



ROSATOM

State atomic energy corporation "Rosatom"

The experience of organizing an international consortium in the form of International Research Center based on Multipurpose Fast-Neutron Research Reactor

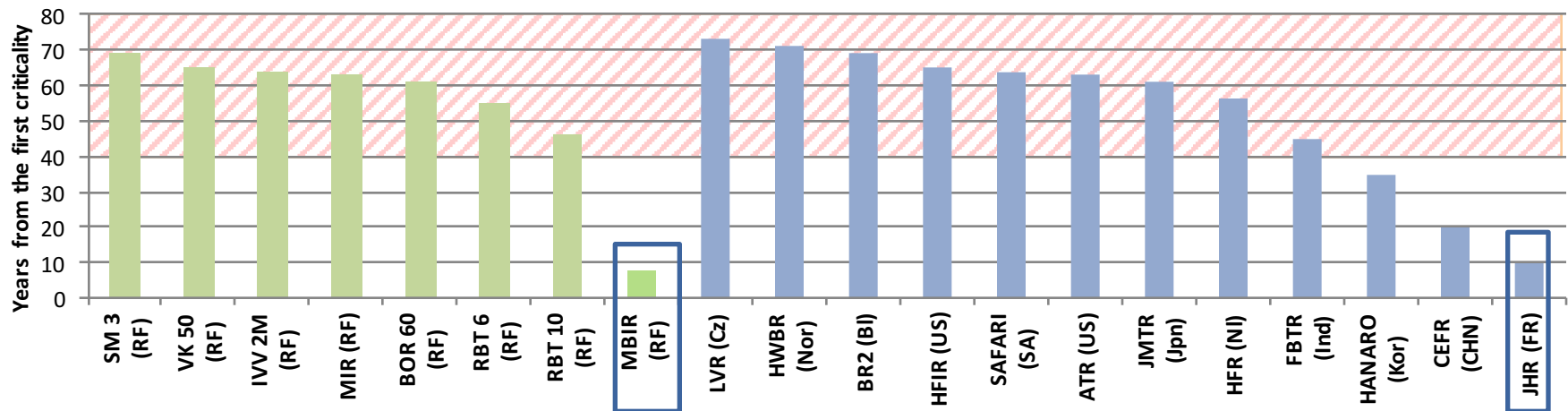


Sochi
15.05.2018

IRC MBIR value proposition

- Possibility to book particular channel or irradiation capacity in MBIR, which guarantees long-term access to the reactor even with the high commercial demand;
- Unique instrument for Generation IV technologies development, knowledge sharing;
- Cost sharing via international consortium and research collaborations provides best value for money vs national research reactor;
- Saving on the national infrastructure required to build and operate a RR;
- Reactor operator with outstanding reactor management experience and available on-site engineering and post irradiation infrastructure.
- Access to a new advanced fast neutron facility on the shrinking research reactors market – by the year 2030 there will be only 4 reactors below 40 years of age including JHR (FR) and MBIR (RF) both currently under construction with expected commissioning between 2020-2025.

High-Flux reactors market by 2030



IRC MBIR key milestones in 2017 - 2018

May, 2017 – MOU signed with CIAE.

June, 2017 – IRC MBIR Seminar at IAEA FR-17 conference.

June, 2017 – MOUs signed with CEA, VEB (Vnesheconombank) and V4G4 Excellence Centre.

August, 2017 – MOU with Russia-China regional investment fund.

November, 2017 – international lawyers advised on the IRC MBIR organizational structure and proposed to use the Agreement based Consortium.

January, 2018 – approval of the budget to update the design for the whole project and CAPEX requirements for whole project.

February, 2018 – new management structure after decision to make MBIR strategic project for Rosatom.

March, 2018 – China (CIAE) moves toward Term Sheet discussion.

April, 2018 – International IRC MBIR seminar and Advisory board meeting, application to “megascience” projects with Russian Ministry of Science and Education.

Decisions reached during the IRC MBIR annual seminar and the Advisory board meeting

- IPPE and Rosatom will distribute the list of the priority perspective R&D areas to the IRC MBIR partners to consider them for the joint multilateral scientific programs.
- Rosatom will coordinate with NEA OECD the participation in the R&D infrastructure working group in order to include MBIR reactor after the construction completion.
- Rosatom will circulate the list of the research equipment that can be accepted as the in-kind contribution from partners to the project.
- Rosatom applied to the Ministry of Science and Technology of Russia with the IRC MBIR project to be included in the “Megascience” projects.

