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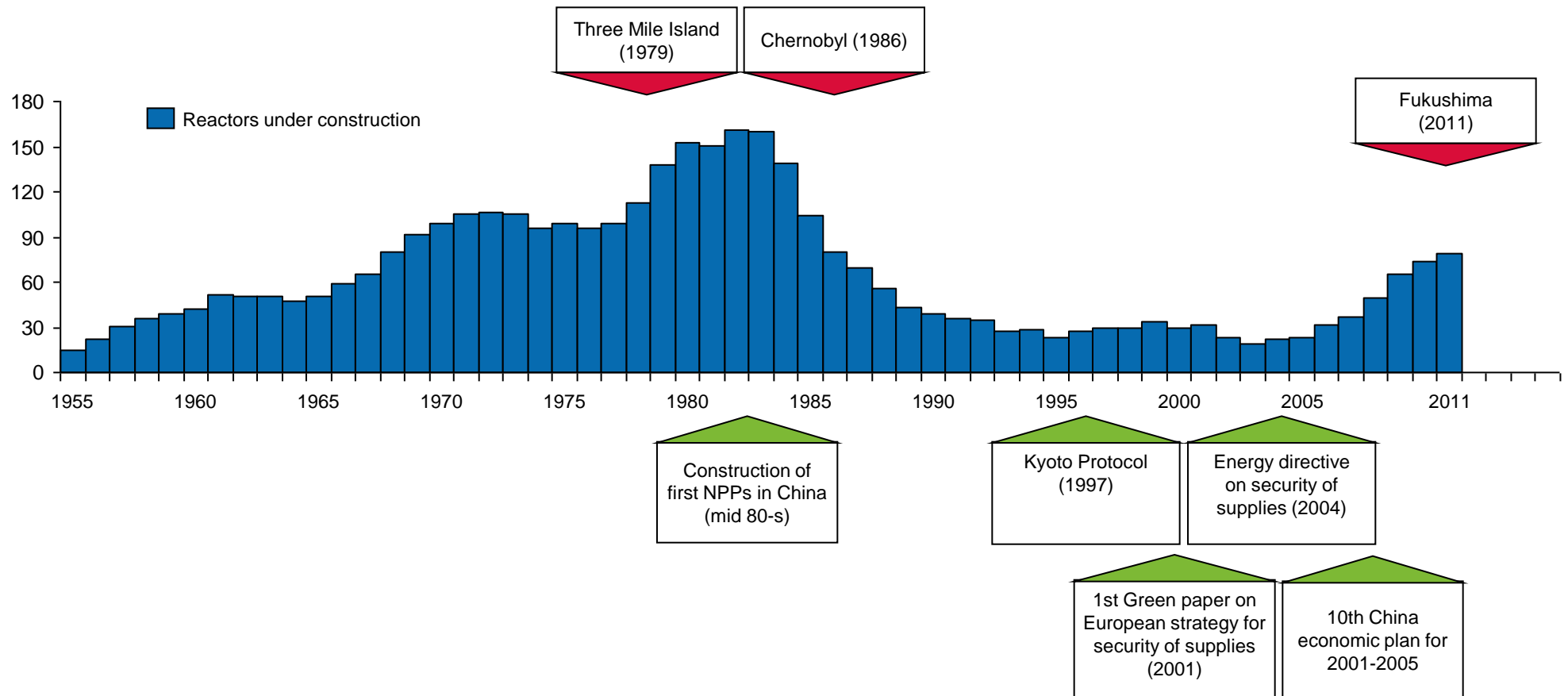
ATOMEX Europe 2011

