

Strategic View – Nuclear Outlook: Construction Needs and Opportunities



Roundtable / Dinner



Nuclear Energy Insider
Annual Construction Summit
--October 23, 2012

Linton Consulting

Strategic View – Nuclear

Outlook: Construction Needs and Opportunities



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Why Are We Here?



- ◆ Knowledge exchange
 - Status of nuclear revival
 - Challenges for the EPC Supply Chain
- ◆ Share insights / perspectives
 - Utilities (demand side)
 - Vendors & suppliers (supply side)
 - Advisors, associations & advocacy groups
- ◆ Timely issues with a lot of associated questions
 - Electricity demand growth outlook
 - Natural gas prices
 - Financing issues
 - Fukushima response
 - Huge repair & retrofit projects

Key Questions



- ◆ What is the outlook for EPC services now?
- ◆ What projects do owners/licensees see coming?
- ◆ Where should EPCs look for opportunities in nuclear?
- ◆ When will we see additional new build opportunities in U.S.?
- ◆ Where will global new build opportunities be?
- ◆ What repair/retrofits are expected?
- ◆ What mods and work will be required for FS response?
- ◆ What D&D and other large projects are coming
- ◆ What is the future for EPC contractors and utility engineering staffs?

Overview



- ◆ Following years of talk about a nuclear renaissance in the U.S., we have seen 5-6 units licensed and under construction
- ◆ Global demand for new NPPs has spread to China, India, Korea, Eastern Europe and the Middle East
- ◆ Fukushima impact
 - Delaying (not halting) new build
 - Increasing safety upgrade investment
- ◆ Financing challenges in the U.S. have dampened demand
- ◆ The “Waste Confidence” ruling to impact momentum?

Expected U.S. Procurements



- ◆ Repair & Retrofit
 - San Onofre, Crystal River
- ◆ Fukushima-response work
 - Flood control retrofits (Example: Oconee, Ft. Calhoun)
 - Buying equipment for disaster mitigation
 - Backup diesel generators, batteries
 - Dry cast storage
- ◆ Normal O&M
 - Finding replacement parts
 - Outage work
- ◆ Digital Upgrades
 - New digital equipment
 - Software and programming

Expected Procurements



- ◆ D&D
 - U.S. DOE – multiple sites
 - Private sector decommissioning
- ◆ D&D Canada
- ◆ Waste Repositories
- ◆ Global Opportunities
 - China
 - India
 - Eastern Europe
 - Middle East

Some Thoughts About Future of Commercial Nuclear



- ◆ Most demand for new plants outside U.S.
- ◆ U.S. regulations still considered ‘gold standard’
- ◆ U.S. EPCs highly respected
 - Will continue to participate globally (with 1-2-3 agreements)
 - Unstable demand difficult for Shaw, Fluor, Bechtel, Others
- ◆ Still ‘local content’ will be important
 - Will require program management
 - Extensive subcontracting
- ◆ Korea, a formidable competitor will grow
- ◆ China, India Nuclear Vendors and EPC capabilities will grow
- ◆ 2030 U.S. unlikely to be in the industry leadership position
- ◆ What role should leading EPCs expect?

Some Thoughts About Future of Commercial Nuclear



- ◆ SMRs may succeed and U.S. may lead
 - Bechtel and Fluor have taken partnership positions
 - Hope is installation in many global locations
 - SMRs will be a long term payback

