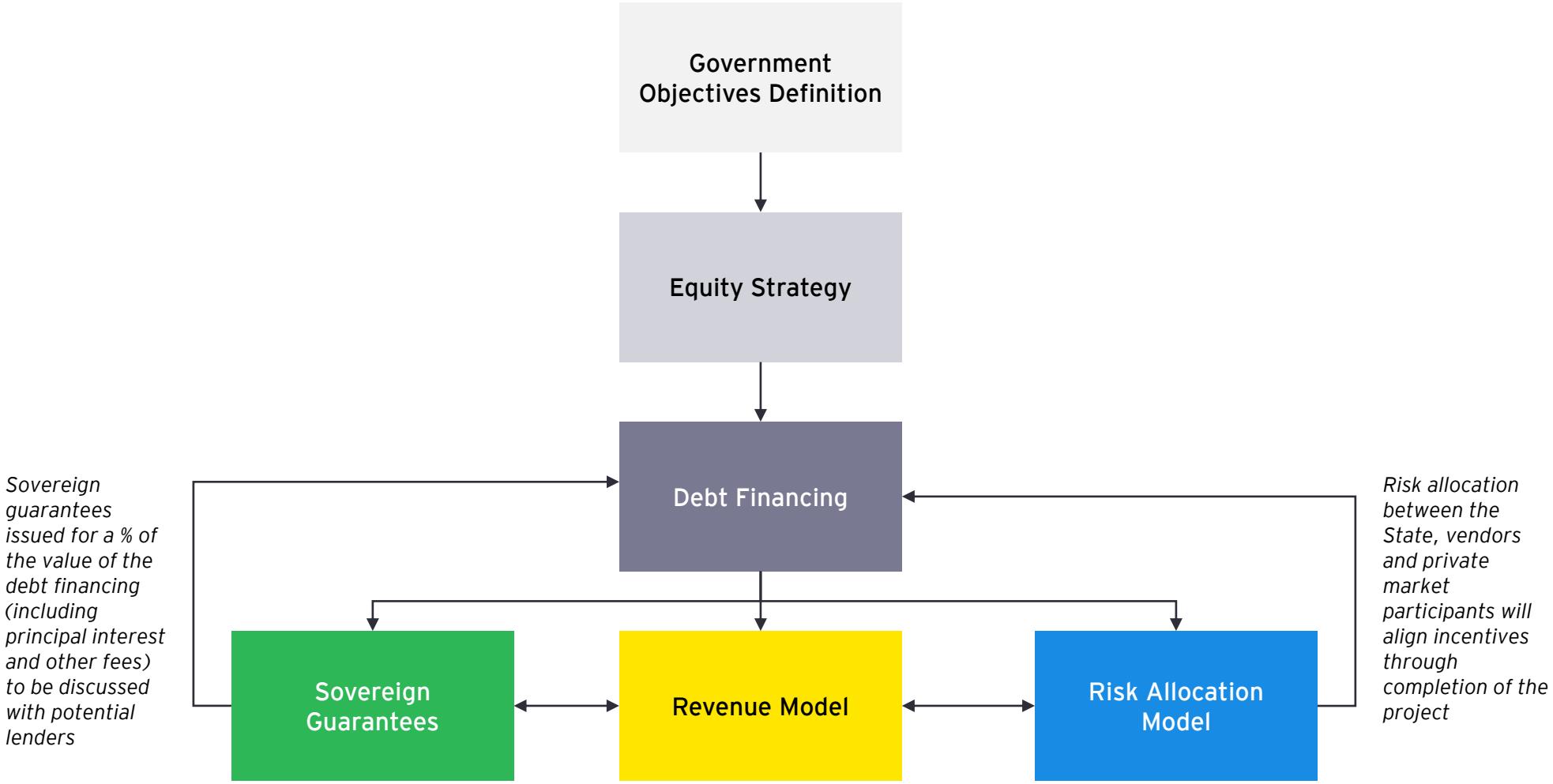
International nuclear case studies substantiate this, whereby significant government support has been observed, as do findings from previous market consultations and those conducted as part of this study (see *Section 3*), in which market participants reiterate the need for government support to enable and incentivize their participation in nuclear projects.

Furthermore, for many previous Dutch infrastructure cases, there were local/neighboring parties available and with the necessary skills/resources to participate but required government support to achieve an acceptable risk allocation. Greater government support is evident where the aim was to attract foreign investment and capability. In the latter case, parallels can be drawn with nuclear power, which requires international companies to be incentivized to bring their business to the Netherlands, in the context of a growing nuclear project landscape across Europe and globally. Not only must the project itself be competitive, but the setting in which it is developed must be suitable for vendors and other participating parties to build supply chains, localize, adapt to foreign regulation, etc.

Accordingly, the nuclear new build process is unique and distinct from the characteristics of such precedents, meaning that a bespoke approach, as informed by/developed through studies, consultations and with reference to nuclear-specific case studies from other geographies, is needed for development of a nuclear-suitable solution (GSP) in the Dutch context.

The Dutch government must iterate and calibrate the GSP by first defining its long-term energy strategy and then providing appropriate project support

Overarching government objectives inform the development of the five GSP pillars



To support the debt raising prospects of the project, an adequate revenue model should be implemented to support overall bankability, and be supported by appropriate sovereign guarantees and a balanced risk allocation model between stakeholders

In its nuclear new build strategy definition, the Dutch government must solve for the 19 infrastructure issues identified by the IAEA, including funding and financing

- IAEA guidelines for member states refer to 19 "issues" for the successful implementation and delivery of any nuclear new build program and project/s.
- Member states are strongly encouraged to abide by IAEA best practices (which are developed in cooperation with the member states).
- For the purposes of the Report, EY will focus essentially on Issue 4 (funding/financing).
- The other 18 issues can be considered mandatory pre-conditions for financial approvals, whether by government, nuclear owner/operators or investors and the broader market.

2.4

Nuclear Business Model

Nuclear new build optimization requires a rethink of the traditional design process that integrates project delivery considerations with financial and risk allocation solutions

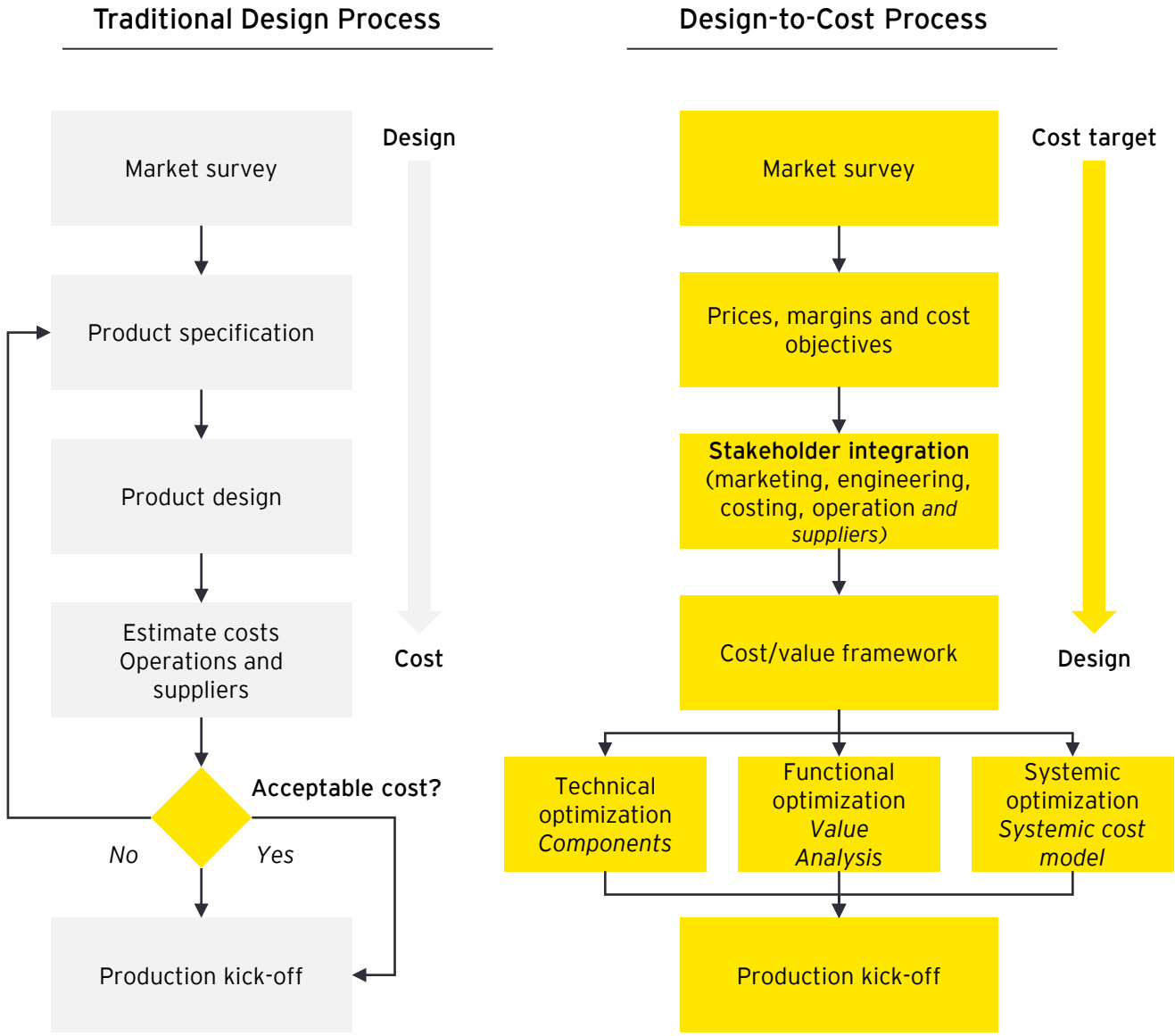
The challenge in competitive NNB tendering is that NNBs are mega-projects without a single unique formula for success.

Variances are observable in vendor approaches to project development and delivery/completion, and each owner's resulting approach with respect to risk allocation, funding/financing, completion and operations.

Equally, each NNB mega-project exhibits unique characteristics related to the site, the grid/interconnections, the operator, the national regulator, the delivery partners, the owner and the national authorities, such that multiple first-of-a-kind variables will be inescapably introduced, no matter how mature the design is, or how experienced the vendor/delivery partners and owner all are.

The high installation costs (EUR/kW) and extended completion schedule (10+ years from decision-in-principle to completion) act to amplify normal project-level errors and uncertainties, which can accumulate and result in unacceptably high, damaging levels of risk for any project party (even government).

Lastly, the necessarily slow cost/schedule maturation cycle, even after bids are submitted (between preferred bidder selection and financial close - which requires significant cost/risk reduction and allocation) renders accurate economic assessment of bids by the owner exceptionally challenging.



