

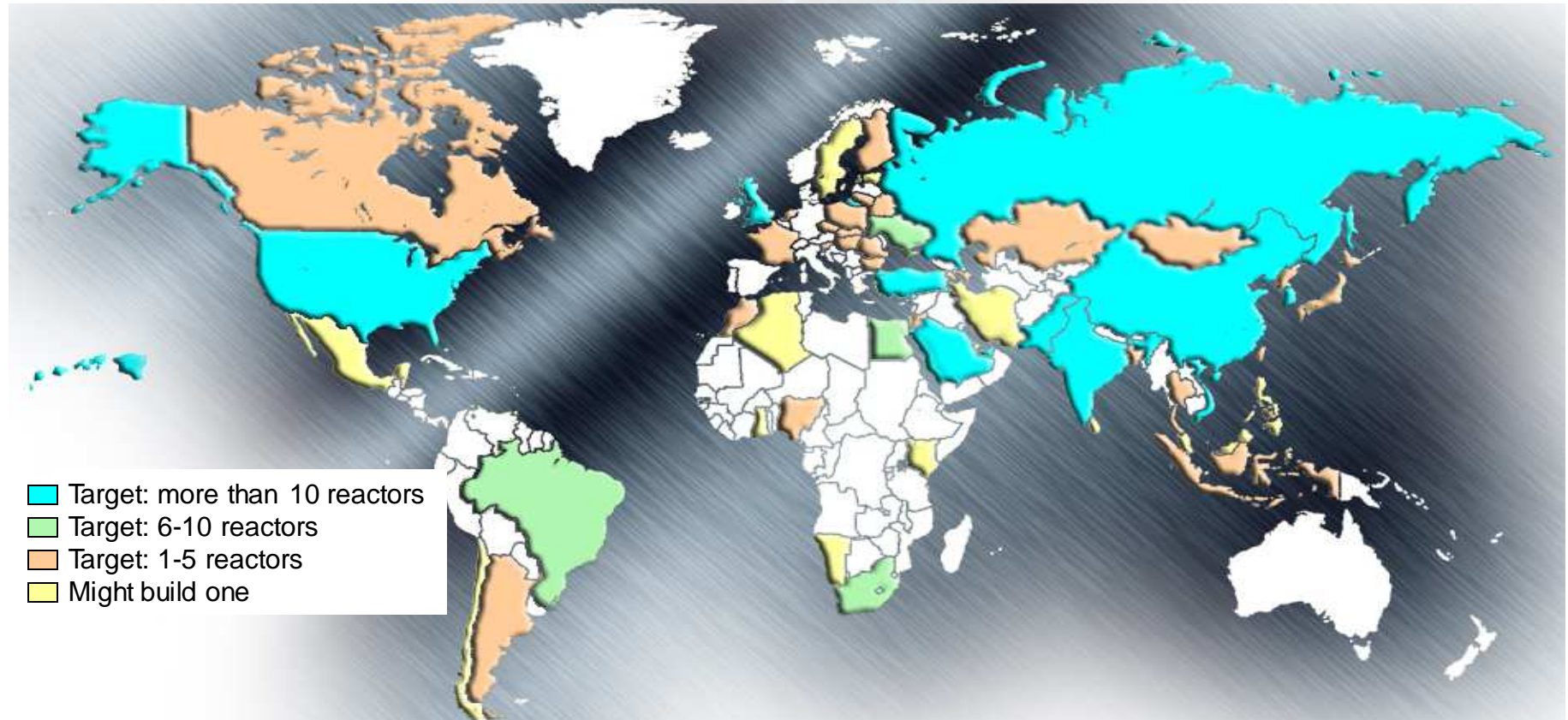


THE INTERNATIONAL FRAMEWORK FOR NUCLEAR ENERGY COOPERATION

**Presented at the
WM2012 Symposia**

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And
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Global Status of Nuclear Energy & Market Projections



- 430+ Nuclear Reactors Operating in 30 Countries (350 GWe; 14% of electricity)
- 66 reactors currently under construction in 15 countries (27 in China);
- 154 reactors planned in 27 countries over next 8-10 years, worth as much as \$740+ billion;
- 331 reactors proposed in 37 countries over next 15 years, worth as much as \$1.6 + trillion.

Post Fukushima: Global Demand for Nuclear Energy Continues

Key Drivers – Not Just An Economic Calculus:


- Energy security/long-term security of supply
- Clean, base-load source of energy
- Significant source of jobs and economic benefit

GLOBAL TRENDS

- **Global commercial nuclear market is dynamic, increasingly integrated, and very competitive. Factors: customer needs, financing, and resources.**
- **Government nuclear R&D communities are working closer than ever.**
- **Role of nuclear for many countries goes well beyond cost-benefit analysis as an energy source.**
- **A unique opportunity is before us to realize private sector commercial opportunities while effectively addressing government priorities such as security of energy supply, job creation and economic prosperity, a reduced global carbon footprint, nuclear safety, and nonproliferation.**
- **A stakeholders and systems-wide approach is a key model for success.**

KEY GLOBAL CHALLENGES

Key Challenges:

- Support for Global Access And Reduce Barriers to Commercially-Based Nuclear Products and Services
 - Ensure Safety and Nonproliferation While Expanding Access
 - Adjust Approaches to Reflect Current Realities, Challenges, and Opportunities
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IFNEC: 61 Countries and 3 International Organizations



Participants

1. Argentina
2. Armenia
3. Australia
4. Bulgaria
5. Canada
6. China
7. Estonia
8. France
9. Germany
10. Ghana
11. Hungary
12. Italy
13. Japan
14. Jordan
15. Kazakhstan
16. Kenya
17. Republic of Korea
18. Kuwait
19. Lithuania
20. Morocco
21. Netherlands

