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6 RE: AMERICAN NUCLEAR ENERGY EXPANSION:

7 POWERING A CLEAN AND SECURE FUTURE

8 TUESDAY, APRIL 18, 2023

9 House of Representatives,

10 Subcommittee on Energy, Climate and Grid Security,

11 Committee on Energy and Commerce,

12 Washington, D.C.

13

14

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16 The Subcommittee met, pursuant to call, at 2:19 p.m., in

17 Room 2123, Rayburn House Office Building, Hon. Jeff Duncan

18 [Chairman of the Subcommittee] presiding.

19 Present: Representatives Duncan, Burgess, Latta,

20 Guthrie, Griffith, Johnson, Bucshon, Walberg, Palmer, Curtis,

21 Lesko, Pence, Armstrong, Weber, Balderson, Pfluger, Rodgers

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22 [ex officio]; DeGette, Peters, Fletcher, Matsui, Tonko.
23 Veasey, Kuster, Schrier, Castor, Sarbanes, Cardenas, Blunt
24 Rochester, and Pallone [ex officio].

25

26 Staff present: Kate Arey, Digital Director; Sarah
27 Burke, Deputy Staff Director; Syndney Greene, Director of
28 Operations; Jack Heretik, Director of Operations; Nate
29 Hodson, Staff Director; Tara Hupman, Chief Counsel; Sean
30 Kelly, Press Secretary; Peter Kielty, General Counsel; Emily
31 King, Member Services Director; Elise Krekorian, Professional
32 Staff Member, Energy; Mary Martin, Chief Counsel, Energy &
33 Environment; Jacob McCurdy, Professional Staff Member,
34 Energy; Kaitlyn Peterson, Clerk, Energy & Environment; Karli
35 Plucker, Director of Operations (shared staff); Carla Rafael,
36 Senior Staff Assistant; Emma Schultheris, Staff Assistant;
37 Olivia Shields, Communications Director; Peter Spencer,
38 Senior Professional Staff Member, Energy; Michael Taggart,
39 Policy Director; Dray Thorne, Director of Information
40 Technology; Waverly Gordon, Minority Deputy Staff Director
41 and General Counsel; Tiffany Guarascio, Minority Staff
42 Director; Kris Pittard, Minority Professional Staff Member;

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43 Kylea Rogers, Minority Policy Analyst; Medha Surampudy,
44 Minority Professional Staff Member; Tuley Wright, Minority
45 Staff Director Energy, Climate, and Grid Security; and Camden
46 Burk, Minority Intern
47

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48 *Mr. Duncan. All right. The Subcommittee on Energy,
49 Climate, and Grid Security will now come to order. We are
50 going to address today the American Nuclear Energy Expansion:
51 Powering a Clean and Secure Future.

52 The Chair will now recognize himself for five minutes
53 for an opening statement.

54

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55 STATEMENT OF THE HON. JEFF DUNCAN, A REPRESENTATIVE IN
56 CONGRESS FROM THE STATE OF SOUTH CAROLINA

57

58 *Mr. Duncan. I want to thank all of you for being here.
59 I called this hearing to set the table for what I hope will
60 be bipartisan, durable policymaking this Congress to expand
61 American nuclear energy and its many benefits for the nation.

62 I think we are off to a good start. Just last week,
63 Chair Rodgers, Ranking Member Pallone, Subcommittee Ranking
64 Member DeGette, and I wrote a number of key nuclear
65 associations and stakeholders to assist our efforts.

66 We asked for comments and recommendations for what may
67 be needed to update nuclear licensing and regulatory
68 activities to provide for a robust and growing industry.

69 The stakeholder information we seek will inform our work
70 to deploy more nuclear energy.

71 Just yesterday, several of my colleagues on this
72 Committee and I returned from a trip to Europe. We met with
73 several groups excited about the promise of deploying more
74 nuclear, especially advanced reactors like SMRs. And I
75 believe the Chairwoman will probably talk a little bit more

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76 about that.

77 While Many European countries are expanding nuclear
78 power, Germany is actively shutting it down. Just on Sunday,
79 stopping and closing three nuclear reactors. We cannot let
80 this be the reality in the United States. Nuclear energy
81 must be a part of our energy matrix.

82 To expand the industry, it is vital we encourage
83 regulatory certainty and make sure our reactor licensing
84 processes enable the safe and broad deployment of nuclear
85 technologies. This is especially important for advanced
86 reactor technologies.

87 The Department of Energy and the Nuclear Regulatory
88 Commission play important roles to advance a new era of
89 nuclear innovation.

90 DOE and its national labs provide critical support to
91 developing, demonstrating, and promoting advanced nuclear.
92 The NRC, of course, is important to assuring the public of
93 adequate protection of health and safety of our nuclear
94 operations.

95 I am from South Carolina. My state is a leader in
96 nuclear energy. Nuclear power is responsible for 54 to 58

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97 percent of electricity in the state and over 90 percent of
98 our carbon-free electricity.

99 We also are home to the Savannah River Site, a DOE
100 nuclear security enterprise site, which supports our nation's
101 nuclear weapons and environmental management missions

102 South Carolina also witnessed the failure of V.C.
103 Summer. This project has created perceived risks of
104 uncontrolled cost overrun and project abandonment, which has
105 limited commitment to new reactor development in this
106 country.

107 We cannot let this concern inhibit nuclear deployment.
108 Nuclear energy is by far our nation's leading source of
109 carbon-free electricity. It is also among the most reliable
110 sources of power, with a capacity factor surpassing 90
111 percent, more than any other generating source.

112 Being a leader in nuclear technology provides the United
113 States significant geopolitical advantage and leverage. A
114 robust nuclear energy export market gives America credibility
115 to set global nuclear norms, the guidelines that ensure safe
116 nuclear energy generation and exports.

117 Despite this, growth in the US nuclear industry has

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118 stagnated over the past decade. China and Russia are seizing
119 this opportunity and doubling down on their nuclear
120 investments.

121 We cannot cede our global leadership to adversaries. We
122 must prioritize modernizing our regulatory structure in the
123 United States and do what is needed to encourage growth
124 throughout the industry.

125 We also look at what is standing in the way of
126 demonstrating and deploying advanced reactors. Our engineers
127 are developing new reactor designs that promise less
128 expensive, more efficient, widely deployable, and walkway
129 safe.

130 We must modernize our licensing structure and establish
131 an advanced fuel supply to bring these technologies online.
132 The U.S. nuclear fleet is operating at the highest levels of
133 performance and safety in history. If you visit a nuclear
134 plant, you will see the commitment to safety in their
135 procedures.

136 Let's talk about that experience today and how it should
137 inform our policies.

138 Our witnesses today provide testimony from different

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139 perches in the stakeholder community, from a leading DOE
140 National Laboratory, to utilities and industry, to policy
141 think tanks. They can help guide us through some of the
142 promises and challenges to expanding nuclear energy here in
143 the United States.

144 I want to thank all of you for being here and I want to
145 yield the remainder of my time to Mr. Fulcher from Idaho to
146 introduce one of our panelists.

147 [The prepared statement of Mr. Duncan follows:]

148

149 *****COMMITTEE INSERT*****

150

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151 *Mr. Fulcher. Thank you, Mr. Chairman.

152 It's an honor for me to introduce, Dr. Jess Gehin today,
153 associate laboratory director at the Idaho National Lab. The
154 nation's nuclear laboratory in Idaho, the Gem State.

155 Dr. Gehin is responsible for research, development, and
156 demonstration of advanced reactors at INL through such
157 programs as the National Reactor Innovation Center.

158 He has 30 years of experience in our National Laboratory
159 system with a career focused on nuclear energy. Dr. Gehin
160 has served as the National Technical Director for the
161 Department of Energy's Microreactor Program. Currently, he
162 is working on INL small modular reactors that range from 220
163 to 300 megawatts of power.

164 Dr. Gehin has advanced degrees in nuclear energy,
165 including a Doctorate degree from Massachusetts Institute of
166 Technology. He was an Associate Professor at University of
167 Tennessee, is a Fellow of the American Nuclear Society.

168 And with that, Mr. Chairman, I welcome Dr. Gehin and
169 thank you. I yield back.

170 *Mr. Duncan. Well, I thank the gentleman for his
171 introduction. I am excited about today's hearing. We are

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172 going to delve into it. Jump into it with all fours, and
173 with that, I will recognize the Ranking Member DeGette for
174 five minutes.
175

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176 STATEMENT OF THE HON. DIANA DEGETTE, A REPRESENTATIVE IN
177 CONGRESS FROM THE STATE OF COLORADO

178

179 *Ms. DeGette. Thank you so much, Mr. Chairman.

180 As we look to transition our nation to zero-carbon
181 emitting forms of energy to stave off the worst effects of
182 the climate crisis, it is important to know the role that
183 nuclear energy can play in that fight.

184 Nuclear energy is responsible for generating nearly 20
185 percent of all of our natin's electricity. And it is now
186 responsible for almost half of the carbon-free electricity
187 that we create here in the United States.

188 So we know that to combat the climate crisis, we must
189 reduce our emissions. And the only way to do that is to
190 reduce our reliance on fossil fuels while electrifying every
191 part of our lives.

192 If done with rigorous, science-based regulations nuclear
193 energy can help us manage that load. It has the ability to
194 help us move towards a zero-carbon energy future without
195 sacrificing Americans access to the electricity that they
196 need.

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197 Because here is the thing, if we are going to reach our
198 climate goals, we are going to need a diverse mix of energy
199 sources and nuclear can be one of those sources. However,
200 that is not to say that nuclear energy is the single, perfect
201 solution to our country's energy needs.

202 In fact, if nuclear energy is to play a role in our
203 energy transition, we must address two things. First, the
204 United States must develop a comprehensive, science-based
205 strategy to dispose of spent fuel. A strategy that does not
206 cause harm to public health or our environment.

207 If we do not have a long-term permanent solution for
208 disposing of nuclear waste then we will struggle to be able
209 to use this source of carbon-free electricity. We must also
210 figure out how to handle the aging of our nuclear plants.

211 Since I have been in Congress, we have only had one new
212 nuclear power plant come online. And during that same time,
213 we have shut down and decommissioned many reactors across the
214 country, including the one reactor we had in my state of
215 Colorado.

216 Because of advancements in technology that have been
217 made over the years, the US nuclear industry has been able to

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218 maintain its non-carbon emitting electricity generation
219 capability for more than three decades now.

220 But with several more nuclear plants scheduled to close
221 in the coming years, and as the impacts of the climate crisis
222 become more apparent, we have to find ways to avoid any
223 reductions in the non-carbon emitting portfolio of our energy
224 sector.

225 As the Chairman said, he, and I, and the chairs of the
226 full Committee sent a series of letters yesterday to key
227 stakeholders in the nuclear industry asking for their input
228 and recommendations on how we can improve the licensing
229 process without sacrificing the health and safety of our
230 constituents.

231 So as we continue to invest in and expand our use of
232 nuclear energy in this country, it must be done in a way that
233 continues to protect the health and the safety of the
234 American people.

235 I am sure all of the witnesses here today will agree
236 with that foundational statement. We need rigorous, science-
237 based regulations and we need strict oversight. So I look
238 forward to hearing from the witnesses today about potential

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239 improvements to the application and licensing process.

240 I also believe, however, it's important that we hear
241 from the body overseeing this work, the Nuclear Regulatory
242 Commission.

243 And so, Mr. Chairman, I would ask that as a follow-up to
244 this hearing, we should have another hearing with
245 commissioners from the NRC to discuss, from their point of
246 view, where we can make improvements without sacrificing
247 public health and safety.

248 Thank you for having this hearing. I think this is a
249 great bipartisan step towards our energy policy and I yield
250 back.

251 [The prepared statement of Ms. DeGette follows:]

252

253 *****COMMITTEE INSERT*****

254

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255 *Mr. Duncan. And we plan on having that hearing with
256 NRC coming up this summer.

257 It is now my honor to recognize the Chair of the full
258 Committee on Energy and Commerce, Ms. McMorris Rodgers for
259 five minutes for an opening statement.

260

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261 STATEMENT OF THE HON. CATHY MCMORRIS RODGERS, A
262 REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON
263

264 *Mrs. Rodgers. Thank you, Mr. Chairman.

265 American leadership in nuclear energy and nuclear
266 technology is critical to our economic security and our
267 national security.

268 It must be part of a strong energy mix. It is how we
269 win the future with clean, reliable, and affordable energy to
270 power our way of life, keep the lights on, build stronger
271 communities, and keep our economies going.

272 Many of us just returned from Europe where we heard a
273 lot about the scary realities of shutting down nuclear
274 energy. Putin is weaponizing Europe's reliance on Russian
275 natural gas. As he shuts down gas pipelines, countries have
276 been forced to scramble to secure their energy supplies, keep
277 their economies running, and energy affordable.

278 Germany, which just completed its phase out of its
279 nuclear power plants this weekend is especially in crisis.
280 Since Putin began cutting supplies, electricity prices have
281 skyrocketed. The government has asked citizens to ration

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282 energy and, as reported by NPR, Germany is even stocking up
283 on candles to prepare for blackouts.

284 Without reliable sources of energy, like nuclear,
285 Germany's security is weakened and is returning to the dark
286 ages. Just yesterday, yesterday morning when we were in
287 Warsaw, we participated in a signing ceremony for an
288 agreement between the United States and Poland in conjunction
289 with GE-Hitachi's small modular reactor deployment.

290 It was inspiring to see all the excitement in Poland for
291 this nuclear deal and another one for the three large nuclear
292 reactors and potentially three more.

293 Poland's leaders, like so many of us in Congress,
294 understand and appreciate the reliable and secure energy that
295 comes from nuclear. They are looking at other American
296 nuclear technologies like NuScale's VOYGR reactors.

297 Not only is this an indication of a strong U.S.-Poland
298 relationship, it shows that nuclear energy must be a key part
299 of our future.

300 America, not Russia or China, must lead to restore and
301 expand our leadership in nuclear energy. And we do it by
302 unleashing our unmatched genius for innovation by assuring a

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303 predictable regulatory landscape to help attract investment
304 and support decisions to expand nuclear deployment.

305 And by encouraging new technologies that will provide
306 exciting new nuclear applications, such as providing power
307 and heat for industrial uses.

308 Our central question today is what does it take to
309 ensure a healthy exiting nuclear fleet and deploy the
310 promising new innovations? What does it take to be sure that
311 we have the nuclear infrastructure and fuels for our fleet
312 and advanced new reactors? And what does it take to assure
313 America can lead the world and our allies and partners on
314 nuclear and nuclear innovation?

315 Sixty-nine years ago, Congress enacted the essential
316 policies that can guide safe nuclear development in the
317 United States and export abroad.

318 The Atomic Energy Act of 1954 encouraged the widespread
319 use of atomic energy for peaceful purposes, consistent with
320 ensuring our common defense and public health and safety.

321 With that policy, we led the world for several decades
322 in developing civilian nuclear technologies and set the
323 standard for safety.

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324 We must continue to build on this leadership to bolster
325 our long-term nuclear competitive edge and strategic
326 interests.

327 If we don't lead, China and Russia will. China and
328 Russia combined have already announced plans to construct an
329 estimated 66 reactors in multiple nations. They are working
330 more closely on nuclear technologies, which raises more
331 serious security concerns.

332 America has also witnessed a weakening of our nuclear
333 fuel infrastructure, building an unhealthy reliance on
334 Russian-sourced nuclear fuels, a security problem intensified
335 by the Ukraine invasion.

336 What does it take to increase our own secure supplies?
337 What does it take to enjoy the economic benefits of a
338 domestic nuclear infrastructure?

339 Despite Germany's poor decisions, other European
340 nations, like as I mentioned in Poland, are looking at
341 American technologies.

342 Closer to home, I have been following the work of Energy
343 Northwest with innovative companies like X-energy. This work
344 holds great promise for Eastern Washington, one of the early

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345 leaders in deploying nuclear technology, to once again lead
346 in advanced nuclear generation.

347 This is encouraging for a brighter and stronger future.
348 This hearing is a solid first step for the Committee, in a
349 strong bipartisan way, to update the nation's regulatory
350 policies that are necessary to restore American nuclear
351 energy and to advance clean and secure energy here and around
352 the world.

353 I look forward to the suggestions from all our witnesses
354 today your suggestions and I also want to just say I
355 appreciate the bipartisan approach to this hearing and
356 working with Ranking Member DeGette of the Subcommittee and
357 the full Committee, Frank Pallone.

358 Thank you, Mr. Chairman, I yield back.

359

360

361 [The prepared statement of Ms. McMorris Rodgers
362 follows:]

363

364 *****COMMITTEE INSERT*****

365

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366 *Mr. Duncan. Thank you, Madam Chair.

367 I now recognize the full Committee Ranking Member, Mr.

368 Pallone for five minutes for opening.

369

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370 STATEMENT OF THE HON. FRANK PALLONE, A REPRESENTATIVE IN
371 CONGRESS FROM THE STATE OF NEW JERSEY

372

373 *Mr. Pallone. Thank you, Chairman Duncan for holding
374 today's hearing and I hope that today is a sign that we can
375 work in a bipartisan matter on energy issues.

376 Last Congress, this Subcommittee spent a lot of time
377 studying the power sector and our nation's electricity grid
378 and how they impact the worsening climate crisis.

379 And while the power sector has made significant progress
380 in reducing carbon emissions over the last two decades,
381 thanks in large part to the growth of renewable energy, it
382 still accounted for 28 percent of total carbon pollution in
383 the United States in 2022.

384 So decarbonizing the power plants that keep the lights
385 on in our homes and businesses is crucial to addressing the
386 climate crisis.

387 Now, nuclear power plays an important role in producing
388 carbon-free power for the electric grid. Last year, nuclear
389 power accounted for nearly half of all carbon-free power
390 generated in the United States.

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391 In my home state of New Jersey, it supplies nearly 90
392 percent of the state's carbon-free power. Committee
393 Democrats have long been committed to decarbonizing the power
394 sector to combat the climate crisis and to lead the world in
395 a clean energy transition.

396 In order to achieve 100 percent decarbonization in the
397 power sector, while keeping prices low for consumers, we need
398 reliable carbon-free resources that can sustain output for
399 long periods of time and nuclear power can meet this test.

400 The Nuclear Regulatory Commission has done an admirable
401 job over the years ensuring nuclear power is safe and secure.
402 The nuclear industry often touts its safety successes over
403 the past decades, but that success is partly due to the
404 efforts of federal regulators to stay on top of inspections
405 and safety protocols of plants around the country.

406 Last week, I joined Chairs Rodgers and Duncan and
407 Ranking Member DeGette in a request for information asking
408 nuclear power stakeholders for comments and recommendations
409 on the NRC's licensing and regulatory process.

410 It is important the Committee hear from all interested
411 stakeholders about any possible regulatory improvements that

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412 could make the process more efficient or to improve safety
413 and security.

414 Now, as we explore any possible changes, first and
415 foremost, it is critical that they do not undermine the
416 safety and security of our nation's nuclear fleet.

417 Now, as we look at the licensing and regulatory process,
418 I also want to take a moment to highlight investments
419 Democrats and President Biden have made over the last two
420 years in our nation's nuclear power industry.

421 The Bipartisan Infrastructure Law authorizes Civil
422 Nuclear Credit Program, a \$6 billion fund to the Department
423 of Energy to support our existing nuclear fleet. And these
424 investments will help support continued operation of nuclear
425 facilities to prevent increases in carbon pollution from the
426 power sector.

427 Then, as part of the Inflation Reduction Act, we created
428 a tax credit for zero-emission nuclear power and invested 700
429 million in a program, originally established by this
430 Committee, in the Energy Act of 2020, to support next
431 generation nuclear fuel.

432 The Inflation Reduction Act was the single largest

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433 investment in climate action in American history. It is
434 going to finally allow us to begin to protect our communities
435 from the impact of worsening climate crisis, while also
436 creating nuclear energy jobs and lowering costs for American
437 families.

438 So I would like to see this Committee work together to
439 build on the progress we made during the last Congress. That
440 is why I appreciate the bipartisan nature of this hearing
441 today and hope that we will see more hearings where both
442 sides of the aisle can work together.

443 And with that, Chairman Duncan, I yield back the balance
444 of my time.

445 [The prepared statement of Mr. Pallone follows:]

446

447 *****COMMITTEE INSERT*****

448

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449 *Mr. Duncan. I thank the Ranking Member and that will
450 conclude the member opening statements.

451 I want to remind members that, pursuant to Committee
452 rules, all members' opening statements will be made part of
453 the record.

454 So now it is time to dive in. I want to thank all of
455 our witnesses for being here today and taking time to testify
456 before this Subcommittee.

457 Each witness will have the opportunity to give a five-
458 minute opening statement followed by a round of questions
459 from members.

460 Our witnesses today: Dr. Gehin, Associate Laboratory
461 Director, Nuclear Science and Technology at Idaho National
462 Laboratory as recognized and introduced by Mr. Fulcher; Mr.
463 Regis Repko is Senior Vice President Generation Transmission
464 Strategy at Duke Energy; Mr. Armond Cohen is the Executive
465 Director of Clean Air Task Force; and Mr. Jeremy Harrell is
466 Chair of the Board of Directors for the U.S. Nuclear Industry
467 Council and Chief Strategy Officer at ClearPath.

468 So gentlemen, we appreciate you being here today. And I
469 will now recognize Dr. Gehin for five minutes for an opening

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470 statement.

471

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472 STATEMENT OF JESS C. GEHIN, PH.D., ASSOCIATE LABORATORY
473 DIRECTOR, NUCLEAR SCIENCE AND TECHNOLOGY, IDAHO NATIONAL
474 LABORATORY; REGIS REPKO, SENIOR VICE PRESIDENT, GENERATION
475 AND TRANSMISSION STRATEGY, DUKE ENERGY; ARMOND COHEN,
476 EXECUTIVE DIRECTOR, CLEAN AIR TASK FORCE, INC.; AND JEREMY
477 HARRELL, BOARD OF DIRECTORS CHAIR, U.S. NUCLEAR INDUSTRY
478 COUNCIL, AND CHIEF STRATEGY OFFICER, CLEARPATH

479

480 *Dr. Gehin. All right. Thank you very much, Chairman
481 Duncan, Vice Chairman Curtis, Ranking Member DeGette, and
482 members of the Committee.