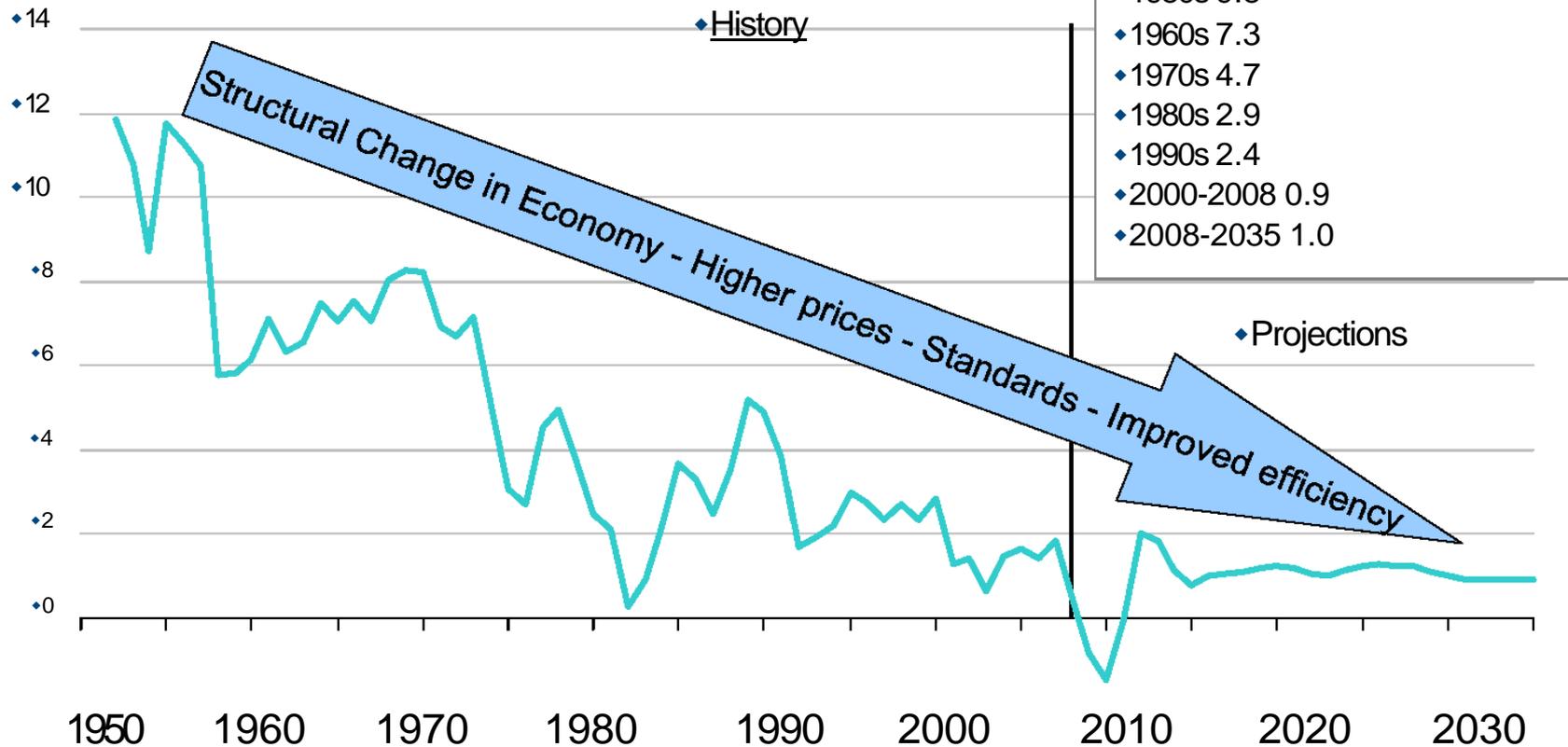


Appendix

U.S. Electricity Use Growth – Slowing



◆ 3-year rolling average percent growth



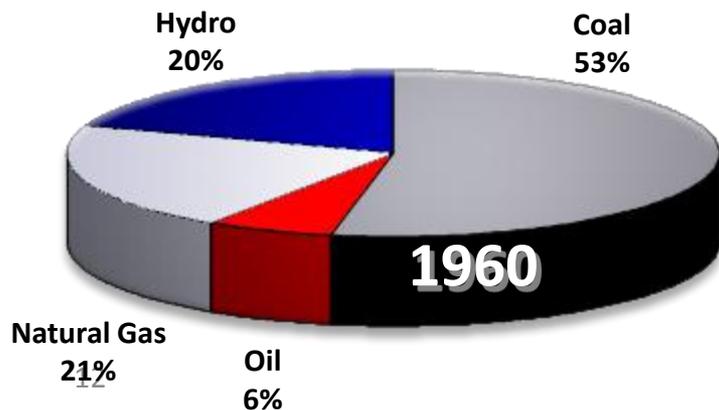
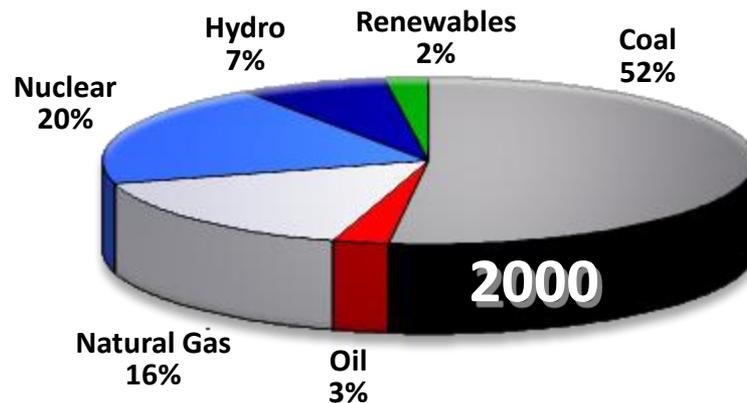
John Conti, USDOE, April 6th, 2010 Source: Annual Energy Outlook 2010