22. Oman
23. Poland
24. Romania
25. Russia
26. Senegal
27. Slovakia
28. Ukraine
29. U.A.E
30. U.K.
31. U.S.

Observer Organizations

1. International Atomic Energy Agency (IAEA)
2. Generation IV International Forum (GIF)
3. Euratom

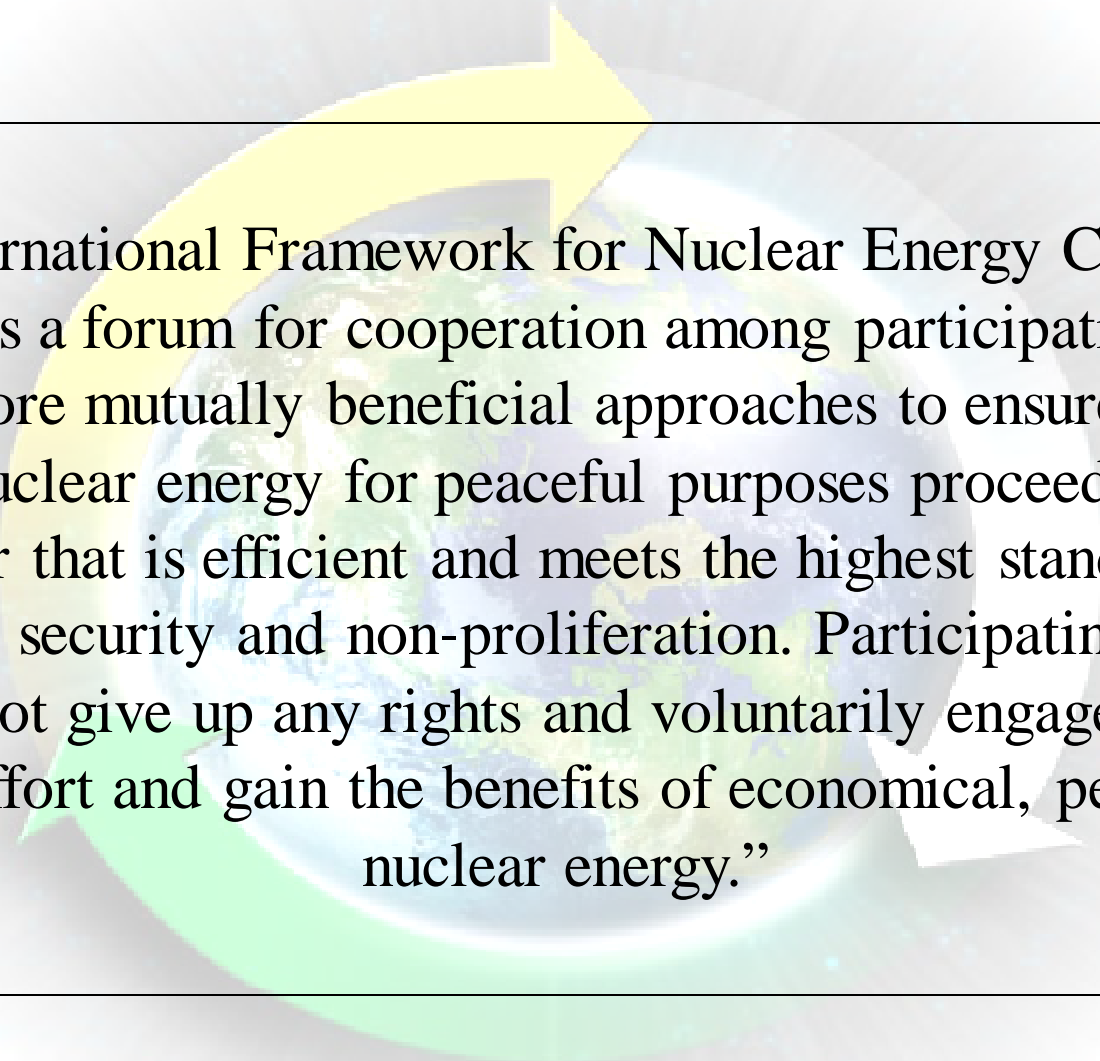
Observer Countries

1. Algeria
2. Bahrain
3. Bangladesh
4. Belgium
5. Brazil
6. Chile
7. Czech Republic
8. Egypt
9. Finland
10. Georgia
11. Greece
12. Indonesia
13. Latvia
14. Malaysia
15. Mexico
16. Mongolia
17. Nigeria
18. Philippines
19. Qatar
20. Singapore
21. Slovakia
22. South Africa
23. Spain
24. Sweden
25. Switzerland
26. Tanzania
27. Tunisia
28. Turkey
29. Uganda
30. Vietnam