483 It is an honor to be here and a privilege to be here
484 today. I have already been introduced. I'm Jess Gehin,
485 Associate Laboratory Director for Nuclear Science and
486 Technology.

487 I appreciate Representative Fulcher's introduction. So
488 will just proceed with my comments.

489 As we look to the future of nuclear energy in the United
490 States, I would encourage members of this Committee to
491 consider the following questions to enable America's nuclear
492 expansion.

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493 First, how do we leverage our existing nuclear industry
494 to ensure domestic energy security?

495 Our current fleet of 92 reactors, soon to be 94
496 operating reactors provide a tremendous resource for us. A
497 key imperative to ensure that these reactors continue to
498 provide clean and reliable power.

499 To do this, we need to ensure our plants are not subject
500 to economic variations that can result in them being shutdown
501 prematurely, which we have had several that have been in that
502 situation.

503 We also need to extend their operating lifetimes to
504 continue to get the value in clean energy from these
505 investments.

506 Second, our reactors require a reliable supply of
507 uranium and enrichment services. We already heard some of
508 that in the opening statements.

509 Currently, our nation imports 90 percent of our uranium
510 needed for our reactor fleet, this includes imports from
511 Russia. Eliminating these imports from Russia requires us to
512 establish an expanded uranium enrichment capability
513 domestically and with our close allies.

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514 The second question is, how do we ensure successful
515 deployment of nuclear energy of new nuclear energy that is
516 critical to our energy security, global leadership, and
517 climate objectives?

518 The recent DOE report on "Pathways To Commercial Liftoff
519 for an Advanced Nuclear'" states that the domestic nuclear
520 capacity has the potential to triple by 2050, and is key to
521 meeting our clean energy goals.

522 This ambitious goal requires us to aggressively develop,
523 demonstrate, and most important, deploy nuclear reactors. To
524 enable this, we must support the near-term reactor
525 demonstrations.

526 This starts with INL's plans to start up the first new
527 reactor on the INL site in 50 years, a reactor called MARVEL,
528 by the end of next year. It's a small reactor, but an
529 important step as it gives us the experience and shows that
530 we can move reactors forward relatively quickly.

531 This will be followed by several other reactor projects
532 first-of-a-kind commercial projects. This includes the
533 carbon-free power project being developed by UAMPS, which is
534 a NuScale SMR, and other reactor demonstrations, including

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535 TerraPower's Sodium reactor in Wyoming, and X-Energy's Xe-
536 100 reactors planned for deployment on the Gulf Coast. And
537 there are others in the next decade.

538 We must ensure a domestic supply of high assay low-
539 enriched uranium. This high assay low-enriched uranium has a
540 higher enrichment than is used in our current fleets and we
541 do not currently domestically produce that uranium.

542 Expanding the deployments to meet this goal, that I
543 outlined, of tripling our nuclear generation will require us
544 to even expand much more our uranium supply and enrichment.

545 And we should encourage the deployment of nuclear energy
546 such that it is on a level playing field of generation. The
547 Inflation Reduction Act provided technology-neutral credits
548 that stimulate early deployments and will also likely improve
549 access to finances, which is important for expanded
550 deployment.

551 Third question, how does nuclear energy support our
552 national security interests? There have already been good
553 comments on this. American ingenuity created the nuclear
554 industry. It was invented in the U.S.

555 The majority of the reactors around the world are based

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556 on U.S. technology. As a result, our safety in
557 nonproliferation standards are the world's standards. But as
558 the nuclear industry in the U.S. has been stuck in neutral
559 for decades, other nations have moved forward, notably China
560 and Russia.

561 Given the momentum that I just talked about, with the
562 demonstrations and the deployment, we have an opportunity to
563 lead again and establish our world leadership in nuclear
564 energy.

565 A recent announcements, such as those in Poland for
566 international deployments, are very encouraging and we should
567 increase our support for export of our technologies.

568 Fourth question, how can regulatory processes be
569 improved to accelerate deployment in nuclear plants? The
570 United States benefits from the Nuclear Regulatory
571 Commission, which is viewed as the world leader. However,
572 one of the most significant time and resource intensive
573 activities for new reactor developers is the NRC licensing
574 process.

575 The NRC is undertaking a new regulatory approach called
576 Part 53, but what else can be done? There's other

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577 efficiencies that can be gained, reducing regulator time
578 frames by looking at mandatory hearings; approaches to
579 expedite environmental reviews; roles of bodies within the
580 NRC, including the Advisory Committee on Reactor Safeguards;
581 NRC licensing processes that include more scheduled
582 certainty; and fee structures to reduce the burden.

583 Finally, I would like to close with some comments on the
584 backend. We need to address our near-term long-term spent
585 fuel management responsibilities. We have the capability and
586 knowledge to responsibly and safely manage spent fuel.

587 Congress has directed DOE to use a consent-based siting
588 approach, in pursuit of a federal consolidated interim
589 storage for the nation's spent fuel inventory. However, the
590 interim storage facilities of sufficient capacity cannot be
591 constructed without revising the Nuclear Waste Policy Act to
592 remove the prerequisite for the repository construction
593 authorization.

594 I will also mention quickly and then I will close.
595 Recycling remains a potential option for the industry and
596 policymakers to consider. INL and other laboratories conduct
597 research, more research is needed to improve the economics of

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598 recycling while addressing proliferation risks.

599 So I will stop there. Thank you and I appreciate you.

600 [The prepared statement of Dr. Gehin follows:]

601

602 *****COMMITTEE INSERT*****

603

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604 *Mr. Duncan. Thank you. There will be a lot of
605 questions. As the witnesses, just try to stay in five
606 minutes as we have got a lot to cover.

607 Mr. Repko, you are recognized for five minutes.

608

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609 STATEMENT OF REGIS REPKO

610

611 *Mr. Repko. Thank you. Chairman Duncan, Ranking Member
612 DeGette, members of the Committee, good afternoon.

613 My name is Regis Repko. I appreciate the opportunity to
614 be with you here today representing Duke Energy where I serve
615 as the Senior Vice President of Generation and Transmission
616 Strategy.

617 I have 38 years in the energy industry experience, 31 in
618 nuclear generation in a variety of roles including having
619 held a Senior Reactor Operator License at the Oconee Nuclear
620 Station in Seneca, South Carolina.

621 Duke Energy is one of the largest energy holding
622 companies in the United States. We serve 8.2 million
623 electric customers and 1.6 million natural gas customers
624 across the southeast and Midwest.

625 We own 50,000 megawatts of energy capacity, including
626 the largest regulated nuclear fleet in the country. Duke
627 Energy is currently overseeing the largest clean energy
628 transition in the industry and I'm proud to represent the
629 28,000 Duke Energy employees that are leading this effort.

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630 As we continue lowering carbon emissions from electric
631 generation, maintaining affordability and reliability for
632 customers is critical. We plan to add unprecedented numbers
633 in amounts of solar, energy storage, wind power to the grid,
634 as we continue to retire our aging coal fleet.

635 However, we must have firm, dispatchable resources, such
636 as nuclear and natural gas, to support renewable energy
637 resources. Our customers depend on us and we must not
638 jeopardize reliability or affordability in this transition.

639 Our nuclear generation is a vital part of Duke Energy's
640 generation portfolio. Our nuclear fleet delivers more than
641 80 percent of our company's carbon-free energy today. While
642 generation from renewables is increasing, the existing
643 nuclear fleet continues providing baseload, carbon-free
644 capacity that our customers need.

645 We cannot achieve our nation's carbon-reduction goals
646 without nuclear power. Our 11 nuclear power units provide
647 about 50 percent of the electricity in the Carolinas and
648 remain economic drivers for their communities, providing
649 thousands of well-paying jobs, significant tax revenues, and
650 partnership opportunities and benefits.

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651 To advance new nuclear, we see a need for certainty in
652 three areas, in the area of licensing, fuel, and financing.
653 In terms of licensing, it's both for the existing fleet and
654 advanced reactor designs.

655 Our licenses of our current nuclear fleet will expire
656 between 2030 and 2046. Renewing our nuclear plant licenses
657 for an additional 20 years will help ensure a reliable,
658 carbon-free, cost competitive power for our customers for
659 decades to come.

660 Duke Energy is closely monitoring the Nuclear Regulatory
661 Commission's rulemaking on the Generic Environmental Impact
662 Statement guidance as we will rely on that guidance for
663 future applications for our existing fleet.

664 The NRC's adherence to this rulemaking schedule will be
665 an important predictor of the needed regulatory stability.
666 And congressional oversight of these matters is appreciated.

667 In terms of looking forward to new nuclear, Duke Energy
668 intends to build eight gigawatts of new nuclear generation to
669 meet our energy goals. We are working with industry groups,
670 reactor technology companies, and leading research
671 universities studying the deployment of advanced nuclear

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672 technology.

673 Regulatory clarity is important in any utilities
674 decision to move forward. Duke Energy looks forward to
675 continuing to work with the nuclear generation industry and
676 the NRC to develop the Part 53 licensing process so that it
677 is effective and efficient and commensurate to the safety of
678 the new reactor designs.

679 Fuel certainty is an issue. Russia's the largest
680 supplier of nuclear fuel worldwide. As the U.S. and its
681 allies pivot from Russian nuclear fuel, there is not enough
682 production capacity to satisfy long-term demand.

683 And although Duke Energy has a diverse set of suppliers,
684 both domestic and from ally nations, there's still a need to
685 do more.

686 And then financial certainty. First, I would like to
687 thank Congress for funding the Advanced Reactor Demonstration
688 Program, supporting reactor vendors to accelerate deployment
689 and develop under their designs.

690 I would also like to thank Congress for the IRA, which
691 includes the production tax credits that support our existing
692 nuclear fleet, as our customers will see the values of these

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693 credits flow right back to them.

694 The IRA also supplies the clean energy PTC, a tax-
695 neutral credit, the technology neutral credit. So out of
696 both of these, our bottom line, our customers will see lower
697 electric bills because of the IRA production tax credits.

698 So we see the potential for costs and scheduled
699 uncertainties, with current estimates for reactor
700 technologies. And we anticipate these cost reductions for
701 successive projects will lessen as learnings are passed
702 around from one project to the next.

703 The federal government has an opportunity to accelerate
704 deployments of new designs by reducing the risk of these
705 first and early projects. This can be done through options,
706 such as federal insurance, if projects were to exceed cost
707 caps.

708 We anticipate these types of programs would only be
709 needed for the first several projects, but their availability
710 to support decisions by utilities to commit to new projects
711 is vital.

712 *Mr. Duncan. May I ask you to conclude?

713 *Mr. Repko. Yes. In closing, thank you very much for

This is an unedited transcript. The statements within may be inaccurate, incomplete, or misattributed to the speaker.

714 being here, I appreciate the opportunity to be here with you
715 today and I look forward to your questions.

716 [The prepared statement of Mr. Repko follows:]

717

718 *****COMMITTEE INSERT*****

719

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720 *Mr. Duncan. I get that the subject of nuclear energy
721 is very complex and I understand going over a little bit, but
722 let's try to stay within five minutes.

723 Mr. Cohen?

724

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725 STATEMENT OF ARMOND COHEN

726

727 *Mr. Cohen. Thank you very much, Chairman Duncan,
728 Ranking Member DeGette, and honorable members of the
729 Subcommittee.

730 I am going to jump right in. It is the best of times
731 for nuclear energy and it is the worst of times, to borrow a
732 phrase. On the one hand, this very hearing, the bipartisan
733 nature of it, the experience that some members have had in
734 Europe, my recent experience even in California working on
735 the Diablo Canyon Plant suggest that there's actually very
736 broad support for nuclear energy as a climate and energy
737 security tool.

738 That is great news. We are in a different place than we
739 were a few years ago on that issue. The problem is that we
740 are just not moving at any scale and pace that is relevant to
741 climate.

742 To be relevant to climate, nuclear is going to have to
743 be churning out something like 100 gigawatts per year
744 globally. That is about in the range of where we were with
745 coal and gas in a sustained way for a few years.

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746 We have to be really running at that scale. We are
747 about 10 gigawatts a year. So we need to be 10x where we are
748 and we are just not there. We are nowhere near there and so
749 the thesis of my testimony is that we are going to need a
750 very radical rethink of this sector.

751 That is a radical rethink of the business model, of the
752 way we regulate, the way we finance, and our international
753 institutions because, after all, the U.S. is only 15 percent
754 of global energy consumption and about the same amount of
755 CO2.

756 So what we do in the U.S. isn't really going to matter
757 to global climate or much anything else unless what we build
758 and create is exportable and readily diffusible.

759 So the key, we think, to this revolution moving from 10
760 gigawatts a year to 100 gigawatts is a very different
761 ecosystem that could basically produce a commoditized
762 standardized product.

763 Think about Boeings not cathedrals or Timex's not
764 handmade Swiss watches is what we are building right now. If
765 we look in Georgia, for example, our \$12,000 Vogtle unit.

766 Now, not only do we need to be cost competitive, we also

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767 need to be able to deliver on time. We can't take a decade
768 or two to deliver these units. We need to be out there in
769 three to five years with very low-risk.

770 These things need to be financeable on near commercial
771 terms and suitable for deployment in the developing world, as
772 I said, where most of the energy growth is going to be.

773 So how do we get there from where we are today, which is
774 basically nowhere? We, in the testimony, we lay out a number
775 of things that we think the U.S. can do to drive the
776 innovation, not just the technical innovation, which we are
777 really, really good at, not so great at regulatory
778 innovation. Not so great at financial innovation, at least
779 in this sector.

780 So we kind of have a laundry list in the testimony. I
781 will just hit a couple points that I think some of my fellow
782 panelists are not going to hit or haven't hit.

783 The first is that we need some sort of private-public
784 collaboration to really build this commoditized product
785 ecosystem, those Boeings. We don't have that right now.
786 There has to be a rethink of standardization and commodity
787 and that's not an easy thing to do. It is going to take some

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788 big brains, but we need to do it.

789 We need public policies that drive large orders enabling
790 repeat deployment of standardized designs. That is how you
791 get the cost down. We can't continue to build one offs that
792 end up being last of kind.

793 We need a comprehensive program to drive nuclear capex
794 costs down below \$4,000 per kilowatt. As I said the Vogtle
795 are 12. That is not going to work. We need to be in a very
796 low-cost range.

797 We need also global initiatives because, as I said, what
798 we do in the U.S. isn't really going to matter to climate
799 over the long run unless we can do this for the rest of the
800 world.

801 So we list a number of reforms that are needed. We
802 think there needs to be an international bank for nuclear
803 infrastructure finance. We believe there needs to be some
804 sort of international licensing authority or platform by
805 which licenses can transfer from one region to another and
806 some mechanism for helping newcomer countries adopt this
807 technology.

808 We need a sandbox or an innovative licensed live testing

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809 environment in the U.S., which we don't have now.

810 Importantly, we also need to look at how we regulate and the
811 question of low-dose radiation standards is at the heart of
812 some of the dysfunction in regulation, in our opinion.

813 The US DOE was given authority and money to do this and
814 unfortunately, it has not moved that forward and Congress
815 should be encouraging them to do so.

816 Finally, the few other items that we mentioned. If we
817 are going to scale up uranium mining at the scale that 100
818 gigawatts a year, we are going to need to ensure socially and
819 environmentally responsible mining practices.

820 And there is several other opportunities we highlight
821 that I look forward to engaging on. Thank you for your
822 attention.

823

824

825 [The prepared statement of Mr. Cohen follows:]

826

827 *****COMMITTEE INSERT*****

828

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829 *Mr. Duncan. Thank you for that.

830 Mr. Harrell, you are recognized for five minutes.

831

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832 STATEMENT OF JEREMY HARRELL

833

834 *Mr. Harrell. Thank you, Mr. Chairman.

835 My name is Jeremy Harrell and I am the Chair of the U.S.
836 Nuclear Industry Councils Board of Directors. The Council
837 represents more than 80 companies engaged in nuclear
838 innovation and supply chain development. I am also the Chief
839 Strategy Officer at ClearPath. Thank you for the opportunity
840 to testify today.

841 American nuclear energy can power a clean and secure
842 future if the U.S. seizes this moment. Global energy markets
843 are demanding a carbon-free, reliable, secure energy source
844 more than ever and the U.S. nuclear supply chain is ready to
845 deliver.

846 This increase in demand has coincided with unprecedented
847 private sector momentum. For example, American electricity
848 providers are calling for 90 gigawatts of new nuclear power
849 by 2050, doubling current capacity.

850 The U.S. Nuclear Regulatory Commission anticipates at
851 least 13 applicants for new nuclear by 2027. And at least
852 eight U.S.-based companies have announced international

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853 partnerships in more than ten countries.

854 These data points underscore the U.S. is entering the
855 era of deployment. Now, we must show the world that we can
856 bring projects in on time and on budget, at scale.

857 Thanks to Congress's support, particularly this
858 Committee, we have seen bipartisan nuclear policy wins, like
859 NEIMA, NEICA, and the Energy Act of 2020. The resulting tax
860 incentives, NRS modernization, and public-private
861 partnerships like the Advanced Reactor Demonstration Program
862 are bolstering the interest of new investors and new
863 customers, not just utilities, but chemical facilities, steel
864 producers, and data centers.

865 There are three challenges this Committee could tackle
866 to further accelerate American nuclear expansion. First,
867 secure the nuclear supply chain and end global reliance on
868 Russia. Second, enhance the US's offerings for new American
869 nuclear abroad, and third, improve regulatory predictability
870 here at home.

871 I will start with the supply chain. From mining to
872 enrichment, our nation is too reliant on Russia. About 95
873 percent of our uranium used in the US today is imported.

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874 Nearly 50 percent of that comes from Russia and Kazakhstan.
875 Russia is the only source of large volumes of high assay low-
876 enriched uranium, the fuel needed for many of our advanced
877 designs, and Russia has been supplying more than 20 percent
878 of our low-enriched uranium for our current fleet.

879 Russia's invasion of Ukraine has made it even more clear
880 that the US and its allies must end the global reliance on
881 the Russian nuclear sector now.

882 To enable a private industry led HALEU supply, the Biden
883 Administration must immediately launch the Advanced Nuclear
884 Fuel Availability Program already authorized by this
885 Committee.

886 Second, the US must enhance its offerings for American
887 technology deployment abroad. Demand in Europe, Africa, the
888 Middle East, and South Asia has never been higher. Nations
889 want affordable, clean, reliable, and secure energy and
890 unfortunately, China and Russia are filing that desire,
891 building dozens of new reactors both within their borders and
892 internationally.

893 The United States and its allies should be the ones who
894 establish these new 100-year partnerships, not China and

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895 Russia. New policies like the Bipartisan International
896 Energy Act send a strong signal that the US will reestablish
897 itself as a leader in the global marketplace, but Team
898 America must do more with the tools available.

899 For instance, in 2020 the Development Finance
900 Corporation removed its restrictions on supporting nuclear
901 power projects, but has been slow to promote American
902 technologies.

903 Similarly, XM's bank, the XM Banks China Program
904 provides financial support for wind and solar, but excludes
905 nuclear. This week's US-Poland deal to support roughly 20
906 SMRs with \$4 billion in loans, the agreement that the full
907 Committee chairwoman mentioned earlier is a great first step,
908 but the US must pursue this aggressive whole of government
909 strategy to compete.

910 Third, neither of these goals work if we do not
911 modernize regulations here at home. To lead the NRC must be
912 structured and incentivized to license the next generation of
913 new reactors.

914 While the NRC is working to modernize, attract new
915 talent and further its technical understanding of new

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916 technologies, efforts that I commend them for, the Commission
917 admits it will still struggle to review these new
918 applications, understandably so, 13 new applications in the
919 next five years is unprecedented.

920 To rise to that challenge, the Commission should do
921 three things. One, realign the NRC's processes for new
922 technologies around their safety benefits and new
923 applications, like clean heat and disaster relief.

924 Two, increase review efficiencies so it doesn't take
925 years to come to a decision. And finally, be proactive.
926 That means asking Congress for support in preparing to be a
927 regulator that not only meets its safety mission, but also
928 enables nuclear's role in our clean energy future.

929 USNIC also applauds early House action with the Lower
930 Energy Cost Act and stands ready to support a bipartisan deal
931 that overhauls our nation's antiquated permitting system.
932 Meaningful permit reform is essential to growing new American
933 clean energy.

934 In conclusion, this Committee has an incredible record
935 of bipartisanship in nuclear energy and is positioning the US
936 to lead the world in the deployment of affordable, reliable

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937 clean energy.

938 The challenge before us today is to double down on those
939 efforts and further increase US supply chain security and
940 international competitiveness. USNIC and ClearPath greatly
941 appreciates what this Committee has accomplished, and stand
942 ready to support your efforts in the months ahead. Thank
943 you.

944 [The prepared statement of Mr. Harrell follows:]

945

946 *****COMMITTEE INSERT*****

947

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948 *Mr. Duncan. I thank all the witnesses. That concludes
949 the witness testimony and I will move into the question
950 portion and I will recognize myself for five minutes.

951 I, and several of my colleagues, as the Chair mentioned,
952 on this Committee just returned from Europe where several of
953 our meetings focused on nuclear.

954 I am optimistic about the partnerships we can make to
955 advance the safe deployment of civilian nuclear globally. To
956 foster these partnerships, the United States must work to
957 advance our domestic industry.

958 For a variety of reasons, it is important that we
959 continue to advance nuclear energy in the United States and
960 as Assistant Secretary Huff recently said at an Atlantic
961 Council announcement on the Poland project, deploy, deploy,
962 deploy.

963 Now, we need to determine how to achieve that deployment
964 of nuclear here at home, nuclear and technology across the
965 globe. So I would like to ask Mr. Repko, Duke is responsible
966 for providing affordable and reliable energy to many of my
967 constituents and many more throughout the country, what will
968 it take for utilities to put orders in for new reactors?

