State Atomic Energy Corporation “Rosatom”
Russian Radiation Technologies: opportunities to success

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Radiation Technologies Program
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Rosatom is the largest hi-tech manufacturer in Russia

<table>
<thead>
<tr>
<th>High-tech products share in revenue</th>
<th>$15.5 bln*</th>
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</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>$15.5 bln*</td>
</tr>
<tr>
<td>R&amp;D investment</td>
<td>$700 mln</td>
</tr>
<tr>
<td>EBITDA</td>
<td>$5.2 bln*</td>
</tr>
</tbody>
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* 2011 Rosatom annual report, currency rate 30.8 RUR/$
Rosatom overview

- ROSATOM is the largest utility in Russia which produces more than 40% of electricity in the country;
- ROSATOM holds leading positions in the world market of nuclear technologies;
- 1-st in the world simultaneous nuclear build abroad;
- 2-nd in uranium reserves and 5-th in uranium mining;
- 4-th in nuclear electricity generation,
- Providing 40% of the world uranium enrichment services and 17% of the world nuclear fuel market
- Global operations in more than 40 countries
«Radiation Technologies» Program Subsidiaries

Business activities

- Nuclear medicine
- Irradiation centers
- Waste management

- Sales of isotope products
- Sales of equipment
- Service

Sales of isotope products on foreign markets (subsidiary company of JSC “Isotope”)
Key projects of Radiation Technologies Program

- A number of interrelated innovative projects in the nuclear medicine field
  - Origination and execution of investment projects in fields of medical isotopes and equipment
  - Medical equipment sales and servicing
  - R&D management

- 3D project of the most effective center for cold sterilization and modification of materials in the world
  - Contract irradiation
  - Equipment production, engineering and maintenance
  - Production of radiation modified materials

- First complex system of medical waste neutralization in Russia
Nuclear medicine
Russia has a lot of potential to develop.

1. Nowadays Russia have lack of nuclear medicine equipment in comparison with other countries. For example, there are only 1 SPECT and 0.1 PET/CT for 1 million people in Russia.

2. According to the "The development of healthcare in Russia" program the 251 units of SPECT, 251 units of SPECT/CT and 20 units of PET/CT equipment will be purchased during the period 2014-2018.

3. Ministry of Economic Development of the Russian Federation has introduced a 15% preference for medical equipment produced in Russia which will be purchased by government.

4. According to "The development of pharmaceutical and medical industries in Russia till 2020 and beyond" the federal program, Ministry of Industry and Trade of Russia will introduce protection measures for the equipment manufactured domestically.

The purchasing of nuclear medicine equipment according to the program "The development of healthcare in Russia" from 2014 to 2018.
In the Nuclear medicine field we perform the following functions

1. Investment projects execution in the fields of medical isotopes, equipment production, etc.

2. Sales of medical equipment and complex solution.

3. R&D management in nuclear medicine.

4. Collaboration with Russian state and international organizations on the nuclear medicine issues.
Production of radiopharmaceuticals and/or medical devices

**Sorption method**
- Generator Mo-99/Tc-99

**Extraction method**
- Production Tc-99
- Radiopharmaceuticals

Mo99 Manufacturing
- Activation method (natural and/or enriched molybdenum)
- Fission-fragments method (fission product of Uranium)

Processing factories producing radiopharmaceuticals

Export of Mo-99

Radiopharmaceuticals

Radionuclide diagnostic department of medical center
Ready to operate RPH manufacturing facility.

Partner

- Engineering
- Construction
- Equipping
- Start in operation
Nuclear medicine. Diagnostics and therapy.

In 2014 ROSATOM becomes the manufacturer of most advanced equipment for nuclear medicine with a leading position in CIS markets!

In 2014 ROSATOM constructs the first national chain of PET-centers!

In 2015 ROSATOM constructs the best in CIS center for nuclear medicine and cancer treatment.

Manufacturing projects

U.I. Corp.
SPECT, PET, PET/CT Manufacturing
JSC Isotope
Compact cyclotrons Manufacturing
JSC Isotope
Ge/Ga
JSC Isotope
Proton therapy center

Project «Construction of chain of diagnostic centers»

Demand on equipment
Equipment delivery

Remuneration for referral of clients
Referral of clients for treatment

Project «Center for cancer treatment»
Mo99 Project results

- The project was set up in the shortest possible time – 2.5 years.
- Hot testing on the first line has been conducted.
- Warm testing on the second line has been carried out.

**Result:** production facilities on 2000 Ki/week have been established.
188Re-Lipiodol

- Promising radiopharmaceutical for the diagnosis of liver cancer and radiotherapy;
- Stable disease in 56% of cases;
- Partial response in 22% of cases;
- The absence of side effects (minimal effects in 93% of cases)

Participants:

- The State Corporation “ROSATOM”
- WARMTH
- Seoul University
R&D: the future comes today

- Construction of a SPECT scanner
- Construction of a CT scanner
- Innovative equipment for radiochemical laboratory
- Medical cyclotrons different energies
- Generator Ga-68/Ge-68 and synthesis facility
- New generation of cyclotron - CC12
- Cancer treatment: radiopharmaceutical based on Ac-225

Diagnostic equipment
Reprocessing equipment
Radiopharmaceuticals

Stages:
- Market analysis
- Requirements specification
- Paperwork
- Selection of the Contractor
- R&D
- Engineering work
- Selection of the production space
- Engineering documentation
- Production start and license obtaining
- The sales channels are defined
- Start of sales
Global supplier for isotope products and solutions

Global Distribution: 100 customers from over 30 countries

Officially represents 12 Facilities

Fission, Cyclotron, EM, GC Production capability

50 years of experience

360° product portfolio incl. Mo-99, Tc-99m, Co-60 and stable isotopes

Global logistics and nuclear safety expertise: over 1000 shipments per year
Medical isotopes

Our product portfolio includes key medical isotopes including:
- Mo-99 (Molybdenum-99)
- Tc-99m (Technetium-99m)
- I-125, 131 (Iodine-125, 131)
- Lu-177 (Luecium-177)
- Gd-153 (Gadolinium-153)
- Ru-106 (Ruthenium-106)
- Pd-103 (Paladium-103)
- Ga-67 (Gallium-67)
- In-111 (Indium-111)
- Re-188

Applications:
- Diagnostics and therapy
- Cardiology
- Neurology
- Oncology

Producers:
Range of medical equipment

Equipment for diagnostic and therapeutic centers:

- PET/CT and SPECT/CT tomography scanners for nuclear medicine;
- Cyclotron complexes for radiopharmaceutical production;
- Laboratory complexes for Ga-68 radiopharmaceutical production for PET diagnostics;
- Radiographic equipment;
- Roentgenotherapeutic equipment;
- Linear accelerators;
- Gamma-therapy systems for distant and contact therapy.
1IBCI Conference overview (1/2)

Moscow, Russia 2012

The 1st International Business Conference for Suppliers, Producers and Consumers of Isotope Products (IBCI)

39 workshops
Over 40 publications about the event

Over 400 participants
Over 80% isotope supplying countries were represented
1IBCI. Conference overview (2/2)

UPCOMING MEETING

September 30 — October 1, 2013

The 2nd International Business Conference for Suppliers, Producers and Consumers of Isotope Products (IBCI)
Looking forward to future cooperation!

“Radiation Technologies” Program

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