61 Countries and 3 International Organizations

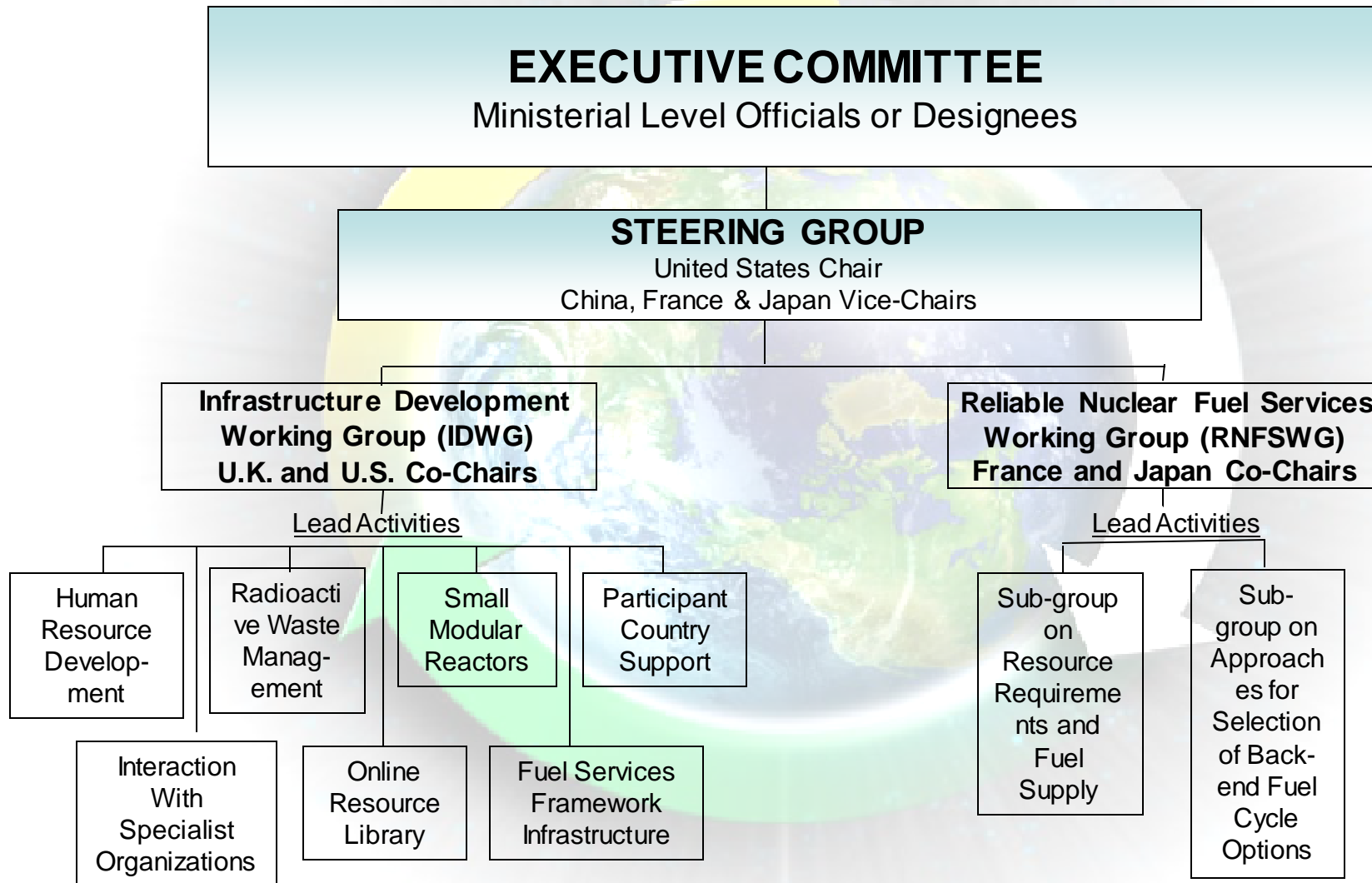


IFNEC Statement of Mission



“The International Framework for Nuclear Energy Cooperation provides a forum for cooperation among participating states to explore mutually beneficial approaches to ensure the use of nuclear energy for peaceful purposes proceeds in a manner that is efficient and meets the highest standards of safety, security and non-proliferation. Participating states would not give up any rights and voluntarily engage to share the effort and gain the benefits of economical, peaceful nuclear energy.”

IFNEC Structure



International Framework for Nuclear Energy Cooperation (IFNEC) A Unique Forum



- **Consensus-based approach has proven to be key to IFNEC's success**
 - Each country has a unique set of challenges and needs but share several common challenges – i.e., human resource development, financing
- **Focus on what countries agree on – not what we disagree on**
- **Neutral approach to the fuel cycle while emphasizing safe, secure and responsible use**
 - IFNEC's approach is to respect each country's right to decide whether to use nuclear energy while emphasizing its safe, secure and responsible use



*IFNEC EXECUTIVE COMMITTEE
WARSAW, POLAND
September 29, 2011*



Joint Statement Issued

- **Fukushima.** Highlights continued importance of safety.
- **Safety Conventions and Liability.** Calls on all IFNEC countries to join four main safety conventions as well as for the establishment of a global nuclear liability regime.
- **Comprehensive Fuel Services (CFS).** Highlights CFS, encourages continued engagement with industry and other stakeholders, and directs that a discussion paper on the benefits and issues regarding CFS be developed.
- **Financing.** Recognizes financing as a major barrier to access and the importance of multilateral development banks. Calls on the World Bank to conduct an economic and financial assessment of nuclear power and offers to work with the World Bank.
- **Stakeholder Engagement.** Emphasizes need for IFNEC to engage with the various stakeholders of the nuclear energy sector.
- **Infrastructure Development.** Emphasizes the need to continue the sharing of lessons-learned, importance of human resource development, and directs the IDWG to continue robust engagement with industry and other stakeholders.



