

INTERNATIONAL
BANK FOR
NUCLEAR
INFRASTRUCTURE

Expanding Nuclear Energy for a Net Zero and
Sustainable World

Executive Summary Presentation

1 November 2021



IBNI

Introduction

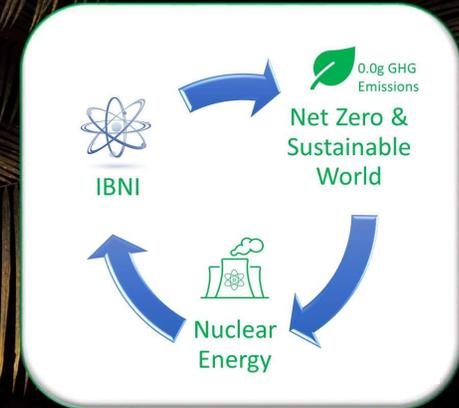
- The International Bank for Nuclear Infrastructure (IBNI) is a conceptual new multilateral International Financing Institution (IFI) that will be solely focused on supporting its member countries in developing new nuclear energy programs or expand existing programs as a core component related to their commitments to achieve sustainable net zero CO₂-equivalent emissions by 2050 (2050 Net Zero).
- IBNI will provide financing and other support for all its member countries, which are expected to range across all geographies, income levels and developmental status.
- IBNI will provide financing and other support on open and inclusive and technology-neutral basis for qualifying new-build nuclear energy generators, reactor life-extensions, refinancing and restructuring, nuclear fuel cycle and decommissioning projects.
- IBNI will provide both attractive long-term market-based financing solutions for all types of nuclear projects, as well as specialized donor-funded support programs for newcomer nuclear programs, early-stage innovative nuclear technologies, long-term nuclear waste storage projects and other specific programs that will be defined and shaped by donor members.
- IBNI will fulfill both *leadership* and *catalytic* roles in global nuclear finance (including sustainability), providing comprehensive and multifaceted solutions to its members, helping them overcome the many diverse challenges and impediments currently facing nations and project sponsors with respect to developing and expanding their nuclear capacities.
- IBNI financing and support programs will be tied to the *expansion of nuclear capacities as a significant component of 2050 Net Zero*, offering all its member nations with access to least cost, reliable, safe, clean and abundant nuclear energy in exchange for the member countries' binding commitments to achieve 2050 Net Zero and other long-term sustainability commitments. Development or expansion of nuclear energy programs also offers near-term security of energy supply in the contexts of many countries.
- It is envisaged that IBNI will utilize structures similar to those of the major existing multilateral IFIs (such as the World Bank Group, European Bank for Reconstruction and Development (EBRD), the Asian Development Bank (ADB), etc.), which offer proven models that have been in existence for many decades. IBNI will be adapted to address the unique characteristics of nuclear finance.



Why Nuclear? Why IBNI? Why Now?

Why Nuclear?

- As the nations of the world are now focused on developing their national strategies and policies which will address the question of *how* will they achieve net zero emissions by 2050, there are principally only two proven and scalable low carbon generation technologies that are capable of powering a modern economy and replacing fossil fuels: renewables and nuclear.
- There are two types of renewables: dispatchable renewables (hydroelectric, geothermal, biomass, etc.) and intermittent variable renewables (solar, wind, wave/tide, etc.) or 'VRE'.
- Most nations have limited economically viable hydrological, geothermal and biomass renewable resources available. Therefore, in order to decarbonize their energy sectors, most nations need to decide whether to scale-up VRE to a very high share of generation – or develop or expand nuclear capacities for some significant share of their 2050 generation which will allow for less reliance on VRE.
- A very high VRE share of generation is technically possible, but amongst other challenges - such as significant land, coastline and materials consumption – it presents nations with the *highest cost and largest total investment* decarbonization option, which may inhibit sustainable economic development and burden future generations with higher energy costs.
- Nuclear is a proven, affordable, dispatchable and safe generation technology that can compliment renewables and be deployed – at scale – as a significant component of a low carbon energy sector.
- Many nations may choose to develop or expand their nuclear programs - and thereby rely less on VRE - over the next three decades as their preferred and *most economically sustainable* alternative to decarbonize their energy sectors.



Why Now?

- The climate crisis requires immediate and decisive action.
- Nuclear capacities need to be expanded, starting now – using existing proven technologies.