Global nuclear industry after Fukushima

Lars Meckenstock

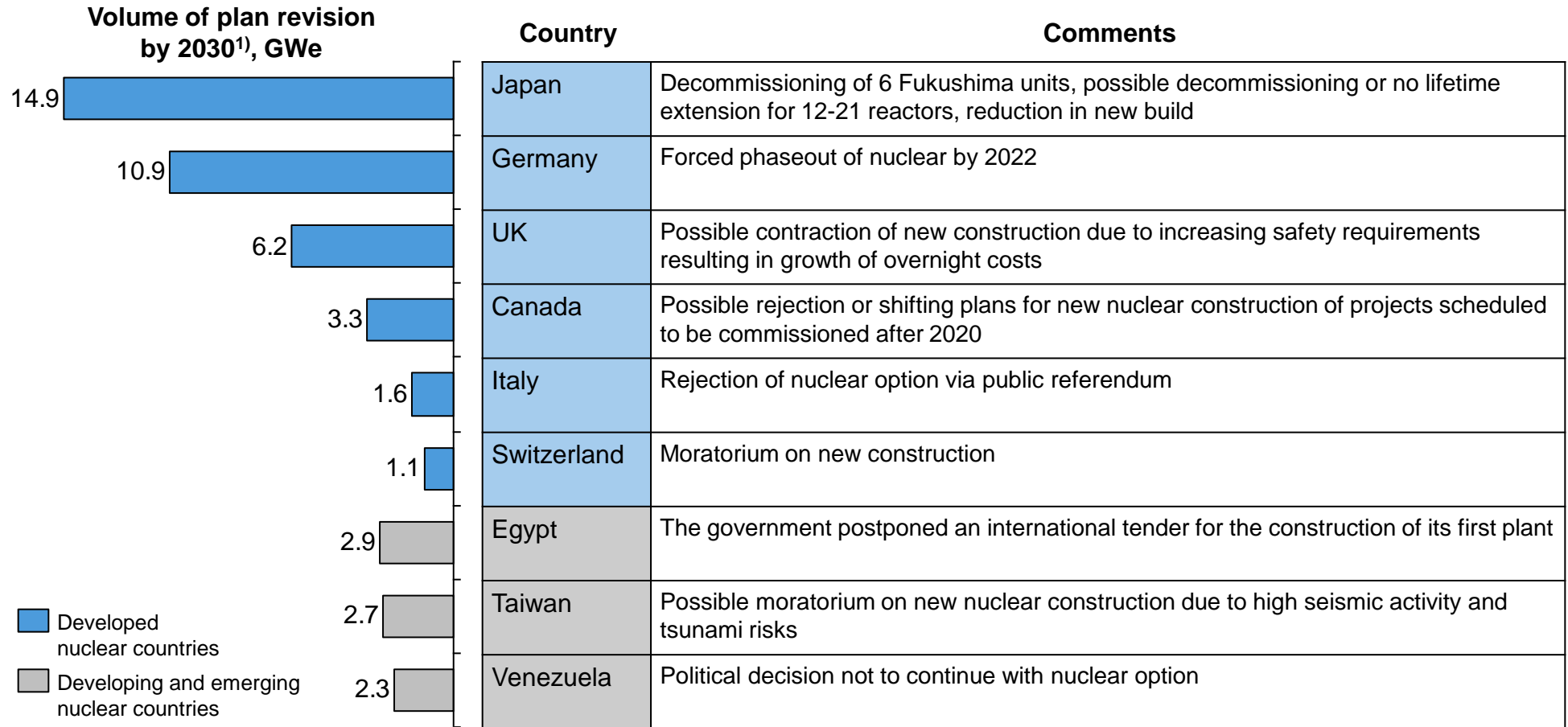
25 October 2011

Nuclear accidents of the 1980s had dramatic impact on the industry, but new favourable factors appeared since that time