MBIR construction progress



2015



2016



2017 August



2018 April



**Reactor core
manufacturing**



2024

International Research Center MBIR road map



ROSATOM develops international cooperation in the form of the International Research Center Consortium

ROSATOM / RIAR



International Research Center Consortium

Technical services



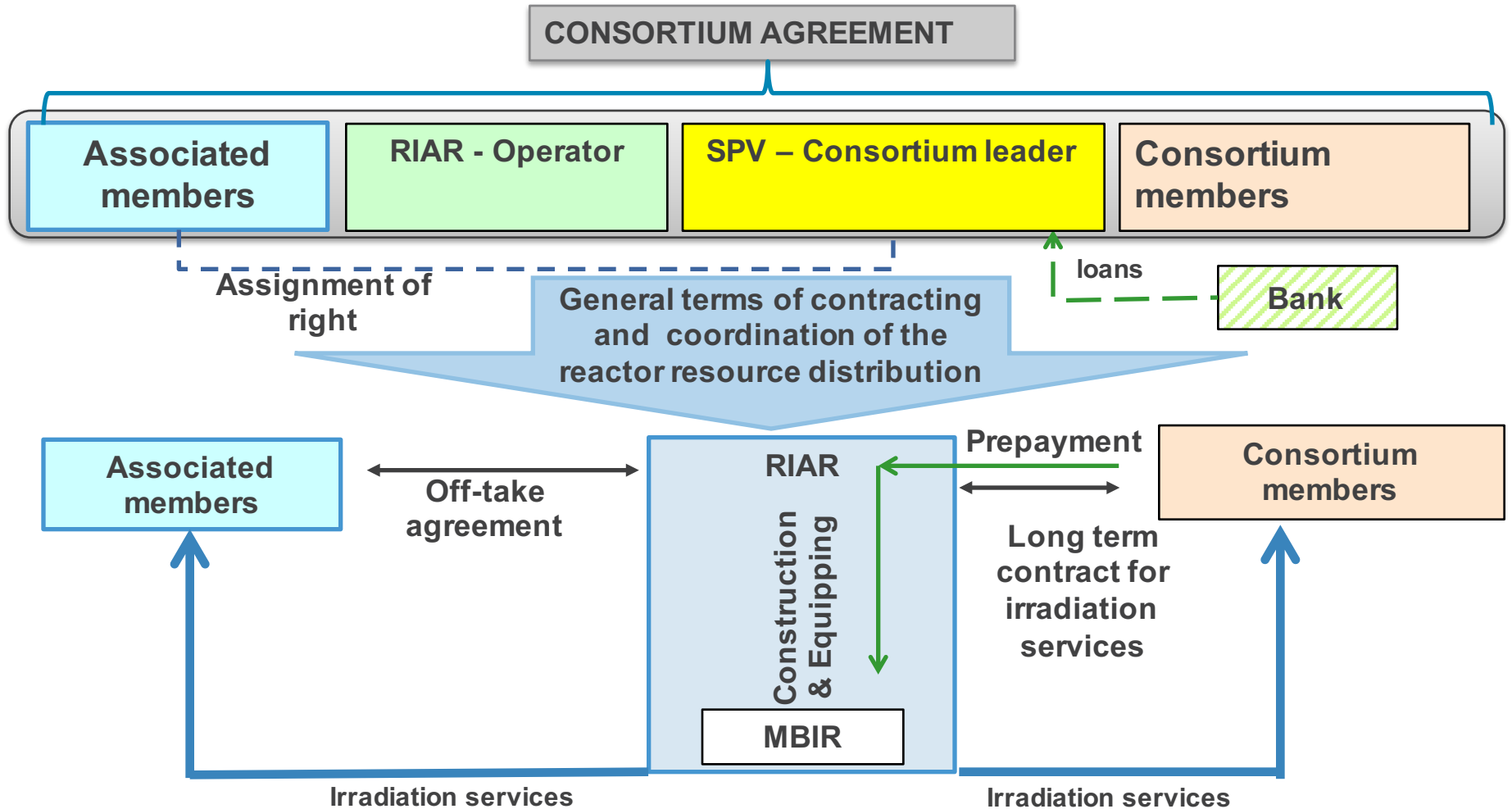
Financial resources



- Operating the reactor
- Liabilities, operation & maintenance
- R&D program execution
- Laboratory assist

- R&D program administration
- Joint activities management
- Reactor services marketing and PR
- Managing of joint financing
- IP servicing

Updated organizational structure



Organizational structure: key changes

IRC MBIR in the form of the legal entity

1. Partners have to be shareholders.
2. IRC MBIR holds the contract with RIAR on all the MBIR resource.
3. The irradiation contract is between IRC MBIR and RIAR.
4. Financing via share buy-out.
5. IRC MBIR in charge of all the joint activities. Operational budget provided by investors.