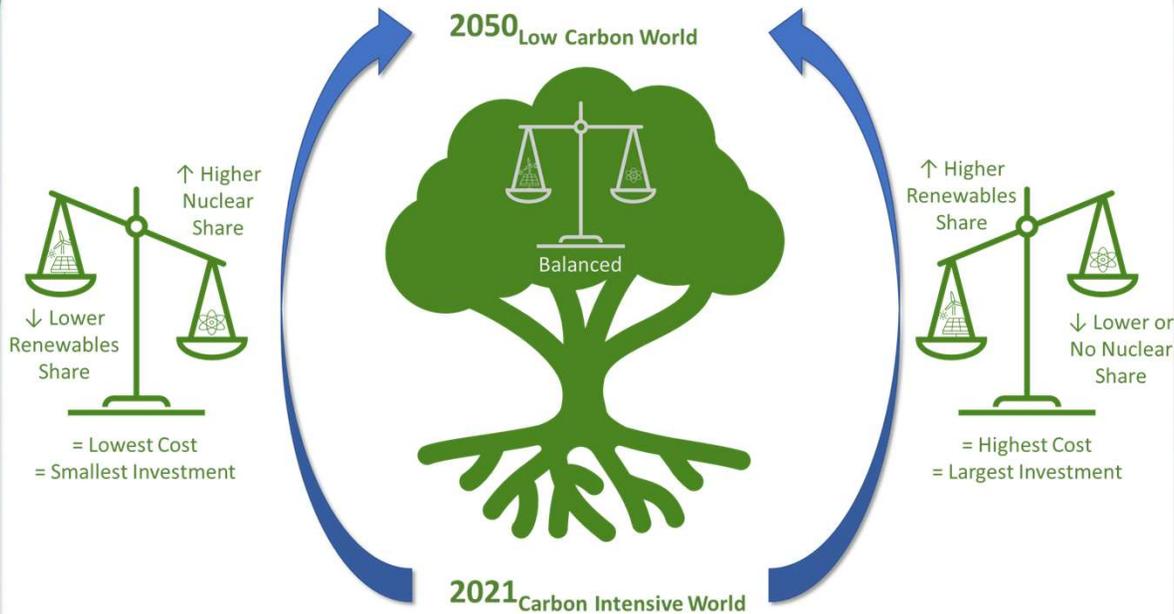
Why IBNI?

- Currently, there are many fundamental challenges and impediments facing those nations that choose to develop nuclear projects and advance national nuclear program initiatives. These challenges range from access to affordable capital, energy markets and regulatory issues, project size and risk profiles, status of nuclear industry and supply chains, lack of harmonized international standards, public acceptance and nuclear safety and security concerns, affordability and numerous other issues.
- IBNI would offer a comprehensive set of multidimensional solutions that address *all* of these challenges and would thus allow nations to develop and expand nuclear energy in a manner that is better, faster, safer and cheaper.



IBNI

Nuclear & Renewables: The Net Zero Pathway



Nuclear & Renewables will Achieve Net Zero

- There are only two proven and commercially feasible low carbon energy generation technologies that can achieve 2050 net zero: nuclear and renewables.
- While it is technically feasible for some nations of the world to pursue near 100% renewables generation until 2050, this option will implicate high costs upon future generations and industries and may inhibit global economic development.
- Nations of the world should consider nuclear (complementing renewables) as the *least cost* pathway toward achieving 2050 Net Zero.
- Today's (Generation III/III+) nuclear technologies the safest forms of generation today and they also require the *least near-term total investment* of any low carbon energy generation technology.
- The emerging technologies in advanced reactor, small modular reactors, and nuclear fusion technologies offer encouraging characteristics in terms of affordability, efficiency, scalability, versatility, safety and other characteristics related to nuclear energy.
- IBNI will have multiple programs that support optimal development of new nuclear technologies (but we must not rely on these).



IBNI is the Missing Link in Nuclear Finance

IBNI provides a comprehensive solution to all challenges and impediments currently facing the nuclear industry.

Lack of access to cost-efficient long-term capital

Market failures

Inadequate regulatory frameworks

Competing fossil fuels and technology-specific subsidy regimes

Nuclear as a sustainable 'ESG compliant asset class'?

Excessive project delay and cost overrun risks

Inadequate risk allocation models

Lack of clear long-term government policies supporting nuclear energy

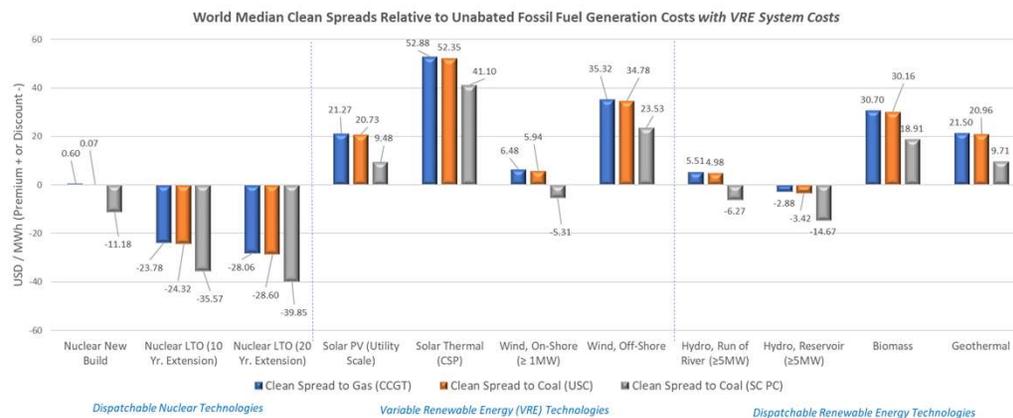
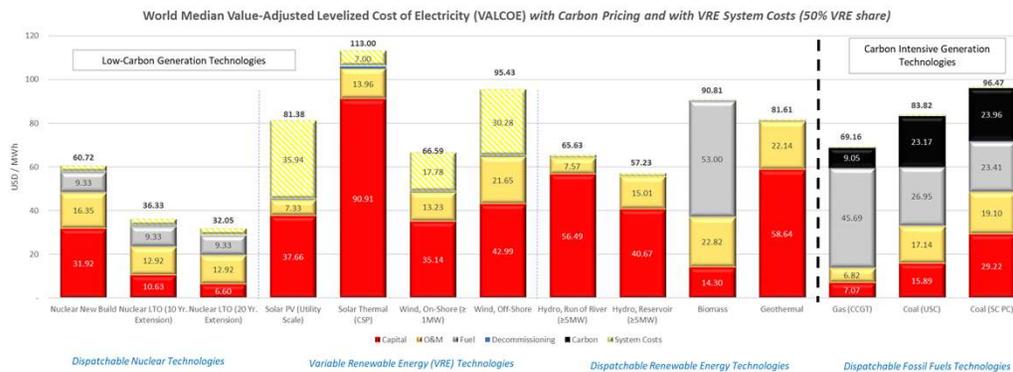
Lack awareness of decarbonization costs, plans and policies for achieving net zero