Source: IAEA, Booz & Company analysis

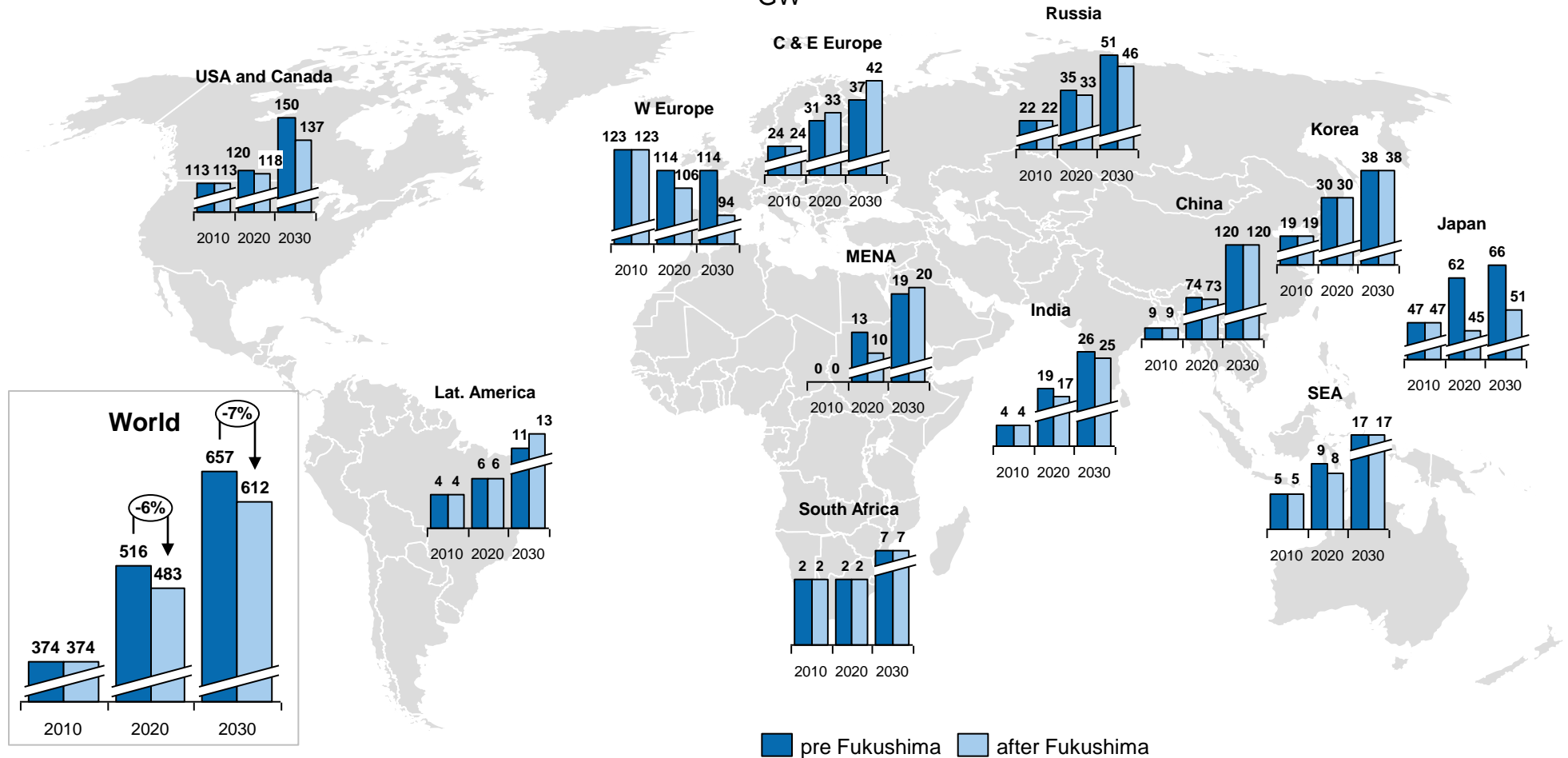
Tragic events at Fukushima affected mostly policies of developed nuclear countries, while others still keep their ambitions high



1) Difference between current and pre-Fukushima base case scenarios in Booz & Company Global Nuclear Market Model. Based both on countries' official statements and assumptions on the outcome of public talks on nuclear
 Source: Booz & Company Global Nuclear Market Model, Booz & Company analysis