A nuclear new build business plan can be split into three main components that are each crucial for successful completion of the project

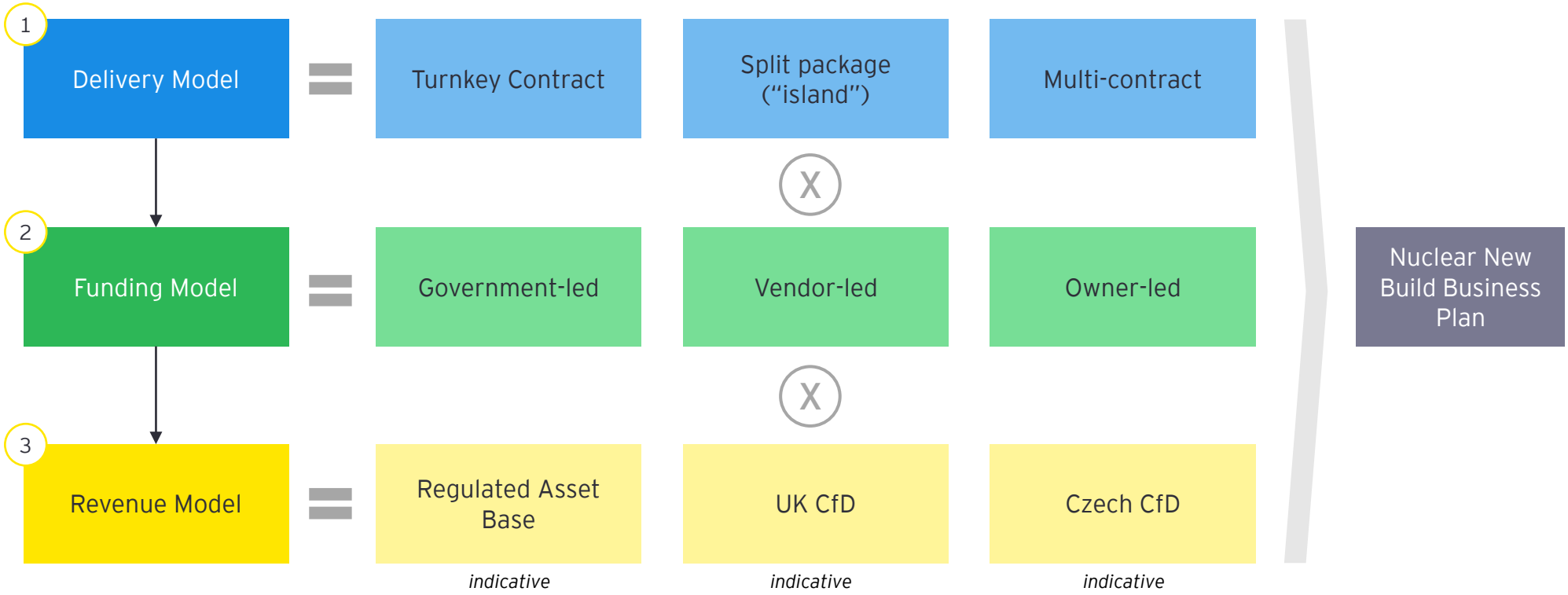
Schematically, the optimally achievable NNB business plan associated with each vendor will represent a combination of delivery model, funding model and revenue model.

Nuclear New Build Business Plan		Government Support Package
1 Delivery Model	▸ How to efficiently deliver an optimal technical offering, while responding to the owner specifications	▸ Likely limited unless government has direct ownership of the asset
2 Funding Model	▸ How to mobilize capital sources to fill the funding gap that can be created by project uncertainty and ensure completion, while minimizing the overall cost of delivery	▸ Potentially high, as governments usually bear a significant share of NNB costs
3 Revenue Model	▸ How to ensure project economic viability and bankability, while striking a balanced risk allocation between offtakers, regulators, vendors, and owners	▸ Deregulated electricity markets are not conducive to nuclear due to low prices, and the State will need to provide a revenue support mechanism

Delivery model economics

- It is accordingly critical for the future owner to undertake a detailed comparative economic analysis of not just the vendor's technical proposal (capacities, availabilities, notional costs and performances, schedule etc.) but of the complete delivery model that each vendor's approach imposes on the owner.
- A complete assessment of the costs, risks and benefits of the delivery model is the most credible underpinning of the NNB funding requirements and finance plan. In turn, the finance plan must be credible in order to justify/support the revenue model (or cost-recovery mechanism, including invested capital) of choice.
- Thus, the owner's revenue model can be said to be derived from the finance plan, which is itself derived from the delivery model.
- Therefore, the Vendor Market Consultation lines of inquiry sought to acquire a full understanding of each vendor's delivery model, and subsequently, the finance plan/s and associated revenue model/s could be better understood and refined in the context of the underlying delivery model.

The successful combination of a delivery model, a funding model and a revenue model will yield an optimized business plan for the Dutch NPP



- Altogether, schematically speaking, there can be said to exist – at a minimum – 27 unique combinations in a competitively procured NNB BP for the owner.
- An example of an "extreme" owner risk-heavy BP is a multi-contract delivery model with limited delivery partner risk-taking, combined with low/absent vendor or vendor-associated financing in the funding model, in a revenue model that does not allow the transmission to owner/project costs/risks to the market/end-users. This was the case, incidentally, for Hinkley Point C.
- An example of a highly de-risked owner would be a delivery model featuring strong fixed price/schedule/plant performance, a meaningful level of financial support from the delivery partners, and a revenue model that absorbs costs/risks with a pass-through mechanism. This, too, has a name - Barakah and, somewhat counter-intuitively, OL3 (since it featured a minimalist GSP).
- Additional international nuclear case studies are discussed in *Section 4*.

A CfD revenue mechanism is likely to be the preferred option for nuclear in the Netherlands and the European Union but its definitive structure remains to be determined

HIGHEST PROBABILITY

	"UK" CfD	"CZECH" CfD	RAB	PPA	Mankala / Cooperative
ADVANTAGES	✓ The mechanism preferred by the European Commission ✓ Possibility to use the experience of the developed CfD for the HPC project in Great Britain ✓ High bankability because the level of electricity prices is fixed ✓ Can be combined with capacity market revenues	✓ Similar framework to CfD however a "Czech CfD" also guarantees volume of electricity sales with the State bearing market price volatility and purchasing the entirety of the plant's output	✓ The possibility of a significant reduction in the cost of by reducing the risk exposure of private investors	✓ Securing the price and volume of electricity sales, increasing the bankability of the nuclear project ✓ Possibility of combining the PPA and a Capacity Market mechanism ✓ Growing demand and widespread use of corporate PPAs on the market as a result of the implementation of ESG policies by enterprises	✓ High bankability, given the lack of output and market risk for the plant ✓ Very good economics for the offtakers as the company sells the output at production cost
DISADVANTAGES	× Additional time (possibly 3 to 4 years based on experience with designing a support system for offshore wind farms) and effort needed to develop and ratify a support mechanism × Lack of certainty as to the shape of the contractual agreement (particularly the price amount) × If staged deployment, CfD mechanism can be utilized to help act as a source of funding for remaining construction	× The European Commission has expressed doubts as to the compatibility of the proposed system with state aid rules × Requires a high-level of state implication due to the take-or-pay nature of the CfD	× Very complex and politically-fraught implementation process × A relatively complicated process of determining the level of justified revenue × Will need to socialize this mechanism across multiple governmental stakeholders and entities	× Unlikely to find corporate PPAs that are bankable in size / term for this project × In the context of the scale of the production volume in a nuclear power plant, PPA may require contracting many customers at once × If staged deployment, PPA revenues can be utilized to help act as a source of funding for remaining construction	× Requires a high level of coordination between offtakers to allocate capacity and financing × Requires an experienced owner-operator which would be able to handle complex construction, financing, and procurement risks × Requires appropriate legislation to enable the development of cooperative structures
Revenues during construction	► No, all development and construction risks are on investors, support is provided to investors only at the operational stage	► Yes, as part of the Czech CfD framework, the Czech government can also provide a low-interest loan to the project	► Yes, regulator sets the RAB payment, which includes justified costs already at the construction stage	► No, all development and construction risks are on investors, support is provided to investors only at the operational stage	► No, all development and construction risks are on investors, support is provided to investors only at the operational stage

3

Market Consultations

3.1

Design of the Market Consultation Process

The Market Consultation process was set up to support the development of transparent non-technical requirements for the BIS of the upcoming tender

Background

In the letter to Parliament dated 9 December 2022, the Minister for Economic Affairs and Climate Policy expressed his support for the preparation of two new generation III+ nuclear power plants, with the Borssele location being preferred at the time of writing.

Part of this preparation would be to carry out a market consultation process among the vendors of nuclear technology to gain insight into preferences from the market on appropriate revenue models and organizational structures for the construction of the two new nuclear power plants.

The market consultations would enable a clear political direction for the follow-up process in 2024, whereby the subsequent competitive tender would prescribe realistic revenue models and organizational structures, significantly increasing the chance of a successful nuclear power plant program.

Purpose of the process

The non-technical Market Consultations with vendors aimed to establish clear input (from EZK) and output (from EDF, KHNP, and Westinghouse, the "Vendors") that would support the most deliverable and competitive nuclear new build project in the market.

Process-wise, the Market Consultations offered a platform to develop the non-technical requirements and potential specifications of the future Bid Invitation Specifications that EZK will put in place for the selection of the future nuclear technology provider in the Dutch nuclear power program context.

The capabilities and risk acceptance of the three Vendors would be valuable information to support the analytical framework that EZK will have to adopt for the future tendering of the two new nuclear power plant units.

Additionally, throughout the Market Consultation process, EZK would be able to develop a baseline set of expectations for the Dutch nuclear new build program with the Vendors and prepare the ground for relevant market updates to the Dutch non-technical hosting environment for large-scale new build nuclear projects.

The Market Consultation would also lay out the first elements to developing a Government Support Package that will comply with Dutch and EU constraints.

Another key objective is to support the subsequent updates to nuclear regulation in the Netherlands, and the ensuing legislative process.

The Market Consultation process also supported/is supporting the interdepartmental working groups in creating a common view and objectives amongst the different stakeholders within the Dutch government, including MoF and EZK.

Critical inputs were obtained from Vendors on the first elements to securing the approval of the European Commission regarding possible state aid, government support for the green transition, and nuclear energy generation.

Key highlights of the Market Consultations will inform the BIS non-technical specifications, as noted, which will be notified to, reviewed by and signed off by key Dutch government stakeholders and the European Commission.

A successful BIS is based on a pre-identified list of objectives and economic evaluation criteria set by the host government

An evaluation framework, comprising a set of parameters and associated qualitative and quantitative criteria, was developed to enable comparison between revenue models and support the decision-making process. The parameters are aligned with the objectives of a successful BIS. The objectives, requirements, constraints and limitations of the Dutch government, other stakeholders and the Dutch context more broadly lead to an assessment of each model variant against the evaluation criteria. From this a set of preferred models can be identified to shape the BIS, and in turn inform the anticipated structure of the Government Support Package to cover the gaps.