Lack of public engagement and dialogue on nuclear energy issues

IBNI Comprehensive Solution

- IBNI is the 'missing link' and will serve as the 'game changer' in global nuclear finance.
- The current challenges and impediments affecting the global nuclear sector are both significant and multidimensional.
- IBNI offers a comprehensive solution to its member countries and their nuclear project sponsors that will overcome all the interrelated challenges and impediments which have hindered global nuclear developments over the past four decades.
- IBNI financing and support will be supplemental to and will not supplant existing forms of nuclear financing such as financing provided from export credit agencies and similar institutions.

Nuclear is a Least Cost Low Carbon Option



Data Source: OECD IEA/NEA as data inputs in analysis by IBNI-IO SAG. See IBNI IRAP, Section 3 and References for details.

Minimizing the Cost of Decarbonization

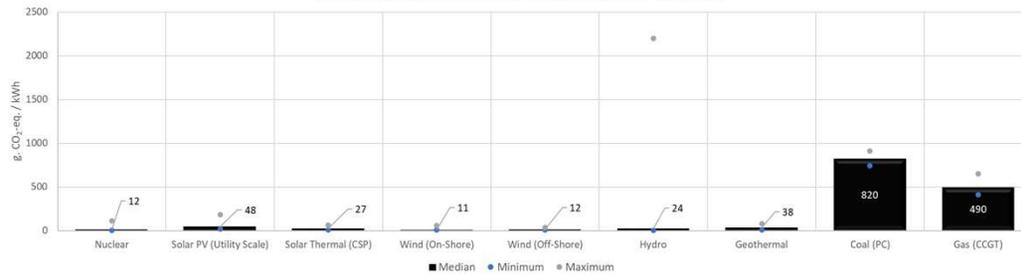
- Under any 2050 Net Zero pathway scenario, it is critical that the world's power generation sector become rapidly decarbonized.
- The main question that policymakers are now grappling with is *how much will it cost for our nation to rapidly decarbonize.*
- While it is technically possible to scale up VRE (mainly solar and wind) to a very high share of 2050 generation, this will likely be the *highest cost option* for nations when considering the system related costs (such as required additional capital and operating costs related to electricity grids, reserves, interconnection and energy storage costs) and associated near-term capital investments.
- Alternatively, scaling up nuclear generation will alleviate the need for very high VRE generation which will therefore result in significantly lower energy cost burdens on future generations.
- IBNI's Standards and Criteria will be aligned and harmonized with the UN's Sustainable Development Goal Nr. 7, which asserts that all nations should have "*access to affordable, reliable, sustainable and modern energy for all.*"



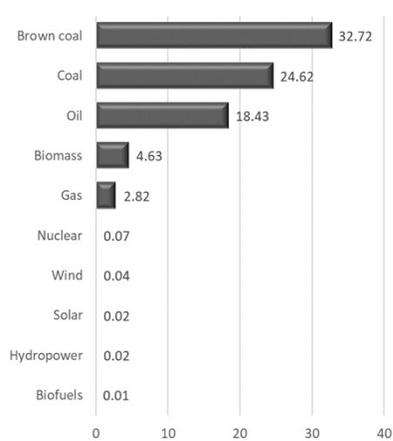
IBNI

Nuclear is Safe, Reliable & Low Carbon

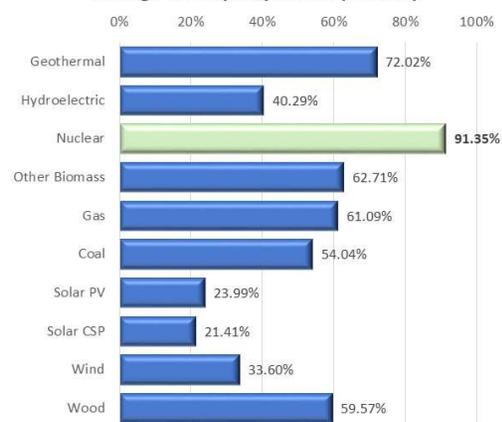
World Life-Cycle Carbon Emissions for Different Generation Technologies



World Fatalities per TWh of Generation



Average USA Capacity Factors (2011-20)



Data Source: UN IPCC WGIII, 5th Assessment Report, Annex III, US EIA, Our World in Data. See IRAP, Section 3 and References for details.