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969 *Mr. Repko. Thank you for that question, Chairman
970 Duncan.

971 I laid out the three priorities for us, right? The
972 licensing certainly. Certainly, the fuel certainty for the
973 entire fleet, but for Duke Energy, it really comes down to
974 that financial certainty.

975 We have introduced nuclear, in terms of our generation
976 of resource planning to our regulators in North Carolina and
977 they are supportive of it. So much so as they have approved
978 for us to be getting costs around early site development, but
979 as you pointed out, everybody wants to be second. A fast
980 second follower to save that risk.

981 As a matter of fact, the North Carolina Commission
982 recognized and endorsed us being a second follower, relative
983 to managing the risk to the customer.

984 So I think it is those kind of financial constructs that
985 are laid out well in the "Pathways to Commercial Liftoff"
986 that the DOE issued last month.

987 There's a number of different avenues or programs that
988 could be put in place, whether it be direct grants that would
989 lower that cost of energy or more of the cost share, relative

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990 to these first few projects, that would have some kind of
991 federal insurance, above a certain cap, and cost share
992 between customers or investors alike.

993 If we were to have that in place, it would put new
994 nuclear not even at a equitable cost, but a competitive cost
995 relative to the value that it adds in other aspects, we would
996 have the support of our regulators, relative to moving faster
997 as well.

998 *Mr. Duncan. Thank you for that.

999 I would ask unanimous consent to insert in the record a
1000 report from the Department of Energy, "Pathways to Commercial
1001 Liftoff, Advanced Nuclear''. It is a really chock-full paper
1002 and so without objection, and so ordered.

1003 It mentions SMRs, advanced reactors in this report. So
1004 Mr. Harrell, advanced reactors will be critical for the
1005 future of energy in the United States. We need to modernize
1006 our regulatory framework.

1007 NRC's putting effort into preparing for the initial
1008 advanced reactor applications, but how will they need to
1009 rethink their licensing and oversight roles to accommodate
1010 these new technologies?

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1011 *Mr. Harrell. Yes, Mr. Chairman, it's a great question
1012 and thank you for your leadership on these issues. And I
1013 think having and really pressuring them to really rethink how
1014 we do this is going to be important.

1015 Advanced reactors have a lot of different attributes
1016 than our traditional gigawatt scale reactors. They are more
1017 flexible, they are smaller, they can be paired to provide
1018 heat to industrial facilities, just like it could be used for
1019 electricity generation. And there are a lot of different
1020 dynamics that the NRC needs to consider in that vein, right?

1021 We don't need the significant security zones, for
1022 example, like a gigawatt scale reactor does and so changing
1023 and making the emergency preparedness zones small for a small
1024 modular reactor makes a lot of sense and actually would
1025 reduce costs without any loss in safety or security.

1026 The ability to streamline a deployment of more reactors
1027 because we are going to build multiple of them in a package,
1028 right? The new scale package, in many cases, are eight to 12
1029 small modular reactors to have an power facility.

1030 X-energy is four reactors, things along those lines. We
1031 need to be able to site those more quickly, that way we can

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1032 scaled these technologies abroad. So really they need to
1033 rethink and really put forth a process that accommodates the
1034 natural attributes that these new reactors have.

1035 *Mr. Duncan. Mr. Gehin, what are the regulatory costs
1036 to a new reactor applicant faces when they are going through
1037 the licensing process at NRC?

1038 *Dr. Gehin. I'm sorry. Could you repeat that?

1039 *Mr. Duncan. So what are the regulatory costs a new
1040 reactor applicant faces when going through the licensing
1041 process at the Nuclear Regulatory Commission?

1042 *Dr. Gehin. Regulatory costs? Is that what you said?
1043 Yes, so there are fees. When you go to license a reactor,
1044 you usually go through a pre-licensing phase. You go through
1045 the typical submissions, those all are costs borne by the
1046 applicant that the NRC charges.

1047 In addition to that, the reactor design has to be of
1048 sufficient mature level to go through that. So there's a lot
1049 of costs on design, that's indirect that needs to be done,
1050 but has to be done in advance before the licensing.

1051 Those costs --

1052 *Mr. Duncan. What would you say is the percentage and

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1053 the overall cost of a reactor project? What's their
1054 percentage of regulator application fees and compliance
1055 versus construction costs?

1056 *Dr. Gehin. For a large, and maybe Mr. Repko can
1057 comment on that for large plants. Of course large plants
1058 cost more money, so that percentage is pretty small, but as
1059 you get to these small reactors like we are advocating for,
1060 micro-reactors and smaller reactors, you can get to --

1061 *Mr. Duncan. The economies of scale will kick in at
1062 that point, once you get the first one approved, right?

1063 *Dr. Gehin. Yes.

1064 *Mr. Duncan. They will be cheaper as they go.

1065 *Dr. Gehin. But for the first one there is significant
1066 cost. So you have to get past this first one. I don't have
1067 an exact percentage number, but it can be quite high and it
1068 can be a barrier to get through.

1069 That is why some regulatory reform, such as eliminating
1070 costs for pre-licensing application, would remove barriers to
1071 get those small, particularly those smaller ones, moving and
1072 into the regulatory process.

1073 *Mr. Duncan. I'm out of time. So we will now go to the

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1074 Ranking Member DeGette for five minutes.

1075 *Ms. DeGette. Thank you so much, Mr. Chairman, and
1076 thanks to the panel for your excellent testimony.

1077 As the Chairman referenced, all the leadership of this
1078 Subcommittee sent a letter actually to the US Nuclear
1079 Industry Council on April 14th asking for comments on how we
1080 could improve the regulatory process.

1081 And so Mr. Chairman, I would ask unanimous consent to
1082 put that letter in the letter.

1083 *Mr. Duncan. Without objection, so ordered.

1084 *Ms. DeGette. Thank you. And I am assured by counsel
1085 that we would like to, even though this is directed at Mr.
1086 Harrell's group, we would like to have comments from
1087 everybody, because we don't have time to get into all the
1088 specific recommendations.

1089 But, Mr. Repko, you said that you have worked through
1090 the renewal process, you are working through that right now
1091 with some of your facilities. And so I just want to ask you,
1092 do you see unnecessary approval processes that could be
1093 streamlined without sacrificing safety standards that are
1094 needed to protect public health and safety?

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1095 *Mr. Repko. Well, thank you for that question.

1096 *Ms. DeGette. Yes or no will work.

1097 *Mr. Repko. Yes, we do. We absolutely do.

1098 *Ms. DeGette. Thank you. And Mr. Harrell, the same
1099 question for you. For your industry.

1100 *Mr. Harrell. Could you repeat the question again?

1101 *Ms. DeGette. Yes. Do you see unnecessary approval
1102 processes that could be streamlined without sacrificing the
1103 safety standards that are needed to protect public health and
1104 safety?

1105 *Mr. Harrell. Absolutely.

1106 *Ms. DeGette. So what I would ask of you and everybody
1107 else, it is all well and good to sit here in this hearing and
1108 talk in general about that. And we all agree, in a
1109 bipartisan way, but where the rubber hits the road is when
1110 you look at the specific proposals.

1111 So I would ask everyone if they could please submit
1112 specific recommendations, so as Mr. Duncan and I sit and
1113 think about how to do this, we can see exactly what can be
1114 done.

1115 And that goes to my next point, which is about the

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1116 waste. So I have been on this Committee since 1997, and you
1117 don't have to do the math, that is fine.

1118 But I will say, we have been talking about what we are
1119 going to do about nuclear waste ever since, well, before I
1120 got here, and I think one of the issues that we have, in the
1121 whole nuclear industry, but also particularly with waste, is
1122 we don't have any clear sense of what to do that we can give
1123 to the industry.

1124 And therefore, it makes it really hard to make business
1125 decisions. As Mr. Repko said in his written testimony,
1126 regulatory clarity is important in any utility's decision to
1127 move forward.

1128 And so one time I went down to Yucca Mountain with Joe
1129 Barton, when he was the chairman of this Committee. We are
1130 all looking around and it looked pretty remote to me, but we
1131 were still going through the scientific process.

1132 And then with whichever party took over Congress, then
1133 it was either certified or decertified and it was based on
1134 politics, not on science. We need to get beyond that. And
1135 so what I want to do is help develop some certainty about
1136 what we do around this waste.

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1137 Because for public health and safety reasons, we need to
1138 figure out what we are going to do. And right now, Dr.
1139 Kathryn Huff of the Department of Energy, Assistant Secretary
1140 for Nuclear Energy said there are only 76 interim storage
1141 sites in the United States, that's clearly not going to work
1142 if we are going to actually include nuclear energy as part of
1143 our portfolio.

1144 So I want to just ask you all a very brief question
1145 about this. And I will start with you, Mr. Harrell. In your
1146 work, in your industry's work, has the lack of a
1147 comprehensive strategy to store spent fuel impacted your
1148 members in the industry?

1149 *Mr. Harrell. Absolutely has. And it's an opportunity
1150 that I think we can turn on a dime and ultimately deal with
1151 this issue and grow the industry as a whole.

1152 *Ms. DeGette. And what about you, Mr. Repko? Same
1153 question to you. Has that impacted your company's ability to
1154 do this?

1155 *Mr. Repko. It has. There are operational resources
1156 necessary to store the fuel onsite.

1157 *Ms. DeGette. And Mr. Gehin, what have you seen to this

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1158 effect?

1159 *Dr. Gehin. Yes, so we, being a DOE research lab, we
1160 primarily look at the future research and I can support your
1161 statements here on the scientific basis. That is what we do.
1162 We do science and want to have that strong basis.

1163 I think we can achieve that. I agree that it is the
1164 policy, policy issues need to be resolved. DOE is also
1165 working on this consent-based siting approach for
1166 consolidated interim storage that will address the 76 or 77
1167 sites.

1168 *Ms. DeGette. Wait. Your participation in this, your
1169 agencies participation is going to be critical --

1170 *Dr. Gehin. Yes.

1171 *Ms. DeGette. -- as we move forward. And finally, Mr.
1172 Cohen, I don't want to leave you out. What are your thoughts
1173 on this?

1174 *Mr. Cohen. We are not from the industry, but it
1175 definitely is a public perception --

1176 *Ms. DeGette. No, I know.

1177 *Mr. Cohen. -- barrier that's the argument that I oddly
1178 enough get most common when I advocate for nuclear energy is

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1179 what about the waste? We know it's a manageable problem,
1180 it's not rocket science. Sweden and Finland are moving
1181 forward. In fact, Finland is starting to put things in the
1182 ground.

1183 It's a question of public perception and politics and
1184 the consent-based siting approach is the way you do it. It's
1185 the way Sweden and Finland have been able to move as far as
1186 they have.

1187 So we need to reboot --

1188 *Mr. Duncan. Yes.

1189 *Mr. Cohen. We have to reboot the process.

1190 *Ms. DeGette. I have been to Sweden and I have seen
1191 what they are doing there, it's incredible.

1192 Thank you, Mr. Chairman, I look forward to working on
1193 this further.

1194 *Mr. Duncan. Yes. Those are great questions and we
1195 plan to have a hearing on reprocessing nuclear waste that
1196 sits at 121 sites in 39 states around the country. So
1197 commercial waste and there is defense waste included, so we
1198 are going to have a hearing on that. That is my plan.

1199 I will now go to the Chairwoman, Ms. Rodgers, five

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1200 minutes.

1201 *Mrs. Rodgers. Thank you, Mr. Chairman.

1202 To restore America's nuclear leadership we also must
1203 have strong and secure supply chains, especially for nuclear
1204 fuels to meet the needs of American industry and innovators.

1205 We must confront current nuclear fuel security and
1206 vulnerabilities, which have been caused by outdated policies
1207 that allowed our nuclear fuel infrastructure to atrophy to
1208 unacceptable levels.

1209 And certainly, this has become clear in wake of the
1210 Ukraine war. This exposed the risk of reliance on Russia for
1211 a large portion of America's enriched nuclear fuels.

1212 Three years ago, in the Energy Act of 2020, Congress
1213 took steps to limit Russia's imports to 15 percent of
1214 American supplies by the end of the decade, but the invasion
1215 shows that more must be done so we don't fall into the same
1216 trap as Germany did, for natural gas supplies, and so that US
1217 taxpayers no longer support Russia's malignant regime.

1218 So my question, Mr. Harrell and Mr. Repko, you both
1219 acknowledge the need for to enable enhanced domestic supplies
1220 and diverse supplies. Beyond the federal investments you

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1221 mentioned, how important is it to send a clear signal that a
1222 date certain, America's nuclear industry can no longer rely
1223 on Russian-sourced low enriched uranium?

1224 *Mr. Harrell. Thank you, Congresswoman McMorris
1225 Rodgers, and it's a great question and I think it is an
1226 extremely important piece of the puzzle to provide some
1227 certainty and ensure that companies can make multi-hundred-
1228 million-dollar investments to ramp up enrichment capabilities
1229 here in the United States and with our allies.

1230 I think it's telling, we saw out of the G-7 just
1231 yesterday, our allies the UK, Canada, the French, and the
1232 Japanese all coming together and say, we need to wane all of
1233 our reliance off of Russia together.

1234 And so we should work together, as like-minded countries
1235 and kind of take a stand and say, we are going to end this
1236 reliance moving forward.

1237 *Mrs. Rodgers. Well, would you speak to what it would
1238 mean for supply contract and investments into new facilities
1239 too?

1240 *Mr. Harrell. I would say, probably Mr. Repko, as an
1241 operator of the existing fleet, is probably suited to answer

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1242 that question.

1243 *Mrs. Rodgers. Okay. Okay. Thank you.

1244 *Mr. Repko. I would be glad to. Thank you for the
1245 question.

1246 *Mrs. Rodgers. Okay.

1247 *Mr. Repko. So first off it's absolutely a risk. As we
1248 take a look at our portfolio, in terms of fuel, currently our
1249 production is around five percent domestic, growing to 14
1250 percent next year, but that's really at the upper end of the
1251 availability domestically.

1252 The conversion process is, this is Duke Energy I am
1253 speaking to, is roughly 50 percent domestic, again, due to
1254 limitations. Now, all of our fabrication is domestic. So
1255 that's kind of the portfolio that we are in.

1256 But to the point being made, the domestic capacity
1257 around the production and conversion is limited. So the
1258 perspective I would give, though, the 2028 goal, 2028
1259 relative to permitting, constructing and getting these kind
1260 of facilities operational, it's right around the corner.

1261 I mean, action needs to happen immediately in order to
1262 progress to that goal.

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1263 *Mrs. Rodgers. Okay. Thank you. Mr. Gehin, I wanted
1264 to turn to you also. We just returned from Europe and we saw
1265 the excitement for deploying not only large conventional
1266 reactors, but also advanced small modular reactors.

1267 To assure that American technology continues to lead,
1268 can you describe the importance of licensing and deploying
1269 advanced nuclear here in the United States and how does that
1270 strengthen our ability to compete globally against Russia and
1271 China?

1272 *Dr. Gehin. Yes, great question. By constructing the
1273 reactors in the United States, we demonstrate our trust and
1274 confidence. We get the first one, as it was mentioned, the
1275 first one is always a hard one.

1276 I can give you a good example with NuScale and the
1277 carbon-free power project. They announced their project out
1278 in Idaho several years ago. When we talked to Romania,
1279 Ghana, Poland, and other countries that are interested in
1280 that technology, they point to that reactor as a showpiece
1281 and come to Idaho specifically, because that reactor is going
1282 to be there.

1283 So it is a huge boost in confidence, attraction. Give

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1284 us the ability to demonstrate to other countries that we are
1285 leading. And that's just the first one. These other
1286 demonstrations I mentioned will do the exactly the same
1287 thing.

1288 So it is vitally important. It is also important
1289 because we develop the supply chains. We develop the talent,
1290 the expertise, the capability that then will support all
1291 these broad international deployments, we will develop that
1292 here in the US, rather than internationally.

1293 *Mrs. Rodgers. Would you also speak to the current
1294 timelines for some of these projects that you are working on?

1295 *Dr. Gehin. Yes.

1296 *Mrs. Rodgers. And how an improved regulatory process
1297 would --

1298 *Dr. Gehin. Yes, well the current time frames we are
1299 looking at for various reactors, there is some, the smaller
1300 micro-reactors, that will happen in the next three to five
1301 years. The larger reactors, the SMRs, we are looking 2027,
1302 2028, 2029, 2030.

1303 Those will be licensed under current regulatory
1304 processes, mostly by taking exceptions and other aspects. It

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1305 is going to be heard to impact their licensing timeframes. I
1306 think we need to look at the licensing that is going to
1307 really blossom to get to the deploy, deploy, deploy and get
1308 us to where we are getting 10 to 20 gigawatts per year
1309 deployed of the US maybe in the 2030's, late 2030's
1310 timeframes.

1311 So we need to be looking for that deployment stage.

1312 *Mrs. Rodgers. Thank you. Thank you, all. I yield
1313 back.

1314 *Mr. Duncan. Thank you, Madame Chair. I now recognize
1315 the gentleman from New Jersey, the Ranking Member, Mr.
1316 Pallone, for five minutes.

1317 *Mr. Pallone. Thank you, Chairman Duncan, and let me
1318 thank our witnesses.

1319 In my opening statement I discussed the need for carbon-
1320 free generation resources that can sustain output for long
1321 periods of time.

1322 So let me ask, Mr. Cohen, you spent a lot of time
1323 discussing this concept in your written testimony. Could you
1324 elaborate on the importance of these long-duration power
1325 generation assets, particularly as to why they are important

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1326 to make decarbonization of the power sector more affordable
1327 for consumers?

1328 *Mr. Cohen. Yes, thank you, Member Pallone. So as I
1329 detail in the testimony, wind and solar are great resources.
1330 They are cheap, they have gotten a lot cheaper. The problem
1331 is, it is not just a daily fluctuation problem, it is a
1332 seasonal problem. Anywhere in the northern hemisphere we are
1333 talking about months where we have solar or wind output at
1334 about half peak. So you can see the problem.

1335 If it were a daily fluctuation problem, and, you know,
1336 just the wind doesn't blow all the time and, obviously, the
1337 sun goes down, we could manage that with battery storage
1338 pretty easily, you know, four- or eight-hour storage.

1339 The problem is when you have December, where you have
1340 got a January, February where you have got no solar energy,
1341 something needs to fill that gap.

1342 And so that's all the modeling that's done, typically,
1343 combines the variable sources, wind and solar, because when
1344 they are there, they are cheap, but usually building on a
1345 baseload of nuclear or something else, carbon capture or
1346 something else that's zero carbon to offset that variability.

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1347 It is a solvable problem, but again the basics physics
1348 are it's not a daily issue we are dealing with. It's
1349 seasonal and that's why you need something that is steady,
1350 24/7, 365 at the base of the system.

1351 *Mr. Pallone. Well, thank you. Now, last week I
1352 mentioned in my opening, I sent out a request for information
1353 letter with Chairs Rodgers, and Duncan and Ranking Member
1354 DeGette and we asked for comments and recommendations on the
1355 NRC licensing and regulatory process. And I know our
1356 witnesses haven't had enough time to develop a formal
1357 response to this letter, but I wanted to get some initial
1358 feedback.

1359 So again, with Mr. Cohen, I know that Ms. DeGette
1360 mentioned this, but if you could just maybe elaborate a
1361 little bit. And that's the industry's desire to make the
1362 licensing process, but the concern that we have can that be
1363 done without jeopardizing public health and safety?

1364 Can you just maybe give me a couple examples? I know
1365 she asked the question, but if you could just elaborate and
1366 maybe give me some examples?

1367 *Mr. Cohen. Sure. Well, in the testimony and in

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1368 comments we filed with the NRC, we think there is an approach
1369 and it is an approach actually taken by other countries like
1370 South Korea, Canada, the UK.

1371 We call it kind of the less is more approach in which
1372 you are not requiring, you don't have a rulebook that's 1,400
1373 pages with a bunch of box ticking.

1374 You are basically requiring the applicant to come
1375 forward and make a safety case. And what we have recommended
1376 to the NRC is that they rethink what they are doing and say
1377 basically, let's strip it down and say what are the essential
1378 output issues. What are the essential metrics that we are
1379 going to judge safety by and then let the applicant say how
1380 they are going to fit in with that.

1381 Don't require them to tell you about some valve that has
1382 no relevance to safety because it happens to be some vestige
1383 in a rulebook.

1384 So it's a flexible approach, but it's tied to actual
1385 safety metric, rather than a laundry list of things. That's
1386 as simple as I can make it, but there is a lot of detail in
1387 the testimony and in our comments that we would be happy to
1388 supply, but that's how you thread the needed.

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1389 You hold very firm on safety, but you allow flexibility
1390 in how those metrics are met.

1391 *Mr. Pallone. All right. Then last question. I
1392 mentioned, again in my opening, about the Bipartisan
1393 Infrastructure Law and the Inflation Reduction Act, grants,
1394 tax credits for the existing nuclear fleet, and also funding
1395 for developing next generation fuel.

1396 Could you just discuss the impact of these new programs
1397 and where there are maybe additional federal funding needs?

1398 Again, you, Mr. Cohen.

1399 *Mr. Cohen. So we think there are a couple of areas.
1400 One would be the potential for the US Government to become a
1401 purchaser, at scale. I mentioned the need to get scale and
1402 build many versions of the same unit over and over again,
1403 which is how we get the cost down.

1404 So having the federal government step in as a purchaser,
1405 whether through DoD or other agencies would be a good first
1406 step. Providing, it was alluded to, some kind of insurance
1407 against market risk.

1408 So for example, if something like a contract for
1409 difference could be an interesting mechanism, which is what

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1410 the UK used to get offshore wind costs down. And then in
1411 addition, Mr. Pallone, there are a variety of things we think
1412 we can do on the innovation front, that I wouldn't describe
1413 as large expenditure items, but thinks like we should have a
1414 program that drives costs down; that examines where are we
1415 getting stuck in the process that drives the reactor costs up
1416 and what can we do, by way of innovation, to drive those
1417 costs down.