Addressed Key Role of Private Sector



- **Addressed key role of private sector and public-private partnership**
 - Bill Gates featured as keynote speaker via video
 - Private sector innovation
 - Need predictability in market, including regulatory, in order to attract investors
 - Need greater government R&D investments
- **UAE joined as a Participant and Philippines and Qatar joined as Observers. Kenya joined as a full Participant several days after the meeting**



EXECUTIVE COMMITTEE MEETING AT WARSAW UNIVERSITY OF TECHNOLOGY, SEPTEMBER 29, 2011

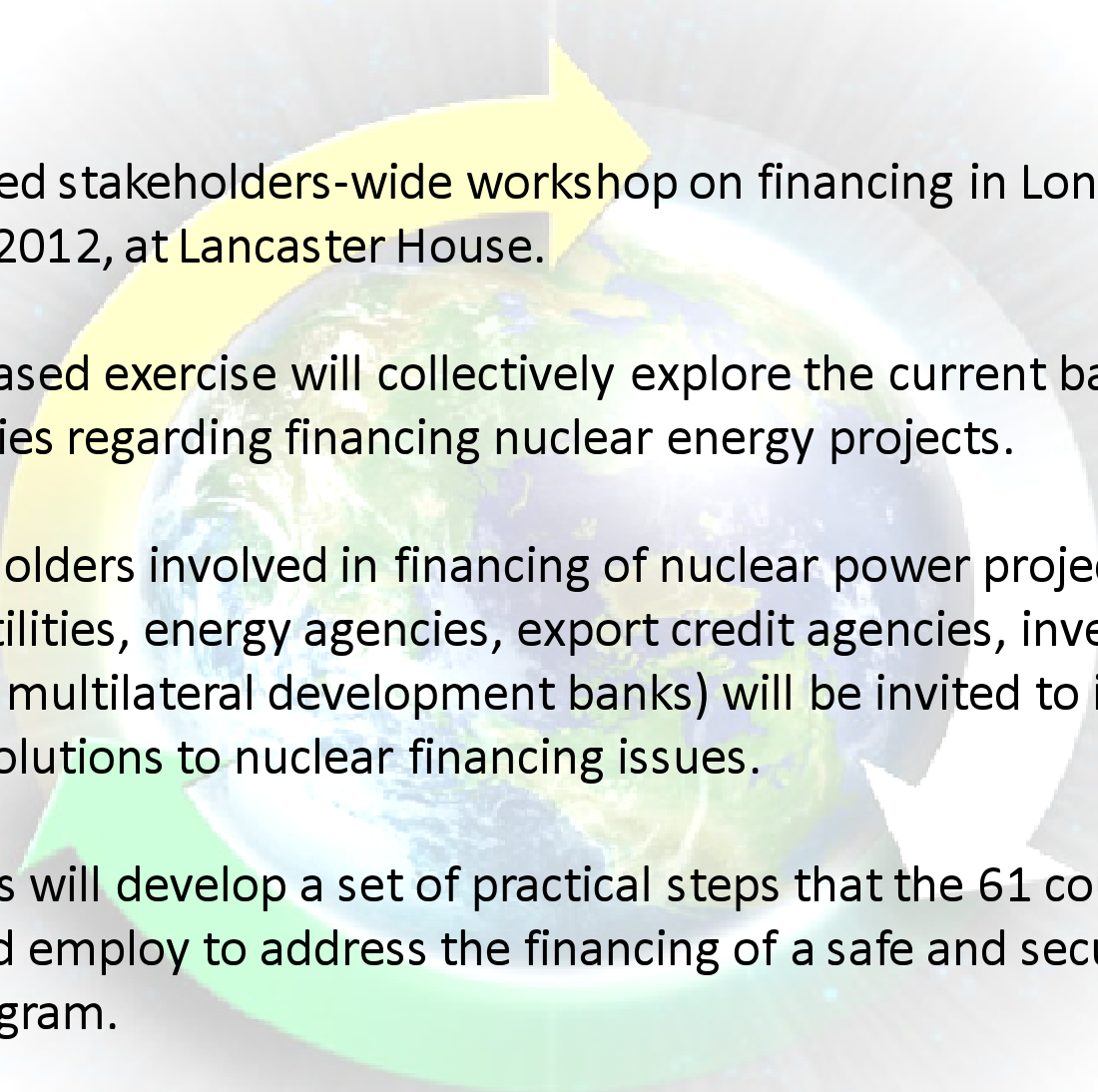
Addressed Financing: Barriers and Opportunities



- **Investment Banking Sector.** Briefing on approaches and status of private financing of nuclear projects provided by Barclays Capital Managing Director James Asselstine.
- **Country Perspectives.** China and France provided briefings on their approach to financing.
- **Agreed Upon Actions:**
 - **World Bank.** IFNEC agreed to encourage the World Bank via the IFNEC Warsaw Joint Statement to undertake a study of the economics and financing of nuclear power.
 - **Finance Workshop.** Agreed to hold an expert-based stakeholders workshop on financing to discuss the challenges and opportunities in the area of financing and what IFNEC can do to support.



IFNEC Nuclear Financing Workshop

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- Expert-based stakeholders-wide workshop on financing in London, U.K., May 9-10, 2012, at Lancaster House.
 - Scenario-based exercise will collectively explore the current barriers and opportunities regarding financing nuclear energy projects.
 - Key stakeholders involved in financing of nuclear power projects (e.g., vendors, utilities, energy agencies, export credit agencies, investment banks, and multilateral development banks) will be invited to identify potential solutions to nuclear financing issues.
 - Participants will develop a set of practical steps that the 61 countries of IFNEC could employ to address the financing of a safe and secure nuclear energy program.

Financing Challenges and Opportunities for the International Nuclear Industry

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- New financing structures along with new contractual agreements are emerging worldwide to diversify risk and to deal with limited available equity and debt.
 - Many see pure project finance as unlikely in the near future and are relying on a combination of corporate and project finance commonly referred to as “hybrid finance.”
 - Sovereign involvement viewed by many in the financial community as essential to the successful financing of nuclear projects. Interest in innovative ways for public-private partnering.
 - The level of equity investment in financings depends on the structure of the project, and the policies and roles of the project entity and country.
 - Stakeholders-wide focus on the barriers more important than ever before.