Safe and Reliable Lowest Carbon Generation

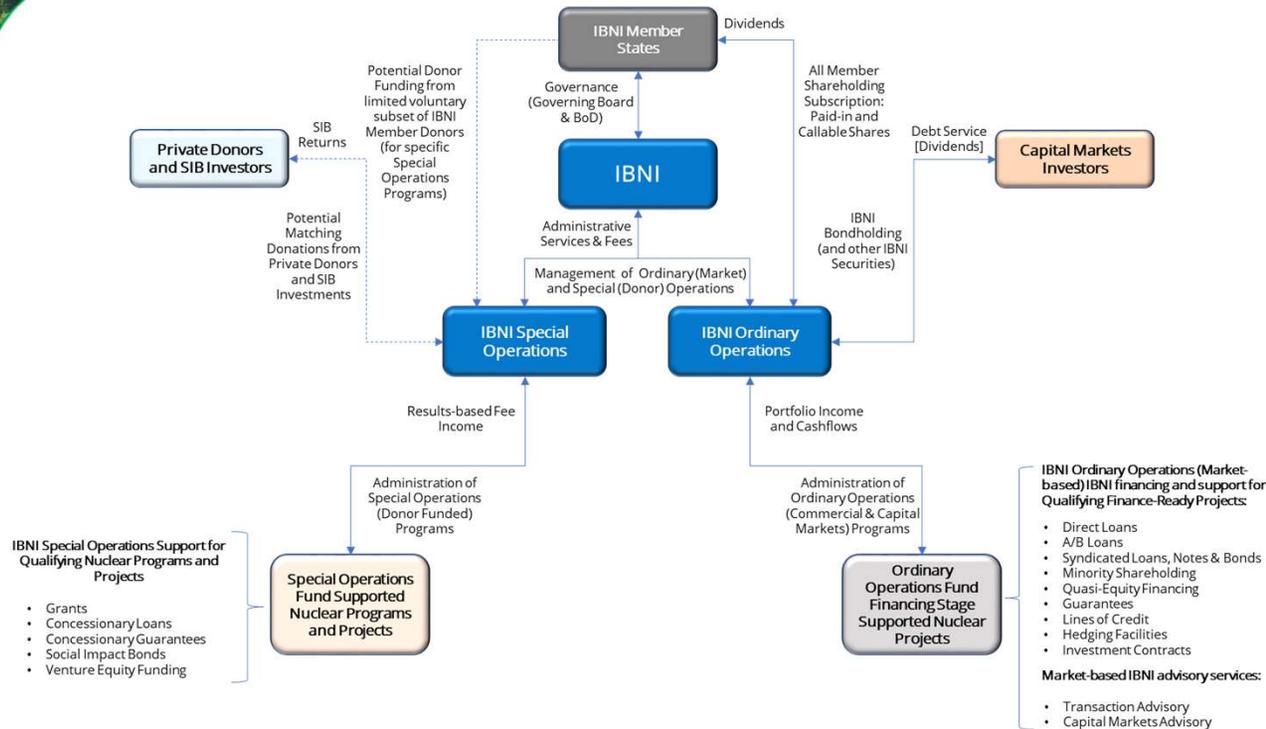
- Nuclear generation clearly offers amongst the lowest whole life-cycle carbon emissions profiles and at the same time are the most reliable (dispatchable) generators in existence.
- As measured in terms of fatalities per TWh of generation, nuclear has demonstrated (over almost seven decades of continuous commercial operations) a safety track record similar to that of all other low carbon renewables technologies.
- Moreover, the European Commission's Joint Research Center recently concluded that modern 'Generation III' nuclear reactors demonstrated the lowest fatality rate of all generation technologies¹.
- It should also be emphasized that the world nuclear industry is amongst the most regulated industries in the world.
- Nuclear power plants also are required to fully account for all the requirements and costs related to nuclear waste disposal.
- Under IBNI Standards and Criteria, all nations and project developers, owners and operators will be required to conform to the highest set of nuclear safety, security and safeguards standards.

(1) Source: UN JRC Taxonomy Report. See IRAP for detailed references.



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IBNI Capital & Operational Structure



Source: IBNI-IO SAG. See IBNI IRAP, Section 7 for additional details on all proposed IBNI financing and support programs.