1418 So those would be three examples of, I think, where
1419 additional federal money could help.

1420 *Mr. Pallone. Thank you. Thank you, Chairman.

1421 *Mr. Duncan. Thank you, Ranking Member. I will now go
1422 to Dr. Burgess from Texas for five minutes.

1423 *Dr. Burgess. Thank you, Mr. Chairman.

1424 Mr. Cohen, let me just stay with you, in the line of
1425 questioning that Ranking Member Pallone was just pursuing.

1426 So Texas has Comanche Peak, which is not in my district,
1427 but not very far away. I have been fortunate enough to visit
1428 there. They are very impressive and the operations are very
1429 impressive, so I think the phrase used was you don't want to
1430 have a vestige in a rulebook.

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1431 So the question I would have is about the evolving of
1432 the Nuclear Regulatory Commission regulations to evolve to
1433 reflect the actual safety performance that's been
1434 historically exhibited. Is that something that you had in
1435 mind with your reference to the vestige in a rulebook?

1436 *Mr. Cohen. Yes, in a way. I think the reality is, we
1437 have got a bunch of new advanced designs coming forward, so
1438 it probably wouldn't be the right thing to do today because
1439 the large light-water reactors have proven safe, we can
1440 assume that all these other reactors are safe.

1441 It does suggest though that you could have a much more
1442 outcomes-based process. It would be a lot simpler. So the
1443 idea, again, is set a boundary, you know, exposure limit or
1444 whatever the right metric is, we detail some of those things
1445 in our testimony, and have a back-and-forth, and allow
1446 several pathways for the applicant to meet that requirement.

1447 *Dr. Burgess. It just seems like it should be a
1448 learning exercise and I mean, the country has a long history
1449 with nuclear Navy, and long history of safety of a lot of
1450 data and experience to go on.

1451 It just seems like the learning from a regulatory agency

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1452 should be part and parcel of what they do. You build on what
1453 your experience was?

1454 *Mr. Cohen. Absolutely. And we make, in the testimony,
1455 we make two specific recommendations on that line. One is
1456 that the rule itself should be evolving. So as applicants
1457 come forward with novel solutions, those should be explicitly
1458 kind of built in as pathways, that the regulators may not
1459 have thought of, and the second idea is license by testing.

1460 That there should be more ability of, and we don't have
1461 the details in the testimony, but that if we could be testing
1462 things in situ and having the regulator involved and looking
1463 at things being dispatched or built in real time and looking
1464 at the performance, that could really speed things along.

1465 *Dr. Burgess. Now, as a practical matter, do you
1466 envision that that's possible to do that in real time?

1467 *Mr. Cohen. Absolutely. There is nothing preventing us
1468 from that. And in fact, you know, in the early days of the
1469 nuclear program, as I think my fellow witness will attest to,
1470 we did much more of that at Idaho.

1471 We had several dozen, I think, reactors being
1472 demonstrated. What would be different about our proposal is

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1473 that you would have the regulator quite involved with an eye
1474 towards commercial licensing on site and actually thinking
1475 about it as, okay, it's not just does the thing work, it's
1476 like how are the safety metrics performing.

1477 *Dr. Gehin. Yes, if I could comment?

1478 *Dr. Burgess. Sure.

1479 *Dr. Gehin. Yes, we tested 52 reactors on the INL site
1480 over a 25-year period. Many of these were specifically doing
1481 tests to support the light-water reactor fleet and enabled
1482 that.

1483 I think as we I talked about these demonstrations we are
1484 considering and the test facilities we have, we can do
1485 testing in our nuclear facilities. We can do demonstrations
1486 on DOE sites. Maybe that's a good place to do those
1487 demonstrations and get that experience.

1488 So I agree with your comments. We have decades and
1489 decades of operational experience, civilian, government and
1490 that should be factored in for sure.

1491 *Dr. Burgess. Right. It seems like there should be a
1492 continuous learning and updating exercise.

1493 Let me just ask you a question, probably Mr. Repko, and

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1494 you too, Dr. Gehin. This Committee, 20 years ago, did the
1495 Energy Policy Act of 2005, and the idea was that we were
1496 going to help with the funding, in the case with Comanche
1497 Peak, they have two reactors onsite, but they have got a
1498 footprint that would permit two more, so the idea was to help
1499 them with the funding.

1500 Now, I get it, the world changed with fracking and
1501 inexpensive natural gas and suddenly the electrons could not
1502 -- the performance was not quite the same as what the pricing
1503 had indicated that it might be, but again, as a practical
1504 matter going forward, is that something we can relook at and
1505 is that something that you are doing, Mr. Repko, with your
1506 energy?

1507 *Mr. Repko. Yes, Congressman. That's absolutely
1508 something we can look at. You know, as we see it right now,
1509 as I said, just to meet our clean energy goals right now we
1510 will have to be to 8 gigawatts from new nuclear.

1511 So even beyond that, mandates around, relative to the
1512 risk of other resources, we can certainly do that, in terms
1513 of just additional goals, right? Mandates relative to new
1514 nuclear, in terms of energy security, other type of aspects

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1515 like that.

1516 *Dr. Burgess. Sure. What happens to those licenses
1517 when they didn't build? Do they still exist?

1518 *Mr. Repko. The licenses can be maintained, in terms of
1519 construction licenses, but generally, they are surrendered.
1520 They expire.

1521 *Dr. Burgess. I see. Okay. Thank you, Mr. Chairman, I
1522 yield back.

1523 *Mr. Duncan. The gentleman's time has expired, now I
1524 will go to Ms. Matsui for five minutes.

1525 *Ms. Matsui. Thank you very much, Mr. Chairman. And I
1526 really appreciate this hearing and thank you for the
1527 witnesses.

1528 When done right, I support nuclear energy as a clean
1529 energy source that has the potential to play a very
1530 significant role in decarbonizing our power grid.

1531 However, we cannot build a new fleet of advanced nuclear
1532 reactors and continue to dodge the question, what we do with
1533 spent fuel and other radioactive materials? 88,000 tons of
1534 spent nuclear fuel is currently stranded at reactor sites
1535 around the country, including the decommissioned Rancho Seco

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1536 Nuclear Generating Station in my district.

1537 Rancho Seco closed in 1989, and the spent fuel is still
1538 awaiting transport to a consolidated storage facility. That
1539 is why I have led appropriations letter in support of DOE
1540 interim's storage program and why I lead the Store Nuclear
1541 Fuel Act. We need a solution to this problem, especially if
1542 we are going to be starting to build more nuclear power
1543 plants.

1544 And believe me, I know we have been having this
1545 conversation here, but we hear about it all the time and if
1546 there is this type of hurdle, we need to really address it.

1547 The cost. Mr. Repko, according to the latest nuclear
1548 waste fund audit report, the temporary storage of spent
1549 nuclear waste a decommissioned reactors sites has already
1550 costs taxpayers \$10.1 billion and the remaining additional
1551 liabilities will total \$31 billion.

1552 Mr. Repko, how much does it cost Duke Energy to store
1553 spent nuclear fuel and other radioactive material from your
1554 operating and decommissioned nuclear power plants?

1555 *Mr. Repko. To date, we have received \$780 million from
1556 the DOE due to the government not meeting its obligation,

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1557 willing to take up a national storage of used nuclear fuel.
1558 So that is across all of our sites, starting in 1995, to
1559 date.
1560 *Ms. Matsui. Okay.
1561 *Mr. Repko. \$780 million.
1562 *Ms. Matsui. Okay. Thank you.
1563 I will be concerned about waste. Mr. Harrell, nuclear
1564 power is and will likely continue to be a key part of the
1565 solution to climate change, but public questions about safety
1566 remain an important concern.
1567 Those questions include what should we do about nuclear
1568 waste? Mr. Harrell, nuclear power has faced strong public
1569 opposition for a variety of reasons, which has led to plant
1570 closures in my district and around the world.
1571 If the nuclear industry hopes to see a renaissance, are
1572 you concerned that public opposition, including concerns
1573 about nuclear waste, could derail that renaissance?
1574 *Mr. Harrell. Thank you, Congresswoman for the
1575 question. And I agree with what Mr. Cohen said earlier.
1576 It is a question that we hear very frequently on the
1577 ground in the public, and it is a very solvable problem. I

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1578 think, no doubt, we need a spent fuel storage strategy. It
1579 will be multipronged. Consolidating storage, at least a
1580 repository, and most likely multiple repositories across the
1581 country is going to be necessary, but also there is
1582 opportunities here as well.

1583 Some advanced reactors burn existing spent fuel, so they
1584 can contribute to the solution. Our nation should be
1585 exploring recycling. 95 percent of the products of those
1586 products, energy potential is not being utilized.

1587 So existing spent fuel stockpiles could actually be used
1588 proactively to improve fuel security.

1589 *Ms. Matsui. Okay. You mentioned advanced nuclear
1590 storage designs. Dr. Gehin, advanced nuclear reactor designs
1591 and small nuclear reactors have the potential to address many
1592 of the challenges facing today's nuclear fleet, however, I
1593 understand these reactors will continue to produce hazardous
1594 waste.

1595 Dr. Gehin, can you briefly explain how spent fuel and
1596 other radioactive waste products produced by advanced nuclear
1597 reactors would differ from the current generation of
1598 reactors?

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1599 *Dr. Gehin. Yes. Thank you for the question.

1600 You know, as we have been talking about the supply of
1601 enriched uranium, advanced reactors generally use higher
1602 enrichment uranium, higher assay LEU. So the enrichment will
1603 be higher. It will be higher as you feed it in, it will also
1604 retain more residual uranium, enriched uranium, as you
1605 discharge it.

1606 It will also be a different form. Our current fuel
1607 form, our ceramic pellets, we are looking at a variety of
1608 fuel forms for these advanced reactors. Whether they are
1609 ceramic coated particles, metallic fuel is a good example.

1610 So they will have a different form as well. The
1611 geometries would be different, rather than the large array of
1612 pens, they could be smaller, it could pebbles. So there's
1613 some variety in that, as I just mentioned.

1614 *Ms. Matsui. Okay. Fine, thank you and I have already
1615 reached my limit here in the time.

1616 Thank you, and I yield back.

1617 *Mr. Duncan. I thank the gentlelady. And now I will go
1618 to Mr. Latta, who is having a birthday today. Happy
1619 birthday, and you are recognized for five minutes.

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1620 *Mr. Latta. You are too kind, Mr. Chairman, but thanks
1621 very much for holding today's hearing and thanks for our
1622 witnesses for being here, because this is a really important
1623 subject and as you can tell, this Committee is very concerned
1624 with.

1625 Mr. Harrell, you cite, in your testimony, our nuclear
1626 fuel supply chain and our overreliance on Russia for fuel
1627 that powers our current advanced reactors.

1628 I have longed believed that nuclear energy can be a game
1629 changer, and for the United States, it is unfortunate we have
1630 surrendered our leadership and competitive edge in the
1631 nuclear fuel space.

1632 Now, alarmingly, 90 percent of the uranium purchased for
1633 the US used in the United States reactors today is produced
1634 by foreign countries, including Russia.

1635 I ask unanimous consent, Mr. Chairman, to include an
1636 article from Nuclear Newswire that highlights these issues
1637 entitled, "On the Verge of a Crisis. The US Nuclear Fuel
1638 Gordian Knot''?

1639 And, Mr. Harrell, what are the implications if we don't
1640 do anything to address this problem and the US continues to

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1641 be reliant on Russia and Russia-aligned nations for nuclear
1642 fuel?

1643 *Mr. Harrell. Thank you, Congressman, and a happy
1644 birthday, and I appreciate the question.

1645 We, potentially, if we fail to invest in the US supply
1646 chain, we could reach this Catch-22, where we have really
1647 exciting commercial technologies that both can improve
1648 affordability, reliability, and our national security in this
1649 country, and can allow us to reassert ourselves with global
1650 leadership and really push to compete with Russia and China
1651 in the global marketplace and deploy in countries like in
1652 Africa and the regions like Africa, the Middle East, and
1653 Europe.

1654 And so frankly, our failure to do so has the likelihood
1655 of both threatening our national security and threatening
1656 global energy security and the invasion of Ukraine by Russia
1657 has only further accentuated that point.

1658 *Mr. Latta. Okay. Let me follow up on something you
1659 said. You know, this we failed to invest in our United
1660 States supply chain. What is holding us back?

1661 *Mr. Harrell. Ourselves.

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1662 *Mr. Latta. No, again, but why?

1663 *Mr. Harrell. We need to make some smart long-term
1664 investments that take matters into our own hands so that we,
1665 and our allies, can both mine, can produce, and enrich our
1666 resources here at home or within our, kind of like-minded
1667 allied countries.

1668 And then, ultimately, I do think the regulatory barriers
1669 are going to be a problem here in the US. We need to
1670 modernize the Nuclear Regulatory Commission. I am worried
1671 that we are going to have cutting-edge technologies that
1672 aren't able to get through an antiquated regulatory system.

1673 We need to lead by doing. As I mentioned in my
1674 testimony, it's the era of deployment and we need a regulator
1675 that's nimble and ready to deploy these exciting tech.

1676 *Mr. Latta. Well, you know, I introduced the H.R. 1086,
1677 which is the Nuclear Fuel Security Act and this legislation
1678 is the House companion to the bipartisan bill introduced by
1679 the senior Senators from West Virginia and Wyoming and that
1680 bill would establish the Nuclear Fuel Security Program;
1681 increase the quantity of low-enriched uranium; and high assay
1682 low-enriched uranium produced by US and nuclear energy

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1683 companies; expand the American assured fuel supply program,
1684 ensure the availability of domestically produced; converted,
1685 and enriched uranium in the event of a supply disruption.
1686 You never know when that might happen.

1687 And then also establish that HALEU for advanced nuclear
1688 reactor demonstration projects program. You know, again, Mr.
1689 Harrell, how important is it for Congress now to act and pass
1690 this legislation, like this bill that I have that sends
1691 signals needed for the industry to respond and build up our
1692 domestic capacity?

1693 And I hate to say it this way, in a timely manner?

1694 *Mr. Harrell. It's an urgent priority, Congressman.
1695 And I should give you kudos. I know you've been talking
1696 about this issue for many years and I think the Ukraine issue
1697 has brought it even more to the forefront.

1698 As mentioned, 13 new reactor companies to come before
1699 the NRC by 2027. We need to start ramping up our enrichment
1700 capacity, our HALEU domestic production capacity now so we
1701 have time to license those facilities, to build them, and the
1702 provide the fuel needed for this new wave of reactors.

1703 There are a bunch of exciting companies that are all

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1704 looking at deploying here in the US by the late 2020s and
1705 early 2030s. If we don't make the investments now, we may
1706 have this Catch-22 fuel situation, which would be really
1707 catastrophic for both our security interests, our economic
1708 interests, and ultimately our mission's goals as well.

1709 *Mr. Latta. Well, thank you.

1710 Mr. Repko, how important is it for Duke to have
1711 certainty over fuel sourcing as you look to implement your
1712 carbon plan and meet your customer's needs?

1713 *Mr. Repko. It's absolutely critical. As I talked
1714 about eight gigawatts. So if you think about that, that's
1715 over 20 SMRs or the small advanced reactors, and you
1716 typically put those in sites of four to five at a site just
1717 for economies of scale.

1718 But to sustain that operations for that energy output,
1719 it would be absolutely critical to have that sustained
1720 supply.

1721 *Mr. Latta. Thank you. Mr. Chairman, my time has
1722 expired and I yield back.

1723 *Mr. Duncan. The gentleman yields back. I will now go
1724 to Mr. Tonko for five minutes.

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1725 *Mr. Tonko. Thank you, Mr. Chair. And I do thank you
1726 for holding this hearing.

1727 I want to associate myself with many others' comments on
1728 the importance of nuclear as part of our energy mix, and we
1729 especially should recognize and support nuclear energy for
1730 being such a large zero-emission resource contributing to our
1731 climate and clean energy goals.

1732 So Mr. Cohen, your testimony mentions there have been
1733 several studies that found achieving a net zero electricity
1734 system will be much more difficult and expensive without
1735 nuclear as part of that mix.

1736 How can nuclear reduce system-wide costs in the clean
1737 grid of the future, even if individual projects look
1738 expensive today?

1739 *Mr. Cohen. Right. Well, as I explained earlier, the
1740 fundamental way that nuclear reduces system costs of a zero-
1741 carbon system is by not requiring a massive overbuild of
1742 renewables.

1743 If you rely, for example, only on wind and solar, you
1744 would have to build enough wind and sun to meet your peak
1745 demand, which might be four or five times the average demand,

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1746 in some cases.

1747 So by having an always available source, you reduce the
1748 need to have that massive overbuild, plus storage, and that's
1749 just a cost savings. Every study, almost that's out there,
1750 will prove that and we put a couple in the testimony. That's
1751 the fundamental driver. It's the ability to have 24/7, 365
1752 without a massive amount of capital expense to meet the most
1753 stringent day.

1754 *Mr. Tonko. You have also discussed an ambitious vision
1755 for the US nuclear industry of mass producing and deploying
1756 advanced reactors. Why is that level of ambition necessary?

1757 *Mr. Cohen. Because if we don't really get to a mass-
1758 produced model, we're going to continue to build these one
1759 offs, and the costs are going to be very, very high.

1760 Every time that, and to be fair, there's no country
1761 that's done this. We are not building Boeings anywhere in
1762 the world, using that analogy. So this is difficult. We
1763 need to think about how do we sort of incentivize that kind
1764 of mass-produced factory-built kind of model? And I think we
1765 can do that with federal incentives to say that the kinds of
1766 things that the federal government is going to support are

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1767 going to be things that look like the Boeings, not the
1768 cathedrals.

1769 That's the key on the policy side.

1770 *Mr. Tonko. Thank you. And there have been several
1771 major incentives enacted recently in the Infrastructure,
1772 Investments and Jobs Act, and certainly the Inflation
1773 Reduction Act to support both new and existing nuclear
1774 projects. This builds upon existing programs like DOE's
1775 Title 17 Loan Program, which was critical to the development
1776 of the Vogtle Project.

1777 So Mr. Cohen, would the vision you have outlined be
1778 possible without a fully committed US Government offering its
1779 support to project developers and just how important are
1780 these federal incentives?

1781 *Mr. Cohen. Well, these are great steps forward and
1782 nothing in my testimony should detract from the fact that the
1783 IAJA and the IRA have made a huge difference, in terms of the
1784 interest in the investment community, among other things.

1785 What I would say is that you would need to build on that
1786 because to build a multi-gigafactory, if you will, for
1787 nuclear is going to take a lot more than just a job

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1788 production tax credit or investment tax credit.

1789 So there needs to be a strategic approach to actually
1790 building that supply chain and that capability. And that is
1791 something that really hasn't been addressed in current
1792 legislation.

1793 *Mr. Tonko. Okay. And Mr. Harrell, I believe ClearPath
1794 has also worked on and supported several of these incentives,
1795 including support to protect and expand the Loan Programs
1796 Office.

1797 What do you see as the federal government's role in
1798 supporting the growth of our domestic nuclear industry?

1799 *Mr. Harrell. Absolutely. I think the Loan Program
1800 Office, cost share programs like the Advanced Reactor
1801 Demonstration Program that do a 50/50 cost share to employ
1802 the very first of a kind technology and tax incentives, like
1803 an investment tax credit are important tools in the toolbelt
1804 to offset the original cost.

1805 Mr. Repko was mentioning no one wants to be the first to
1806 build these, right? They want to be second, third, or
1807 fourth. Programs like the ARDP or the LPO Program are really
1808 important to de-risking that first build so that we can show

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1809 that we can build it and then ultimately be able to then get
1810 the learnings from that and drive down the cost. I think
1811 that's going to be really important for the future of
1812 nuclear.

1813 *Mr. Tonko. Thank you. And over the years this
1814 Committee has taken a lot of time to examine nuclear waste
1815 issues, which given the long-term uncertainty for disposal of
1816 waste remains a significant economic and social risk to
1817 future growth of the industry.

1818 I heard Representative Matsui quizzing about this, but
1819 can anyone provide more context on how these new advanced
1820 reactor designs may help limit or address waste challenges?

1821 *Dr. Gehin. Yes, maybe I'll make a few comments on
1822 that. So the advanced reactors, many of these advanced
1823 reactor types can, while you feed them with high assay LEU or
1824 higher enrichment, they can actually burn the fuel more in
1825 situ, so you generate less used fuel per unit energy
1826 produced.

1827 Maybe longer term, especially some of what we call fast
1828 reactors, have the capability to actually burn waste. So if
1829 we do the research on recycle or in situ burning, we can

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1830 actually burn the fuel deeper.

1831 If you go far enough to continuous recycle, you can
1832 reduce the waste burn by maybe up to an order of magnitude,
1833 but there's a lot of research that would need to be done to
1834 get to that point.

1835 *Mr. Tonko. Okay. Thank you very much. I went over my
1836 time, so I thank you for being generous, Mr. Chair.

1837 *Mr. Duncan. The gentleman's time has expired. I will
1838 now go to Mr. Griffith from Virginia for five minutes.

1839 *Mr. Griffith. Thank you very much. First, let me make
1840 a slight correction to Mr. Harrell. I come from Virginia;
1841 Governor Youngkin wants to be first. You were just saying,
1842 nobody wants to be first, Governor Youngkin wants us to be
1843 first and we've been debating all those issues and
1844 interestingly, today in the Cardinal News, an online news
1845 service, Dwayne Yancy does a report where he talks to the
1846 head of the Virginia Tech Nuclear Engineering Department and
1847 he says, even though Virginia's well positioned, we have
1848 North Anna, we have Surry Nuclear, we have Newport News
1849 shipbuilding, which does all the nuclear submarines, we have
1850 BWX Technologies, about six or seven miles outside of my

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1851 district, maybe ten. They also have got a facility in Erwin,
1852 Tennessee, also just outside of my district, and my district
1853 is only about a little less than two hours from Oak Ridge,
1854 Tennessee.