BIS objectives	Illustrative evaluation criteria	
Economic robustness of the delivery program	▸ Notional EPC contract price ▸ EPC price transparency ▸ EPC price formula and price-firming process ▸ EPC scope additions/subtractions & variants (if any) ▸ Owner scope, costs and contingencies (by phase: pre-construction, construction)	▸ Incentive/penalty regime (by phase: pre-construction, construction) ▸ S-curve and schedule (major milestones) ▸ Total project budget ▸ Major budget assumptions and uncertainties
Technical specifications & assumptions	▸ Licensing/licensability ▸ Design, construction & operating differences from reference plant ▸ Capacity profile ▸ Availability and dispatch profile ▸ Operating regime & dispatch flexibility	
Commercial specifications & assumptions	▸ Approach to risk reduction ▸ Approach to funding & finance ▸ Risk allocation ▸ Risk/reward sharing	
Financial specifications & assumptions	▸ Expected tariff/revenue requirement ▸ Range of potential out-turn tariffs (against pre-defined scenarios) ▸ Total funding requirement ▸ Finance parties (amounts, timing, ordering)	▸ Equity IRR ▸ Debt IRR
Government Support Package requirements	▸ Owner equity ▸ Debt guarantees ▸ Revenue support ▸ Indemnities	▸ Risk allocation

A Market Consultation process was run with each of the three Vendors, in two rounds, held in October and December 2023 respectively

Round preparation

Preparation for the Market Consultation rounds included:

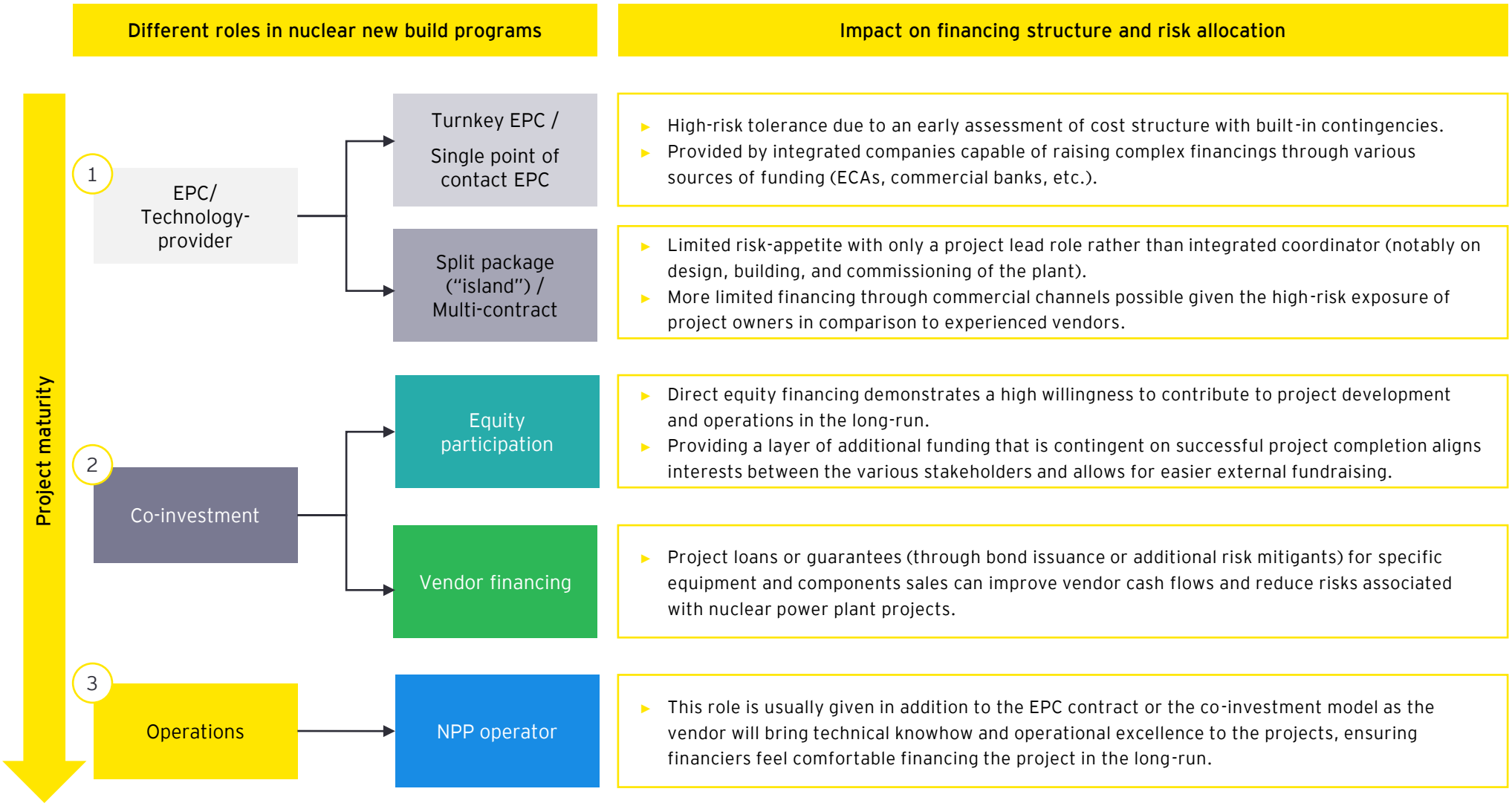
- Preparation by EZK and advisors of an information pack sent to Vendors ahead of the consultations to introduce and set out the process.
- Identification of EZK/national objectives, reasons for a nuclear tender and, where possible, constraints/red-lines, and development parameters (technical, legal, commercial, financial, etc.).
- Development of a process map including full program timeline (including key decision gateways on EZK/government side) & socialization with EZK/government and Vendor sides to set expectations on the consultations and beyond.
- Definition of the governmental interagency team/mandate/process, for internal and external communication purposes.
- Identification of preliminary assignments for each role-holding party to the process (e.g. MoF, EZK, Cabinet, Parliament, Vendors, financial institutions, European Commission, etc.).
- Fact-pack prepared with a preliminary set of standard questions to Vendors.
- Further communications sent out prior to the second block of sessions, including topics for Round 2 and relevant case studies.

Round	Considerations
Round 1 *October 2023*	**Purpose** ▸ Present Dutch government approach/priorities and gather an initial view from Vendors on commercial and financial bounding conditions. **Objectives** ▸ High-level understanding on the possible partnership with the Vendors and their possibilities and restrictions. ▸ Introduction of EZK objectives and main parameters. ▸ Preliminary discussion on delivery models, revenue models, financing structure, etc.
Round 2 *December 2023*	**Purpose** ▸ Undertake a deeper dive to further understand the preferences from Vendors and potential market bounding conditions. **Objectives** ▸ Deep-dive on the possible partnership with the Vendors and implications across the project structure. ▸ Taking recommendations and testing the Vendors' preferences and boundaries.

3.2

Vendor Background & Bounding Conditions

Vendors can provide varying degrees of project support, and act as original equipment manufacturers of nuclear technology, co-investors, and/or plant operators[1]



(1) EY view of typical roles of vendors in nuclear power projects. The contents of this slide do not represent the specific views or intentions of the Vendors involved in the Market Consultation process

Preliminary vendor and market views on the role of the Dutch government in the nuclear new build program have been gathered and represent a starting point for this study

Preceding studies[1] have determined preliminary market views on the role of the State and perspectives on what vendors and market participants are prepared to offer. This represents a starting point for the work undertaken through this study, which has:

- Facilitated deeper insight into market appetite and preferences for certain revenue and delivery models, as well as organization and ownership structures; and
- Helped to facilitate the development of a common view amongst the different stakeholders within the Dutch government, including MoF and EZK, on Dutch government objectives and (im)possibilities and boundaries in relation to the Government Support Package.

Consideration	Preliminary market views impacting the GSP (based on preceding studies)
Financing	▸ Market participants suggested that private financing without extensive government guarantees would be difficult/impossible. ▸ In addition to guarantees, government is expected to participate in the project and provide a significant portion of the equity financing, as the large size and time horizon of a nuclear project is too great for many private investors, and vendors are expected to have little willingness or ability to provide financing. ▸ Numerous market participants suggested government should build a new plant for which it should largely provide the financing itself (through equity, loans, or a combination thereof), with a sale considered after commissioning/start of operations, after which the risk profile for private financiers has decreased.

Guarantees	▸ Private financiers are expected to require a range of guarantees from government, such as:
	  ▸ Revenue certainty provided via the financing model and/or government guarantees (private financiers indicated that revenue guarantees are critical for private financing)
	  ▸ Guarantees covering certain cost increases (overruns cost-bearing distribution is negotiable)
	  ▸ Guarantees covering licensing risks during construction
	  ▸ Guarantees covering decommissioning costs in the event of premature bankruptcy of the operator
	  ▸ Guarantees to cover black swan events (e.g. incidents).

Policy, regulation and political risk	▸ Market parties expect the State to provide some certainty in relation to political risk, through guarantees or additional agreements for financial compensation in the event of early termination, and additional measures (e.g. vision on the future energy mix and role of nuclear, transparency on the (social) value of nuclear energy). ▸ The political and regulatory environment must build investor confidence through strategies and policies that provide assured revenue to investors, reduce risk and provide low cost of capital, and do not lead to delays. ▸ Stable political policies and adequate public support for nuclear energy are key conditions for private financiers.

(1) Nuclear energy market consultation, KPMG, July 2021; Financing models for nuclear power plants, European nuclear power plant case studies, Baringa, September 2022; Investigation of financing structures for nuclear energy, KPMG, February 2023

Preliminary vendor and market views on the role of the Dutch government in the nuclear new build program have been gathered and represent a starting point for this study (cont'd)

Consideration	Preliminary market views impacting the GSP (based on preceding studies)
Construction risk	▸ Market parties see a role for the State during the construction phase due to the associated significant risks. Suggested options include providing returns through the remuneration model, providing financing (e.g. through a loan) or 100% state participation. ▸ Provided there is a revenue guarantee, private financiers indicate a willingness to bear 'ordinary' construction risks to the extent they can control them. That means construction costs with a dedicated pool for "limited" overruns.
Operational risk	▸ Private financiers are willing to bear 'ordinary' operating risks after commencement of operations.
Revenue risk	▸ Market parties are willing to bear some turnover risk. Remuneration models can provide a degree of revenue certainty. Due to the rising demand for energy, volume risk was considered limited, and there are various options available for distributing price risk.
Licensing	▸ Market parties indicated they are only willing to accept licensing/permit risks to a limited extent and expect the State to play a role. Suggested options include the State providing financing/guarantees until the most critical permits become irrevocable, or cover part of the additional costs in case of material changes in permit requirements, and agreements made to limit the risk of changes in permit requirements, as well as early stage concept testing and certainty on conditions/requirements from ANVS. ▸ Several private financiers indicated they would only become involved after a license is obtained. ▸ Private financiers suggest that government should bear the risk of higher costs and longer lead times resulting from changes to licensing requirements since this is out of their control.
Decommissioning	▸ Private financiers are willing to fund decommissioning but would like to share the risk of (interim) incidents with the State. ▸ Market parties prefer fundraising over the term of the power plants rather than an upfront decommissioning fund. To guarantee coverage, additional agreements are necessary. ▸ Private financiers show little willingness to pay additional decommissioning costs above initial estimates, with the risk of a rise in these costs being substantial.