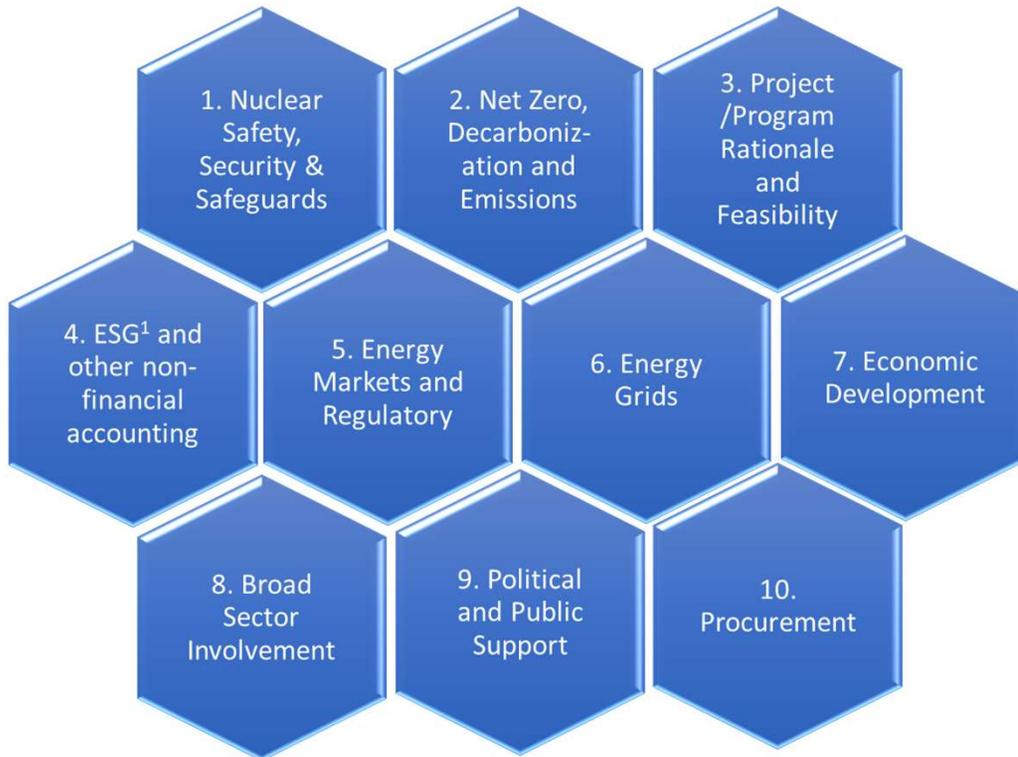
Proposed Structure and Products

- Similar to a number of existing multilateral IFI's IBNI will have two operating funds.
- The Ordinary Operations Fund will be capitalized with shareholder capital from IBNI Member States (sovereign governments) and from long-term bonds sold in the global capital markets. All market-based long-term nuclear financing programs of IBNI will be conducted through the Ordinary Operations Fund.
 - Long-term Loans
 - Minority Equity Shareholding & 'Quasi-Equity' Investments
 - Guarantees
 - Hedging & Investments
 - Advisory Services
- IBNI will separately administer specific donor funded programs through the Special Operations Fund.
 - Grants
 - Concessionary Loans
 - Social Impact Bonds
 - Venture Equity



IBNI

Rigorous IBNI Standards & Conditions



Source: IBNI-IO SAG. (1) ESG = Environmental, Social and Governance criteria. See IBNI IRAP Section 5 for additional details.

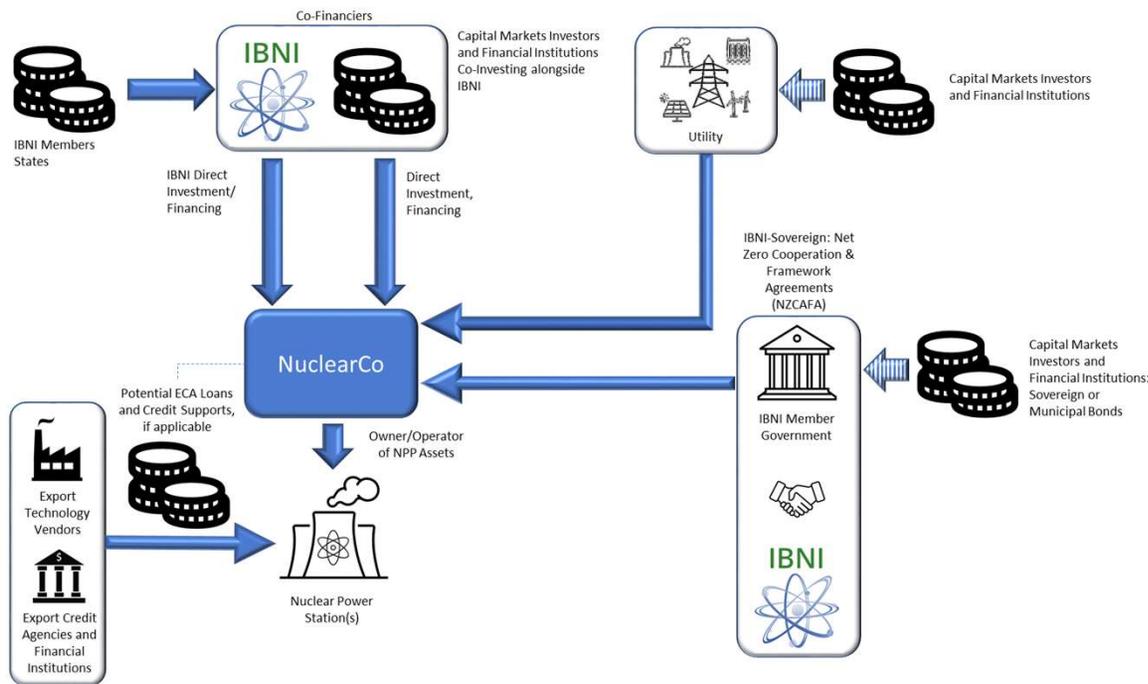
Proposed Standards & Conditions

- IBNI will serve as the lead institution, driving the global financial markets into the nuclear finance space, based on a broad array of Environmental, Social and Governance (ESG) principles and sound financial fundamentals.
- IBNI will adopt and enforce a rigorous set of international standards and conditions that will become harmonized benchmarks across 10 categories.
- IBNI Member States that seek the Bank's support for their nuclear projects will need to sign comprehensive long-term "Net Zero Cooperation and Framework Agreements" (NZCAFAs) which will include binding 2050 Net Zero commitments and other state-level sustainability standards and criteria.
- Both state-level and project-level standards and criteria will serve as the basis to determine which nuclear projects and programs qualify for and receive IBNI financing and support.
- IBNI Standards and Conditions will create the framework for the Bank, IBNI Member States and nuclear project sponsors to each report exceptionally well against all ESG metrics.



IBNI

New and Innovative IBNI Financing Model



Source: IBNI-IO SAG. (1) ESG = Environmental, Social and Governance criteria. See IBNI IRAP Section 4 for additional details.

