



EPRI

ELECTRIC POWER
RESEARCH INSTITUTE

The Need for Standards & Productivity Improvement in the Electric Sector

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Plenary

Measurement Science Needs for Advancing Infrastructure Delivery (MS-AID)

Sponsored by the National Institute for Standards & Technology (NIST)

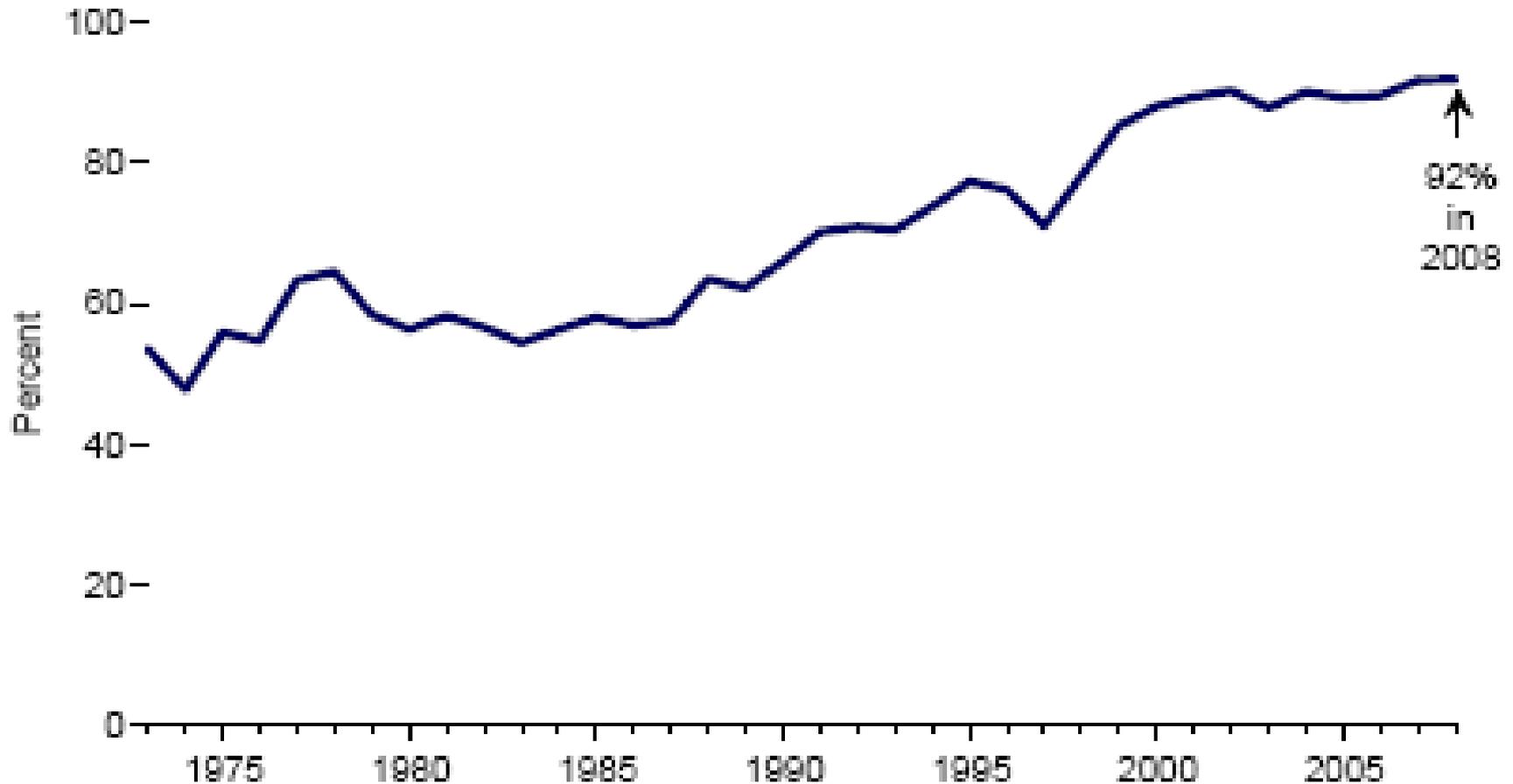
May 19, 2010

The horizon

- More electric generating plants
- More work at each plant
 - Safety, environmental, security compliance
- Less people