3.3

Findings from Market Consultation Round 1

Agenda of Round 1 Market Consultation sessions with EDF, KHNP and Westinghouse

Session	Objective	Content
Workshop 1 *Introductions, objectives and considerations*	▸ Set out EZK objectives for the MC and the framework for the workshops, designed to generate a dialogue that will inform the most efficient and deliverable NPP.	▸ General introduction and presentation of the Dutch nuclear new build program ▸ Lessons learned from precedent nuclear experiences ▸ Traditional challenges encountered by nuclear project owners ▸ Presentation of the development and delivery models of the Reference Plant ▸ Preliminary BIS structure and requirements
Workshop 2 *Value drivers*	▸ Identify the value drivers and trade-offs that could enable the most competitive NPP for the Dutch market.	▸ Approach to the project delivery model ▸ Risk allocation, division of responsibilities, and commercial considerations ▸ Economics and cost considerations ▸ Funding requirements, overview of the anticipated Government Support Package

Workshop 3 *Delivery models, revenue models and public support*	▸ Discuss the business plan specifics and generate indicative views on the most suitable approach to align with stakeholders' interests and expectations for future decision-making purposes.	▸ Discussion and interactions between:
		  ▸ Delivery models
		  ▸ Funding models
		  ▸ Revenue models
		▸ Bankability and investability requirements
		▸ Possibilities of Dutch government support

Workshop 4 *External funding mechanisms and project structuring*	▸ Examine the various external funding options available for the nuclear project and to identify/explore potential funding pathway/s.	▸ Optimal legal and financial structuring in view of the external funding ▸ Equity funding and possibilities of co-investments ▸ Potential sources of debt financing ▸ Focus on the Export Credit Agencies support possibilities

Round 1 generated high-quality inputs in the key lines of inquiry

Information gathered from Vendors	
Delivery model	▸ Vendor roles across engineering/procurement and construction and approach to partnerships/consortium building ▸ Approach to delivery, reduction/management of completion risk (cost, schedule, unit performance) ▸ Pros/cons of various contracting frameworks/mechanisms and implications of each on key project elements, including risk transfer and pricing
Contracting	▸ Supply chain and localization considerations ▸ Technology/knowledge transfer ▸ Interface management and risk
Owner support	▸ Support for the owner across design, construction and operations phases and transition between phases ▸ Overview of Vendor role in operations on previous NNB projects and preferences for future projects ▸ Key considerations for the future owner/operator organisation
Risk acceptance	▸ Allocation of key risks across parties, including revenue, operational, construction, political, regulatory, decommissioning, and waste management risk ▸ Role of guarantees throughout the NPP lifecycle
Bankability/ECA support	▸ Early indication of the potential for ECA and/or specialized financing support, and overview of support on previous NNB projects ▸ Key considerations for attracting external financing ▸ Alternative revenue model options and implications for project bankability
Equity & overall investability	▸ Overview of equity position on previous NNB projects, pros/cons, lessons learned and early indication of willingness to share in early-stage risks through financial structuring ▸ Possibilities for third party equity interest (strategic, sovereign and/or partners)
Owner/operator appetite	▸ Overview of role in operations on previous NNB projects and generic possibilities for the Dutch NNB
Competitive tendering	▸ Preferences regarding selection process, pros/cons and lessons learned in previous experience ▸ Reflections on approach and proposed timelines for the Dutch project
Approach to the BIS	▸ EZK process map and level of interaction between EZK and Vendors ▸ Interlink between technical and non-technical workstreams and approach to defining the specifications

Main takeaways

The Vendors provided significant, valuable insight into their specific preferences and bounding conditions across key project parameters. Due to confidentiality agreements, sensitive details cannot be disclosed. Broader key takeaways from MC Round 1 include:

- The BIS document needs to be specific, detailed, and include comprehensive requirements on both technical and non-technical aspects. This will demonstrate project maturity, and comfort Vendors on the long-term prospects of the project, and lead to reduced built-in contingencies and overall cost.
- Vendors will require guidance and significant inputs from EZK on the overarching process leading to the BIS (including the Technical Feasibility Study (TFS), SPV creation, Environmental Assessment, interdepartmental discussions, pre-BIS political direction), the expected/possible GSP that will be put forward by the Dutch government, and the expected requirements from the future NNB power plant owner/operator.
- Vendor preferences in relation to various delivery models were discussed, including extent of, and approach to, price firming. Delivery models will be more or less integrated. Risk/reward sharing between the Vendor and the owner must lead to incentives alignment.
- There are localization opportunities at various stages of the project. Localization strategies will consider local subcontracting, localization of activities through identification of potential suppliers and knowledge transfer, and adaptation of design to local specifications to achieve greater local content. Localization strategy depends on owner requirements and existing local supply chain knowhow.
- Various levels of owner support are possible, with support programs/approaches available to enable a smooth handover and transition between project phases.
- Various approaches to the development phase exist with associated contractual frameworks, which can create alignment between stakeholders long before FID.
- To secure external finance, Vendors will need strong support from the host government. An appropriate risk distribution between the parties, a strong revenue model, a simple shareholder structure and minimal regulatory changes enhance overall project bankability.
- Equity funding and co-investment and debt financing options require further negotiation and discussion.
  - Owner's government or a state-owned SPV (indirect government investment) would ensure a strong political direction.
  - Investor pools should be sounded to determine potential equity interest, noting that historical precedent has shown there to be limited appetite.
  - It is likely that debt financing will need to be procured essentially through ECAs and Vendor government support, unless the Dutch government is willing to underwrite or guarantee a significant portion of the undertaking.

3.4

Findings from Market Consultation Round 2

Agenda of Round 2 Market Consultation sessions with EDF, KHNP and Westinghouse

Session	Objective	Content
Workshop 1	▸ Definition of the adequate owner/operator structure and competencies, and overall contractual relations with EPC and nuclear technology providers: Dutch developer model	▸ Identify/implement the appropriate O/O structure ▸ Develop the most effective strategy for project delivery (project within a project) ▸ Vendor delivery model, key assignments and risk allocation ▸ Considering the government expectations and Dutch context: first steps toward the definition of a preferred contractual scheme ▸ Definition of a high-level program structure, and appropriate enabling tools within the project organization ▸ Role of the vendor in support to the owner/operator and risk/scope acceptance
Workshop 2	▸ Study the role of the State/GSP/state aid process ▸ Potential Dutch investor model	▸ Dutch government balance sheet position/resources ▸ Public/private distribution of project benefits, costs and risks across phases ▸ Allocation of risks to be addressed on the governmental side: long-term political support at national and local level, key stakeholders' support (public acceptance, unions), long term visibility and certainty on costs and revenues ▸ EU state aid goalposts
Workshop 3	▸ Examine optimal project trajectory/competitive process	▸ Overall process & associated phases for a competitive process including definition of intermediate commercial/contractual steps (e.g. Early Works Agreement (EWA) or equivalent) aiming at de-risking the project ▸ Conditions for a competitive dialogue supported by a Joint Development Agreement, with a mutual progressive commitment from both parties leading to a formal submission of a binding offer
Workshop 4	▸ Deep-dive on key specifics of the financing scheme and economic model notably through detailed case studies of recent nuclear new build projects lead by each of the Vendors	▸ Detailed case studies of recent nuclear new build projects in Europe, the Middle East, and the US

Traditionally, Bid Invitation Specifications as per IAEA guidelines take the form of a multi-year process to sequentially de-risk the project until Final Investment Decision

	Technical Feasibility & Market Consultation	Decision in Principle & BIS Development	Bid Development	Bid Evaluation	Early Works Agreement
	TFS completion	BIS release	Bid submission	Bidder selection	Contract signing
	9 months	9 months	12-24 months	6-12 months	>12 months
	Feasibility in principle Site confirmation Adaptable technology	**Building up call for tenders with supplier technology and capacity**	**Relevant input data for purpose of bidder's response**	**Best bidder selection**	**Firming-up of delivery conditions**
Advantages	► Global picture of the main project and execution risks ► Identification of the necessary input data ► First allocation of risks between vendor and O/O ► First planning: main key drivers & availability of input data ► Costing class 4 (order of magnitude)	► Political support for a sustainable process/project ► Opportunity for the bidder to continue technology de-risking at its own cost ► Opportunity to develop and share early preliminary packages of the BIS	► Binding allocation of risks from the bidder perspective ► Supply chain preliminary identification and evaluation ► Opportunity to lead clarification workshops with bidders	► Longer clarification period on redlines of bidder's bid ► Assessment of residual risks to be managed only by the owner ► Option to lead several bid revisions and sequences of submission to clarify/ align bids	► Firming-up of technical compliance ► Firming-up of price and pricing model ► Securing delivery (supply chain, resources ramp-up and long-lead item schedule) ► Putting in place financing support ► Finalization of GSP
Drawbacks	► Non-binding proposal	► Vendor's involvement limited ► Selection of a capable/ independent/sustainable owner's engineer	► Late discovery of bidder's limitations/restrictions ► Limited room for clarifications and alternative proposals due to competition ► No project-level optimization of the risks between vendor and O/O	► Need to understand bids in a short timeframe ► Difficult to define relevant selection criteria ► Selection of a capable/ independent/sustainable owner's engineer ► No certainty given to bidders	► Costs borne by the owner

Main takeaways

Objectives and process outcomes

- What we tested for:
  - Vendor insights and preferences on investability drivers
  - Delivery models, operating models, revenue models, financing structures.
- What we input:
  - Dutch nuclear new build imperatives & constraints
  - Scoping letters setting out key lines of enquiry and trade-offs (Round 1) and case study-based cross-examination (Round 2).
- What we could not define/input into the scoping letters:
  - Developer identity/process
  - Owner/operator identity/requirements
  - Government Support Package shape/quanta/pre-conditions.

Conclusions

As noted, due to confidentiality agreements, sensitive details cannot be disclosed. Broader conclusions are as follows.

- The two rounds of Market Consultations have provided critical inputs to the definition of the needs, objectives and milestones that must be covered by the ongoing nuclear procurement process in the Netherlands.
- While initially dedicated to exploring specific revenue models (CfD, RAB, PPA, etc.) and financing structures (vendor, sovereign, private, etc.), the exercise has been instructive in painting a fuller picture of what Vendor preferences and expectations are, when it comes to the competitive procurement process of the Dutch NNB.
- Vendors preferred not to discuss specific developments surrounding revenue and funding models in isolation. Instead, they expressed a unanimous view that a more complete mapping of the potential Dutch investor and developer model is required in order to indicate preferences/appetite outside of their traditional technical delivery roles.
- Their commercial/financial appetite was dependent on key factors such as:
  - The vendor selection process
  - Competitive tendering criteria, which should evolve over the various iterations of the BIS over time to reflect the comments from Vendors during the development and selection phases
  - The identity of the owner/operator, which is yet to be identified
  - Project delivery risk allocation
  - The level of government support and bankability support from ECAs, multilateral, and commercial finance brought by project stakeholders.

Next steps

- EZK will need to generate a consistent, comparable output across Vendors by providing a clear roadmap and reflections on:
  i. a Dutch developer & investor model, and;
  ii. a roadmap/process to BIS development, competitive tendering, bidder selection and commencement of joint project development/delivery activities.