1855 So we think we are well positioned, and the professor
1856 comes out today and says, Yes, all the issues you all have
1857 been discussing are not the major one. The major one is the
1858 workforce. Finding the people who know how to build it and
1859 know how to manage it is going to be the real issue.

1860 So can you all talk about that and how we are going to
1861 be prepared? Because we have been thinking that will all the
1862 skilled folks that we have coming out of natural gas and coal
1863 production in the district, that we would have people that
1864 were used to energy and comfortable with it, but he says we
1865 don't have the workforce ready.

1866 So can you all discuss that a little bit? The workforce
1867 to manage a small, and we are looking at small modular
1868 reactor.

1869 *Mr. Harrell. Sure. Yes, absolutely.

1870 *Mr. Griffith. I'll start with you, but I am happy to
1871 get everybody's opinion.

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1872 *Mr. Harrell. Appreciate the question and yes, very
1873 exciting what's happening in Virginia now and I think
1874 Virginia is very well positioned to be a leader in new
1875 nuclear.

1876 Your universities have robust nuclear energy programs,
1877 they are trying to get at some of that training. Obviously
1878 BWXT, big employer there in the state and really the driver
1879 and it's one of the big upsides for nuclear, right? The
1880 nuclear energy jobs pay significantly higher relative to
1881 other energy industries and they're long-term high paying
1882 jobs.

1883 And you mentioned the nexus with the national security
1884 side. Civilian nuclear is a great spot for our
1885 servicemembers who have been involved in Navy nukes, things
1886 like that.

1887 So once they leave the service to land in a high-paying
1888 industry that still has significant impact on our national
1889 security. And so I do think we need to be thoughtful about
1890 those types of investments.

1891 And so I think these universities are doing the right
1892 thing. The VNEC has made a lot of big moves, kind of in

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1893 advance of this military --

1894 *Mr. Griffith. Hold on. The V what?

1895 *Mr. Harrell. The VNEC, the Virginia Nuclear Energy
1896 Commission.

1897 *Mr. Griffith. Gotcha.

1898 *Mr. Harrell. It's kind of the coalition in the state
1899 that over the last couple of years have really wanted to make
1900 some of these investments to position the state well.

1901 And so I think those are going to be really important.
1902 The crux of it is we need projects. This is the era of
1903 deployment. Like, we need to attract new young people who
1904 are excited about this.

1905 *Mr. Griffith. But if we build it, will there be people
1906 to build it, operate it, run it, and make sure that it's
1907 doing what it's supposed to? That's the question.

1908 *Mr. Harrell. Not yet. Not yet, but I think all this
1909 excitement in the industry is giving us that moment.

1910 *Mr. Griffith. How long will it take to gear up because
1911 we are ready to, I mean, a lot of us are ready to go forward?
1912 I understand that not everybody in the state feels that way,
1913 but a lot of us do.

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1914 *Mr. Harrell. It's why some of these programs, so that
1915 we have more than just one project or big manufacturing
1916 facilities are so important, because it gives long-term
1917 certainty to folks to come into this field. And so --

1918 *Mr. Griffith. So what you are saying is, is that we,
1919 as the federal government, should incentive a couple of
1920 projects in my district on this level?

1921 *Mr. Harrell. And the state should as well. I think
1922 this Virginia Nuclear Energy Hub is a really great idea by
1923 Governor Youngkin and I think will drive more investment in
1924 the state.

1925 *Mr. Griffith. All right. My clock is running, but I
1926 did promise that I would let all of you weigh in. Anybody
1927 got anything to add on workforce?

1928 *Mr. Repko. I would echo much of what has been said.
1929 But thinking, even beyond the operation, just the
1930 constructability. The workforce relative to those skills,
1931 that's an area I think Europe is ahead of us, with their
1932 strong apprentice-type programs, but I do think the answer
1933 that Mr. Harrell said, creating the market first.

1934 The urgency with creating that market will subsequently

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1935 develop those kind of programs, either through community
1936 colleges, apprenticeship programs and that. We have some of
1937 those in place right now at Duke around transmissions
1938 skillsets, right? Linemen skillsets, that can expand.

1939 *Mr. Griffith. We are not that far from Duke territory
1940 either.

1941 *Mr. Repko. And I understand.

1942 *Mr. Griffith. I'm in southwest Virginia. Go ahead,
1943 yes, sir?

1944 *Dr. Gehin. Yes, I was just going to make one point. I
1945 agree with all this, projects, everything, the demo projects,
1946 but, you know, we're finishing two large plants in Georgia.
1947 It would be great if they were actually moving right on to
1948 the next plant. There are a lot of people that have a lot of
1949 experience that could just continue constructing plants,
1950 moving from one to one --

1951 *Mr. Griffith. All right. So we might be able to --

1952 *Dr. Gehin. -- a lot of them --

1953 *Mr. Griffith. -- pick up some workers out of Georgia
1954 short term. We want them to come live and spend their money
1955 in our area.

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1956 *Dr. Gehin. Yes.

1957 *Mr. Griffith. Mr. Harrell, a lot of folks are
1958 concerned about just being used by the nuclear industry as
1959 the next stop -- what kind of investments do they make?
1960 Besides the good paying jobs, what else can the community
1961 look for if we get a small modular reactor in the area?

1962 *Mr. Harrell. Yes, absolutely. I would say nuclear is
1963 the exact opposite. We've got a track record across the
1964 country and in your state and in South Carolina as well, that
1965 nuclear is there to stay. These are 50, 60, 70-year
1966 projects. They invest in communities. They're contributing
1967 significant local tax resources.

1968 It's not an industry that comes in and out. The
1969 construction, obviously there's a big uptick, but unlike the
1970 solar industry, the wind industry --

1971 *Mr. Griffith. And the safety record is pretty good.

1972 *Mr. Harrell. -- most people are on --

1973 *Mr. Griffith. My time is up. I'm going to have to
1974 yield back. I yield back.

1975 *Mr. Duncan. I thank the gentleman. I now go to Ms.
1976 Veasey from Texas for five minutes.

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1977 *Mr. Veasey. Mr. Chairman, I thank you very much and I
1978 thank the witnesses for being here as well.

1979 Last year the power sector accounted for 28 percent of
1980 the total US carbon dioxide pollution. If we are going to
1981 slash that figure, we need reliable carbon-free energy
1982 sources like nuclear that can sustain output for long periods
1983 of time, particularly while we work on things like battery
1984 storage, which we are making great progress on in Texas.

1985 According to the Energy Information Administration,
1986 nuclear power accounts for about 46 percent of the zero-
1987 carbon electricity generated here at home. And the Inflation
1988 Reduction Act, Democrats created a tax credit of up to 1.8
1989 cents per kilowatt hour for zero-emissions nuclear energy and
1990 provided the DOE with \$700 million to invest in increasing
1991 the availability of next generation nuclear fuel for advanced
1992 reactors, and all of you have mentioned in your testimony a
1993 significant priority must be enhancing the domestic supply
1994 chain for uranium and boosting the US enrichment and
1995 conversion industry.

1996 What we have learned, since the Russia/Ukraine conflict,
1997 is that geopolitical events have complicated the supply chain

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1998 for these materials even further as a substantial portion of
1999 the supply comes from Russia and the Eastern European region.
2000 And I wanted to ask, for anyone to answer this, Russian and
2001 Chinese nuclear companies, as we know, receive the full
2002 backing of their government when competing for export bids
2003 and projects in overseas markets.

2004 This integrated government support has made them very
2005 competitive in global markets and dominant in the nuclear
2006 energy supply chain, despite this influence, recent research
2007 shows that the US industry is well positioned to become a
2008 global leader in key parts of the value chain for nuclear
2009 fuel and the manufacturing of small modular reactors worth
2010 \$180 billion plus in market value.

2011 What are we doing to ensure that we have the necessary
2012 technology and infrastructure to compete globally and how can
2013 Congress best support such efforts so that the US can lead
2014 the development of new nuclear reactors with the highest
2015 standards of safety, security, and non-proliferation in the
2016 world?

2017 Anybody jump in.

2018 *Mr. Pence. I'm happy to start. As I mentioned, I

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2019 think we need a whole of government approach. You're exactly
2020 right. China and Russia are willing to do 100-year
2021 partnerships with these countries. They're willing to build,
2022 they're willing to staff, they are essentially owner
2023 operators. We're never going to get at that model, right?
2024 That's not the American way and there's a lot of other
2025 inherent advantages to working with a country like the United
2026 States, but we do need to put in competitive financing
2027 packages.

2028 So things like this Poland announcement that happened
2029 yesterday where we're putting loans from XM and Development
2030 Finance Corporation, that we're willing to make fuel deals,
2031 so that we ramp up our enrichment capacity and we can be a
2032 fuel provider to these countries as well.

2033 It's a really important piece of the puzzle and if we
2034 don't do that, we're not going to compete with the Russias
2035 and Chinas, because when we're talking about a country like
2036 Ghana, for example, they want a partner that's going to
2037 ensure that they can deliver electricity to their people now
2038 to meet their needs.

2039 The US can win those contracts. Ghana has every

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2040 advantage to do it with the US, but we've got to be
2041 competitive with our offerings.

2042 *Mr. Duncan. Yes.

2043 *Mr. Cohen. Mr. Veasey, we also suggest, in our
2044 testimony, that maybe the US doesn't have to carry the only,
2045 is not the only party bearing the financial de-risking
2046 burden. So we recommend a creation of something called an
2047 international bank for nuclear infrastructure.

2048 The World Bank won't touch nuclear right now, for a
2049 variety of reasons, but it's a world imperative. And so the
2050 proposal really here is that a coalition of the willing, not
2051 just the US but other countries, and other investors that
2052 want to see this technology go, should be providing de-
2053 risking financing for global expansion, and American reactors
2054 could compete in that environment.

2055 So I don't know that we necessarily have to go at it
2056 alone. We detail, there actually is a proposal out there,
2057 quite a concrete proposal, to create this multi-lateral bank
2058 that would do some of that work.

2059 *Mr. Veasey. Yes. Let me also ask Jeremy Harrell. I
2060 like to inquire about the synergy between DoD and DOE. I

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2061 know that there have been some growing interest, with the US
2062 military, to explore the use of advanced nuclear technologies
2063 to help power land bases at home or reliable energy assets in
2064 forward areas.

2065 As the interest increases and DoD-led projects move
2066 forward, what are the synergies between these efforts and
2067 those occurring within the commercial sector and how can
2068 defense-led programs benefit the advancement of new nuclear
2069 technologies in the civilian sector?

2070 *Mr. Harrell. Yes, it's a great question, Congressman.
2071 So there has actually been a study that shows that there is
2072 roughly a \$3 billion benefit of the civilian nuclear industry
2073 to our defense apparatus, and vice versa. It's an
2074 interchangeable supportive organization.

2075 And so this program you mentioned, Project Pele, which
2076 gets at one critical issue that affects our servicemembers
2077 abroad. So many deaths are related to diesel resources
2078 getting brought to troops on the ground and for deployments.

2079 This Pele Project, for example, would use transportable
2080 reactors to take that diesel dynamic out and get at one of
2081 the single largest casualty risks that servicemembers have in

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2082 forward deployments.

2083 *Mr. Veasey. Thank you very much, Mr. Chairman?

2084 *Mr. Duncan. The gentleman's time has expired. I will
2085 now go to the bluegrass state, Mr. Guthrie, for five minutes.

2086 *Mr. Guthrie. Thank you. Thanks, gentlemen for
2087 yielding the time, the Chair for the time, and I thank all of
2088 our witnesses for being here.

2089 Mr. Repko, this is kind of going to be directed at you,
2090 questions for you. In 2017, Kentucky actually, during the
2091 seven month three-mile island and all that other stuff, put
2092 in a nuclear ban where you couldn't do atomic energy in
2093 Kentucky.

2094 Finally, in 2017, effort of people I was in the general
2095 assembly with and others finally got it across the line when
2096 Governor Bevin was in office and rolled back our background.

2097 And there's been a really strong interest, particularly
2098 in Western Kentucky in bringing nuclear power, including
2099 small modular reactors. And, you know, Kentucky's obviously
2100 historically been an energy producing state, particularly
2101 coal and state and community leaders see nuclear energy as a
2102 way to continue Kentucky's leadership as an energy-producing

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2103 state and also improving reliability of our grid, which we've
2104 struggled with.

2105 We actually had rolling blackouts in Kentucky in
2106 December, because of some, I don't know, it's debatable, but
2107 I think some decisions on taking out coal fire plants left us
2108 below our baseload.

2109 So the question is nuclear and my question for you is,
2110 is Duke Energy looking at converting old coal fire plants
2111 into nuclear power plants, and what would be your
2112 considerations? And what are some performance features of
2113 new technologies that make it appropriate for you to invest
2114 in this type of thing?

2115 *Mr. Repko. So we are looking at siting new
2116 technologies, new nuclear at existing sites. There are some
2117 technologies around retrofit of coal plants. Those would
2118 typically involve like storage-type technologies, molten
2119 salts, but for where we're at right now, the existing
2120 retiring sites provide the best opportunities for deployment
2121 of new nuclear.

2122 So if you think about it, the water infrastructure is
2123 already there. The transmission interconnection and

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2124 infrastructure is there. They're already paid for by the
2125 customer and there are very generous incentives for
2126 replacement of generation and things.

2127 So that's how we are approaching, in terms of utilizing
2128 existing or retiring facilities.

2129 *Mr. Guthrie. Okay. Anybody else want to comment on
2130 that? Mr. Cohen?

2131 *Mr. Cohen. Yes, if I may?

2132 *Mr. Guthrie. Yes.

2133 *Mr. Cohen. There's an easy lay-up here, which is the
2134 government already has a lot of authorities, as well as
2135 money, through the IRA, to move forward these coal-to-nuclear
2136 conversions.

2137 What we've yet to see from DOE, and I know they have a
2138 lot on their plate, is a kind of whole of government approach
2139 where you're kind of made into a one stop shop, to kind of
2140 like knit together the regulation, the funding, the planning,
2141 support, all of that to make these things happen.

2142 It really is a great opportunity, as Mr. Repko said and
2143 we've looked at this in detail. And you typically have good
2144 political support at the local community level.

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2145 So again, there's really gold to be mined there and we
2146 just need to do it.

2147 *Mr. Guthrie. Appreciate that. Mr. Harrell, you seem
2148 like you want to answer something?

2149 *Mr. Harrell. Yes, just one quick thing I'll flag.
2150 It's low-hanging fruit for regulatory reform.

2151 *Mr. Guthrie. I'll end and Mr. Gehin next. Yes, go
2152 ahead.

2153 *Mr. Harrell. It's low-hanging fruit for regulatory
2154 reform. Like, if we're building at brown field sites, a lot
2155 of the dynamics of building a nuclear power plant, the coal
2156 plant, similar dynamics there.

2157 The NRC should make it a lot easier to --

2158 *Mr. Guthrie. The transmission lines are already there,
2159 right?

2160 *Mr. Harrell. The transmission lines is already there.
2161 A lot of synergies that make this -- and it's great for the
2162 workforce too. A lot of these new designs, like TerraPower,
2163 for example, that's building their first project in Wyoming,
2164 they separate the nuclear power unit and the power plant
2165 operations.

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2166 And so many of those coal workers could work at that
2167 power plant operations with pretty minimal training.

2168 *Mr. Guthrie. Yes. I was just sending out TBAs plant
2169 in Paradise, in Muhlenberg County, if you know the song, but
2170 it was at Paradise, but they went from a coal plant that had
2171 400 employees to a combined gas plant that has about 32, I
2172 think.

2173 So I think it's just all automated. So sometimes that
2174 doesn't translate. Is that, Mr. Gehin, Doctor?

2175 *Dr. Gehin. Yes. And what I wanted to add is certainly
2176 Kentucky is a great location for this. DOE did a study that
2177 identified about 80 percent of the coal sites could be
2178 converted to nuclear and it would result in a 15 to 35
2179 percent cost reduction in deploying nuclear plants by reusing
2180 some of the things that Mr. Repko talked about here.

2181 So there's huge opportunities in this space.

2182 *Mr. Guthrie. Thanks for adding that. And then one
2183 more, Mr. Repko, and for 30 seconds that I have, you
2184 mentioned in your testimony that Duke Energy's applied for
2185 license renewals for expiring license for one station that
2186 plans to do for other expiring licenses.

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2187 Can you explain how these expiring licenses will be
2188 safely extended and continue to improve reliable and
2189 affordable energy, and what are your regulatory challenges?
2190 Twenty seconds.

2191 *Mr. Repko. Yes, very quickly. I will tell you that
2192 the age of these plants do not reflect their actual physical
2193 condition. There are constant replacements of valves,
2194 piping's, and things like that. Very few of the physical
2195 assets there, the reactor vessel being one of which undergoes
2196 very extensive monitoring of that, but these are not ages,
2197 the equipment there is not the age of the plants.

2198 So in terms of that, we're really looking for the
2199 regulatory certainty around the guise to enable the future
2200 applications.

2201 *Mr. Duncan. Ms. Kuster is recognized for five minutes.

2202 *Ms. Kuster. Thank you very much for hosting this
2203 hearing, Chairman Duncan.

2204 Until recent emergence of cheap solar and wind energy,
2205 there were two energy generation resources that provide the
2206 United States with the bulk of our carbon-free energy,
2207 nuclear and hydropower.

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2208 These two energy resources are often thought of in the
2209 same breath. When the United States built out our nuclear
2210 energy fleet during the 1960s and 70s, we also built
2211 hydropower pump storage projects around the country to
2212 capture excess nuclear energy when there was not sufficient
2213 demand on the grid for the energy.

2214 I am glad we are talking about nuclear energy today,
2215 Chairman Duncan, and I encourage you to hold a similar
2216 hearing on hydropower in the near future.

2217 Turning to the issue at hand, the Seabrook Nuclear Power
2218 Plant in New Hampshire is responsible for nearly three-fifths
2219 of the electricity generated in my state. The facility is a
2220 source of reliable power and provides high paying, high
2221 skilled jobs.

2222 While nuclear energy plays an important role in keeping
2223 the lights on, our nation is sadly too reliant on nuclear
2224 fuel imports from Russia. Russia provides nearly 14 percent
2225 of America's low-enriched uranium, which is the key component
2226 for nuclear fuel.

2227 And unconscionably, the proceeds from Russian fuel sales
2228 to the United States, may be supporting Russian's aggression

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2229 in Ukraine.

2230 Last year, Congress acted in an overwhelming bipartisan
2231 way and banned the importation of Russian oil and natural
2232 gas.

2233 Mr. Harrell, my first question is to you. Should
2234 Congress also ban low-enriched uranium imports from Russia?

2235 *Mr. Harrell. I think it needs to be a piece of the
2236 puzzle as we provide some certainty for US and allied
2237 providers and enrichers to move forward.

2238 We need the financial or the assurance that the Russians
2239 aren't going to flood the market and drive those investments
2240 out of business. So I think it's a piece of that long-term
2241 picture.

2242 *Ms. Kuster. And to Mr. Harrell and Mr. Cohen, in both
2243 of your testimonies, you touted the benefits of new advanced
2244 nuclear reactors. These new electricity generating
2245 technologies have the potential to reliably produce power
2246 with fewer environmental externalities and safety concerns
2247 than existing nuclear technology.

2248 But I also understand that high assay low-enriched
2249 uranium, or HALEU, which is a critical fuel source for

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2250 advanced nuclear reactors, also largely comes from Russia.

2251 Again, would banning the importation of Russian uranium
2252 help America and our allies win the future by creating an
2253 incentive to move this HALEU production to friendlier
2254 nations?

2255 *Mr. Cohen. Yes.

2256 *Mr. Harrell. Sure. I think the biggest thing that we
2257 can do for HALEU production here is to get the Biden
2258 Administration to launch the Advanced Fuel Availability
2259 Program that this Committee authorized in the Energy Act
2260 before.

2261 Launching that program, providing the initial certainty
2262 for companies to ramp up production of HALEU can immediately
2263 challenge Russian dominance in this space. And so I think
2264 it's the biggest thing that we can do on that front, and we
2265 can ensure that the HALEU problem isn't just like the LEU
2266 problem that we've got here.

2267 *Ms. Kuster. Great. Would you like to add, Mr. Cohen?

2268 *Mr. Cohen. Yes. I just was going to say, I think it's
2269 a supply side answer as well as managing demand side. It
2270 might provide us additional incentives to do our domestic

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2271 program, but we're still, we still need a lot of effort
2272 there.

2273 We've supported appropriations for the domestic HALEU
2274 program.

2275 *Ms. Kuster. All right. Thank you. And I have a
2276 follow-up question for you, Mr. Cohen, can you describe one
2277 safety benefit of advanced nuclear reactors and how having a
2278 secure fuel supply for advanced nuclear reactors would help
2279 the US realize those benefits?

2280 *Mr. Cohen. Sure. Well, obviously, if we don't have
2281 the advance fuels, we're not going to have the advanced
2282 reactors, but probably the most significant safety feature of
2283 many, not all, of the advanced reactor designs, is that
2284 they're not relying on water as a coolant or as a reaction
2285 moderator.

2286 The major accidents we've had, Chernobyl, Three-Mile
2287 Island, and Fukushima, were all driven by loss of coolant,
2288 water boiling off, essentially. And many, not all, of the
2289 designs have moderators or coolants that have much higher
2290 temperature thresholds.

2291 You know, they can withstand a lot of runaway heat. So

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2292 that's probably the single most significant safety attribute,
2293 which is the inability to have a runaway reaction that, you
2294 know, essentially melts through the core and the containment
2295 vessel.

2296 *Ms. Kuster. All right. Well, thank you very much.
2297 Mr. Chairman, there's bipartisan interest in banning imports
2298 of Russian uranium. It will make our energy supply chains
2299 more secure now and into the future and I look forward to
2300 working with you to get this done. Thank you very much. I
2301 yield back.