Reliable Nuclear Fuel Services Working Group



- **Working Group Activities.** IFNEC's Reliable Nuclear Fuel Services Working Group (RNFSWG) explores:
 - Resource requirements and fuel supply
 - Approaches for selecting back end fuel cycle options; and
 - Opportunities and challenges associated with Comprehensive Fuel Services (CFS), including engagement with industry.
- **Industry/Stakeholder Engagement.** Engages with industry and other key stakeholders to explore challenges and opportunities associated with CFS.
- **CFS/Joint Convention.** Agreed to seek inclusion of CFS under the Joint Convention on the Safety of Spent Fuel and Safety of Radioactive Waste.

The Comprehensive Nuclear Fuel Services (CFS) Concept



- A CFS approach is one that provides reliable and commercially-based services on a global basis.
- Under the CFS concept, suppliers would offer a set of options for fuel supply, used fuel management, and ultimate disposal services.
- CFS is intended to be a flexible and tailored approach that recognizes and accommodates the unique requirements of the specific users and service providers.
- A CFS approach could provide a competitive economic advantage over indigenous development of enrichment and reprocessing and would remove some of the burdens associated with the interim storage and the final disposal of used fuel or/and high level radioactive wastes.

Infrastructure Development Working Group

- **Human Resource Development (HRD):**
 - Lessons learned shared by several countries
 - Facilitates international exchanges
 - Developed a Human Resource Modelling Tool which was transferred to the IAEA in 2011
- **Decommissioning and Radioactive Waste Management:**
 - Infrastructure support to RNFSWG (comprehensive fuel services)
 - Develop radioactive waste management sub-group position paper
- **SMRs and Transportable NPPs:**
 - Preliminary Findings of Independent Ongoing Study of Economics of SMRs
 - “Economies of Small and Modular” can be competitive w/ “Economies of Scale”
 - Consideration of waste management issues from SMRs
- **Stakeholder Engagement and Communication:**
 - Countries’ perspectives and discussion of challenges and effective approaches
- **Most recent meeting held in Vienna, Austria on October 31-November 1, 2011.**
 - Workshop on Emergency Preparedness and Response with IAEA participation

Reliable Nuclear Fuel Services Working Group

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- **RNFSWG explores:**
 - 1) Resource requirements and fuel supply
 - 2) Approaches for selecting back end fuel cycle options; and
 - 3) Opportunities and challenges associated with Comprehensive Fuel Services (CFS), including engagement with industry.
 - **Industry/Stakeholder Engagement.** Industry is encouraged to participate in RNFSWG meetings where its input is crucial to the Working Group's efforts to explore the challenges and opportunities associated with CFS.
 - **CFS/Joint Convention.** IFNEC will seek inclusion of CFS under the Joint Convention on the Safety of Spent Fuel and Safety of Radioactive Waste.
 - **Next Meeting.** Tentatively planned for April 2012, location TBD.

The Comprehensive Nuclear Fuel Services (CFS) Concept



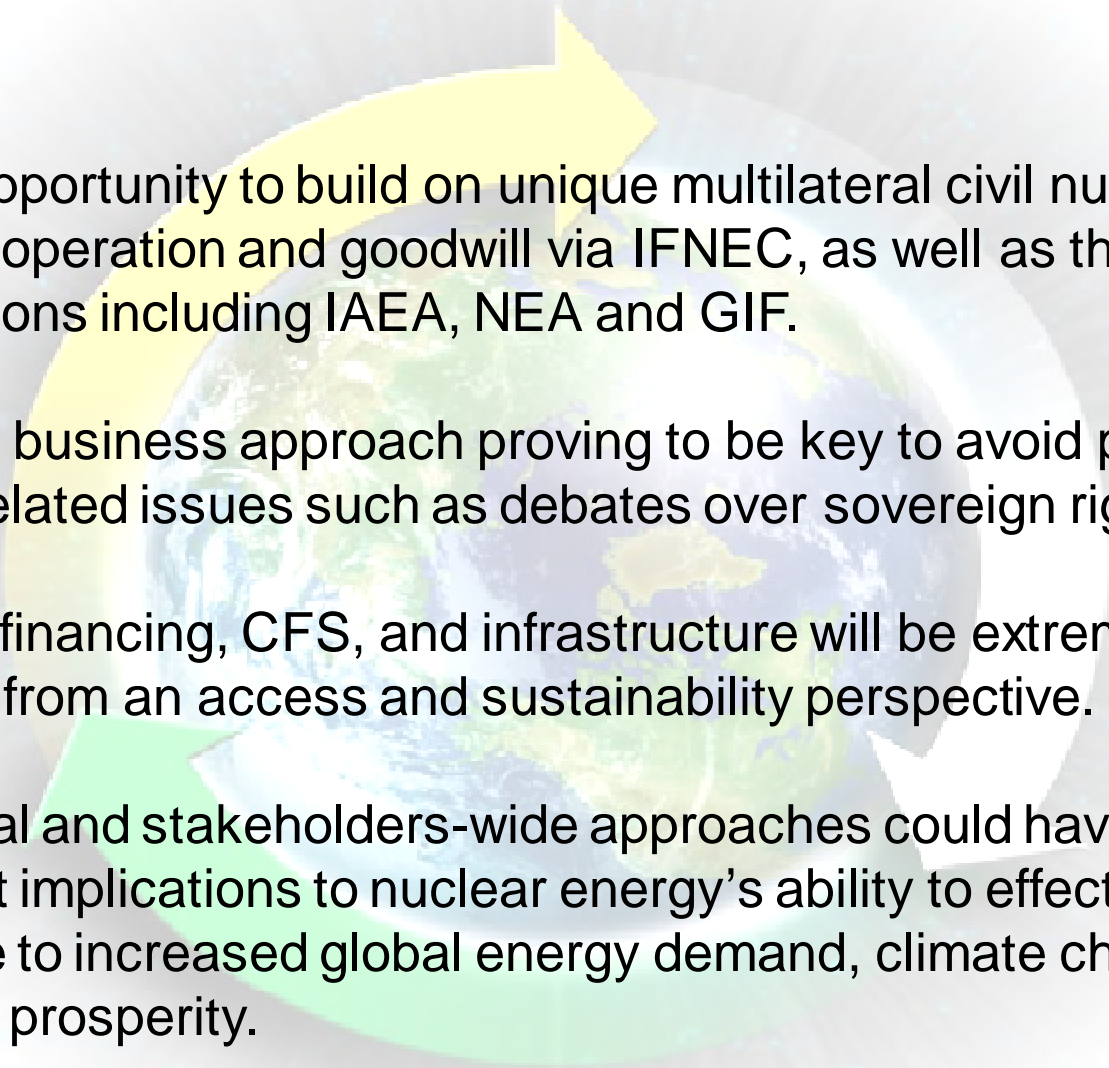
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Morocco To Host and Chair 2012 Executive Committee Meeting