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Energy Dynamics

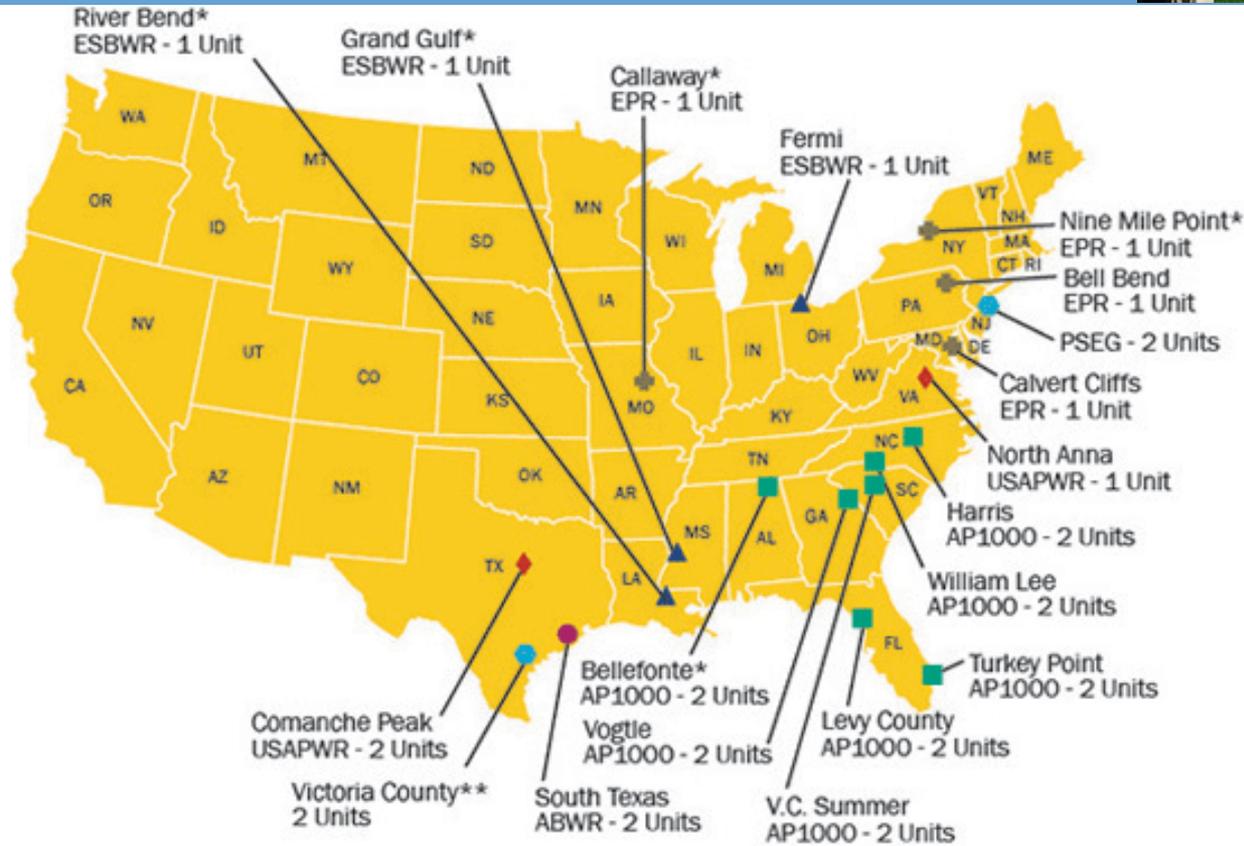


- ◆ U.S. Generation mix changes over time
- ◆ Nuclear share from zero to 20%
- ◆ Global growth expected



Scenarios for Nuclear Power

Proposed Reactors – How Many?



*Review Suspended by Applicant

** COL Application Amended by Applicant to ESP on 03/25/2010

Scenarios for Nuclear Power

Proposed Reactors – How Many Likely 5 Years?



X = Significant
Postponement
(Linton Assessment)

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Scenarios for Nuclear Power

Operating Reactors - 104



U.S. Commercial Nuclear Power Reactors—Years of Operation



Years of Commercial Operation

- △ 0-9
- ▲ 10-19
- ▲ 20-29
- ▲ 30-39

Number of Reactors

- 0
- 10
- 42
- 52

Source: U.S. Nuclear Regulatory Commission

“The future of nuclear will be driven more by existing plants than new builds”

“Recent events in Japan are likely to result in changes at existing U.S. nuclear plants...”

--NRC Commissioner Gregory Jaczko

Scenarios for Nuclear Power

Operating Reactors - 104



U.S. Commercial Nuclear Power Reactors—Years of Operation



“Fukushima”
upgrades to cost
Billions?

“Operating plants
spend \$400 million
for goods and