That will allow to increase installed nuclear power generation capacities on the global level by 2030 despite Fukushima effect

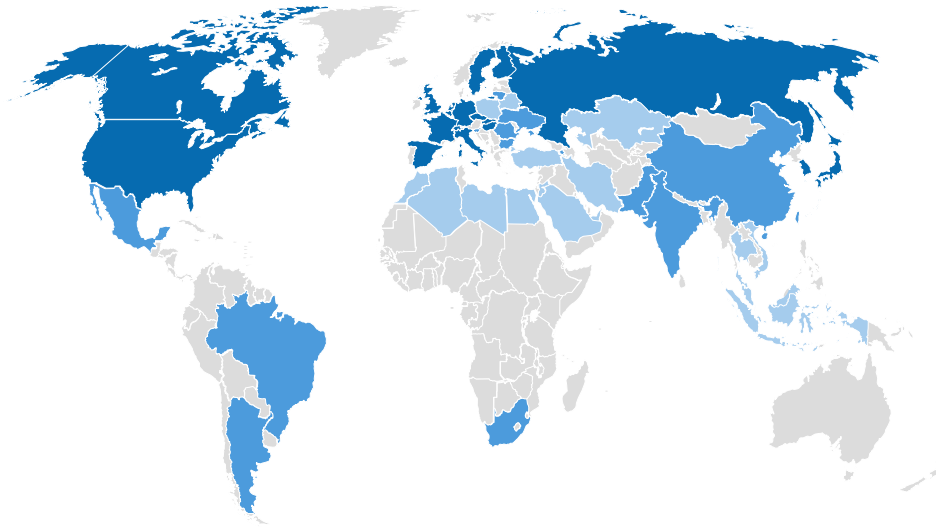
Installed capacity of NPPs
GW



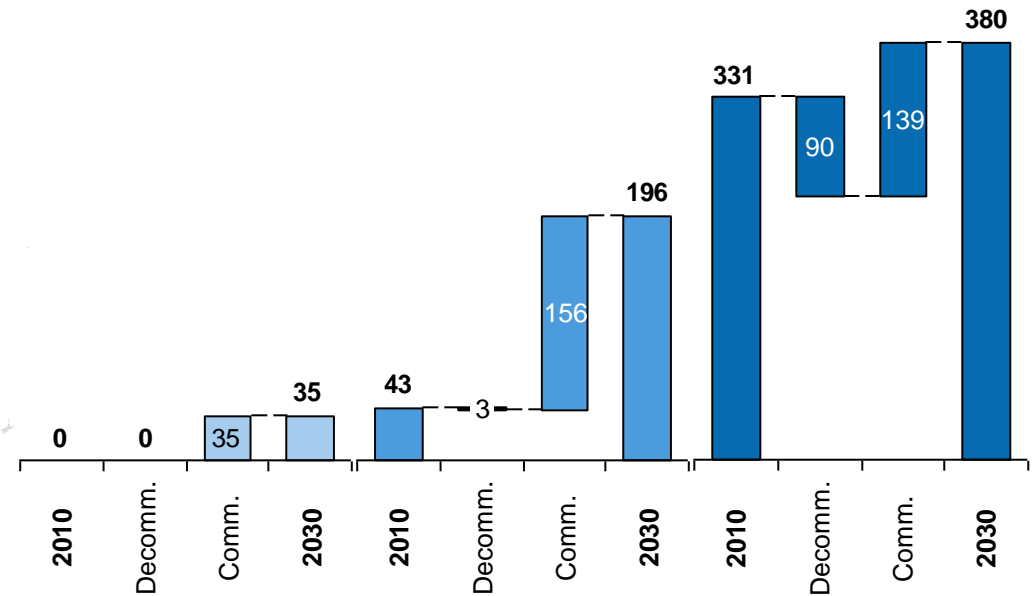
Source: Booz & Company Global Nuclear Market Model