4

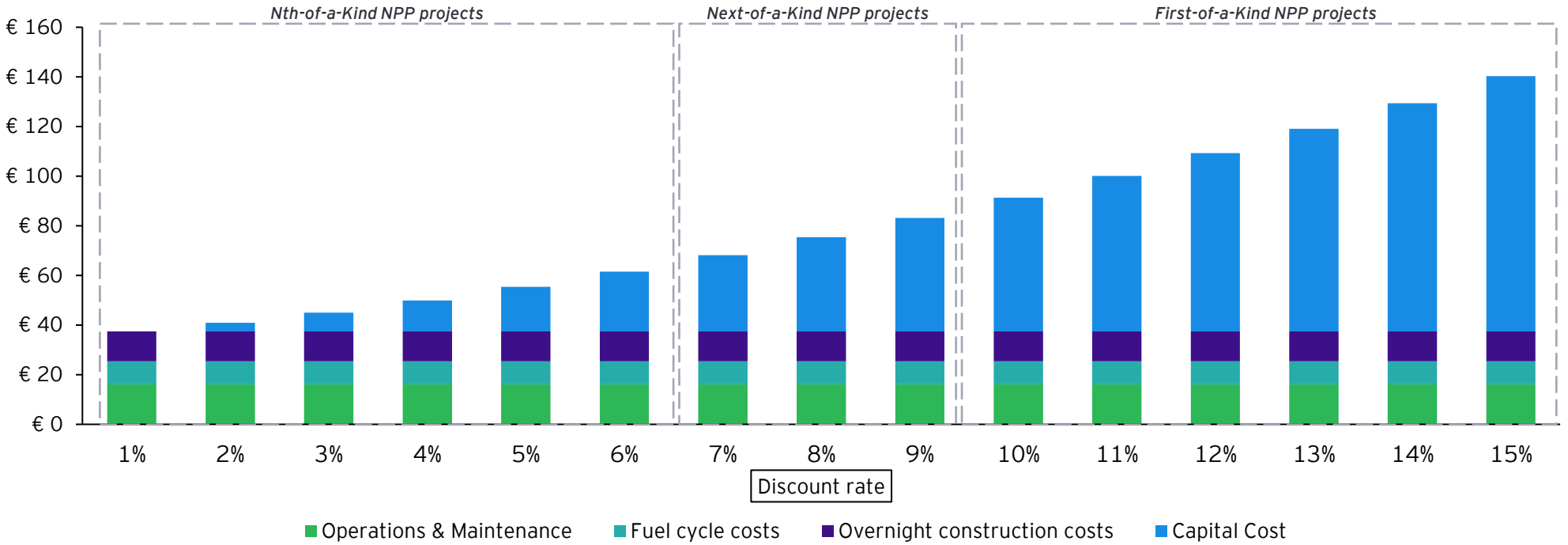
Preliminary Considerations for the Government Support Package

4.1

Government Support Package Optimization

Nuclear energy developments are only economically-viable thanks to successful project de-risking undertaken by all stakeholders

2020 Levelized Cost of Energy – New nuclear power plant (EUR/MWh)



Nuclear remains the dispatchable low-carbon technology with the lowest expected costs once program maturity is reached. Thus, it is critical to move beyond continuous FOAK projects (as has been the norm in Europe since the 1990s) and reach the industrial-scale deployment that goes along with Nth-of-a-kind projects. However, the cost of risk for FOAK reactors is too high to make any project competitive on a standalone commercial basis, and private investors are unlikely to support a project with such complexity without some form of government support.

Thus, the objective for any government willing to invest in nuclear is to provide the necessary support to decrease the cost of nuclear as it moves back down toward the Nth-of-a-kind cost structure.

This is achieved by reaching economies of scale along the supply chain, carefully allocating risks between actors, accumulating experience for all project stakeholders, and reducing the perceived cost of financing nuclear energy.

By minimizing risk (and risk perception) to project funding and ensuring successful project completion in a timely manner, the Dutch government can successfully harness the benefits of nuclear as another source of low-carbon baseload energy.

Source: EY research, IEA, OECD-NEA

Successful Government Support Packages can solve critical market failures in a cost-effective way by targeting the riskiest aspects of a nuclear energy project first

An optimal Government Support Package needs to ensure that multiple key objectives are achieved:

- The project must be bankable, that is, capable of drawing in external finance (both debt and equity)
- The project must ensure its economic viability (price competitiveness vs. other technologies, and obtain a positive value for money assessment).

Lowering the cost of capital (i.e. the cost of risk) is the most crucial parameter in ensuring that nuclear remains a competitive offering.

Nuclear energy financing suffers from a clear risk premium due to recent failures in FOAK projects, heightening risk perception among investors, and policymakers alike.

The size of nuclear undertakings generally goes against traditional project finance considerations at a FOAK stage, but can be achieved successfully at an Nth-of-a-Kind reactor development stage.

Thus, the objective of the Dutch government should be to successfully de-risk the nuclear new build project at the lowest cost, given current market conditions, and provide a pathway to reaching successful Nth-of-a-Kind financing conditions for either FOAK or NOAK reactors.

In *Section 3* feedback provided by Vendors demonstrated that the Government Support Package must be considered through the lens of an overall risk allocation model.

Vendors have expressed strong preferences across a range of different asks regarding delivery model, bankability, or approaches to competitive tendering, which go hand-in-hand with specific financial and program backing.
Previous experience in large-scale infrastructure financing by the Dutch government stretches across all identified pillars of a possible GSP (with the exception of indemnities, which are nuclear-specific).

	Solves for
Owner Financial Support	▸ High cost of private capital impacting project economics ▸ High financing risk, and low chance of reaching FID
Lender Support	▸ Bankability considerations from financial actors
Revenue Support	▸ Market risk and market failures ▸ Long-run project profitability (if revenue support is sized appropriately)
Project Risk Allocation	▸ Regulatory risk ▸ Technology and organizational risks
Indemnities	▸ Political risk

Moving from FOAK reactors to Nth-of-a-Kind reactors will require government intervention to de-risk successive projects and enable the industry to accumulate experience…

	Current situation  *First-of-a-Kind*	 *Next-of-a-Kind*	 *Nth-of-a-Kind*
Cost of capital	▸ High (7-10%) ✗	▸ Median (4-7%) ~	▸ Low (below 4%) ✓
Difficulty to reach FID	▸ High due to project uncertainty ✗	▸ Depends on success of FOAK project, but generally lower ~	▸ Low given accumulated project experience ✓
Construction risk	▸ High due to lack of experience ✗	▸ Lower given accumulated experience ~	▸ Low due to strong learning curve ✓
Bankability	▸ Low due to scant experience from financial actors and project managers ✗	▸ Depends on success of FOAK project, but generally improved ~	▸ High as all actors benefit from past experience in financing nuclear ✓
Market risk	▸ High ✗	▸ Depends on market regulation ~	▸ Depends on market regulation ~
Regulatory risk	▸ High as design and licensing need to be approved by the regulator ✗	▸ Generally lower ~	▸ Low ✓
Technology and organizational risk	▸ High, as supply chain and vendors lack project experience ✗	▸ Depends on success of FOAK project, but generally lower ~	▸ Low due to strong learning curve ✓
Political risk	▸ High, due to project uncertainty ✗	▸ Lower, as energy is being deployed as part of the energy mix ~	▸ Low ✓

→ **"Comprehensive" GSP** → **"Moderate" GSP** → **"Basic" GSP**

...ensuring that the long-term series effect will eventually reduce the need for large Government Support Packages

	Current situation  *First-of-a-Kind*	 *Next-of-a-Kind*	 *Nth-of-a-Kind*
Owner Financial Support	▸ High equity contribution to support the NPP owner (20-100%)	▸ High equity contribution to support the NPP owner (20-100%) is likely	▸ Limited equity contribution (0-20%) thanks to strong owners & operators
Lender Support	▸ Sovereign debt support (either through guarantees or direct issuance) ▸ First-loss debt tranche guarantee ▸ Regulated Asset Base payments also cover debt repayments ▸ Significant ECA commitment to project funding	▸ Guarantees on commercial debt issued by owners ▸ Significant ECA commitment to project funding	▸ Limited thanks to high project bankability ▸ Sovereign guarantees could be provided to reduce cost of capital ▸ Significant ECA commitment to project funding
Revenue Support	▸ Long-term, predictable revenue stream negotiated in advance (Regulated Asset Base, Contract for Difference, PPAs) ▸ Comprehensive level of protection and support for the project revenue	▸ Long-term, predictable revenue stream negotiated in advance (Regulated Asset Base, Contract for Difference, PPAs) ▸ Reduced level of protection and support for the project revenue (vs. "Comprehensive" GSP)	▸ Long-term, predictable revenue stream negotiated in advance (Regulated Asset Base, Contract for Difference, PPAs) ▸ Reduced level of protection and support for the project revenue (vs. "Comprehensive" and "Moderate" GSPs)
Project Risk Allocation	▸ Funder of last resort in case of overruns and/or delays	▸ Most risks of overruns should be borne by utilities, vendors, and their supply chain	▸ Utilities and project owners will likely be able to absorb overrun and delay costs
Indemnities	▸ Extensive nuclear liability coverage ▸ Indemnification in case of change in policies (early plant closure or construction cancellation)	▸ Standard nuclear liability coverage (as per Paris and Vienna conventions) ▸ Indemnification in case of change in policies (early plant closure or construction cancellation)	▸ Standard nuclear liability coverage (as per Paris and Vienna conventions)
	→ **"Comprehensive" GSP**	→ **"Moderate" GSP**	→ **"Basic" GSP**

4.2

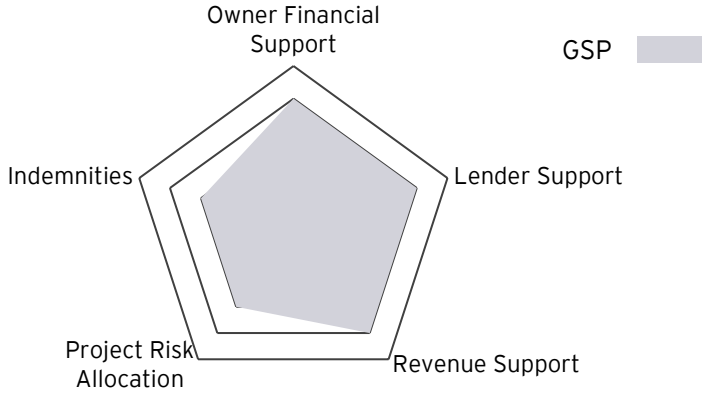
“Comprehensive” Support Package

"Comprehensive" Government Support Package is needed in the case of a FOAK project and potentially a NOAK project in a first-in-a-while country

Indicative "Comprehensive" GSP Overview[1]

1	**Owner Financial Support**	Significant (20-100% of funding) equity contribution from the government or a government-related entity into the project SPV
2	**Lender Support**	Full or significant government underwriting of the debt (either through direct loans, or sovereign debt issuances, or full guarantees), at preferential rates
3	**Revenue Support**	A long-term CfD could be put in place to shield the project from market volatility and provide a bankable foundation for the project to raise debt on a commercial basis
4	**Project Risk Allocation**	"Traditional" nuclear owner/EPC model (significant levels of owner/equity risk)
5	**Indemnities**	An indemnity clause offering compensation against any change in policy (i.e. early plant shutdown) could be put in place

Indicative Public-Private Financial Risk Allocation at FID



- The radar chart's residual outer web that is not covered by the GSP is that share filled by private sector actors.
- This does not represent the final version of the GSP, but an indication of the key pillars that can be maximized in a comprehensive GSP scenario. Going beyond that could potentially result in overcompensation, and lead to a European Commission decision that cuts back on some of the measures put forward.
- A tailored GSP should take all those considerations into account and be designed carefully.