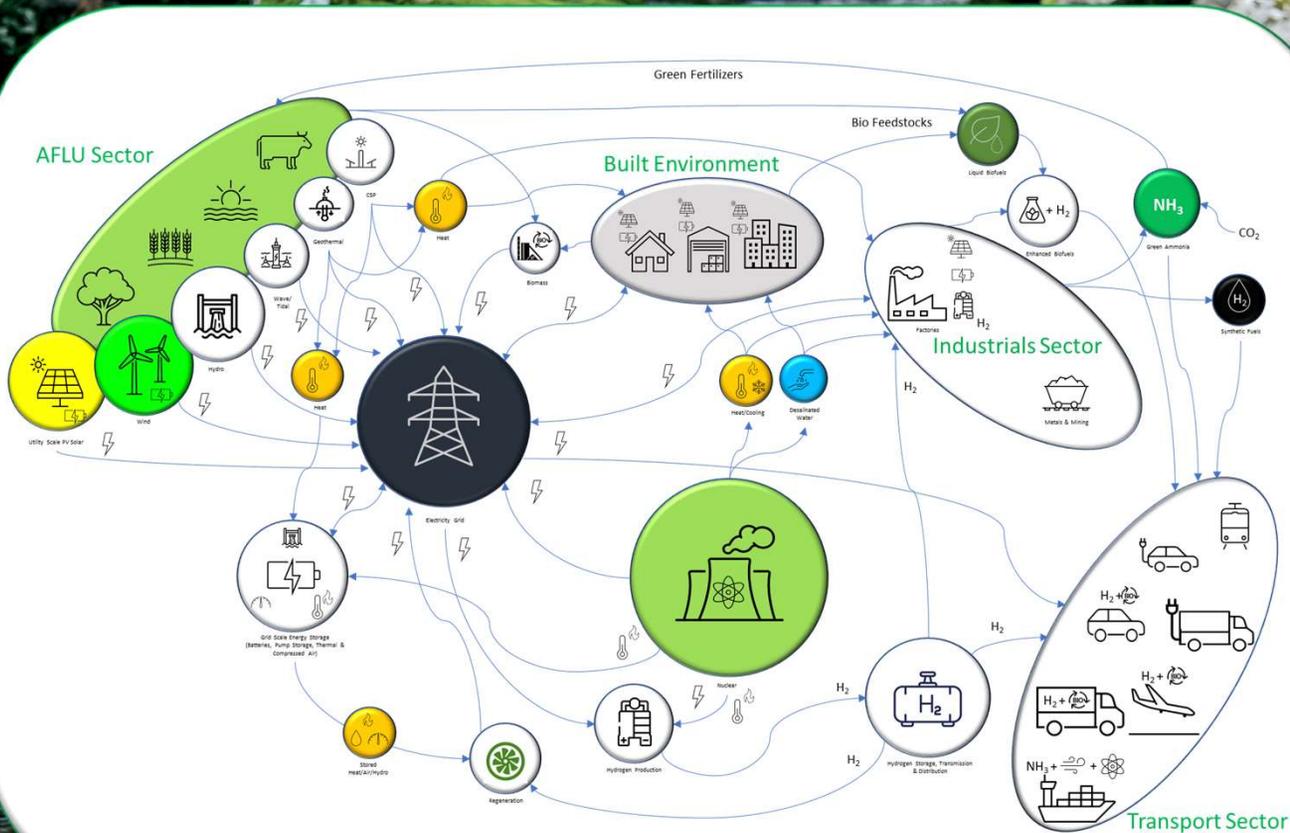
New Nuclear Financing Model

- The new IBNI financing model unlocks significant additional and incremental financing sources available for nuclear projects.
- The financing model also retains (but does not depend on) potential existing sources of financing from export credit agencies, utilities, governments and other sources of potential existing financing.
- IBNI will serve as the lead 'anchor' investor or lender in qualified projects, directly deploying its own capital. However, IBNI's participation in the transaction will catalyze other new global capital markets co-investors and financial institutions to co-invest alongside IBNI.
- Similar to models successfully implemented by many other major multilateral IFI's, IBNI aims to achieve a significant 'multiplier' impact where every dollar of government shareholder capital results in many multiples of additional capital available for project investments.
- Over time as the IBNI model evolves and gains increasing acceptance by the capital markets and lending institutions, the necessity for IBNI's direct investment or lending role in projects is expected to become less critical.