2302 *Mr. Duncan. Agreed. And the Chair will now go to the
2303 Chair of the Environment, Climate, and Critical Minerals
2304 Subcommittee, Mr. Johnson, for five minutes.

2305 *Ms. Castor. Well, thank you, Mr. Chairman. And let me
2306 say thanks to our panelists for being here with us today.
2307 Let me start by saying, I'm very encouraged today. We
2308 disagree on a lot of things on this Committee, but I do
2309 believe that bipartisan support for nuclear power hasn't been
2310 this strong since I have been in Congress for the last 13
2311 years.

2312 And it's not a mystery why. The fact is that nuclear is

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2313 the only, and I mean only, large-scale reliable baseload
2314 carbon-free electricity source available to us. It's not
2315 going away and the world needs more of it.

2316 The only question now is, will America lead in this
2317 critical energy sector or will we cede our leadership to our
2318 adversaries like Russia and China?

2319 When Russia and China export their civilian nuclear
2320 technology to other nations, it gives them a near century
2321 long foothold. I don't have to tell you guys this, you know
2322 it.

2323 A geostrategic advantage. So how do we respond to that?
2324 Back in the mid-20th Century, America took the global lead in
2325 the atomic age, but unfortunately for our 21st Century
2326 nuclear entrepreneurs and innovators, our regulatory
2327 framework is, in many ways, quite literally stuck in the
2328 1950s, that's got to change.

2329 Mr. Harrell, it's good to see you here again. I plan on
2330 reintroducing my Strengthening American Nuclear
2331 Competitiveness Act this year and a key aspect of my
2332 legislation is requiring DOE to provide a report on US
2333 civilian nuclear commerce.

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2334 With China and Russia currently dominating the
2335 international market, we have got to make sure we have a
2336 robust supply chain.

2337 So, Mr. Harrell, why is it so important to understand
2338 the gaps in our supply chain, particularly as it relates to
2339 nuclear?

2340 *Mr. Harrell. Yes, thank you, Congressman, for the
2341 question and it's good to see you as well.

2342 You get at the very crux of this issue, right? This is
2343 not a zero-sum game. If the US doesn't meet the demand that
2344 Europe, Africa, the Middle East, South Asia have, it doesn't
2345 mean that they're not going to build nuclear, it just means
2346 they're going to build it with someone else, mostly likely
2347 Russia or China.

2348 And so it's a national security imperative for us to
2349 compete on that front. And so your focus on technology
2350 exports and ensuring that we invest in our supply chain here
2351 to ensure project delivery, is really a critical piece of
2352 global energy security as a whole.

2353 *Mr. Johnson. Okay. Thanks. Another provision, in my
2354 legislation, directs the Nuclear Regulatory Commission to

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2355 look at unique industrial and manufacturing uses as well as
2356 innovative advanced reactors that can be safely located
2357 closer to cities and businesses.

2358 So Dr. Gehin and Mr. Harrell, you can chime in too if
2359 you'd like, if we can get this right, what would this mean
2360 for US nuclear leadership?

2361 *Dr. Gehin. Yes, great question. It was talked about
2362 mostly the discussion today has been about electricity, where
2363 28 percent of our, you know, talk about carbon from 28
2364 percent. What about the other 62 percent?

2365 Well, reactors, particularly advanced reactors produce a
2366 lot of energy, but they produce at a higher temperatures that
2367 can be directly used for industrial processes, whether it's
2368 hydrogen, steel, chemicals, you know, X-Energy is working
2369 with Dow Chemical, oil refining, you know, to reduce the
2370 carbon for that.

2371 So it really opens the door to address all these other
2372 areas that we need a lot of energy, and those can be deployed
2373 worldwide. We can establish them here; they can be deployed
2374 worldwide.

2375 *Mr. Johnson. Okay. Mr. Harrell, any comments?

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2376 *Mr. Harrell. Yes, I would completely agree there.

2377 There are immense opportunities here. Chemical production,
2378 steel production, hydrogen production, especially if we're
2379 going to use that for a variety of different applications.

2380 But that's going to force the regulator here in the
2381 United States, in particular, to think about these things
2382 differently. We need to be able to put a microreactor right
2383 pretty close to that Dow Chemical facility to use both the
2384 heat and the electricity for that process.

2385 If we had the same emergency preparedness zone of the
2386 plant, like, Davis-besse in Ohio, you know, you've got a mile
2387 security zone around that.

2388 *Mr. Johnson. No.

2389 *Mr. Harrell. That doesn't quite make sense in
2390 Louisiana and chemical country.

2391 *Mr. Johnson. One final point in question, I want to
2392 address fuel. You know, it's a chicken or egg problem. You
2393 need the fuel, you need the new reactors as a market for the
2394 fuel, but you need a reliable fuel supply in order to build a
2395 reactor.

2396 The future of advanced reactors depends on HALEU, that's

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2397 already been mentioned. Mr. Harrell, why is having a
2398 domestic supply of HALEU so important and what happens if we
2399 do not have a sufficient supply of it for our nuclear
2400 innovators?

2401 *Mr. Harrell. The Russians are the only entity that are
2402 capable of a large supplies of HALEU. We don't want to be
2403 relying on Russia, so we absolutely need our own domestic
2404 supply. It's why the Administration moving on this Fuel
2405 Program is critically important.

2406 *Mr. Johnson. Basically, it comes down to whether or
2407 not we are going to lead or we are going to cede leadership
2408 to Russia and China, right?

2409 *Mr. Harrell. 100 percent, sir.

2410 *Mr. Johnson. Okay. Mr. Chair, I yield back.

2411 *Mr. Duncan. Great questions. I will now go to
2412 Florida, Ms. Castor for five minutes.

2413 *Ms. Castor. Well, thank you, Mr. Chairman. And thank
2414 you to all our witnesses for your testimony today.

2415 I was privileged to lead the House Select Committee on
2416 the Climate Crisis for four years as we took a fresh look at
2417 electricity generation from nuclear power and the role it can

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2418 play in fighting climate change, and we also issued a broad
2419 request for information.

2420 A lot of your folks responded to us and you all provided
2421 very important input. So we developed very specific
2422 recommendations for ambitious reductions in carbon pollution
2423 through a cleaner, more resilient electricity sector. And
2424 then we successfully passed these important new laws boosting
2425 carbon-free nuclear power in the Bipartisan Infrastructure
2426 Law, the \$6 billion for the civil nuclear credit initiative,
2427 to keep the existing nuclear power plants online and save
2428 thousands of jobs.

2429 In the CHIPS and Science Act, we authorized the historic
2430 research, development, demonstration, and deployment,
2431 including on both nuclear, fusion, and fission technologies
2432 and then of course, the Inflation Reduction Act that you all
2433 have all highlighted today for the generational investments
2434 in clean energy production, the production tax credit, clean
2435 energy production tax credit, the investments tax credits for
2436 new nuclear power plants that go into service at 2025.

2437 We are here to work with you to make that happen, but I
2438 would like to go back to the how do we extend licenses and

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2439 the safety considerations.

2440 Mr. Gehin, you said we have 92 reactors today going to
2441 94. As you look out across all of the reactors, what do you
2442 want us to know going in as we have invested money to safely
2443 look at extending these licenses, but what should we be
2444 anticipating? What should we know?

2445 *Dr. Gehin. Yes. So let me comment on it. Maybe Mr.
2446 Repko might want to comment as well.

2447 *Ms. Castor. Yes.

2448 *Dr. Gehin. So many of the reactors, in fact I think
2449 most of the reactors currently operating will go from 40 to
2450 60 years. They go through regulatory process that's very
2451 rigorous on safety, safety of those reactors to ensure they
2452 can operate safely.

2453 As Mr. Repko mentioned, those reactors are maintained
2454 impeccably. You know, new components, new parts looked at
2455 rigorously. There's been a few plants, including I believe
2456 Turkey Point, you know, going to 80 years.

2457 It goes through the same rigorous process, from a safety
2458 point of view, to get to those 80 years. I think the biggest
2459 threat, at least in the past several years, for these

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2460 reactors has been less to do with the technology and more to
2461 do with the economics as they've been competing with low
2462 price natural gas, as well as incentivized renewable energy.

2463 So the Inflation Reduction Act and other activities have
2464 helped that. So I think the vision here would be all of our
2465 existing plants operating 80 years, as we bring on, you know,
2466 new reactors, whether SMRs, advanced reactors, to get to
2467 perhaps this 300-gigawatt goal that I mentioned from this DOE
2468 report.

2469 *Ms. Castor. Mr. Repko, anything you want to add?

2470 *Mr. Repko. Thank you, Congresswoman. As I said, we've
2471 already committed to the relicensing of our entire existing
2472 fleet. All 11 reactors. We have submitted that for the
2473 Oconee Station and making plans for the Robinson Station
2474 next.

2475 You know, in terms of our resource planning? These
2476 assets are proving valuable and necessary, in terms of
2477 meeting our requirement goals and they have the regulatory
2478 support for that.

2479 And a lot of that is contributable, not just for the
2480 clean, reliable power that they serve, our entire fleet has

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2481 served 24 consecutive years at capacity factors greater than
2482 90 percent, 24 years consecutive.

2483 So impressive reliability. Impeccable safety. And then
2484 in terms of the community support --

2485 *Mr. Johnson. Can I move on because I just have one
2486 more minute?

2487 *Mr. Repko. Sure. I'm sorry.

2488 *Mr. Johnson. I was so happy to hear you say that our
2489 customers will see lower electric bills thanks to the
2490 Inflation Reduction Act.

2491 *Mr. Repko. They will.

2492 *Mr. Johnson. That is music to my ears because Florida
2493 families are really being squeezed right now with high
2494 electric bills and a lot of the reason for that is Florida,
2495 you would think the Sunshine State, we would be a leader in
2496 solar power, but we generate electricity 75 based on gas.

2497 So they put all the eggs in one basket, so you have
2498 these price spikes, like we had at the pump and then our
2499 electricity bills go out of sight.

2500 So I really hope that Duke Energy, in addition to what
2501 you are going to do across your service areas in all states,

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2502 you know, expanding, making sure carbon-free nuclear power is
2503 there, that you are also just as enthusiastic about using
2504 these tax credits for solar power and wind power, where it
2505 makes sense, but in Florida, we have such great potential for
2506 solar power to lower electric bills and to power our
2507 communities.

2508 I trust that you are just as enthused about that?

2509 *Mr. Repko. Absolutely. 800 megawatts of solar in
2510 Florida, planning on 300 megawatts a year in our future
2511 plans. All the incentives going back to the customers.

2512 *Mr. Johnson. Thank you very much.

2513 *Mr. Duncan. The gentlelady's time has expired. We
2514 will now go to Mr. Bucshon from Indiana.

2515 *Mr. Bucshon. Thank you, Chairman Duncan. When it
2516 comes to the energy policy of the United States, Congress
2517 must act in all the above energy strategy in my view in order
2518 to maintain grid reliability, lower emissions, and ensure
2519 affordable energy prices using all sources of available
2520 energy is crucial.

2521 There is no doubt that nuclear energy plays an important
2522 part, if not critical part of this diverse energy mix. So I

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2523 appreciate the opportunity to discuss it here today.

2524 Chairman Duncan, and maybe Chairwoman McMorris Rodgers
2525 might have discussed, we were recently in Europe, in Poland,
2526 Czech Republic, and in Belgium and what we heard, on the
2527 nuclear side, in Poland is dramatic.

2528 A lot of opportunity. In fact, American companies,
2529 right now, American companies are competing for that business
2530 as Poland has completely taken themselves off of Russian
2531 natural gas and oil, for that matter.

2532 So there's a lot of opportunity for us here in the US if
2533 we do this, not only to deploy nuclear power sources in the
2534 United States, but around the world in our allies, and also
2535 in high emissions countries, like India, for example.

2536 I mean, how are we going to get the worldwide emissions
2537 down if we don't have the opportunity to help deploy nuclear
2538 around the world?

2539 And so this is really important. And somebody may have
2540 touched on this earlier, but four years ago in the Nuclear
2541 Energy Innovation and Modernization Act, which came out of
2542 this Committee, Congress directed the NRC to establish a risk
2543 informed technology neutral framework suitable for licensing

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2544 advanced nuclear.

2545 Mr. Harrell, can you tell us, has NRC met those
2546 objectives under Congress's direction?

2547 *Mr. Harrell. Thank you for the question, sir. The
2548 answer is no. The initial draft for the Part 53 Rule does
2549 not meet those objectives and effectively, the NRC needs to
2550 go back to the drawing board.

2551 And to his credit, Chairman Hanson said, at the RIC
2552 Conference a couple of weeks ago that they are going to send
2553 it back and they need this to get moving, because the key is
2554 going to be to get this right.

2555 All these designs that are about to move forward in this
2556 kind of 2025 to 2027 time period are going to use Part 50 and
2557 Part 52. It's an imperfect process, but they've got a
2558 strategy to go through the process and get their first
2559 reactors built.

2560 We need Part 53 for the future, the scaleup of these
2561 technologies and what the Commission put forth, publicly a
2562 couple of weeks ago, simple doesn't meet that goal.

2563 *Mr. Bucshon. Great. Anyone else want to comment on
2564 that?

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2565 Mr. Cohen?

2566 *Mr. Cohen. Yes, we agree with that position. The
2567 current draft just doesn't do it. It just compiles more
2568 complexity on existing system. As I said earlier in the
2569 hearing, there's a way to do this in which less is more.

2570 *Mr. Bucshon. Yes.

2571 *Mr. Cohen. And its other countries that have
2572 demonstrated the ability to do that.

2573 *Mr. Bucshon. Anybody else want to?

2574 *Mr. Repko. And I might offer, for this Committee, is
2575 that NEI and the United States Nuclear Industry Council did a
2576 survey of 21 or a survey of components we might use in the
2577 new rulemaking and 18 of 21 responded back, they would not
2578 use the Rule in its current draft.

2579 So that alone tells you there's opportunity.

2580 *Mr. Bucshon. Yes. Sounds like we have a consensus,
2581 for the most part, here.

2582 And Mr. Johnson touched on this, using nuclear for other
2583 things, other than electricity, right? I mean, and
2584 specifically hydrogen power, for example, has a lot of
2585 potential in the near zero greenhouse gas emissions and

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2586 certainly a source of growth in both the stationary and
2587 transportation energy sectors.

2588 Mr. Harrell, can you discuss some of the barriers to
2589 building reactors that can produce other end products like
2590 directly using processed heat or hydrogen?

2591 *Mr. Harrell. Yes. We need to take on a few key issues
2592 there. For example, how do we site a micro-reactor close to
2593 a chemical facility or to a steel production facility? How
2594 do we put those resources next to critical infrastructure to
2595 distribute hydrogen, for example?

2596 The existing regulator framework really isn't conducive
2597 to that. To the NRCs credit, that is one area, post NEMA
2598 that they are starting to advance. They've done a proposed
2599 rule on emergency preparedness zones. They've done a
2600 proposed rule on a generic environmental impact statement,
2601 but they haven't voted it and moved it forward.

2602 And so it would be great to see the Commission advance
2603 those things forward, because it's looking at these issues
2604 differently.

2605 *Mr. Bucshon. Great. I appreciate that. And I just
2606 want to say, I know the comments were made that if you had a

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2607 lot more renewables, like solar for example, that the cost of
2608 energy would be lower. And the actual fact is that the data
2609 shows that energy costs would be slightly higher in the short
2610 run, with that situation.

2611 So I support on an all of the above energy approach, but
2612 I think the record needs to show that the data is
2613 inconclusive about if you go all the way to renewables that
2614 you are going to have lower cost energy.

2615 That's just not true. And the other thing is, then you
2616 have some potential for a grid unreliability and instability,
2617 as some people have mentioned. But that's why I think this
2618 nuclear discussion is really critical going forward.

2619 I yield back.

2620 *Mr. Duncan. I thank the gentleman. I will now go to
2621 Maryland and Mr. Sarbanes, five minutes.

2622 *Mr. Sarbanes. Thanks very much, Mr. Chairman. I want
2623 to thank you and the Ranking Member for collaborating on this
2624 hearing today and I haven't been here as long as some and
2625 therefore not as focused on this issue as long as some have
2626 been, but I have been in a kind of listening/learning mode
2627 the entire time I have been here, which is a little over 16

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2628 years now and certainly appreciate the important role in our
2629 energy portfolio that nuclear power can play.

2630 There's all kinds of concerns about it. You know what
2631 those are. Some of those are squarely within the
2632 jurisdiction of this Committee, others are not. But we
2633 recognize that this an important part of the conversation.

2634 So I want to thank the members of the panel for being
2635 here today.

2636 Dr. Gehin, I am interested in these advanced nuclear
2637 reactors because whatever little understanding I have of
2638 their potential encourages me to think that they may solve,
2639 for some of the challenges that we have seen with kind of the
2640 larger more traditional fleet of reactors, both in terms of
2641 what it means for siting, for waste, for cost, et cetera.

2642 So I wondered if you could talk a little bit more about
2643 what that potential is?

2644 *Dr. Gehin. Sure.

2645 *Mr. Sarbanes. Maybe point to current examples of where
2646 it's begun to be deployed and can one argue that it could
2647 change the landscape on this or not?

2648 *Dr. Gehin. Sure. Thank you for the question. Yes,

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2649 one of the features that you mentioned, the advanced
2650 reactors, they tend to be smaller. You know, we're
2651 completing these large light-water reactors at Vogtle, these
2652 are massive construction projects.

2653 As we can shift, for the advanced reactors, from
2654 construction to manufacturing. We have already mentioned a
2655 little bit about factory, making more of these in the factory
2656 where it's more cost effective to do so where you can use all
2657 of our improvements in manufacturing technology to produce a
2658 large number of smaller reactors versus a few large reactors.
2659 There will be benefits.

2660 It also puts less capital at risk if you're an investor.
2661 That you're not investing in and a few smaller things, and
2662 you can deploy them as you're generating revenue from that.

2663 In terms of the technology itself, higher temperatures
2664 gives other applications that may generate higher revenue,
2665 higher efficiency reactors get more energy out of your
2666 reactor because it's a higher temperature. You can transfer
2667 heat better and produce more efficient electricity as well.

2668 And then the designs tend to have one of the key safety
2669 features is they tend to be passively safe. So you have

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2670 fewer systems in these reactors, which will lower their cost.

2671 Admittedly, the first ones will probably be more

2672 expensive, but you need to go down that learning curve. So

2673 one of the objectives there is to build, you know, build

2674 several of these. Get an order book. Get committed to

2675 building, build more of them.

2676 *Mr. Sarbanes. Right. Could you hazard a guess as to,

2677 like, could you quantify what you think the ultimate

2678 allocation of the nuclear part of our portfolio might be

2679 between the traditional larger reactors and these -- I mean,

2680 could we live in a world one day where it's all advanced

2681 nuclear reactors or no?

2682 *Dr. Gehin. Yes, I mean, I hope we continue to operate

2683 our current fleet for a long time. So we keep our existing

2684 large reactors.

2685 *Mr. Sarbanes. Yes. Okay.

2686 *Dr. Gehin. There is interest internationally in a

2687 large reactors. Poland's a great example, as they really

2688 need to do major deployments. I think in the US, we'll be

2689 deploying small modular reactors --

2690 So you can scale those, those can be larger.

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2691 *Mr. Sarbanes. Yes.

2692 *Dr. Gehin. -- reactors just by scaling the number of
2693 modules as we build those out. That seems to be where most
2694 of the interest in and maybe Mr. Repko can talk about Duke
2695 specifically and the type of reactors.

2696 The large reactors, you build them, build them on
2697 schedule, they operate very well, generating a lot of power,
2698 very cost effective, but right now we're in a situation where
2699 it's challenging for us to build those things.

2700 *Mr. Sarbanes. Yes, it's interesting to think about
2701 whether this sort of time that's passed, in terms of making
2702 any more progress on the legacy kinds of reactors has brought
2703 us technologically to a place where this new opportunity is
2704 more available to us.

2705 Mr. Cohen, can you talk about the climate impact
2706 dimension of advanced reactors versus?

2707 *Mr. Cohen. It's a pretty straight forward connection
2708 in my mind, which is that if we can deploy these things
2709 faster and cheaper, we're just going to have a bigger climate
2710 impact more quickly.

2711 There's nothing, I mean, it's zero-carbon kilowatt hours

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2712 --

2713 *Mr. Sarbanes. Either way.

2714 *Mr. Cohen. Yes. That's the major issue.

2715 *Mr. Sarbanes. Yes. Okay. All right. I think I have
2716 run out of time. Thanks, Mr. Chairman. I yield back.
2717 Appreciate it.

2718 *Mr. Duncan. I thank the gentleman. Now go to
2719 Michigan, Mr. Walberg for five minutes.

2720 *Mr. Walberg. Thank you, Mr. Chairman and thanks to the
2721 panel for being here.

2722 Last week I had the pleasure of touring the Cook Nuclear
2723 Facility at the west edge of my district on Lake Michigan. I
2724 also have the Fermi II facility on the other side of my
2725 district, on Lake Erie, and sadly, we are losing the
2726 Palisades Nuclear facility just north of my district, on Lake
2727 Michigan.

2728 The two plants that are still operating certainly are
2729 producing enough clean, reliable energy to power millions of
2730 homes and they do. At both plants, that I have toured, both
2731 Fermi and Cook I have seen the incredible safety measures,
2732 the redundancies, the planning and the experienced workforce

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2733 that makes those things operate, including having the what
2734 Cook calls the Fukushima building, where they have all the
2735 preparations made to handle anything that would come on, not
2736 expecting it, but prepared nonetheless.

2737 Instead of being spooked by problems of the past and
2738 doing away with nuclear power, like our friends in the EU, US
2739 companies invested time, money, energy, expertise to make
2740 this essential baseload power source even safer and more
2741 effective and we have seen that.

2742 The energy crisis you see in Europe right now proves
2743 which decision was right. I am excited about the future of
2744 nuclear energy with the challenges as well that are there,
2745 but I think we are also missing an opportunity to preserve
2746 and expand our existing fleet that we have in place, and so I
2747 am glad this panel is here today.