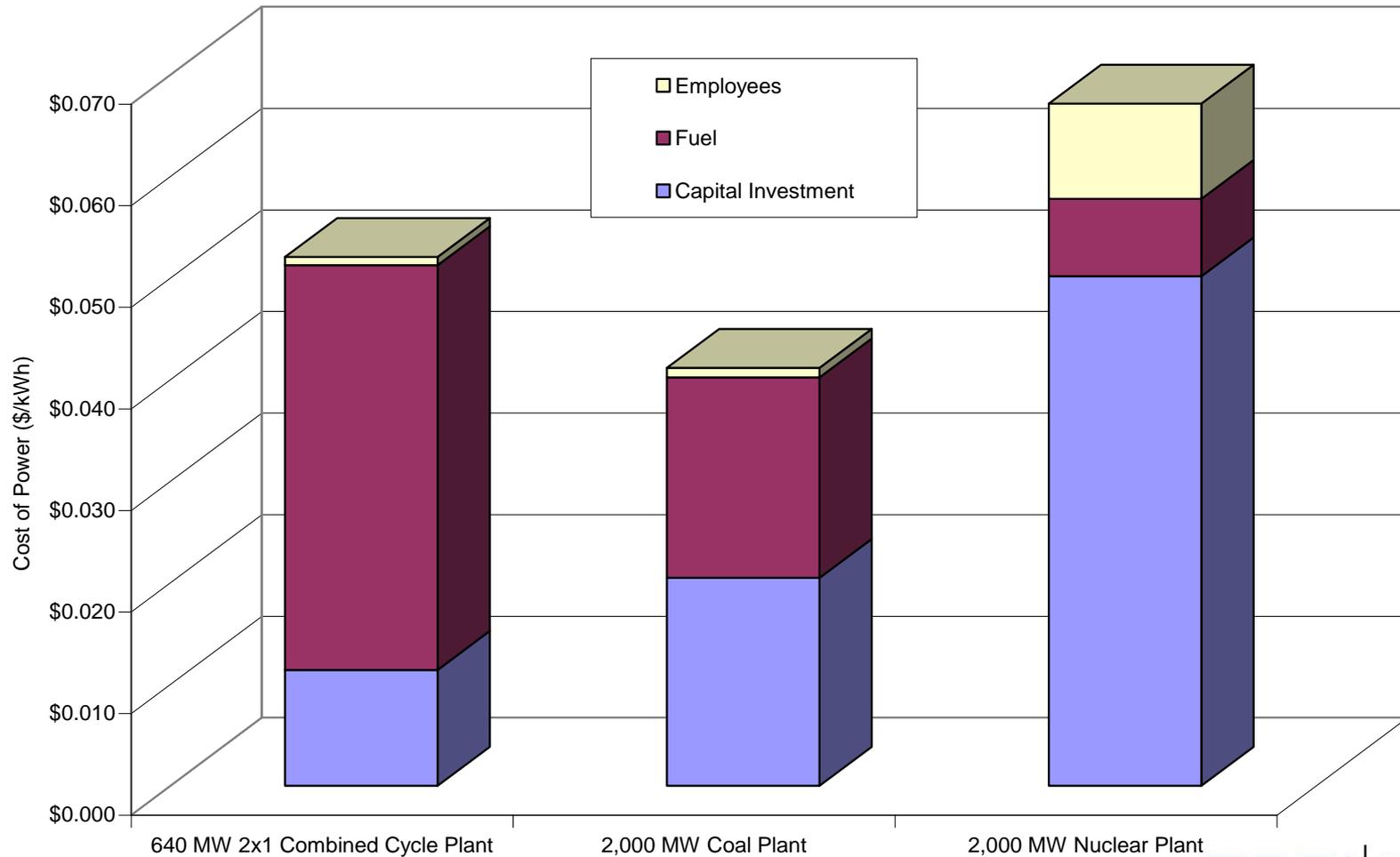
Running more hours not realistic...