IBNI

Nuclear Primacy in Future Energy Systems



Source: IBNI-IO SAG. Note: AFLU = Agriculture, Forestry and Land-use

IBNI Supports Low Carbon Systems

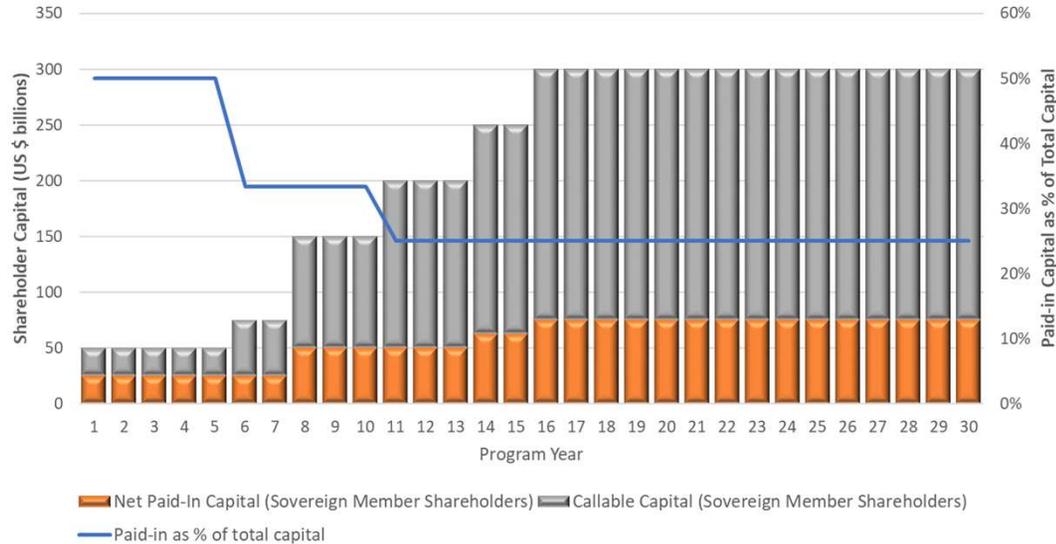
- IBNI will support its member countries in their transition away from carbon intensive fossil fuels to low carbon systems in the energy generation, industrial, buildings and agriculture, forestry and land use sectors.
- The path to net zero will require massive investments in multiple new systems and infrastructures across the whole economy.
- Significant increases in demand for electricity, hydrogen, electrofuels, heat and cooling are expected.
- Under 'net zero pathways' world electricity generation is expected to nearly triple from 26,776 TWh/a in 2020 to 71,164 TWh/a in 2050 (an average 3.3% annualized increase).
- Nuclear energy is a versatile, reliable, dependable and secure source of generation that can power future low carbon energy systems.

Source: OECD IEA/NEA "Net Zero 2050 Pathway Scenario". See IRAP Sections 1 & 2 for and References for details.



IBNI

IBNI Shareholder Capital Requirements



Source: IBNI-IO SAG. See IBNI IRAP Sections 6, 7 and 8 for additional details.

Evolution of IBNI Capitalization

- Similar to existing major multilateral IFI models, it is foreseen that the IBNI Member State shareholders will contribute capital in the form of *paid-in* and *callable* shareholding subscriptions.
- Based on various world electricity demand and world nuclear generation share growth scenarios, it is envisaged that an initial total shareholder capital requirement of US \$50 billion will be necessary, with 50% (US \$25 billion) paid-in and the remaining 50% (US \$25 billion) would be pledged as callable shares.
- As the program grows over time (the objective of significant growth in global low carbon nuclear capacity is realized), it will be necessary to also periodically increase capital requirements.
- Capital amounts will be driven by credit rating criteria, so that IBNI maintains 'triple-A' category credit ratings and thereby achieves the lowest cost of capital on its bond issuances, which will be passed-down for the benefit of its project participants.
- Illustrating the 'multiplier impact', under high demand scenarios, it is projected that IBNI could directly support approximately US \$1 trillion, which could catalyze approximately US \$36 trillion in total worldwide nuclear sector investments over 30-years*.

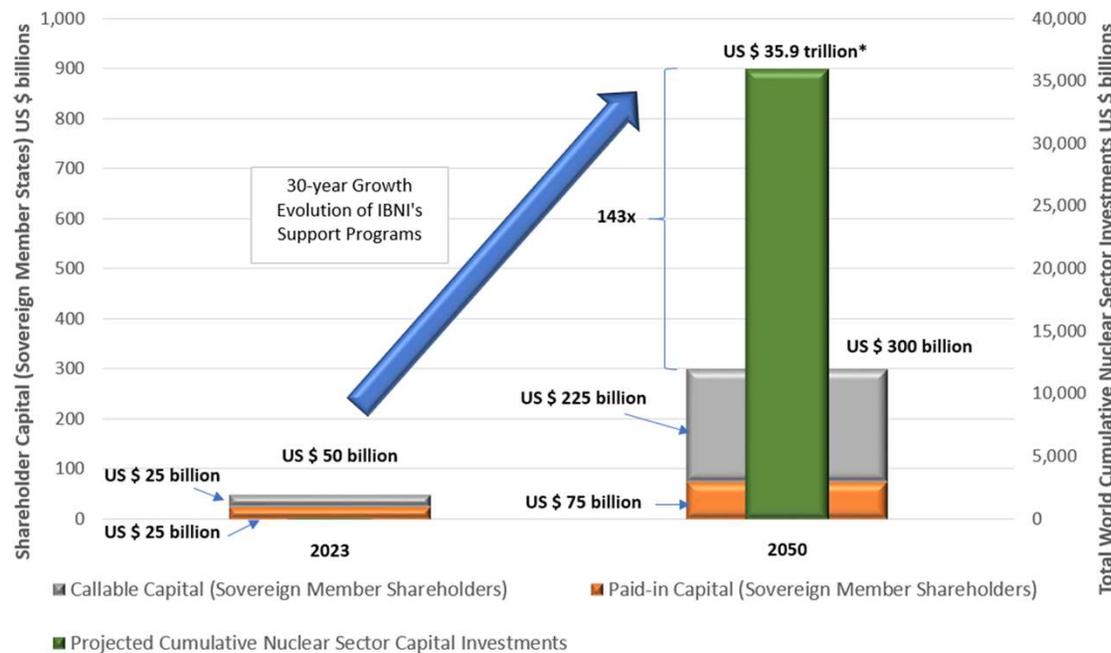
Source: IBNI-IO SAG. *See Slide 12.