services per year”

“It will cost Billions
to fix Crystal River”

Years of Commercial Operation	Number of Reactors
△ 0-9	0
▲ 10-19	10
▲ 20-29	42
▲ 30-39	52

Source: U.S. Nuclear Regulatory Commission

Global Growth is Likely



WNA NUCLEAR CENTURY OUTLOOK

MAJOR NUCLEAR PROGRAMMES*	2008	2030 Low	2030 High	2060 Low	2060 High	2100 Low	2100 High
<i>Units - 1GWe</i>							
Belarus	0	2	5	5	8	5	10
Belgium	6	6	8	8	10	8	22
Brazil	2	10	30	40	100	70	330
Bulgaria	2	4	7	5	7	5	7
Canada	13	20	30	25	40	30	85
China	9	35	100	150	750	500	2800
Czech Republic	3	5	7	5	12	5	15
Finland	3	5	7	8	10	8	11
France	63	65	75	80	110	80	130
Germany	20	20	50	40	80	80	175
Hungary	2	4	5	4	8	5	12
India	4	20	70	60	350	200	2750
Japan	48	55	70	80	140	80	200
Lithuania/ Latvia/ Estonia	1	4	6	5	8	5	8
Netherlands	1	1	5	7	20	10	35
Romania	1	4	10	5	20	10	25
Russia	22	30	70	75	180	100	200
Slovakia	2	3	4	4	5	5	7
Slovenia	1	1	1	1	2	1	2
South Korea (and North Korea)	18	25	50	45	80	70	145
Spain	7	8	20	20	50	25	60
Sweden	9	10	15	10	18	10	18
Switzerland				5	10	5	11

Source: World Nuclear Association Website

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Insights for Industry and Government



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Who Is Linton Consulting?