IRC MBIR in the form of Agreement based Consortium

1. Partners sign the Consortium agreement.
2. Consortium holds all the MBIR resource.
3. The irradiation contract is between Partner and RIAR.
4. Financing via advance on the long-term contract.
5. Consortium leader to be in charge of Consortium activities. Operational budget provided by Consortium members

Forms of participation

Significant discount

FLUX COST

Market value

IRC Consortium members

- Early participation at construction stage
- CAPEX sharing
- Permanent seats in the Steering committee and Advisory board
- OPEX pro rata on going

Associated members

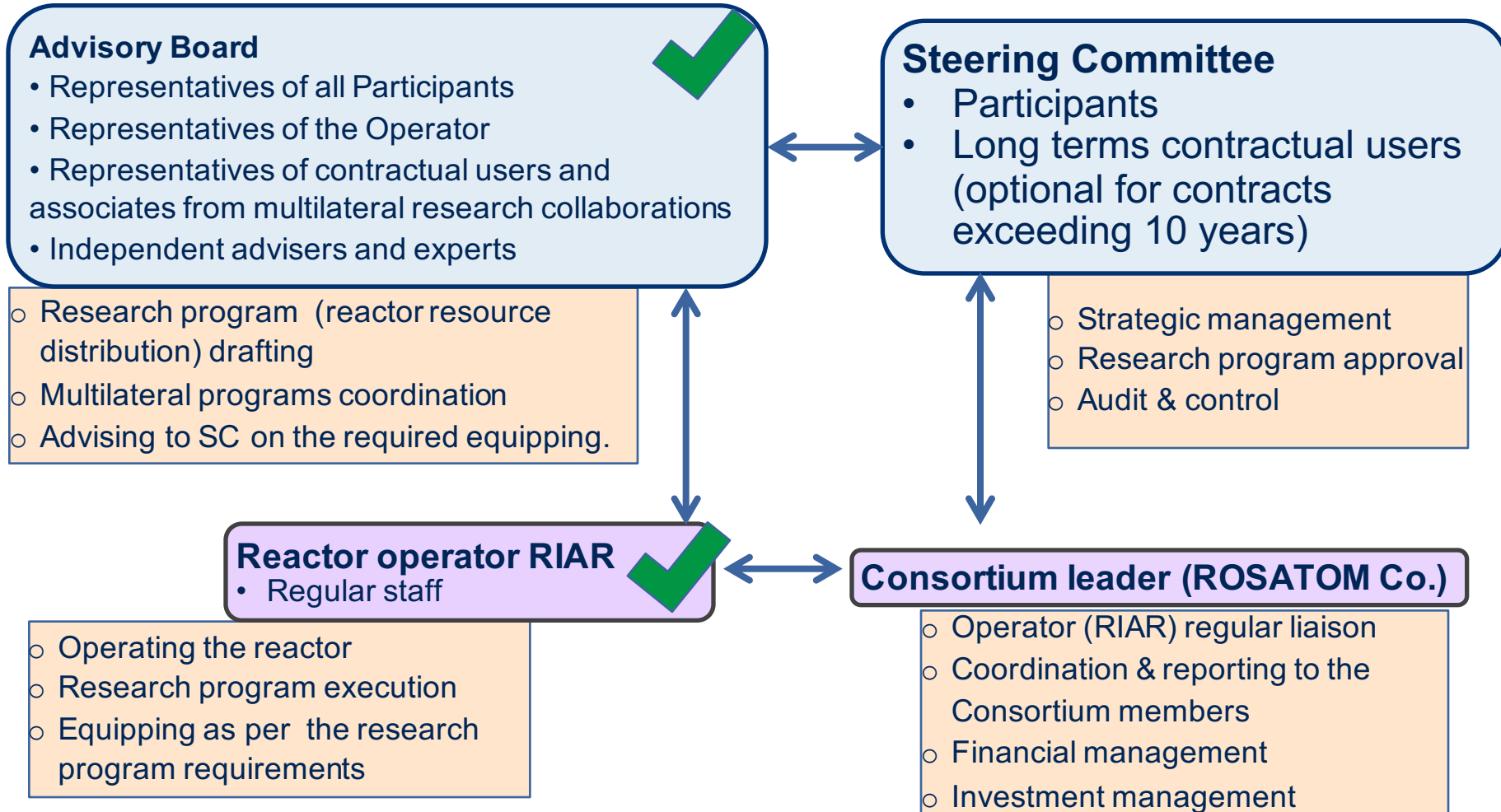
Contractual users, research collaborations

- Late participation after commissioning
- Standard price formula at market benchmarks
- Seat in the Advisory board for the contract period

Multilateral Research Programs

- Multilateral research collaborations for selected research topics.
- Results available to all institutions participating in the collaboration.
- Open for IRC Consortium members and associated members.

IRC MBIR Consortium management chart



Key organizational issues to decide upon in the nearest future with the partners

At the construction phase:

1. What happens if one of the partners fails to fulfil his obligations?
2. What guarantees if any are needed from Rosatom in order to minimize construction risks for partners?
3. Consortium control over the CAPEX and use of proceeds.
4. Steering committee participation and decision making procedures.
5. Consortium leader functions and key personnel.

During operational stage:

1. What is the mechanism of the operational cost overview and approval?
2. How to lease your share of the MBIR time or invest it into the multilateral research program?
3. How to completely sell your share and what can be limitations from Consortium if any?

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