IBNI

IBNI Investment Multiplier Impact

Projected IBNI Multiplier Impact on Cumulative Global Nuclear Sector Investments over 30 Years



Source: IBNI-IO SAG. * Includes inflation, which is assumed to average 3.5% per annum.

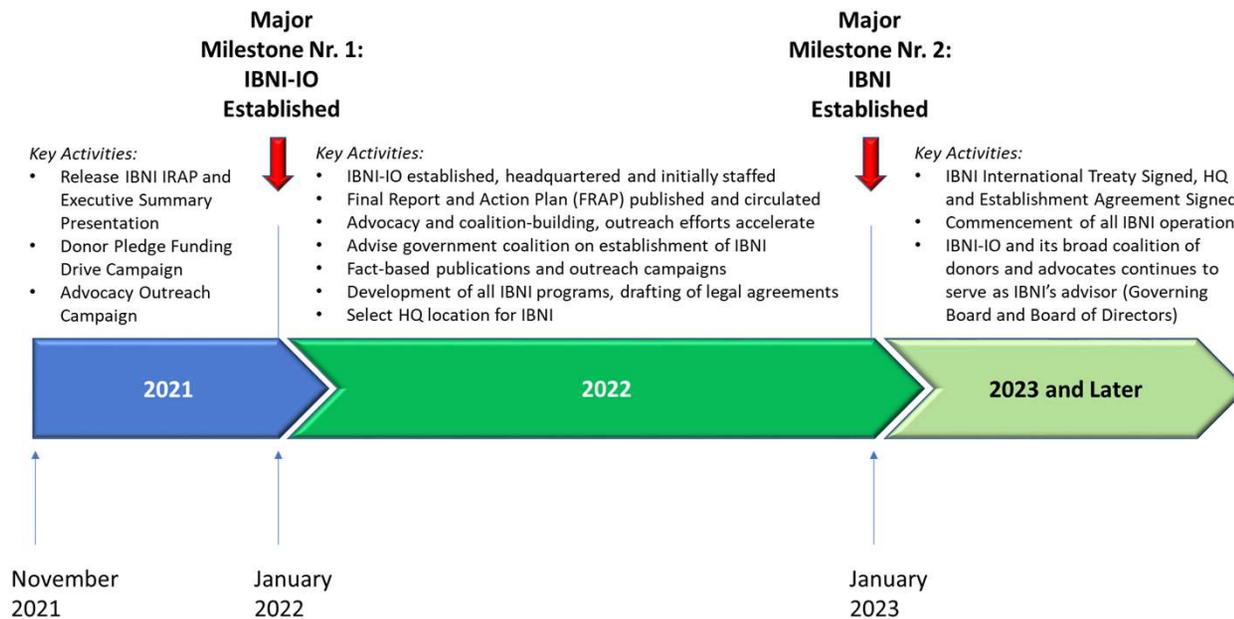
IBNI Investment Multiplier Impact

- Existing multilateral IFIs have exhibited a strong and proven track record of catalyzing significant quantum of global capital investments in the projects and programs that they sponsor.
- IBNI will utilize similar models that have been proven over many decades to catalyze significant amounts of global capital investments in the nuclear sector.
- IBNI's participation in nuclear sector projects will be most impactful in the early years of the program.
- As IBNI programs evolve, it is anticipated that the requirements and magnitudes for IBNI's direct financing and support intervention will lessen over time.
- Typically, IBNI will support between 20% and 60% of the total capital costs of supported nuclear projects.
- IBNI's support will range from providing long-term loans (direct, A/B and syndicated), minority or quasi-equity shareholding positions, guarantees, credit facilities, hedging products, investment contracts and advisory services.



IBNI

Timeline for Establishing IBNI



Source: IBNI-IO SAG. See IBNI IRAP Section 9 for additional details.

Timeline and Action Plan

- The global climate crisis requires immediate action – and so does IBNI.
- IBNI needs to be established and capitalized as soon as possible to support nuclear energy's role in achieving 2050 net zero – 30-years is an all too short period of time and we are running out of time.
- It is envisaged that IBNI will be established in early 2023.
- The immediate step will be to establish the not-for-profit, International Bank for Nuclear Infrastructure – Implementation Organization (IBNI-IO) by the beginning of 2022.
- IBNI-IO is intended to be an all donor-funded organization that will serve to build a broad coalition of nations supporting the IBNI initiative and advise the coalition on establishing IBNI.
- Please consider your organization's letter of endorsement and potential donor pledge for the IBNI initiative.



IBNI

Additional Information and Representative



For more information on the IBNI initiative, please review the *IBNI Initial Report and Action Plan (IRAP)*, which can be downloaded from the below website.

Presentations, Letters of Endorsement and Donor Pledges

- The IBNI-Implementation Organization Strategic Advisory Group (IBNI-IO SAG) is responsible for producing and distributing this material.
- IBNI-IO SAG welcomes all opportunities to provide virtual and live presentations (where possible) with all parties interested in supporting the IBNI initiative.
- Please send all 'Letters of Endorsement' addressed to 'The International Bank for Nuclear Infrastructure – Implementation Organization' to the representative below.
- All inquiries related to potential donor pledges to IBNI-IO should be directed to the IBNI-IO SAG representative below.



Representative for the International Bank for Nuclear Infrastructure – Implementation Organization Strategic Advisory Group

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