- **Executive Committee meeting to be held in Marrakech on October 10 (tentative)**
 - Greater attention on the needs of the developing world and access to the global market (e.g., financing, HR, infrastructure, expert-based information sharing) expected.
- **Actions for IFNEC to Take.** Will receive specific proposals from Steering Group and Working Groups as to what IFNEC can do to:
 - Address financing as a barrier;
 - Realize CFS; and
 - Further engage in infrastructure development areas.



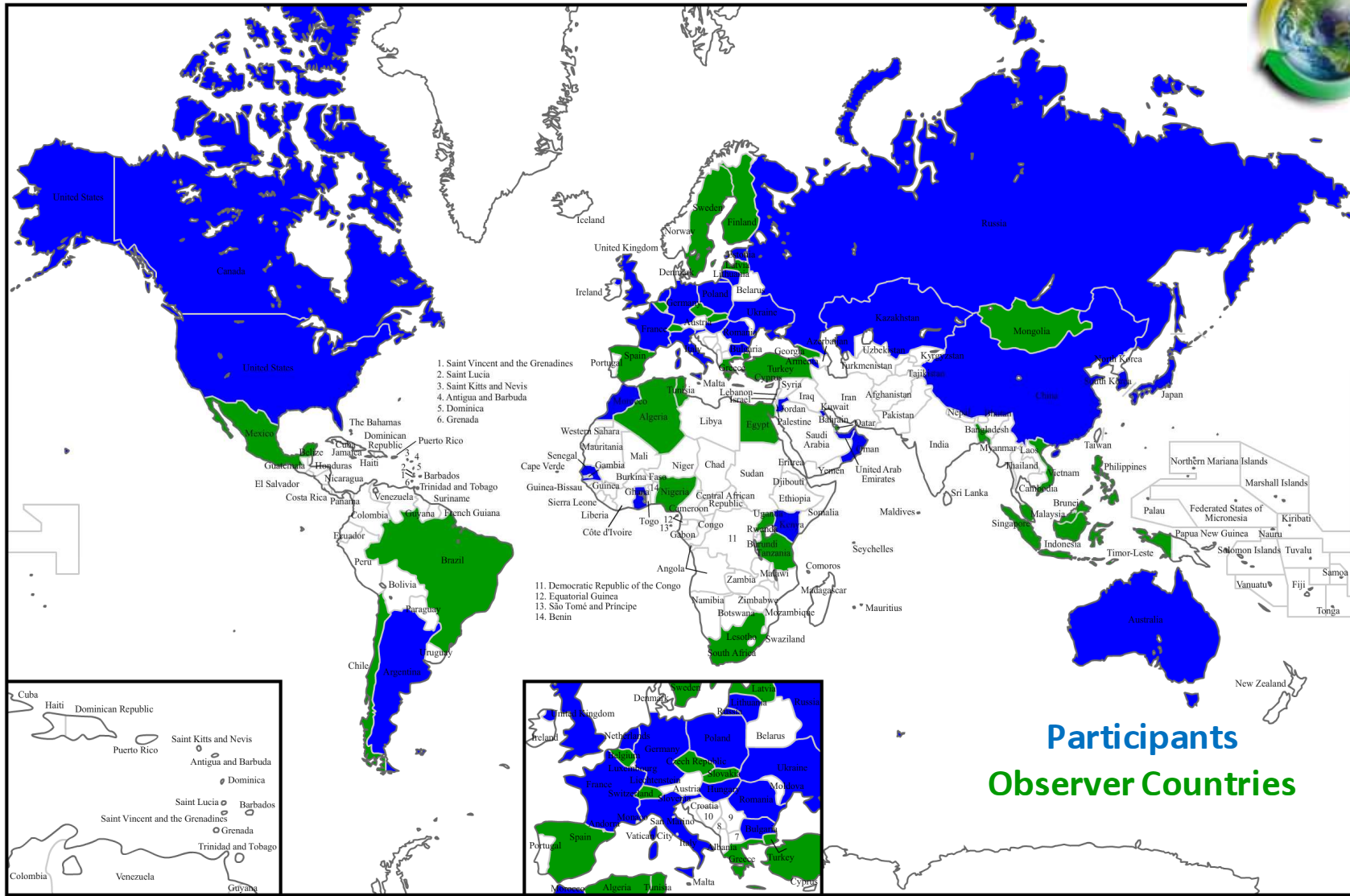
Concluding Thoughts

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- Historic opportunity to build on unique multilateral civil nuclear energy cooperation and goodwill via IFNEC, as well as through organizations including IAEA, NEA and GIF.
 - A focused business approach proving to be key to avoid polarizing nuclear-related issues such as debates over sovereign rights.
 - Focus on financing, CFS, and infrastructure will be extremely important from an access and sustainability perspective.
 - Multilateral and stakeholders-wide approaches could have significant implications to nuclear energy's ability to effectively contribute to increased global energy demand, climate change and economic prosperity.



