

CONTENTS

1. INTRODUCTION.....	1	
2. THE NEW CONTEXT — ECONOMY, NEED AND MARKET	2	
2.1. The status of nuclear power plant competitiveness	2	
2.1.1. Existing plants.....	2	
2.1.2. Projecting costs of generating electricity for new plants.....	4	
2.2. Resulting implications	7	
3. APPROACHES TO REDUCE NEW PLANT COSTS	8	
3.1. Proven means to reduce capital costs.....	8	
3.2. New approaches to reduce capital cost	12	
3.2.1. Increased application of PSA in design and licensing.....	14	
3.2.2. Development of advanced technologies.....	26	
3.2.3. Application of passive systems	31	
3.2.4. Re-evaluation of user design requirements with a focus on economic competitiveness	34	
3.2.5. Improving the technology base for eliminating over-design.....	37	
3.2.6. International consensus regarding commonly acceptable safety requirements that would facilitate development of standardized designs....	37	
4. IMPLICATIONS FOR THE NUCLEAR COMMUNITY — LEARNING NEW WAYS AND FINDING A NEW BALANCE.....	38	
APPENDIX	41	
REFERENCES.....	45	
ANNEXES		
ANNEX 1	Turkey’s recent decision regarding the Akkuyu NPP	49
	<i>A. Bölme, A. Tanrikut</i>	
ANNEX 2	Building a new nuclear power plant in Finland? Studies performed.....	53
	<i>E. Patrakka</i>	
ANNEX 3	Nuclear power: A competitive option?	75
	<i>E. Bertel, P. Wilmer</i>	
ANNEX 4	Development of new nuclear power plants in the Republic of Korea	85
	<i>Jung-Cha Kim, Kee-Cheol Park</i>	
ANNEX 5	Cost reduction and safety design features of ABWR-II.....	93
	<i>F. Koh, K. Moriya, T. Anegawa</i>	
ANNEX 6	Economical opportunities on advanced conventional island design for the European pressurized water reactor (EPR) based on KONVOI design	107
	<i>A. Kremayr, K. Wagner, U. Schubert</i>	
ANNEX 7	AP1000: Meeting economic goals in a competitive world.....	127
	<i>G. Davis, E. Cummins, J. Winters</i>	

ANNEX 8	Optimization of design solutions on safety and economy for power unit of NPP with VVER reactor of new generation.....	139
	<i>V.N. Krushelnitsky, V.M. Berkovich, Yu. Shvyrayev, A.K. Podshebaykin, N.S. Fil</i>	
ANNEX 9	Development of new nuclear power plant in Argentina	149
	<i>V. Mutsumi, Ishida Fukami</i>	
ANNEX 10	Key thrusts in next generation CANDU	157
	<i>B.A. Shalaby, D.F. Torgerson, R.B. Duffey</i>	
ANNEX 11	What it would take to order new nuclear plants — Japanese perspective	165
	<i>A. Omoto</i>	
ANNEX 12	Cost reduction and safety design features of CNP1000.....	177
	<i>Zhang Senru</i>	
ANNEX 13	Cost reduction and safety design features of new nuclear power plants in India	193
	<i>V.K. Sharma</i>	
ANNEX 14	The use of probabilistic safety analysis in design and operation — Lessons learned from Sizewell B.....	203
	<i>N.E. Buttery</i>	
ANNEX 15	Cost and risk reduction using upfront licensing in Canada	217
	<i>V.G. Snell</i>	
ANNEX 16	Trends and needs in regulatory approaches for future reactors.....	233
	<i>T.S. Kress</i>	
ANNEX 17	A completely new design and regulatory process — A risk-based approach for new nuclear power plants	241
	<i>S.E. Ritterbusch</i>	
ANNEX 18	Expected benefit from new approach for equipment purchasing policy....	251
	<i>J.-P. Launay</i>	
ANNEX 19	The application of an integrated approach to design, procurement and construction in reducing overall nuclear power plant costs.....	261
	<i>R. Didsbury, B.A. Shalaby, D.F. Torgerson</i>	
ANNEX 20	New technologies for lower-cost design and construction of new nuclear power plants.....	271
	<i>S.E. Ritterbusch, R.E. Bryan, D.L. Harmon</i>	
CONTRIBUTORS TO DRAFTING AND REVIEW		289