Vendors

- Vendors would likely prefer this option, as it removes any project funding risk from their scope
- Debt and equity contribution to be provided from vendors would be minimal, therefore ensuring full government control over the process
- A "comprehensive" Government Support Package would resemble what was used in the 1970s-1980s to achieve the rapid development of nuclear in Europe and throughout the world as it allows vendors to solve for finance (one of the longest-lead items in nuclear energy projects)

Financial Markets

- Limited to no participation in equity from external actors
- Limited underwriting risk for the financial sector as the debt will be provided either through full government undertaking, or with important sovereign guarantees
- In the case of a RAB, yield-seeking investors looking for stable long-term returns could be brought in

European Commission

The European Commission DG Competition might look at the GSP through two main pillars:

- Necessity and proportionality of the instruments: the GSP could be subject to scrutiny by the DG Competition for the size of the undertaking, given potentially high equity and debt commitments to be provided. The only recent cases of such commitments are PAKS II (approved debt support) and Dukovany (approved equity and debt support)
- Market concentration and distortion of competition within the internal market: unlikely to cause significant risk as the target for nuclear is 9-12% of the Netherlands electricity consumption

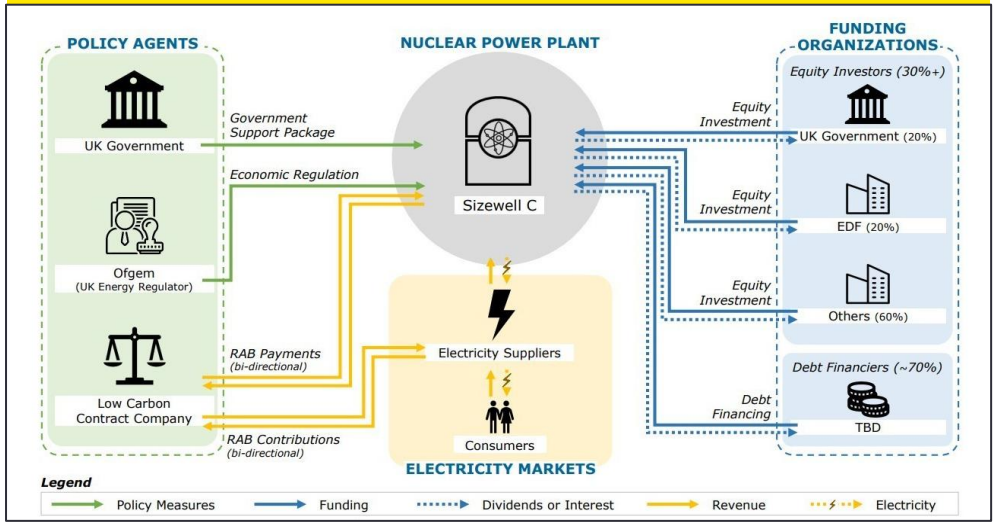
(1) Some items could have overlap in terms of cost reduction/cost of capital optimization

Case Study: At Sizewell C, the United Kingdom implemented a Regulated Asset Base mechanism, wide-ranging overruns underwriting and indemnities clauses

Market Overview

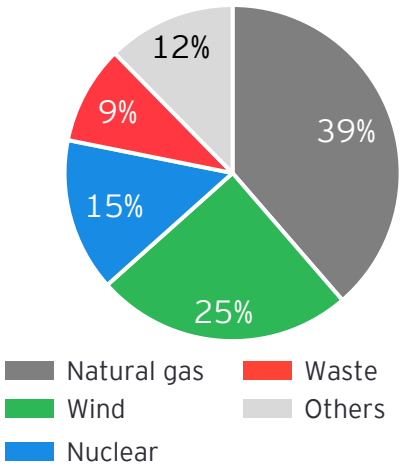
- The UK government's overall aim for its energy policy is to ensure secure, affordable, and clean energy supplies, consistent with its target for net zero emissions by 2050
- In 2020, the UK electricity production was still heavily reliant on natural gas (110 TWh, 35.4% of total generation), while low-carbon sources such as bioenergy (45TWh, 14.6%), wind (76TWh, 24.4%) and solar (14TWh, 4.3%) have grown rapidly
- Nuclear generation has steadily decreased since 2000 (down from 85 TWh to 50 TWh) due to the lowered production of ageing NPPs
- Sizewell C was designated as one of the potential sites for a NPP new build project back in 2010. Following issues faced with the CfD model for Hinkley Point C, a new Regulated Asset Base financing structure was put in place to better attract external funding for the project

Project Contractual Structure



Electricity Mix (as of 2022)

323 TWh



Country Credit Rating

S&P Global	AA Stable
FitchRatings	AA- Stable
Moody's	AA3 Negative

Risk Allocation Matrix

	Political & Regulatory	Construction	Operations	Electricity Market	Decommisioning & Waste Mgmt
Owner/ Operator					
EPC/Vendor					
Debt Providers					
Government					
Consumers					

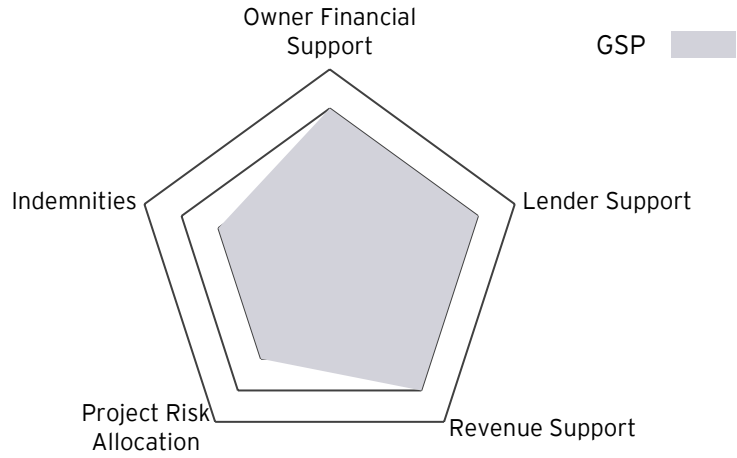
Level of Risk exposure: High | Moderate | Low | No exposure | Not applicable

Case Study: At Sizewell C, the United Kingdom implemented a Regulated Asset Base mechanism, wide-ranging overruns underwriting and indemnities clauses (cont'd)

Sizewell C GSP Overview

1	**Owner Financial Support**	EDF 20% equity commitment (maximum), requiring Her Majesty's Government (HMG) and/or third-party investors to step up
2	**Lender Support**	RAB-based revenue profile regulated by Ofgem assures investment-grade rating to the borrower/generator from financial close (pre-completion)
3	**Revenue Support**	Regulated Asset Base model draws consumer funding into construction finance plan, limiting the amount of capital requiring a rate of return
4	**Project Risk Allocation**	Extensive government as the "funder of last resort" protection through RAB and HMG equity (up to 80%)
5	**Indemnities**	The British government offered compensation against any change in British energy strategy (i.e. early plant closure)

Public-Private Financial Risk Allocation at FID



The radar chart's residual outer web that is not covered by the GSP is that share filled by private sector actors

Main Considerations for the Dutch GSP

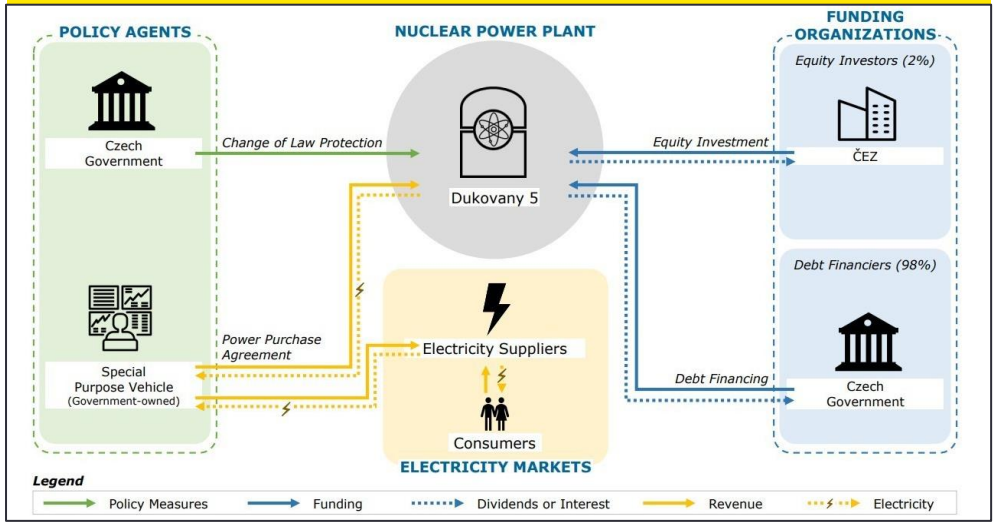
1	The central question/challenge is essentially if third party investors are comfortable to take a minority and/or collective majority role in a nuclear new build that is facing still-material completion cost and operations risks (limited European Pressurized Reactor (EPR) track record) and the reliance they may face with an economic regulator with new powers that are balanced between the opposing poles of consumer protection, protection of lenders and protection of equity
2	On the basis of sufficient equity subscriptions and nature of the shareholders, SZC lenders are expected to be well-protected (consistent with UK infrastructure finance practice) - can these conditions be transposed efficiently to a Dutch project?
3	Revenue support (RAB) is deemed strong based on UK/EU precedent, as it already serves as the basis for remunerating infrastructure projects across Europe (gas storage in France, wastewater installations in the UK, etc.) though it is untested in nuclear new build with the UK economic regulator - this uncertainty is likely to leak into debt and equity terms/appetite
4	Project-level risk allocation is expected to be accomplished largely through the RAB mechanism - the lack of a nuclear track record for the UK economic regulator can open up significant uncertainty for financiers (and consumers) in the effectiveness of contract/regulatory implementation
5	Indemnity structure may be more complex with a more complex finance plan, given the potentially high ownership stake of the UK government, and other stakeholders in the project by financial close

Case Study: At Dukovany 5, the Czech government will provide extensive contingent equity contribution, debt underwriting and revenue support

Market Overview

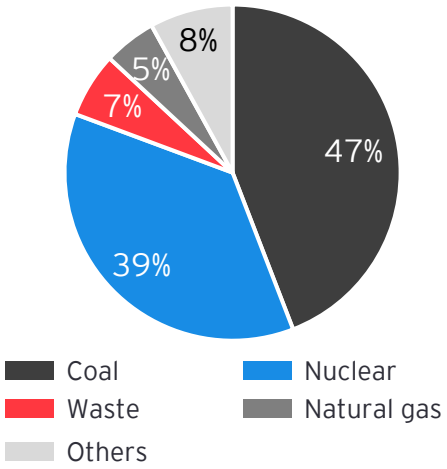
- There are currently six nuclear power units operating at Czechia in two sites, Temelin (two units) and Dukovany (four units). The existing units at the Dukovany site are expected to shut down between 2045 and 2047
- Czechia committed to becoming climate neutral by 2050, which requires significant investment in decarbonization of the electricity sector as supported by its National Energy and Climate Plan (NECP) which lays out a target of 46-58% of nuclear in its energy generation by 2040 (vs. 37% currently) with two new units at Dukovany and two new units at Temelin planned as of today
- Czechia has planned an ambitious state package consisting of three measures: (i) a PPA contract that will remove most revenue risk from the project by providing a fixed strike price (€50-60/MWh) over up to 40 years, (ii) a state loan of c.€7.6bn, and (iii) a Change of Law or Policy Protection mechanism for CEZ (the plant operator and owner)
- The final choice of technology vendor is still ongoing as EDF and KHNP have only recently submitted their final offers for the tender of Dukovany 5, while Westinghouse was disqualified for not providing a firm bid price for all units

Project Contractual Structure



Electricity Mix (as of 2022)

85 TWh



Country Credit Rating

S&P Global — AA Stable

FitchRatings — AA- Stable

Moody's — AA3 Negative

Risk Allocation Matrix

	Political & Regulatory	Construction	Operations	Electricity Market	Decommisioning & Waste Mgmt
Owner/ Operator		Low	Low		
EPC/Vendor		Low			
Debt Providers		High	Moderate		
Government	High			Moderate	Moderate
Consumers				High	