BACKGROUND

IFNEC Expanded to 61 Countries + 3 Int. Orgs (31 Participants, 30 Observers)



1. Saint Vincent and the Grenadines
2. Saint Lucia
3. Saint Kitts and Nevis
4. Antigua and Barbuda
5. Dominica
6. Grenada

11. Democratic Republic of the Congo
12. Equatorial Guinea
13. São Tomé and Príncipe
14. Benin

7. Macedonia 8. Montenegro 9. Serbia 10. Bosnia and Herzegovina

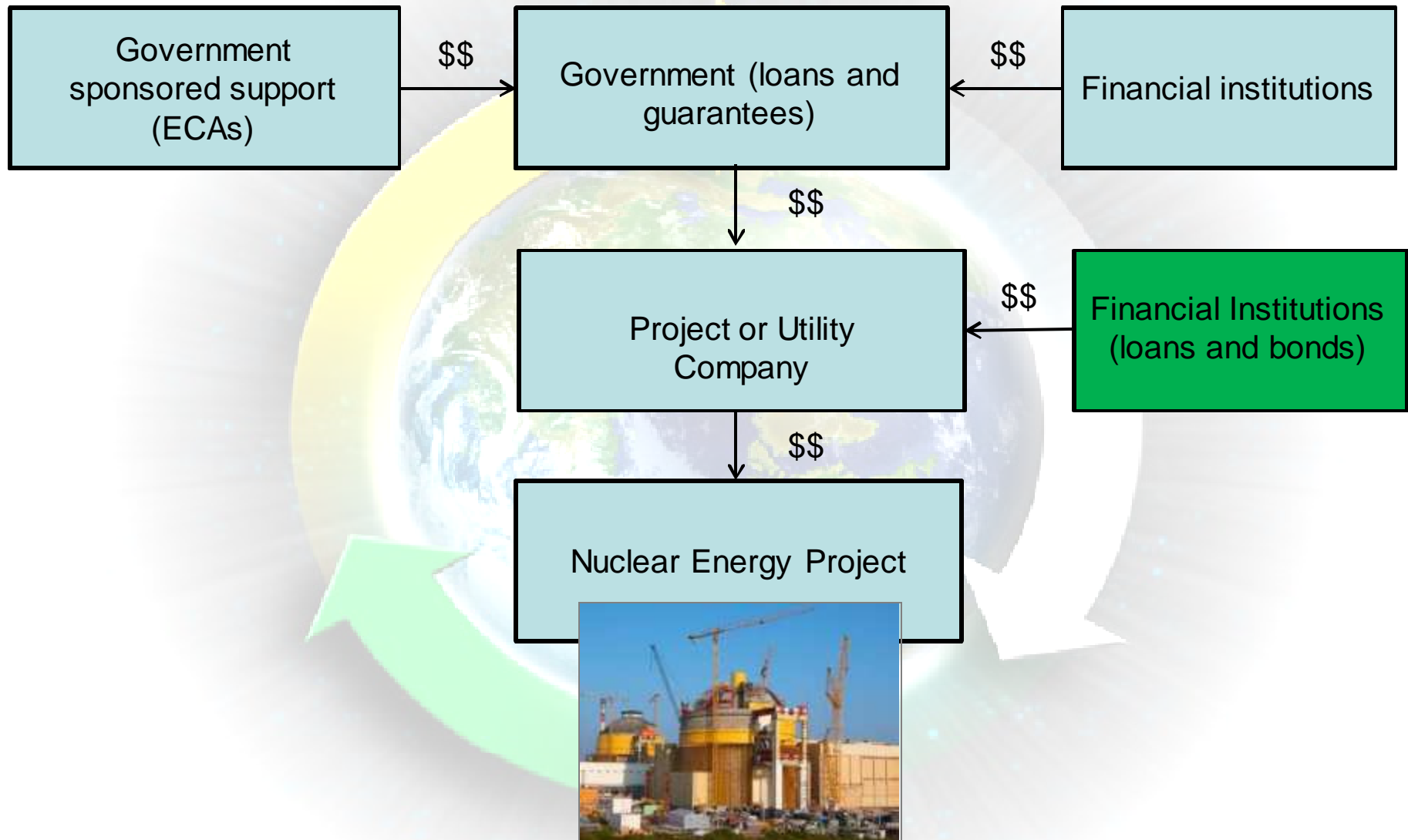
Current Challenges to Financing Nuclear Energy Projects

- **Cost of finance is generally higher than for other types of power projects**
 - Large up front construction costs with long lead times are often perceived to contain greater risk and are thus challenging to finance; HOWEVER, once operational, nuclear plants have very favorable economics
 - Lack of value (e.g., tax) placed on carbon increases competitiveness challenges
- **Questions remain on how to cap and allocate liabilities for extraordinary nuclear occurrences**
 - Nuclear liability is limited by international conventions and national legislation
 - In most cases, operators are “strictly” and “exclusively” liable, but are required to carry “third-party liability” insurance
- **Increased financial regulation has resulted in reduced liquidity and greater financing challenges for investors, particularly for nuclear projects, which are perceived as higher risk**