2748 Mr. Gehin and Mr. Repko, you both discussed how to
2749 support our existing nuclear fleet. Some plants have looked
2750 into uprating and increase power generation, something we
2751 significantly need as more and more coal and gas plants are
2752 forced, I say that clearly, forced to shut down.

2753 What are the challenges to uprating existing facilities?

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2754 *Mr. Repko. I'll go first. I will say, so thank you
2755 for the question, Congressman.@@

2756 So actually half of our fleet has already been uprated.
2757 We've gone through that process already and we are currently
2758 evaluating the opportunities for the remaining fleet.

2759 We think collective we could gain another over 300
2760 megawatts again of clean, reliable energy. So the process is
2761 established, relative to doing that. It comes off of the
2762 economics and, as we see it, it's viable and supported by our
2763 regulators as well.

2764 *Mr. Walberg. Mr. Gehin, what are the challenges.

2765 *Dr. Gehin. Yes, let me again, add to that. You know
2766 as you uprate the power, you need to look at the safety
2767 parameters, the evaluation of those things. Mr. Repko talked
2768 about that. That process has been established. You've
2769 uprated the plants.

2770 Occasionally, some plants need upgraded equipment. None
2771 of those, I would consider, are challenges. The challenge is
2772 whether the economics makes sense. Fortunately, uprated
2773 plants probably offer some of the cheapest additional
2774 generation that you can get because you've already invested

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2775 in the plant. You're getting more out of the existing plant.

2776 So it's making the economics work. Production tax
2777 credits could be a benefit there, as well as driving those
2778 decisions. The technical aspects are similar to what's done
2779 in operating the plants already in making the safety case.

2780 *Mr. Walberg. Well, let me move on, Mr. Gehin. Flowing
2781 from that, what should Congress look at to ensure timely
2782 licensing decisions from the Nuclear Regulatory Commission?
2783 Because that's part of the big costs, isn't it?

2784 *Dr. Gehin. It is. It definitely is part of the cost
2785 and so some of the things I, you know, I outline in my
2786 testimony are looking at some of the processes of the NRC
2787 regarding timelines for mandatory hearings. If there are
2788 environmental reviews, those can be time consuming and
2789 there's been a number of discussion, broadly, on trying to
2790 streamline environmental reviews for energy deployment.

2791 You know, some of the processes internally specifically
2792 setting timelines at the NRC and trying to enforce those to
2793 try to move things on efficiently and effectively and to meet
2794 the expectations of being able to deploy these improvements
2795 when needed, rather than there being delays in those

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2796 processes.

2797 So some of these aspects of how the NRC does business
2798 could be looked at and there could be improvement there.

2799 *Mr. Walberg. My final 25 seconds. Any of you could
2800 answer this if you would like to hop in. Fermi has a license
2801 that they spent a lot of time, money, and effort to get, but
2802 they don't think they probably will ever use it.

2803 Is there a scenario where building one becomes
2804 financially viable at a site like Fermi?

2805 *Mr. Repko. So are you asking in terms of new nuclear
2806 or extending Fermi?

2807 *Mr. Walberg. This is new. This is a third license and
2808 it appears that my time has expired. So I will have to yield
2809 back --

2810 *Mr. Repko. So we certainly see it for our fleet. So I
2811 think there could be lessons learned.

2812 *Mr. Walberg. Okay. Thank you.

2813 *Mr. Duncan. And we are hoping those licenses get
2814 renewed, I can tell you because one of those is Oconee
2815 Nuclear Station.

2816 I will go to California, Mr. Cardenas for five minutes.

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2817 *Mr. Cardenas. Thank you, Mr. Chairman, and thank you
2818 for the book.

2819 I commend this Committee for convening this discussion,
2820 which should be happening far more often than it does, but at
2821 least we are here today.

2822 I am hopeful this is something we can continue to make
2823 progress on in a bipartisan manner, going forward. Nuclear
2824 currently accounts for nearly half of the zero-carbon
2825 electricity generated in the United States. And if, done
2826 safely, could play a role in our efforts to address the
2827 climate crisis that we are in today.

2828 However, I have serious concerns about the effects
2829 nuclear waste has on the health and safety of the communities
2830 living in proximity within it. Inequities and exposure to
2831 pollution are already persistent across our great country,
2832 and as we consider nuclear, we need to consider and address
2833 the legacy of toxic waste associated with this source of
2834 energy, so as not to recreate, reinforce, or worsen
2835 environmental injustices upon communities in our country.

2836 Mr. Repko, of the nuclear plants that operate in the
2837 United States, how is low level and high-level waste been

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2838 dealt with and managed, and how has the safety, health, and
2839 security of nearby communities been impacted?

2840 *Mr. Repko. Yes, Mr. Gehin might be better to answer
2841 that one.

2842 *Mr. Cardenas. Sure. Absolutely.

2843 *Dr. Gehin. Yes, I mean, currently, when you look at
2844 the used nuclear fuel that's stored in the spent fuel pool
2845 moved to dry storage, which I think is the preferred longer-
2846 term storage, until we work on this consolidate interim
2847 storage.

2848 You know, I think to your point, trying to move to a
2849 central location. Those storage containers are incredibly
2850 robust. I don't know if you happen to visit a nuclear plant
2851 and see them, but that's pretty well established.

2852 The low level waste? I think there are standard
2853 commercial processes that handle that. I'm not as familiar
2854 in that aspect of an operation of a plant, but those are
2855 usually processed out pretty quickly, the way I understand
2856 it, and moved to a low-level waste disposal facilities.

2857 And so the longer the material stays at the site, and in
2858 many of these sites, after operation, tends to be the used

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2859 fuel that we're looking at this consolidated storage.

2860 *Mr. Cardenas. So if you can continue on high level
2861 waste. How long would that waste need to be in that dry
2862 level storage? How many years?

2863 *Dr. Gehin. Yes, I mean, it will need to stay in that
2864 high level storage until there's a geologic repository
2865 developed and this is the discussion today.

2866 *Mr. Cardenas. So today, how long have they been in
2867 storage of the facilities that have been active in the United
2868 States to this day?

2869 *Dr. Gehin. Yes. Since we don't have a geologic
2870 repository, we've been storing that since, you know, the
2871 original fuel is being stored in those. For some plants that
2872 are 40 years old, maybe Mr. Repko can comment, but for 40
2873 years. These cannisters have been designed, I think, for in
2874 excess of 100 years, maybe even longer than that.

2875 And so they're designed for very long-term storage, even
2876 though that's not the ultimate solution.

2877 *Mr. Cardenas. Got it. Yes?

2878 *Mr. Repko. Yes, I would say the same. I mean, the
2879 casts are very robust. They have very extensive design basis

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2880 relative to the Transportation Acts that's in vehicle, rail,
2881 fire, all those kind of aspects, but to the point made, all
2882 of the original fuel is still maintained.

2883 We have even had to go so far as to ship used fuel to
2884 our other nuclear locations to maintain room in our spent
2885 fuel pools for some of our sites. So it's a problem that
2886 needs to be addressed.

2887 *Mr. Cardenas. Yes. So my point is this, looking at
2888 nuclear facilities as a whole, 360 degrees as a whole, yes,
2889 it's a cleaner fuel on the frontend, but at the same time
2890 there's a byproduct that we still need to solve long term to
2891 make sure that the safety and the efficacy of the facility
2892 and also the people potentially being affected long term is
2893 actually solved.

2894 So we are still working on solving those issues, right?

2895 *Mr. Repko. I completely agree. Those issues need to
2896 be addressed. I will say there are radiological controls
2897 relative to this high-level waste, the design of the cask is
2898 built to attenuate those kind of aspects of it as well.

2899 I think there's perhaps a valuable perspective. You
2900 take all of the high-level nuclear waste that's been

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2901 generated for operating our reactors in the US.

2902 *Mr. Cardenas. Okay.

2903 *Mr. Repko. This is back to the 50s, it would be a
2904 volume of roughly a football field, 30 feet high. That is
2905 the total volume of nuclear high level used fuel waste that
2906 we're looking at.

2907 So in terms of solving this problem, it should give a
2908 perspective, it's quite solvable.

2909 *Mr. Cardenas. It is quite solvable, but you actually
2910 put it in the perspective of how much volume there is so far,
2911 but if we are going to have nuclear facilities going forward,
2912 we are going to have more than that one football field size,
2913 but so my point is, I think that we need to have longer
2914 discussion about how will we make sure that long-term, 360
2915 degrees, how we can actually make sure that this is not only
2916 a cleaner fuel, but also a safer fuel.

2917 Thank you so much, Mr. Chairman, I yield back.

2918 *Mr. Duncan. I thank the gentleman. And now I will go
2919 to Alabama to Mr. Palmer, five minutes.

2920 *Mr. Palmer. Thanks, Chairman. I want to get a little
2921 deeper into the whole issue of the nuclear fuel issue and the

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2922 safety, particularly the next generation nuclear.

2923 I have been looking at what France has done and they
2924 have very tight legislation and a very strong regulatory
2925 body, which I think you have to have, but I think the real
2926 key to the safety and efficiency of the French nuclear fleet
2927 is the standardization of their design.

2928 It's almost cookie cutter. And the interesting thing
2929 about this, and this is what I would like to talk to my
2930 colleagues across the aisle about, is French recycles what we
2931 have always considered spent fuel rods. I think that they
2932 are able to recover up to 96 percent of reusable material and
2933 what is left, I think, can be used for other purposes.

2934 So it largely solves our issue of spent fuel and I would
2935 like for your comment on this, Mr. Harrell?

2936 *Mr. Harrell. Yes. Thank you for the question,
2937 Congressman.

2938 There is an opportunity in spent fuel management, right?
2939 We can use the spent fuel repositories for productive use.
2940 You underscore a really key point. 95 percent of the energy
2941 in that spent fuel is being wasted. It's just sitting
2942 onsite, and so advanced reactors, one, could burn some of

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2943 that resource as their fuel, and recycling is a huge
2944 opportunity.

2945 We see it abroad; we should invest in that. There are a
2946 lot of exciting companies that are USNIC members who are
2947 working in that space, like Oklo and Curio, for example, and
2948 so it's something we should explore moving forward.

2949 RPE has recently done a program to explore recycling as
2950 well. I really think it is an opportunity. I wish Mr.
2951 Cardenas had stuck around because new nuclear could actually
2952 reduce our spent fuel --

2953 *Mr. Palmer. Well, I promise you that when they are
2954 back in here, I will remind them of it repeatedly.

2955 Mr. Gehin, I just wonder with the amount of spent
2956 nuclear fuel that we have right now that we are trying to
2957 deal with, how many, I know this is a crazy question, but how
2958 many units do you think that would fuel and for how long if
2959 we wanted to use all of that? Because it doesn't take a lot.

2960 *Dr. Gehin. Yes, it's a -- thank you for the very good
2961 question. I actually did that calculation. If you just look
2962 at the spent fuel, which is not all the material I have, I'll
2963 comment on that in a minute, use that in a particular type of

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2964 reactor, such as we're developing, you could provide all the
2965 electricity for the US for well over 100 years.

2966 That's a lot of power.

2967 *Mr. Palmer. Just using up what we have?

2968 *Dr. Gehin. That's using the used fuel.

2969 *Mr. Palmer. Yeas

2970 *Dr. Gehin. Now, in making that rich uranium, we also
2971 have depleted uranium that we produce and there's a lot of
2972 that as well. That could also be fuel if we choose to use
2973 it.

2974 So in terms of fuel supply, if we choose to go that
2975 direction, we do the research and develop that technology,
2976 there's a lot of fuel available. Now, that's a longer-term
2977 endeavor to get to that point, but --

2978 *Mr. Palmer. Yes, but it largely takes care of the
2979 issue of what we are having to do, in terms of storage and
2980 sending billions of dollars --

2981 *Dr. Gehin. We would still have disposal of radioactive
2982 waste or fission products --

2983 *Mr. Palmer. Right.

2984 *Dr. Gehin. -- and other things. So you still would

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2985 need disposal, but the scale would be lower.

2986 *Mr. Palmer. And Mr. Cohen, I really appreciate your
2987 answers to the questions, and particularly, in regard to
2988 renewables. And I'm one of these all of the above, but I
2989 also understand that variability issue, but I also understand
2990 the physics and you touched on the physics a little bit and
2991 we are not going to have an order of magnitude leap forward,
2992 in terms of power generation from renewables, because we are
2993 pretty close to their maximum efficiency.

2994 But when you compare it to next generation nuclear, as I
2995 understand it, there are a couple of advantages that next gen
2996 nuclear would have over renewables. One, would be the
2997 physical land use. I think you can put one nuclear facility
2998 on 640 acres, one square mile and it would take about -- it
2999 would generate the same amount of power, from a turbine farm,
3000 it would take about 77,000 acres.

3001 But the other thing that I want to address and you other
3002 guys can answer this, I've only got a few seconds left, is
3003 that a next gen nuclear facility would probably operate 24/7
3004 except when it's shut down for maintenance. And it would
3005 operate for 80 years plus, which lord knows what the

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3006 technology will be by then.

3007 Whereas the turbine, the average turbine, I think,
3008 starts losing generating capacity after 10 years and it's
3009 pretty much done after 25 to 30, and right now we are not
3010 able to recycle the blades.

3011 I would just for you guys, all four of you in the little
3012 bit of time left to respond to that.

3013 *Mr. Harrell. In my testimony, there is a comparison
3014 and it doesn't even take into account the longevity of
3015 nuclear, it just says head-to-head nuclear is, in terms of
3016 material consumption, cement, steel, all of the critical
3017 minerals, you know, many orders of magnitude smaller than --
3018 it's very compact and that's one of the great advantages.

3019 So resource efficiency, hands down.

3020 *Mr. Palmer. Mr. Chairman, I think this has been a very
3021 constructive hearing. I am very grateful that we have held
3022 it and I appreciate the comments from my colleagues across
3023 the aisle. I think we are at a place where we can have
3024 agreement and work together and get some things done.

3025 I yield back.

3026 *Mr. Duncan. I thank the gentleman for yielding back.

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3027 And I recognize the gentlewoman from the state of Washington,
3028 Ms. Schrier for her five minutes.

3029 *Mr. Schrier. Thank you, Mr. Chairman. First, let me
3030 just thank all of the witnesses today and say how refreshing
3031 it is to have such a bipartisan Committee hearing where
3032 everybody in this room is looking at how we can employ
3033 nuclear in a safe way to give us the baseload that we need to
3034 power our communities.

3035 I also want to say that it was really pretty exciting to
3036 hear my Republican colleague talk about recycling. So I am
3037 eager to get started.

3038 Let me first say, also, that I am very supportive of
3039 integrating nuclear energy into our energy portfolio. That
3040 includes brining advanced nuclear to Washington state.

3041 Washington only has one nuclear plant right now, the
3042 Columbia generating station. It produces about 12 percent of
3043 our state's electricity, with only a 1.7 square mile
3044 footprint, which meets, in addition to hydropower, our
3045 baseload needs and avoids a tremendous amount of greenhouse
3046 gas emissions.

3047 So by expanding our nuclear portfolio, in addition to

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3048 the hydropower we have, but in many states that don't have
3049 that, this is baseload, we can really better integrate other
3050 renewables and wean ourselves off of fossil fuels.

3051 According to the Pacific Northwest, it's National Lab,
3052 benefits of small modular reactors and other advanced
3053 reactors are expected to help reduce economic, security,
3054 technical, perceived safety, and regulatory barriers
3055 associated with nuclear power, which could then help
3056 establish new nuclear power throughout the country.

3057 Mr. Harrell, I am going to direct this first question to
3058 you. You know, whenever we talk about a change in energy
3059 portfolio, there is anxiety about what will happen to people
3060 working in a different part of that industry at any given
3061 time, for example coal that is on the decline.

3062 But according to the 2023 Department of Energy Pathways
3063 to Commercial Liftoff: Advanced Nuclear Report, advanced
3064 small modular reactors can create about 230 permanent onsite
3065 jobs per gigawatt.

3066 The report, and I will need some translation of how that
3067 breaks down, what kind of jobs those are, but the report also
3068 found that the median nuclear industry wage is the highest in

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3069 the energy industry.

3070 So coupled with the possibility of transitioning
3071 existing coal plant sites to advanced nuclear, this could be
3072 a boom, in terms of employment opportunities. I was
3073 wondering how we can work with industry and labor to improve
3074 nuclear workforce development, where those jobs are, and how
3075 we can expand?

3076 *Mr. Harrell. Yes. That's a great question. Thank
3077 you, Congresswoman. And a lot of exciting things happening
3078 in Washington state in the advanced nuclear space. And so
3079 you're exactly right. The US supply chain already employs
3080 half a million Americans, they are good high paying jobs.
3081 And you know, I think we see, in advanced nuclear, some major
3082 opportunities.

3083 I'll just give you the example the TerraPower Sodium
3084 Project. They are headquartered there in Bellevue,
3085 Washington, but building their first project in Wyoming.
3086 It's going to create 2,000 construction jobs and then support
3087 250 full-time employees.

3088 And a lot of those employees are going to transition
3089 from the coal plant that had retired there. I was talking a

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3090 little bit earlier; they're separating the nuclear island
3091 verse the powerplant functions. That way there's kind of a
3092 direct translation between the people who are working at the
3093 coal plant who could then work in that powerplant function
3094 with minimal training.

3095 I think assets like the National Labs and some of the
3096 universities who are making a big push here. We're seeing
3097 universities, like Abilene Christian, for example, is a USNIC
3098 member that are building a research reactor on their campus
3099 and then really ramping up their nuclear energy program.

3100 And so things like that, I think, are really forward-
3101 leaning policies. And some of the universities in Washington
3102 state have done the same.

3103 *Mr. Schrier. Thank you. I think that provides a great
3104 degree of comfort when these anxieties about transitions come
3105 up. I just wanted to thank you and in the remaining moments,
3106 wanted to underscore this bipartisan support.

3107 I am excited to work with my colleagues. I also look
3108 forward to engaging with my colleagues on the other side of
3109 the aisle and in the Senate, with the recent introduction of
3110 the Bipartisan Advance Act.

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3111 So thank you very much, and I yield back.

3112 *Mr. Duncan. I thank the gentlelady. And now I will go
3113 to Mr. Curtis for five minutes.

3114 *Mr. Curtis. Thank you, Mr. Chairman, Ms. Ranking
3115 Member.

3116 You know I just have to think that anybody that cares
3117 about affordable, reliable, clean energy has to be very
3118 excited about today's hearing.

3119 This is, I think, a big deal for us and Mr. Chairman and
3120 Ranking Member, please my appreciation for pulling this
3121 together and having this productive conversation. And I am
3122 so pleased that it is fair to have questions about nuclear.
3123 I think that is great that questions are coming out.

3124 I personally believe there is not a single one of these
3125 obstacles that the industry can't overcome and tackle and I
3126 regret that it seems like we have taken almost a couple
3127 decades out of innovation of this for a number of reasons we
3128 won't go in today, but I have no doubt had we had our head in
3129 the game for a long time, all of these things would have been
3130 resolved.

3131 A couple of thoughts quickly. I am from Utah. We have

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3132 a UAMPS. It's an organization, you are nodding your heads,
3133 you are probably familiar with them. They have been engaged
3134 in trying to license a small nuclear reactor for a decade.
3135 They have spent about \$100 million and they are halfway
3136 through the process.

3137 Almost overwhelming, particularly if nuclear is really
3138 going to be part of our energy mix going forward, how can
3139 this be, right? This is clearly not acceptable if we are
3140 going to make nuclear a major part of what we are doing.

3141 I am also fortunate, PacifiCorp, Rocky Mountain Power in
3142 my district is working with Mr. Buffett on a very unique
3143 concept to put a nuclear plant that would actually be
3144 positioned in Wyoming, ironically, both of these would be in
3145 Wyoming.

3146 But, Ms. Schrier, I am really pleased that part of their
3147 process is to look at previous coal plants where they have
3148 closed down, that are perfect homes for these small nuclear
3149 reactors. They have the transmission lines and it is a
3150 really good answer.

3151 Most answers for these towns haven't really worked.
3152 This is an answer that I think would be very helpful and

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3153 would work and quite frankly, the would welcome this facility
3154 into their neighborhood.

3155 A couple questions, like, how do we help these early
3156 adopters, these early movers, right? How do we encourage
3157 this? I actually had a bill that would authorize the
3158 Secretary of Energy to make targeted awards to cover the
3159 regulatory costs of first technologies.

3160 Jeremy, you are nodding your head. Do you want to weigh
3161 in on this? How do we start this thing?

3162 *Mr. Harrell. Yes. It's a great question, Congressman.
3163 It's great to see you and you underscore this kind of crazy
3164 scenario, right?

3165 NuScale, NuScale itself, beyond UAMPS had to spend \$500
3166 million in five years to get their design certification. The
3167 customer, UAMPS is then spending another insane amount of
3168 resources. That's not feasible for a municipal co-op or
3169 organization along --

3170 *Mr. Curtis. Or anybody.

3171 *Mr. Harrell. -- or anyone, frankly, right? And so
3172 that is why it's important to have prizes, for example, to
3173 help early movers go through the process.

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3174 The entire industry is benefiting from what NuScale to
3175 go through the process first. They should get support and
3176 they did from the federal government going through it. It's
3177 why tax incentives and having those be refundable, so
3178 municipals or co-ops can use it to deploy their first project
3179 in programs like the Advanced Reactor Demonstration Program,
3180 because as we mentioned, folks want to be project two, three,
3181 or four, but we need those pioneers. The folks like UAMPS,
3182 to be successful so that we unlock the scaleup of these
3183 technologies.

3184 *Mr. Curtis. Yes. Big shout out to them, right, for
3185 trying?

3186 *Mr. Harrell. 100 percent.

3187 *Mr. Curtis. I wish I had time to hear from all of you.
3188 Let me kind of switch gears just a little bit. Where does
3189 uranium come from to do this? My district has a uranium mill
3190 that is constantly under attack. We are dependent on China,
3191 right, for this and other places outside the United States.