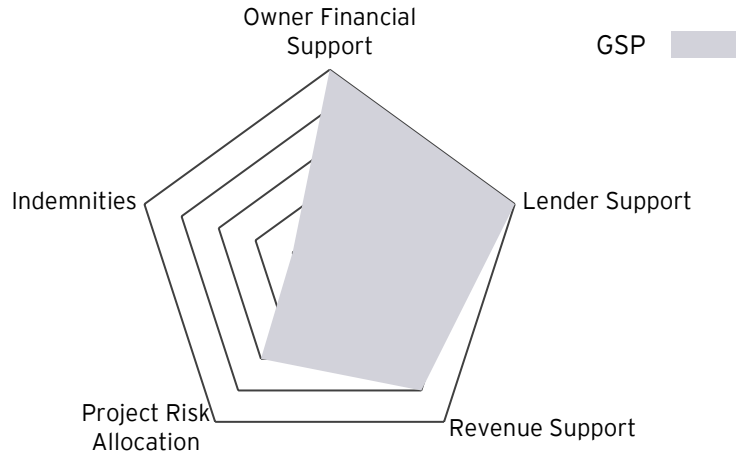
Level of Risk exposure: High | Moderate | Low | No exposure | Not applicable

Case Study: At Dukovany 5, the Czech government will provide extensive contingent equity contribution, debt underwriting and revenue support (cont'd)

Dukovany 5 GSP Overview

1	**Owner Financial Support**	Nuclear utility 100% owner but capped equity commitment of only 2% of project budget (€180 million), with a maximum equity commitment of €1.95 billion
2	**Lender Support**	Czech government debt funding (98%) including overruns beyond overall project cost of €9.4 billion
3	**Revenue Support**	Nuclear CfD assuring revenue protection/stability on post-completion basis
4	**Project Risk Allocation**	Tax-payers and end-users significantly exposed, subject to limited risk allocation expected in EPC arrangements
5	**Indemnities**	N/A

Public-Private Financial Risk Allocation at FID



The radar chart's residual outer web that is not covered by the GSP is that share filled by private sector actors

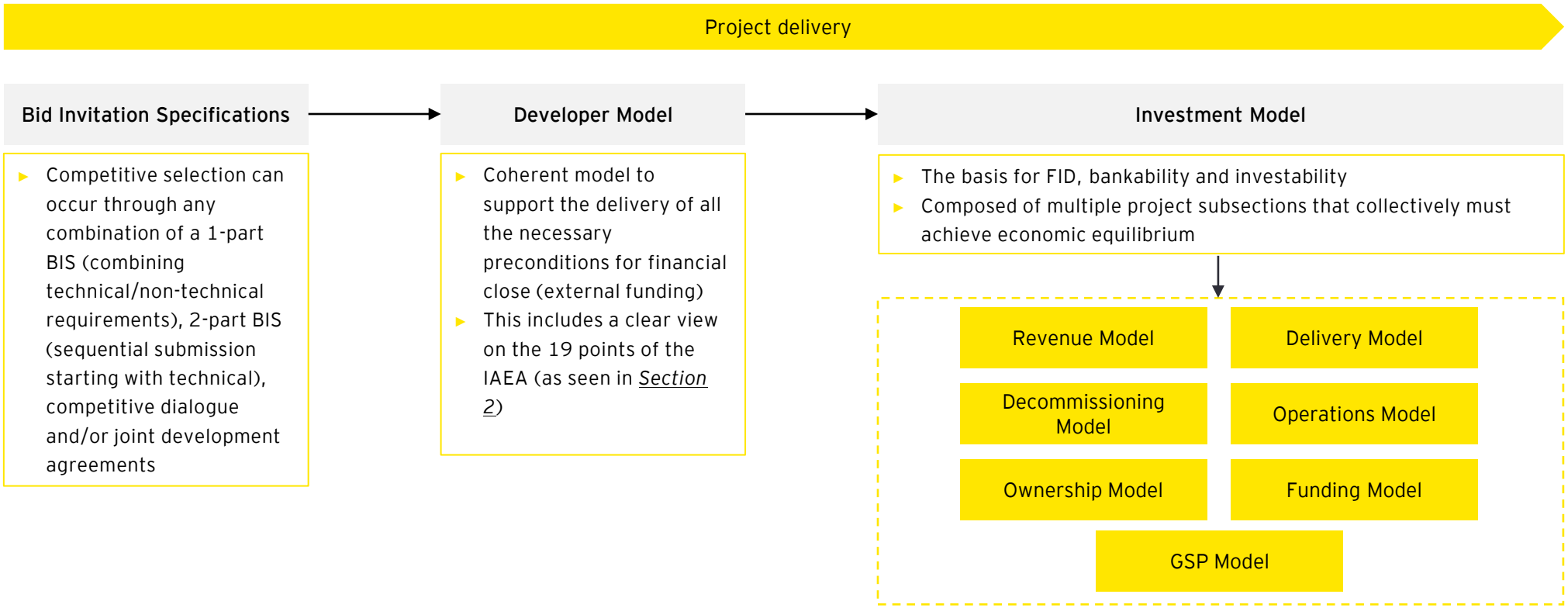
Main Considerations for the Dutch GSP

1	Owner support is expected to be minimal (quantum/balance sheet perspective) - this could be an attractive option for the Dutch setting whereby the incumbent owner/operator similarly may not have financial capacity to support a nuclear new build (regardless of other elements of the GSP)
2	Construction debt (provided by the government) may need to include contingent facilities for potential overruns - this may be an important state aid consideration. If successful, the host government retains full flexibility to refinance and recycle its (taxpayer) capital after Commercial Operations Date (COD) without putting upward pressure on the out-turn CfD strike price level
3	The PPA set in place by the Czech government removes significant revenue risk from the plant, as it is signed by an SPV owned and managed by the Czech government, which commits to buying all electricity produced by the beneficiary at a fixed price during the 40 years. The SPV will then sell all this electricity to the electricity wholesale market and assume the revenue risk derived from market price and demand volatility
4	Project-level risk allocation is not disclosed – presumably the Czech government and the EC will both need to be comfortable that incentives/penalties are appropriate at the project level (delivery partners, supply chain). The allocation of end-state (post-COD) costs/benefits between Czech taxpayers and end-users is not disclosed either
5	Indemnities will be simplified and limited likely to supply chain/delivery partners only, since the Czech government is effectively underwriting all the financial risk in the project

5

Concluding Remarks & Next Steps

Moving forward, the Dutch government will need to complete the structure of the BIS, and create a template developer and investment model



- Subsections listed in the investment model will need to be vendor-neutral to ensure successful program delivery, and increase non-technical (i.e. economic and commercial) program definition
- The BIS will need to cater for all the subsections of the investment model to ensure that final bids are compatible with the requirements of external finance
  - The subsections will be further defined by taking into account the final government objectives and strategy, detailed owner specifications through the BIS, and vendors limitations/risk tolerance for project delivery
- Offering the opportunity to respond (or requiring responses) for each subsection brings forward hidden complexities in project development/delivery, and can be effective in leveraging accumulated vendor knowledge that would otherwise remain untapped/untested

The definition of a developer model will be critical to successful project planning until FID

Progressive definition of a developer model

Bid Submission	Clarification(s)	Preferred Bidder Award	Initial Investment Decision	Government and Investor Investment Decision	Final Investment Decision
► How much development risk is targeted by the owner to be shared by the bidder? ► How much value/credit is attributed to the bidder accepting development risk?	► Are the BIS specifications and reply formsheets sufficiently detailed/designed to enable detailed clarifications to reduce development risk for both sides?	► What activities and contractual structure are to be implemented to lock in bid value by the owner? ► How are incentives going to be structured to encourage project-level economically-motivated behaviours?	► How shall early development activities be funded? ► Can the necessary partnership arrangements get contractualized in a shareholder agreement? Early works agreement? EPC?	► Early development can sometimes extend into pre-construction/ construction independently of progress (or lack thereof) with external fundraising ► Thus there can be several rounds of pre-financial close investment	► Financial close is the realization and end-state of the investor model ► All pre-conditions for external finance have been met at this point ► But this point cannot be easily predicted at Preferred Bidder Award date (hence the necessity of the developer model framework to organize, regulate and fund activities as long as it may take to achieve financial close)

- The developer model is an integral part of the future BIS development
- Given the long development lead times for nuclear new builds, bidders are required to bid into a developer model framework; this ensures that the winning bidder remains incentivized to deliver value throughout the pre-FID/pre-construction phase of the project
- An efficient developer model sets out contractual and economic underpinnings designed to de-risk the overall process by continuously updating and defining the bid requirements in order to best capture the value of the winning bid

Concluding remarks & next steps

Concluding remarks

- Following the two Market Consultation rounds, Vendors made clear that they were keen to engage with the Dutch nuclear procurement process and were willing and able to dedicate considerable time to help support the project.
- Vendors want to keep an active dialogue open and help define the direction of the procurement, notably in terms of the development and investment model for the future of Dutch nuclear.
- Government support is critical to project success. Dutch government agencies will need to coordinate and generate sufficient input to provide Vendors with clarity on the level and the type of package that the Dutch government will be able to provide (developed through interdepartmental working groups).
- EY has provided an early-stage matrix of Government Support Package solutions, based on earlier comparable government support in other countries. The findings of the Report will be an input to ongoing interdepartmental discussions.
- However, the final shape and cost of the Government Support Package can only be reached through further dialogue with the Vendors, increased government policy definition, and political and financial consultation with additional stakeholders (financial markets, ANVS, supply chain actors, etc.).
- A quantified and in-depth analysis must be carried out to measure the optimal level of commitment that the Dutch government can achieve through the five pillars of the GSP.
- The Report has not provided cost estimates for the potential GSP, but the impact of such an undertaking should be quantified against government headroom.
- Finally, a critical reflection should be made on the state aid package and its compulsory assessment by the European Commission (DG Competition) and potential distortions to the European internal market.
- Although previous aid packages have received a favorable view from the European Commission, landmark cases have historically not been made precedents. As such, there remains idiosyncratic risk to the DG Competition assessment of the GSP.

Next steps

For the continuation of government work on the GSP and non-technical requirements, EY recommends that:

1. A robust, sufficiently staffed project organization with the requisite expertise is established/scaled up by EZK, with urgency, to execute the program. It is EY's view that such organization:

- Should be interdepartmental, cross-disciplinary and highly interactive with key stakeholders
- Must address the critical points of attention across work streams (technical and non-technical), including those relating to the non-technical aspects described in the Report and this Summary, in order to develop and deliver a feasible and adequately attractive project in a global competitive market
- Should ultimately be granted executive power to be able to take the steps needed, in the timeframes required, to realize new nuclear power in the Netherlands.

2. In anticipation/as part of the above, government progresses work within interdepartmental working groups with clear roles and responsibilities/accountabilities (and appropriate interagency agreements in place where required), exploring the points listed adjacent, in order to:

- Provide Vendors with further information on the government position with respect to non-technical project arrangements (including interaction with technical elements, impacting bankability), to allow for iteration in bounding conditions based on two-way dialogue with Vendors, increasing the likelihood of a successful/competitive tender process and NNB project

continued over page

Concluding remarks & next steps

- Enable timely ministerial decision-making and approvals, which narrow down the bandwidth of the GSP elements, in the lead up to BIS development and issuance.

3. The Dutch government ultimately formulates a sufficiently comprehensive support package. Other/past infrastructure projects in the Netherlands could be procured with limited government participation, but it is clear that nuclear is a unique case requiring extensive state support, as reiterated by the market and evidenced by international nuclear case studies.

4. EZK will need to generate a consistent, comparable output across Vendors by providing a clear roadmap and reflections on:

- A roadmap/process to BIS development, competitive tendering, bidder selection and commencement of joint project development/delivery activities
- A Dutch developer & investor model, and
- Future vendor consultations timeline and objectives.