Capacity Factor, 1973-2008



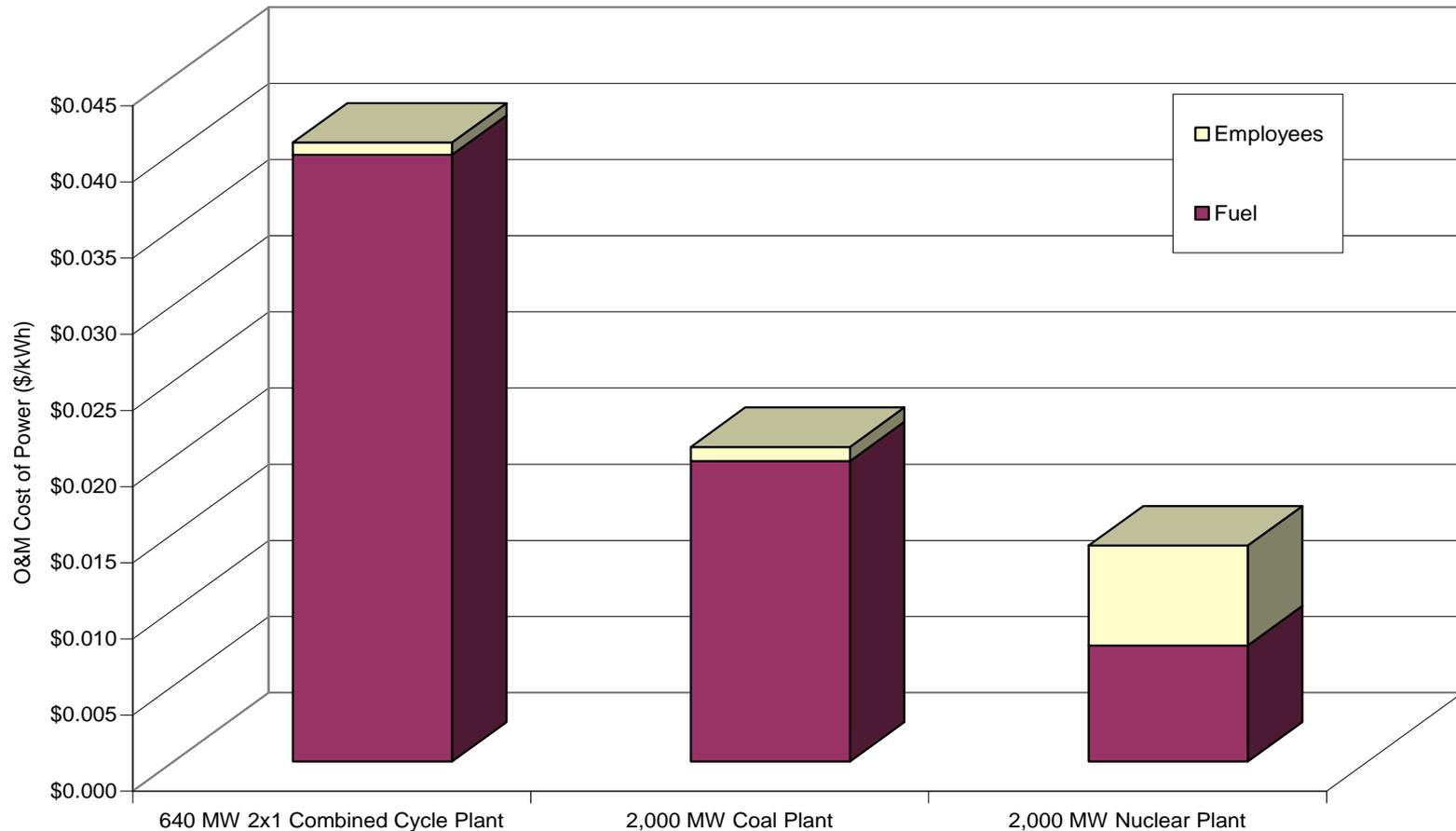
Capital costs can dominate overall costs...

Economic Comparison of Various Power Generating Technologies



But employees dominate O&M...