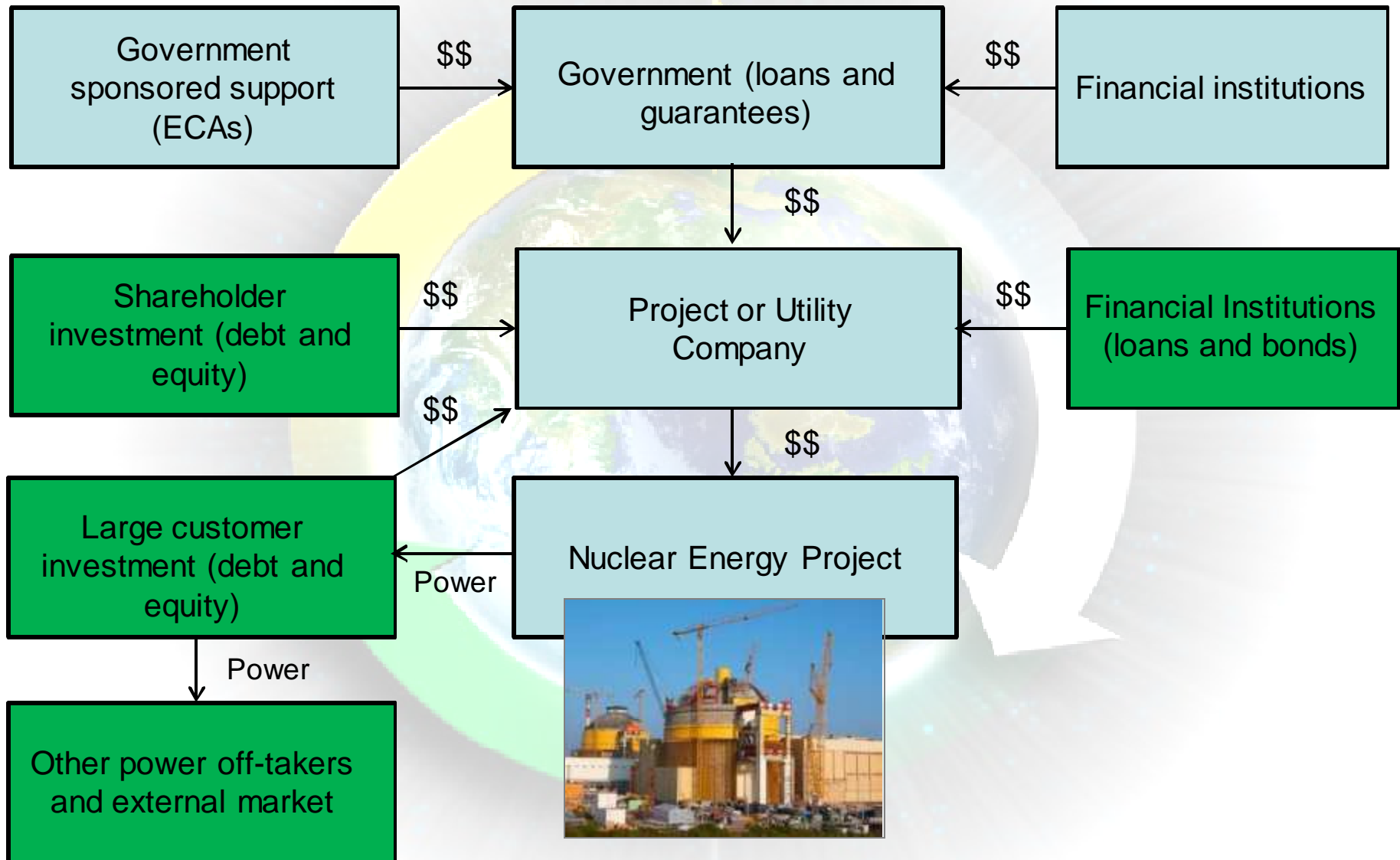
New Trends Emerging for Nuclear Energy Financings to Diversify Risk

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- **Two basic financing structures**
 - Government (sovereign) financing – *traditional*, loans and loan guarantees, risk borne by public
 - Industry financing – new financing structures emerging to expand the private sector participation and diversify risk
 - **Emerging Trend - hybrid or co-operative financing that expands equity partners to diversify risk burden**
 - **Regardless of the financial structure, some form of government involvement is required**
 - Government involvement brings significant funding capacity, and reduces perceived risk, as banks are wary of lending without government guarantees

Add Industry Financing: Corporate (or balance sheet)



New Trends Emerging: Co-operative or Hybrid Financing



Emerging Trends for Nuclear Energy Contractual Arrangements

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- **Supply and management contracts (duration 1-5 years)**
 - Ownership: *public*; Investment: *public and private*; Risk: *public and private*
 - **Leases (duration 3-20 years)**
 - Ownership: *public*; Investment: *public*; Risk: *public and private*
 - Project company finances and builds (B) a facility, upon completion transfers asset to a lease (L) arrangement for a fixed term, and then transfers (T) ownership to government
 - Example: Build-lease-and transfer (BLT).
 - **Initial right of operation, or Concession (duration 15-30 years)**
 - Ownership, Investment, Risk: *public and private*
 - Project company contractually assumes risk for the project, finances and builds, owns (O), and/or operates (O) the facility over a fixed term, and then transfers the ownership to government
 - Examples: Build-own-transfer (BOT), Build-transfer-operate (BTO), Build-Own-Operate-Transfer (BOOT)
 - **Private ownership of assets (duration indefinite)**
 - Ownership, Investment, Risk: *private*
 - Project company finances and builds, owns and operates the facility
 - Example: Build-own-operate (BOO)