Dutch translation of the original "Concluding remarks & next steps" presented on Pages 77-78.

Afsluitende opmerkingen en volgende stappen

Afsluitende opmerkingen

- Na de twee rondes van marktconsultatie hebben leveranciers duidelijk gemaakt dat ze graag willen deelnemen aan het Nederlandse nucleaire aanbestedingsproces en bereid en in staat zijn om aanzienlijke tijd te besteden om het project te ondersteunen.
- Leveranciers willen een actieve dialoog openhouden en helpen de richting van de aanbesteding te bepalen, met name wat betreft het ontwikkelings- en investeringsmodel voor de toekomst van de Nederlandse kernenergie.
- Overheidssteun is cruciaal voor het succes van het project. Nederlandse overheidsinstanties zullen moeten coördineren en voldoende input moeten genereren om leveranciers duidelijkheid te geven over het niveau en het type pakket dat de Nederlandse overheid kan bieden (ontwikkeld door interdepartementale werkgroepen).
- EY heeft een vroegtijdige matrix van oplossingen voor het Overheidssteunpakket geleverd, gebaseerd op eerdere vergelijkbare overheidssteun in andere landen. De bevindingen van het rapport zullen een input zijn voor lopende interdepartementale discussies.
- Echter, de uiteindelijke vorm en kosten van het Overheidssteunpakket kunnen alleen bereikt worden door verdere dialoog met de leveranciers, toegenomen beleidsdefinitie van de overheid, en politieke en financiële consultatie met aanvullende belanghebbenden (financiële markten, ANVS, actoren in de toeleveringsketen, enz.).
- Er moet een gekwantificeerde en diepgaande analyse worden uitgevoerd om het optimale niveau van toezegging te meten dat de Nederlandse overheid kan bereiken door de vijf pijlers van het GSP.
- Het rapport heeft geen kostenramingen gegeven voor het potentiële GSP, maar de impact van een dergelijke onderneming moet worden gekwantificeerd tegen de financiële ruimte van de overheid.
- Tot slot moet er een kritische reflectie plaatsvinden op het staatssteunpakket en de verplichte beoordeling ervan door de Europese Commissie (DG Concurrentie) en mogelijke verstoringen van de Europese interne markt.
- Hoewel eerdere steunpakketten een gunstig oordeel hebben ontvangen van de Europese Commissie, zijn historische zaken doorgaans geen precedenten geworden. Als zodanig blijft er idiosyncratisch risico bestaan voor de beoordeling van het GSP door de DG Concurrentie.

Volgende stappen

Voor de voortzetting van het overheidswerk aan het GSP en niet-technische vereisten, adviseert EY dat:

1. Een robuust, voldoende bemande projectorganisatie met de vereiste expertise wordt opgericht/uitgebreid door EZK, met urgentie, om het programma uit te voeren. Het is de visie van EY dat zo'n organisatie:

- Interdepartementaal, multidisciplinair en zeer interactief met belangrijke belanghebbenden moet zijn.
- De kritieke aandachtspunten over de verschillende werkstromen (technisch en niet-technisch) moet aanpakken, inclusief die met betrekking tot de niet-technische aspecten die in het Rapport en deze Samenvatting zijn beschreven, om een haalbaar en voldoende aantrekkelijk project te ontwikkelen en te leveren in een wereldwijde concurrerende markt.
- Uiteindelijk zou uitvoerende macht moeten worden verleend om de benodigde stappen te kunnen zetten, binnen de vereiste tijdframes, om nieuwe kernenergie in Nederland te realiseren.

2. In afwachting van/als onderdeel van het bovenstaande, vordert de overheid het werk binnen interdepartementale werkgroepen met duidelijke rollen en verantwoordelijkheden/verantwoording (en waar nodig passende overeenkomsten tussen instanties), waarbij de naastgelegen punten worden verkend, om:

- Leveranciers te voorzien van meer informatie over de positie van de overheid met betrekking tot niet-technische projectafspraken (inclusief interactie met technische elementen, die de financierbaarheid beïnvloeden), om iteratie in de afbakeningsvoorwaarden mogelijk te maken op basis van tweerichtingsdialoog met leveranciers, waardoor de kans op een succesvol/concurrerend aanbestedingsproces en NNB-project toeneemt

vervolg op volgende pagina

Dutch translation of the original "Concluding remarks & next steps" presented on Pages 77-78.

Afsluitende opmerkingen en volgende stappen

- Zorgen voor tijdige besluitvorming en goedkeuringen door de minister, die de bandbreedte van de elementen van het GSP verkleinen, in de aanloop naar de ontwikkeling en uitgifte van BIS.

3. De Nederlandse overheid formuleert uiteindelijk een voldoende uitgebreid ondersteuningspakket. Andere/voorgaande infrastructuurprojecten in Nederland konden worden verworven met beperkte overheidsdeelname, maar het is duidelijk dat kernenergie een uniek geval is dat uitgebreide staatssteun vereist, zoals herhaald door de markt en aangetoond door internationale kernenergie casestudies.

4. EZK zal een consistente, vergelijkbare output over leveranciers moeten genereren door het verstrekken van een duidelijke routekaart en reflecties op:

- Een routekaart/proces naar BIS-ontwikkeling, concurrerende aanbesteding, selectie van bieders en aanvang van gezamenlijke projectontwikkeling/-leveringsactiviteiten
- Een Nederlands ontwikkelaars- & investeerdersmodel, en
- Toekomstige tijdlijn en doelstellingen van leverancierssconsultaties.

6

Appendix

6.1

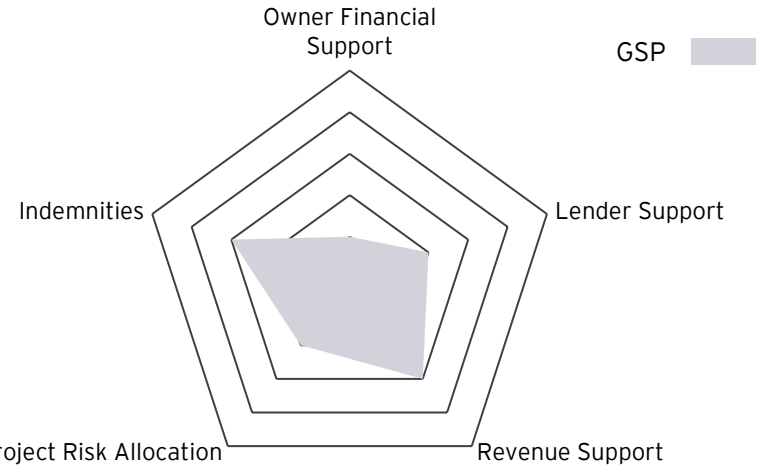
“Basic” Support Package

"Basic" Government Support Package is needed in the case of a Nth-of-a-Kind project

Indicative "Basic" GSP Overview(1)

1	**Owner Financial Support**	Minimal government involvement (<20%) with all project risk borne by the owner
2	**Lender Support**	Commercial debt should be available at this stage, thanks to better fleet economics. ECA support should be guaranteed, and government guarantees could be brought in for credit optimization
3	**Revenue Support**	Possibly no support provided requiring a specific model to be followed, such as a collaborative partnership (e.g. Mankala)
4	**Project Risk Allocation**	Project risk borne by vendors and the owner
5	**Indemnities**	An indemnity clause offering compensation against any change in policy (i.e. early plant shutdown) could be put in place

Public-Private Financial Risk Allocation at FID



The radar chart's residual outer web that is not covered by the GSP is that share filled by private sector actors

Vendors

- Such a limited GSP requires a very strong owner/ operator, capable of setting out a comprehensive selection process independent of the government. Strong business development and management capabilities are required upstream, to ensure successful program implementation
- Vendors can intervene with a limited scope (nuclear technology selection), while the owner is capable of handling other parts of the delivery model (as seen in Bulgaria with the EPC selection for Kozloduy 7&8)

Financial Markets

- Nuclear projects can use the full suite of project finance tools to ensure complete funding is achieved without the help of the government
- Private investors could be brought in by long-term, stable revenues, and risk management

European Commission

The European Commission DG Competition might look at the GSP through two main pillars:

- Necessity and proportionality of the instruments: depending on whether revenue support is provided, the DG Competition could potentially review the instrument
- Market concentration and distortion of competition within the internal market: unlikely to cause significant risk as the target for nuclear is 9-12% of the Netherlands electricity consumption

(1) Some items could have overlap in terms of cost reduction/cost of capital optimization

6.2

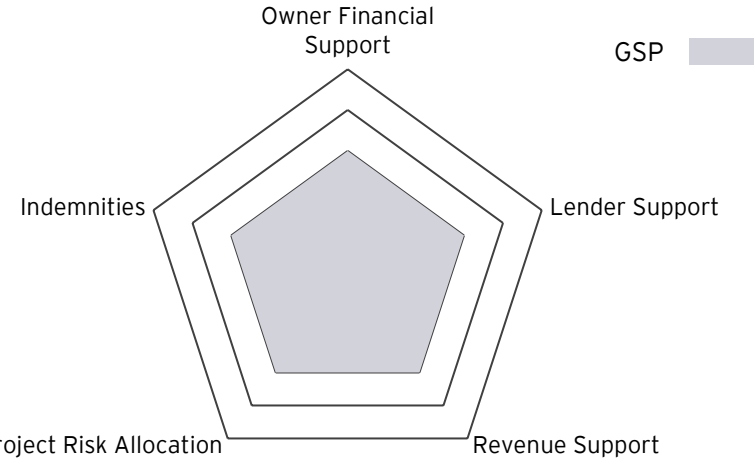
“Moderate” Support Package

"Moderate" Government Support Package is needed in the case of a NOAK project

Indicative "Moderate" GSP Overview(1)

1	**Owner Financial Support**	Significant equity funding to the SPV/owner still likely (>20%). Additional overrun guarantees from the State will ensure a specific return on investment, while limiting cost of capital
2	**Lender Support**	Significant government-backed finance (credit guarantees) could help leverage project bankability and ensure external project funding is achieved. ECA support is very likely
3	**Revenue Support**	A long-term CfD could ensure that the project is shielded from market volatility
4	**Project Risk Allocation**	Risk-sharing structures could be implemented with the vendors in case of overruns and delays
5	**Indemnities**	An indemnity clause offering compensation against any change in policy (i.e. early plant shutdown) could be put in place

Public-Private Financial Risk Allocation at FID



The radar chart's residual outer web that is not covered by the GSP is that share filled by private sector actors

Vendors

- Debt and equity contribution to be provided from vendors would be greatly increased from the "comprehensive" scenario
- This package resembles what could be expected from an experienced developer (such as Rosatom), with strong state underwriting of the risk, and a financial plan hinging on government support

Financial Markets

- Project bankability is increased, leading to greater funding needs being met by external investors
- Project finance debt would still require a form of nuclear premium, which needs to be covered by the State to reduce cost of capital and support project competitiveness
- External equity contributions (non-vendor, or State) could be negotiated with certain risk-sharing mechanisms with the government, as was the case at Sizewell C

European Commission

The European Commission DG Competition might look at the GSP through two main pillars:

- Necessity and proportionality of the instruments: just like the extensive review for Hinkley Point C, the European Commission will want to review the level of support provided across all categories
- Market concentration and distortion of competition within the internal market: unlikely to cause significant risk as the target for nuclear is 9-12% of the Netherlands electricity consumption

(1) Some items could have overlap in terms of cost reduction/cost of capital optimization

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