Economic Comparison of Various Power Generating Technologies

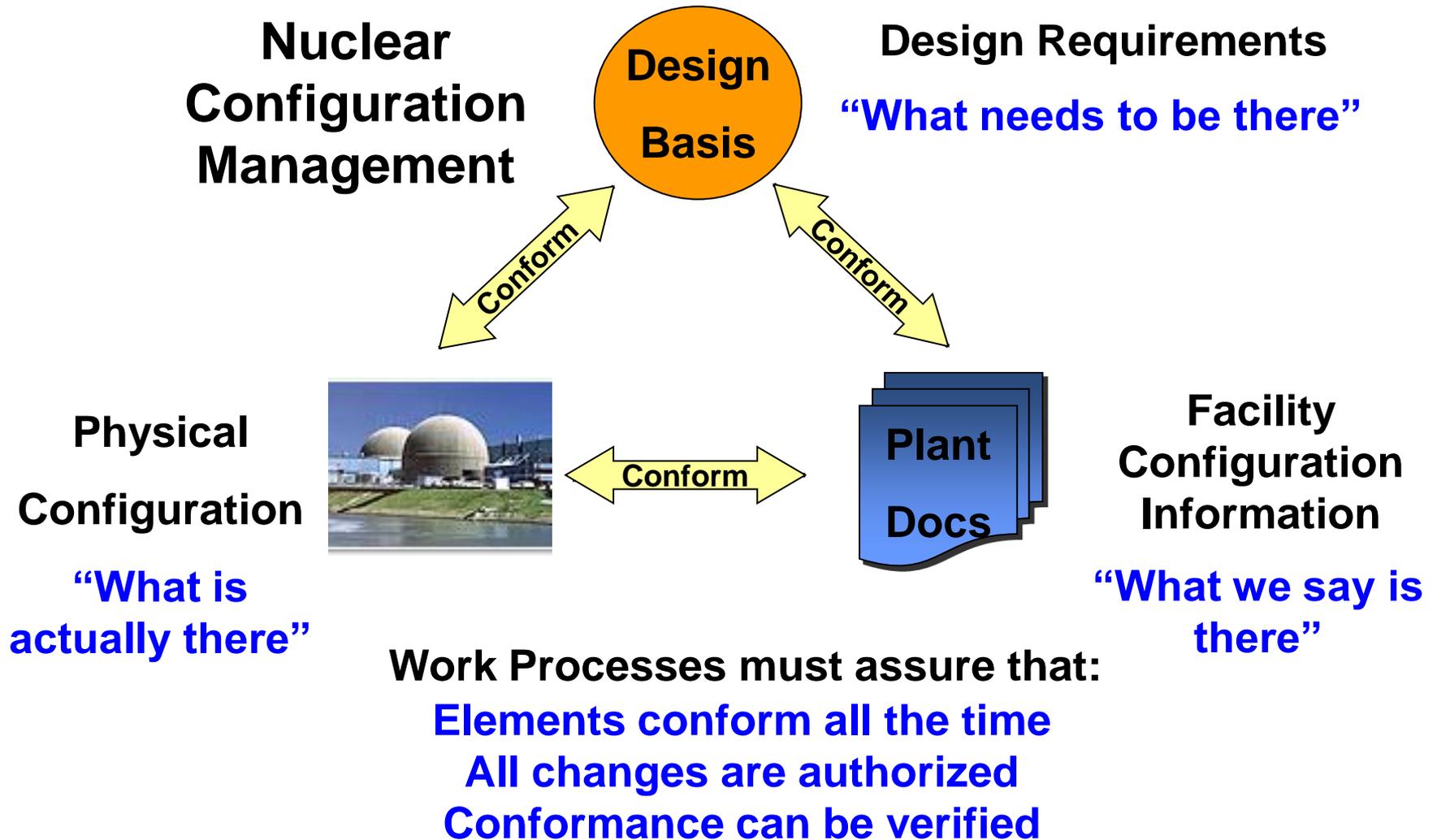


Nuclear task analysis... current

Plant Organization	Current	
	Staff	Cost
Maintenance		
I&C Maintenance	29	\$2,853,535
Electrical Maintenance	8	\$754,297
Mechanical Maintenance	25	\$2,450,240
Facility Maintenance	57	\$4,919,782
Maintenance Management	12	\$1,497,600
Operations		
Plant Operators	66	\$6,521,611
Off-Shift Operations	8	\$632,000
Operations Support	14	\$1,601,600
Engineering		
Systems Engineering	30	\$4,077,216
Design Engineering	25	\$3,397,680
Engineering Technical Services	23	\$3,125,866
Scheduling		
On-line Scheduling	9	\$1,123,200
Outage Scheduling	6	\$748,800
Training		
Technical Instructors and Support	17	\$1,996,800
Operations Instructors	15	\$1,872,000
Managers	5	\$624,000
Radiation Protection	35	\$3,680,874
Chemistry	24	\$2,551,535
Management Support Systems		
Finance	7	\$873,600
Licensing	5	\$624,000
Emergency Planning	5	\$624,000
Quality Assurance	5	\$624,000
Nuclear Assessment	13	\$1,622,400
Document Services	12	\$748,800
Information Technology	0	\$0
Manager	1	\$124,800
Security	131	\$8,399,200
Corporate	0	\$0
Total	587	\$58,269,436

From: *Task Evaluations for Nuclear Plant I&C Modernization Strategies*. EPRI, Palo Alto, CA: 2005. Product 1011934