Key segment of such growth would be developing and emerging nuclear countries

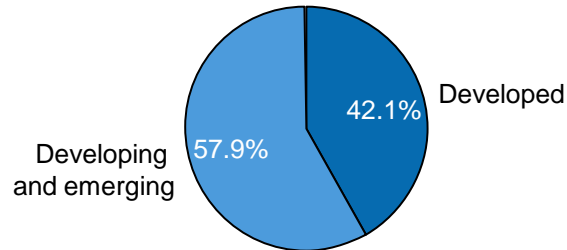
Geography of nuclear markets



Installed NPP capacity GWe



NPP construction by GWe commissioned 2011-2030



Emerging nuclear	Developing nuclear	Developed nuclear
Countries of South-East Asia, Middle East and North Africa, Turkey, Poland, Belarus, Kazakhstan	China, India, Latin America, most East European countries, South Africa	USA, France, Russia, Japan, Canada, South Korea, Czech Republic, most West European countries

Source: Booz & Company Global Nuclear Market Model, Booz & Company analysis

Newcomers impose additional requirements on nuclear engineering and construction companies

Types of countries and their requirements

Type of country	Relevant group of countries	Reasons for development of nuclear	Requirements to suppliers	Examples
Seeking Nuclear solution	<ul style="list-style-type: none"> • Developed • Developing 	Eager to enter global nuclear market in the future or extend current positions basing on their own indigenous nuclear programs	<ul style="list-style-type: none"> • Localization of construction and of equipment production • Technologies transfer 	China
Seeking Industrial solution	<ul style="list-style-type: none"> • Developed • Developing • Emerging 	Focused on stimulating and developing local engineering, machinery and construction industry as well as creation of jobs for population	<ul style="list-style-type: none"> • Localizing machinery and equipment. 	Czech, India, Brazil, Saudi Arabia
Seeking Energy solution	<ul style="list-style-type: none"> • Emerging 	Primary target is just meeting energy demand and diversifying sources of energy supply	<ul style="list-style-type: none"> • Integrated offers (turnkey or BOO(T) projects) • Localization mostly limited to site construction works 	Turkey, UAE

Reaction of suppliers

Examples
<ul style="list-style-type: none"> • Westinghouse AP-1000 as a base of Chinese nuclear program
<ul style="list-style-type: none"> • India is in the process of negotiating localization of equipment production with Rosatom • Argentina and Brazil are discussing localization topics with potential reactor suppliers
<p>Suppliers are cooperating and offering integrated solutions (e.g.):</p> <ul style="list-style-type: none"> • Rosatom: first BOO project in nuclear industry (Akkuyu, Turkey) • Kepco: consortium with Hyundai, Samsung and Doosan • Areva: consortium with Total, GDF Suez, EdF and Alstom

Source: Booz & Company

Across all the segments global players should recognize new trends in “Post Fukushima” world

Segment	Implication for global nuclear technology companies
Reactors & Services	<ul style="list-style-type: none"> • Increased safety requirements • Ability to expand traditional set of services into new areas will be required from developing and emerging nuclear markets: <ul style="list-style-type: none"> • Education of client workforce • Technology transfer • Providing project finance • Shift from traditional EPC contracts to more complex contractual arrangements
Front-End	<ul style="list-style-type: none"> • Developing and emerging nuclear markets will be increasingly oriented on developing local capacities and resources (except enrichment segment) • In this environment ability of global front-end players to form local JVs can become core capability for keeping this part of their business profitable
Back-End	<ul style="list-style-type: none"> • Under increased scrutiny of safety standards additional demand and requirements will exist for back-end infrastructure development support especially in emerging countries • Suppliers to be successful would need to adopt their approach and provide complex solutions for SNF treatment in developing and emerging nuclear countries

Source: Booz & Company