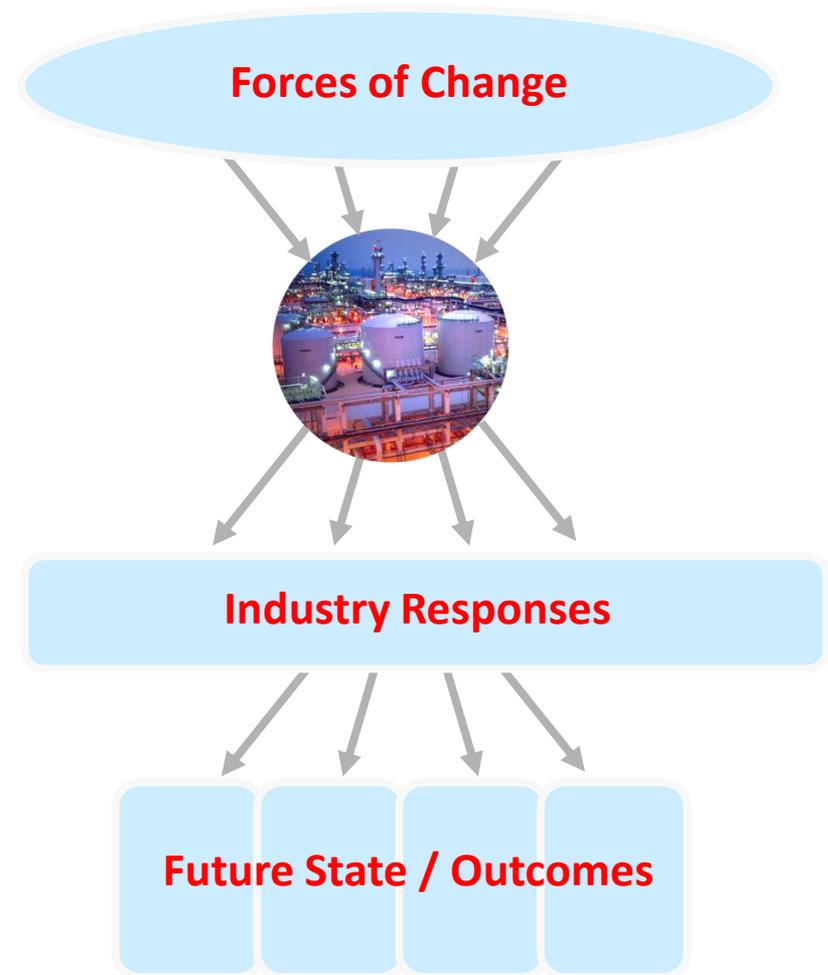


- ◆ A professional practice providing independent insights and advisory services to industry and government
- ◆ Focus: Energy, Power, Nuclear
- ◆ Business strategy, market development, diversification, trend analyses, scenarios and visioning
- ◆ Executive relationships and introductions
- ◆ Strategic View
 - Process develops high level insights on the future state
 - Ongoing analyses and executive interviews
 - *Strategic View* Nuclear 2013
- ◆ Services leading to sound business strategies, decisions, plans and implementation

What is *Strategic View*?



- ◆ Research model
 - Used 15 years; 5 in energy
 - Forces affecting the future of the energy industry
 - Industry responses
 - Where it is leading – the future state/outcomes
- ◆ Process
 - Interviews with executives and thought leaders
 - Research & analysis
 - Executive Roundtable
 - Follow up & plan integration



Executive Roundtables



◆ Common purpose

- Convene executives and thought leaders for knowledge exchange
- Expand understanding
- Share perspectives
- Confirm/challenge paradigms
- Advise leadership
- Uncover ideas and opportunities for your organization
- Explore Future – trends and challenges
- Establish practical, realistic path forward



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