New Plants - The Must



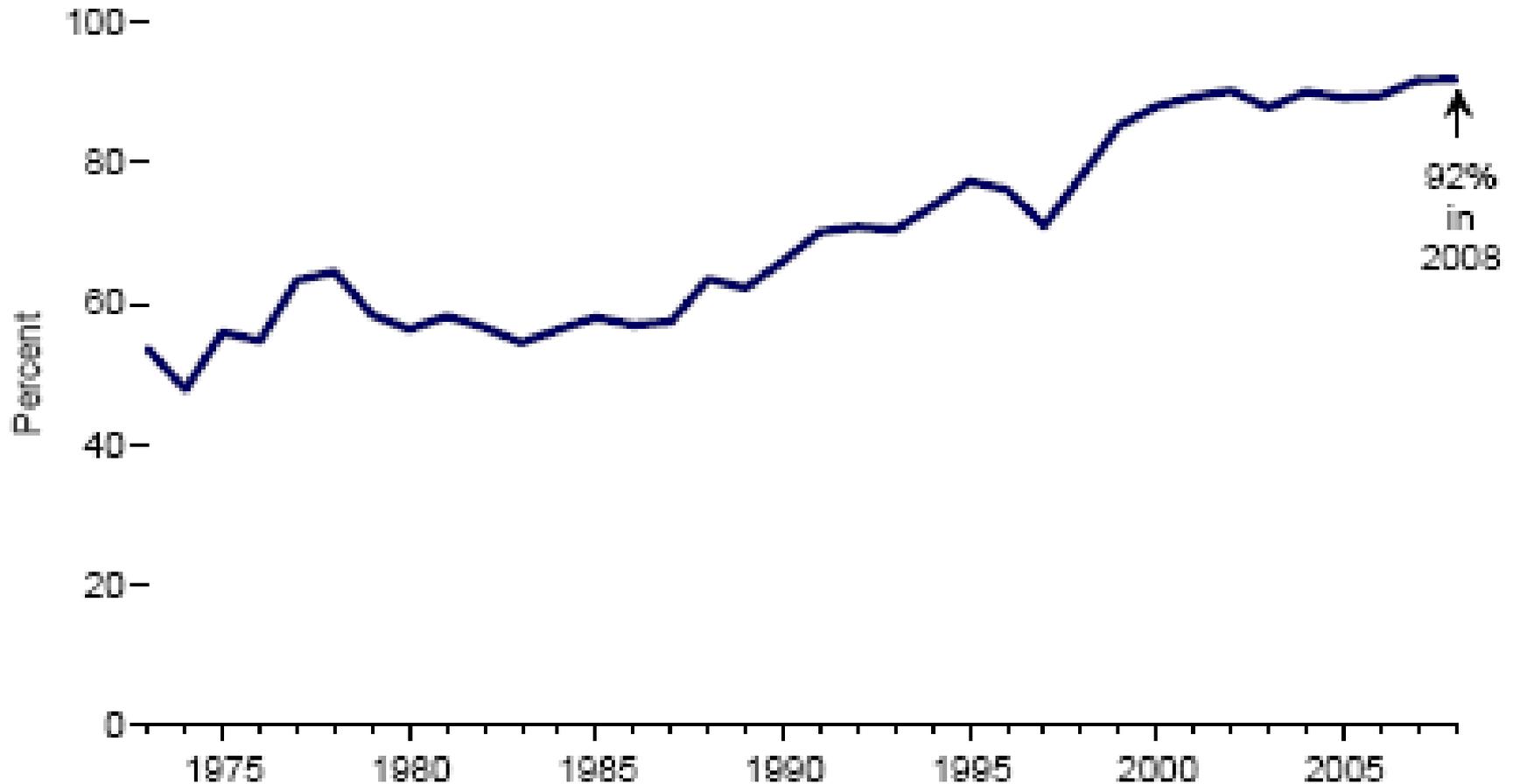
Nuclear task analysis... & reduced

Plant Organization	Current		Reduction Estimate			
	Staff	Cost	Staff	Cost	% of Current	% of Total
Maintenance						
I&C Maintenance	29	\$2,853,535	20	\$1,990,192	70%	19%
Electrical Maintenance	8	\$754,297	2	\$195,019	26%	2%
Mechanical Maintenance	25	\$2,450,240	6	\$548,854	22%	5%
Facility Maintenance	57	\$4,919,782	6	\$686,400	14%	6%
Maintenance Management	12	\$1,497,600	3	\$374,400	25%	3%
Operations						
Plant Operators	66	\$6,521,611	13	\$1,285,731	20%	12%
Off-Shift Operations	8	\$632,000	1	\$104,000	13%	1%
Operations Support	14	\$1,601,600	1	\$62,400	4%	1%
Engineering						
Systems Engineering	30	\$4,077,216	8	\$1,087,258	27%	7%
Design Engineering	25	\$3,397,680	0	\$0	0%	0%
Engineering Technical Services	23	\$3,125,866	4	\$543,629	17%	4%
Scheduling						
On-line Scheduling	9	\$1,123,200	2	\$249,600	22%	2%
Outage Scheduling	6	\$748,800	1	\$124,800	17%	1%
Training						
Technical Instructors and Support	17	\$1,996,800	5	\$624,000	31%	5%
Operations Instructors	15	\$1,872,000	3	\$374,400	20%	3%
Managers	5	\$624,000	1	\$124,800	20%	1%
Radiation Protection	35	\$3,680,874	11	\$1,192,335	32%	10%
Chemistry	24	\$2,551,535	1	\$98,010	4%	1%
Management Support Systems						
Finance	7	\$873,600	6	\$748,800	86%	6%
Licensing	5	\$624,000	3	\$374,400	60%	3%
Emergency Planning	5	\$624,000	4	\$499,200	0%	4%
Quality Assurance	5	\$624,000	0	\$0	0%	0%
Nuclear Assessment	13	\$1,622,400	5	\$624,000	38%	5%
Document Services	12	\$748,800	7	\$436,800	58%	7%
Information Technology	0	\$0	0	\$0	0%	0%
Manager	1	\$124,800	0	\$0	0%	0%
Security	131	\$8,399,200	8	\$497,638	6%	7%
Corporate	0	\$0	-13	(\$1,666,829)	0%	-12%
Total	587	\$58,269,436	108	\$11,180,836	19%	100%

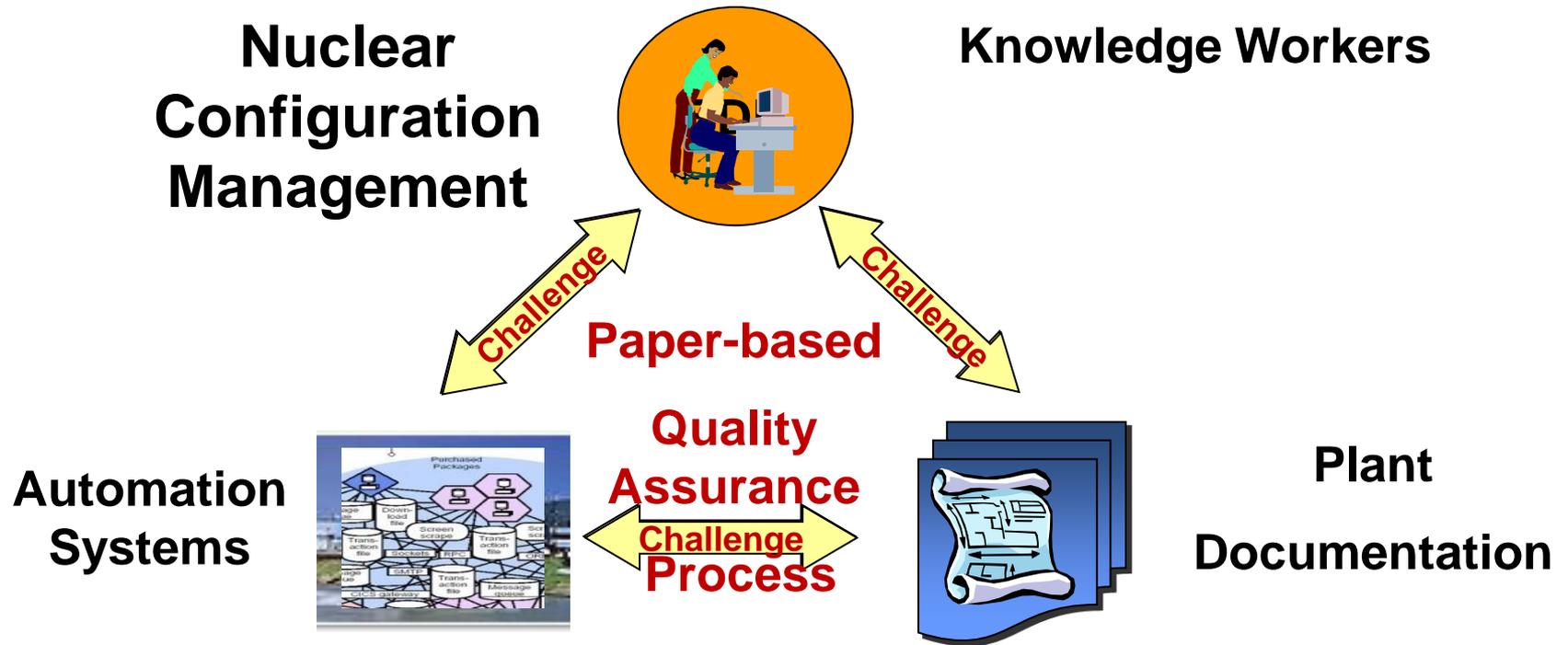
From: Task Evaluations for Nuclear Plant I&C Modernization Strategies. EPRI, Palo Alto, CA: 2005. Product 1011934

Can this performance be maintained?

Capacity Factor, 1973-2008



The Challenge



Lots of Tribal Knowledge , Semi-Connected and Disconnected Systems, Manual Processes and yes.....Paper

Babel avoidance...



The Confusion of Tongues by Gustave Doré (1865).

EPRI Advanced Nuclear Technology - Project Goal

- We need a common data language and interoperability standards that will be used by the nuclear plant sub-tier suppliers through the suppliers through the EPC and reactor vendors and finally through to the owner and operator
- Need to develop a roadmap for New Nuclear Build data handover and configuration management
- Electronic delivery of compliant, “as-built” information for smarter operation and maintenance

Productivity Improvement Through Advanced Technology – New EPRI Group

- Kick-off Meeting: Tuesday, June 29, 2010 8:00 AM - Wednesday, June 30, 2010 5:00 PM
- Sign up at:
<http://guest.cvent.com/i.aspx?4W,P1,36D5F50E-48EA-47ED-87BD-A267659731F3>
- EPRI technical contact: Dr. Joseph Naser,
jnaser@epri.com

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