3192 How do we change that dynamic to where we are not
3193 dependent for uranium? Anybody want to -- and I need a short
3194 answer.

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3195 Yes, Mr. Gehin, please.

3196 *Dr. Gehin. Yes, I'll talk a little bit about that.

3197 One of the things that was talked about a little bit earlier,
3198 about there being enough demand to make this economically
3199 feasible to mine uranium.

3200 Uranium has been very cheap for a while, internationally
3201 selling at a low prices. So we need this demand signal for
3202 this.

3203 *Mr. Curtis. And I'm so out of time. So let me just
3204 push it along a little bit.

3205 *Dr. Gehin. Okay.

3206 *Mr. Curtis. Like processing too, right? We got to
3207 talk about not just mining it.

3208 *Dr. Gehin. It's the whole supply chain.

3209 *Mr. Curtis. Processing it.

3210 *Dr. Gehin. Mining, processing, conversation.

3211 *Mr. Curtis. Yes. Now, also this PacifiCorp project is
3212 going to produce hydrogen. Jeremy, will you talk about real
3213 quick about how important it is to not forget hydrogen as
3214 part of this and are we offering the right incentives for
3215 that?

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3216 *Mr. Harrell. Yes, absolutely. I think it's why
3217 permitting reform is really important. We're going to need
3218 to build out a hydrogen distribution infrastructure because
3219 the production that's going to be happening at exciting
3220 sites, like our nuclear facilities.

3221 *Mr. Curtis. I'm out of time. Thank you all for
3222 coming. Thank you for having this hearing. I would just end
3223 with: I have heard, and nod your head if you think it's
3224 true, that nuclear is actually one of our safest forms of
3225 energy, all things said?

3226 The big incidences we all hear about, right, but we
3227 forget how many people's lives have been lost in other forms
3228 of energy. So despite its reputation, this is actually very
3229 safe.

3230 And Mr. Chairman, I regrettably yield my time.

3231 *Mr. Duncan. I thank the gentleman. Members votes are
3232 going to be called at 5.

3233 We are going to continue and just work right through it.
3234 We will swap the Chair out here, but when votes are called,
3235 if you feel like going to vote, come straight back. It's one
3236 vote, so we are just going to move through.

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3237 The Chair will not go to Arizona, Ms. Lesko, who has the
3238 largest nuclear power facility in her district and for five
3239 minutes.

3240 *Ms. Lesko. Thank you, Mr. Chairman.

3241 Yes, just outside of my district is Palo Verde Nuclear
3242 Plant. So I am very proud about that.

3243 We have talked a lot about needing new sources for
3244 uranium and nuclear fuel, especially if we are going to
3245 expand and have more modular nuclear reactors, and that we
3246 are too reliant on Russia for nuclear fuel and crucial
3247 isotopes.

3248 And so Mr. Harrell, what are your thoughts on recycling
3249 nuclear waste?

3250 *Mr. Harrell. Yes. Thank you, Congresswoman for the
3251 question and Palo Verde was the very first nuclear facility I
3252 ever visited.

3253 *Ms. Lesko. Good.

3254 *Mr. Harrell. So it really is a gem in the fleet.
3255 Recycling is a huge opportunity, right? We should absolutely
3256 be investing in research and development and exploring it as
3257 an option. It can both reduce our spent fuel reserves and

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3258 increase our own fuel security by turning that spent fuel
3259 into product that we can use.

3260 *Ms. Lesko. And what do you think the obstacles are to
3261 recycling waste?

3262 *Mr. Harrell. Some of it is just political gumption.
3263 You know, I think the DOE is not restricted on exploring that
3264 option. We heard, Rita Baranwal, the Assistant Secretary of
3265 Nuclear Energy in the Trump Administration talk about it
3266 regularly.

3267 RPE is doing some public/private partnerships with
3268 companies at the moment. I think we need to explore.
3269 There's absolutely a non-proliferation concerns that need to
3270 be taken into account, but Japan has solved for those issues
3271 with the IAEA, as have the French and others. It's
3272 absolutely a manageable situation and frankly, an opportunity
3273 that we're squandering at the moment.

3274 *Ms. Lesko. And how about the cost? Is it too costly?

3275 *Mr. Harrell. The fuel that would be produced from a
3276 recycling would be more costly than, for the lack of a better
3277 way of putting it, green fuel production, but what you do
3278 need to factor in is the cost liability of spent fuel that we

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3279 have right.

3280 *Ms. Lesko. Right.

3281 *Mr. Harrell. Someone earlier was talking about the
3282 millions of federal taxpayer dollars that have been used
3283 because we don't have a long-term repository. The offset of
3284 that cost to the federal government needs to be considered in
3285 the price as well.

3286 *Ms. Lesko. All right. My next question is to any of
3287 the witnesses. Today I just met with electric cooperatives
3288 from Arizona and they were very concerned about making sure
3289 they have reliable electricity on the grid.

3290 One of the electric co-ops said they were now down to
3291 one coal plant and that they were having a really hard time
3292 getting batteries for energy storage for the solar, that they
3293 were waiting now for two years. They haven't been able to
3294 get it. The supply chains are terrible, costs are going up.

3295 And we are spending, in the United States, billions of
3296 dollars on subsidies for solar and wind energy. And I was
3297 wondering what your thoughts are, and if we should divert
3298 some of those subsidies to nuclear? That's my question.

3299 Mr. Cohen?

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3300 *Mr. Cohen. We're going to need it all. I mean, we'll
3301 be lucky if we have a lot of nuclear and a lot of solar and
3302 get to where we need to go.

3303 I just don't think we can do this as a zero sum. It's
3304 certainly true that nuclear is not being rewarded in the
3305 marketplace for its characteristics. So you often get this
3306 false comparison and people say, well, solar is three or four
3307 cents and nuclear is seven or eight. You know, well, that's
3308 just on a straight kilowatt hour basis, it doesn't account
3309 for reliability.

3310 So there's some things that can be fixed in state
3311 regulation to make that happen. I don't know that you'd call
3312 that a subsidy. I'd call that recognizing the value and if
3313 we could sort that out, I think we'd get a long way towards,
3314 we certainly wouldn't be seeing plants shutdown like they are
3315 right now.

3316 But I don't think there's a silver bullet here,
3317 honestly. I think tripling the electric supply in the US all
3318 zero-carbon is going to need everything we've got and more.

3319 *Ms. Lesko. Anyone else?

3320 *Dr. Gehin. Yes. Maybe I would totally agree with

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3321 that. I also think making sure nuclear is included as part
3322 of the option set. You know, in some places I suspect it's
3323 not yet because of the, you know, the concerns about risks,
3324 actually completing projects.

3325 So as we see these advanced reactors develop, that
3326 create more opportunities to include it in integrated
3327 resource plans and things like that.@@

3328 *Ms. Lesko. All right. Thank you. And I yield back --
3329 oh.

3330 *Mr. Harrell. The last thing I'll add is I'm confident
3331 that new nuclear is going to compete in the commercial
3332 marketplace without these types of incentives, eventually. I
3333 think they are critical for these first movers, to do their
3334 first of a kind deployment, but as we scale these, mass
3335 produce them, and deploy, I think we're going to see a very
3336 similar situation to what we saw with US Natural Gas that's
3337 going to be really attractive in US electricity markets and
3338 globally, from a price affordability and security standpoint.

3339 *Ms. Lesko. Well, great. I am looking forward to
3340 seeing what happens at the Idaho National Laboratories on the
3341 modular reactor and see if we can replicate it and use it.

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3342 It's exciting and thank you all for being here for now
3343 three hours without leaving the table. I really appreciate
3344 all of your expertise. And I yield back.

3345 *Mr. Duncan. The gentlelady yields back. I will now go
3346 to Mr. Pence from Indiana.

3347 *Mr. Pence. Thank you, Mr. Chairman, and Ranking Member
3348 DeGette for holding this meeting, bipartisan meeting. And
3349 thank you to the witnesses being here today.

3350 And I echo my peers. I don't know how you sit there for
3351 that many hours. I could never do that.

3352 You know in the Hoosier state, innovators are leading
3353 the way to power the next generation of nuclear energy.
3354 Purdue University is a national leader in nuclear engineering
3355 programs and home to the country's first and only fully
3356 digitized nuclear reactor used to train students in research,
3357 cyber-physical protection.

3358 Purdue has also undergone extensive collaboration with
3359 Duke Energy to study opportunities to use next generation
3360 small modular reactors to power their campus. Rolls Royce,
3361 in Indianapolis, is advancing their reactor designs for
3362 transportable small modular reactor design to provide 470

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3363 megawatts of baseload power.

3364 While Indiana currently does not have nuclear assets
3365 powering our grid, the state legislature has begun paving the
3366 way for utilities to deploy advanced nuclear reactors across
3367 our state. We are looking forward to it.

3368 Mr. Repko, earlier this year I had the opportunity to
3369 meet with DOE Assistant Secretary Dr. Huff and Duke Energy at
3370 Purdue University as you collaborate with the school on a
3371 joint feasibility study to bring nuclear power to their
3372 campus.

3373 The joint effort from Purdue and Duke made several
3374 important policy recommendations to accelerate commercial
3375 deployment of advanced reactor technologies. In particular,
3376 one recommendation focused on a university-led consortium of
3377 industry leaders and researches for advanced nuclear
3378 convergent manufacturing, qualification of manufacturing
3379 components, and workforce development.

3380 In order to bridge the gap of commercialization for
3381 small modular reactors, research universities are well
3382 positioned to utilize advanced technologies and expertise in
3383 material science to assist the deployment and operation of

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3384 small modular reactors.

3385 Can you speak, sir, about the importance of your
3386 company's collaboration with Purdue University and the
3387 potential benefits for implementing a public/private
3388 consortium, including the universities, for convergent
3389 manufacturing, and workforce development?

3390 *Mr. Repko. Yes, Congressman. And thank you, thank you
3391 for the opportunity to comment.

3392 So we have been working with Purdue, as you said, and we
3393 very much valued those interactions. Purdue is an
3394 engineering leader and we very much appreciate their interest
3395 in small modular reactor technologies.

3396 So you know I would offer that, you know, the
3397 recommendation around the consortium is really at the heart
3398 of what we've been talking about collectively here, right?

3399 All of the different aspects of risk. Some of the
3400 technical challenges, the environmental considerations, the
3401 workforce and supply chain. It's going to take more than
3402 just a one singular type solution set around that.

3403 Granted, it's going to be necessary, in terms of that
3404 market signal, to get the rest moving, but that's only going

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3405 to be the start. So I think that framework gives us the
3406 opportunity to look broader around all of the aspects that
3407 will enable small modular reactors for Purdue University and
3408 beyond.

3409 *Mr. Pence. Yes. I think as Mr. Harrell said, you
3410 know, being able to deliver projects on time, you know, you
3411 need the workforce, educated workforce in this space. And I
3412 know that Purdue is dedicated to that.

3413 Dr. Gehin, in your testimony you mentioned Project Pele
3414 an innovative micro-reactor that holds tremendous potential
3415 to advance military and civil capabilities. Rolls Royce, who
3416 has facilities in Indianapolis has partnered with the DoD for
3417 micro-reactor development through Project Pele.

3418 Can you take a moment to speak to the importance of this
3419 project and the steps you are taking to bring this innovation
3420 to the commercial market?

3421 *Dr. Gehin. Yes. Thank you. Thank you for the
3422 question. Yes. Project Pele is the Department of Defense
3423 project to develop a mobile micro-reactor. It's a pilot
3424 project.

3425 The reactor is being designed and developed by BWXT with

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3426 Rolls Royce and other partners, as you mentioned. It will be
3427 tested at Idaho National Laboratory. We have a large site
3428 able to do tests, so the plans are to test it there. The
3429 fuel that's used for that was technology developed through
3430 DOE R&D programs TRISO Fuel as well.

3431 So the research is being led, the technologies that will
3432 go into that reactor. And then as that reactor is developed
3433 and tested, it will be authorized by the Department of
3434 Energy.

3435 So with all the discussion on regulation, it's taking a
3436 little different path, because --

3437 *Mr. Pence. So that's the timeline in --

3438 *Dr. Gehin. -- it's very appropriate to --

3439 *Mr. Pence. -- in innovation?

3440 *Dr. Gehin. -- do that and, in a quick timeline, get
3441 that demonstrated with the goal of this is the first, you
3442 know, we talked about the first mover. This should lead to
3443 further developments in this space.

3444 *Mr. Pence. Okay. Thank you. Thank you all for being
3445 here. I yield back.

3446 *Mr. Duncan. Thank you, Mr. Pence. I will now go to

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3447 Mr. Weber from Texas.

3448 *Mr. Weber. Thank you. I appreciate that, Mr.
3449 Chairman.

3450 For those of you who don't know when I was in the Texas
3451 legislature, I had a south Texas nuclear project in my
3452 district and it's about 35 so miles from my district now,
3453 from the county line.

3454 We were there in 2010, and watched them change out spent
3455 fuel rods with their own isotopes, it's a fascinating -- they
3456 could do it cleanly, they could do it safely.

3457 I was encouraged to see that you were having a
3458 discussion with the Congresswoman DeGette and Congressman
3459 Cardenas about nuclear waste. Are any of you all aware of
3460 any waste control specialists in West Texas at Andrews Texas?
3461 Dr. Gehin is, and you are, Mr. Harrell?

3462 But the other two are not. Have either of you all been
3463 there? I have been there. I was on the environmental reg
3464 committee in the Texas legislature. It's a fascinating
3465 facility. It's so huge and so big and so intense, of course
3466 I get that that's low level.

3467 So we ought to be focused on their concerns that they

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3468 legitimately raised. What do we do with some of that waste?
3469 First of all, reprocessing, and using as much of it as we
3470 could is what I think the best alternative.

3471 Mr. Cohen, I am going to go to you. Can you talk more
3472 about how nuclear waste recycling can be a solution to the
3473 problem? Storing waste and a way to produce valuable fuel
3474 and isotopes?

3475 *Mr. Cohen. I don't consider myself an expert on that,
3476 Congressman Weber, to be fair. I'd like to get back --

3477 *Mr. Weber. You know, an expert's just someone who is
3478 50 miles from home.

3479 *Mr. Cohen. Okay. Fair enough. You know, I think
3480 clearly there's the opportunity to harvest the remaining
3481 energy value in the fuel for sure. I do think that it's
3482 sometimes, we had an earlier back-and-forth about whether
3483 you're really reducing a lot of the volume and that's
3484 debatable.

3485 You can certainly reduce the total amount, but whether
3486 it's an order of magnitude or not is another question.

3487 I really think I ought to defer to the scientists on
3488 panel regarding the harvesting of the other --

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3489 *Mr. Weber. Is it Gehin? How do you say your last
3490 name?

3491 *Dr. Gehin. Gehin.

3492 *Mr. Weber. Mr. Gehin, to you.

3493 *Dr. Gehin. Thank you. Yes, we've been doing research
3494 on recycle for a long time. In fact, we are recycling fuel
3495 at Idaho National Laboratory from the EBR 2 reactor to
3496 produce HALEU, so there's real value to that. So we have a
3497 lot of expertise.

3498 The question is, I think the questions around this have
3499 been right. Is it economic to do so and it hasn't been
3500 because uranium has been very inexpensive and then, you know,
3501 can you factor in the benefits addressing the backend.

3502 So the studies that we've done, if you do full
3503 continuous recycle, which you keep recycling through the
3504 reactors, you potentially get to an order of magnitude less
3505 spent fuel and high-level waste, because you're burning
3506 things and turning it into shorter lived things.

3507 That's a long-term endeavor. You can do limited
3508 intermediate recycle. There's some benefits to that. So
3509 there's a range of options. I think the real need is to do

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3510 research to improve the economics, as well as research on
3511 ensuring we can deploy it confidently, in terms of
3512 proliferation risk, if we deploy this broadly.

3513 So those are the types of areas that need to be looked
3514 at.

3515 *Mr. Weber. So you said you had been, are you are of
3516 waste control specialists out in --

3517 *Dr. Gehin. Yes.

3518 *Mr. Weber. -- in Andrews County, Texas?

3519 *Dr. Gehin. Yes.

3520 *Mr. Weber. Have you been there?

3521 *Dr. Gehin. I haven't been there, unfortunately. I
3522 would love to visit there.

3523 *Mr. Weber. You have not been there? Well, just for
3524 the benefit of our friends across the aisle and our team here
3525 too, South Texas Nuclear Project basically took and sent
3526 showed videos of how they store -- some of you all are
3527 talking about waste in a cannister. I forget, was that you,
3528 Dr. Gehin?

3529 *Dr. Gehin. Yes.

3530 *Mr. Weber. Okay.

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3531 *Dr. Gehin. Yes. It's moved from the spent fuel,
3532 dried, put in cannisters, and what you'll see is a concrete
3533 pad with these cylinders on it --

3534 *Mr. Weber. Right. Well, back then in 2010, what we
3535 saw was they would take that cannister, they didn't put waste
3536 in it. This was testing of the cannisters to show how viable
3537 they were and how strong. They put it on a flatbed rail car
3538 and they ran that rail car into a solid concrete wall and it
3539 just rails car just went to pieces, wheels came off it and it
3540 rolled, the chains holding the cannister broke, cannister
3541 goes out spinning, you know, on the ground wherever it was.
3542 Cannister stayed intact.

3543 We can store this stuff safely. Thoughts on the Yucca
3544 Mountain? I will stay with you, Dr. G., for my last 40
3545 seconds.

3546 *Dr. Gehin. Yes. So obviously Yucca Mountain is I'll
3547 call it a political issue. It's been investigated
3548 extensively for spent fuel storage. It hasn't gone through
3549 the full regulatory process. There could be value in doing
3550 that, of course, to understand if it could be a viable place

3551 But from a, the way I understand it, I'm a scientist. I

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3552 think this is in the political space.

3553 *Mr. Weber. So it's a political science, but you don't
3554 want to get in that realm? I got it. I yield back, Mr.
3555 Chairman.

3556 *Mr. Curtis. [Presiding] Thank you. The gentleman
3557 yields. The Chair recognizes the gentleman from Georgia, Mr.
3558 Allen.

3559 *Mr. Allen. Thank you, Chairman and I appreciate Chair
3560 Duncan holding this important hearing to discuss the critical
3561 needs, which we talked about, in expanding nuclear energy and
3562 really an all-out energy program for this country.

3563 We know that our energy needs are going to increase
3564 dramatically and I think nuclear energy is going to play and
3565 it will play a big part of that, because it's clean,
3566 affordable, safe, and we got to work towards solutions to
3567 expand the use of commercial nuclear energy to be energy
3568 dominate, as we were just a few years ago.

3569 In my district, we have plant Vogtle, where units three
3570 and four are currently under construction. It's well known
3571 that these are the first nuclear reactors under construction
3572 in the United States in more than 30 years.

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3573 Currently in operation are units one and two, which
3574 power more than 500,000 homes and businesses. Unit three is
3575 expected to come online in the next few months, and Unit four
3576 is expected to come online towards the beginning of next
3577 year.

3578 Unit three actually hit a milestone in April, as Unit
3579 three recently generated electricity on the grid and it's
3580 connected to the grid. Once both Units three and four come
3581 online, Plant Vogtle will be the largest single generator of
3582 clean energy in the United States.

3583 This is a huge accomplishment for nuclear energy in
3584 America and I'm proud that it is being done in my home
3585 district. I am hopeful that we can use what we have learned
3586 in constructing Plant Vogtle to further expand our nuclear
3587 energy.

3588 I also want to shout out a big thanks to Southern
3589 Company and their perseverance through multiple challenges to
3590 finish the construction of these important facilities.

3591 Mr. Gehin, we have learned a lot about what it takes to
3592 build large-scale nuclear reactors from Plant Vogtle. Units
3593 three and four cost more than anticipated and when seeing

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3594 projects of this size and cost, companies may be weary and we
3595 have talked about the investment risk in building a large-
3596 scale nuclear reactors.

3597 So how can we use lessons of Plant Vogtle to help build
3598 future facilities to better predict investment cost and
3599 capital risk?

3600 *Dr. Gehin. Right. Thank you for the question and
3601 congratulations on these plants.

3602 *Mr. Allen. Thank you.

3603 *Dr. Gehin. A lot of times you learn the most from
3604 things that maybe don't go well and you take those lessons
3605 learned. So there's plenty here to take from this regarding
3606 construction planning, finalization to design, probably input
3607 there on regulatory processes. So this will be a case study
3608 on those and taking that to future nuclear plants.

3609 I also think in addition to the Vogtle plants, there are
3610 other plants that are being built in the world and are being
3611 done well, and we can take lessons learned from them.

3612 One of the lessons learned is you really want to build a
3613 pipeline of these reactors. So you take the lessons from
3614 Vogtle three and four, carry those on to the next one. So

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3615 it's kind of unfortunate that we're not continuing to build
3616 more of these.

3617 The experience has been in United Arab Emirates, for
3618 example, where they built four units that the labor
3619 productivity on Units three and four was double that on Unit
3620 one and two. And so there was sort of the cost of doing
3621 business in Vogtle Three and Four that could have benefited
3622 the next units, and unfortunately, we're not going to be
3623 doing that.

3624 So we'll have to take that to other reactors that are
3625 being designed and built.

3626 *Mr. Weber. And I agree with that, because it's almost
3627 like over that 30 years, we had a few people around that had
3628 actually built reactors and could understand exactly the
3629 unique construction application there.

3630 Will any of these issues that we have seen, as far as
3631 labor force and training and that sort of thing and
3632 inefficiency in module fabrication that caused the challenges
3633 at Vogtle Three be issues for these small modular reactor
3634 generation reactors, Mr. Gehin?

3635 *Dr. Gehin. Yes. And so if we don't learn the lessons,

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3636 they could be. Fortunately, we are learning the lessons.

3637 The other aspect is on the smaller reactors, as I mentioned
3638 earlier, we're shifting more to factory fabrication, which
3639 has also reduced those risks.

3640 Also the fact that they're smaller, puts less at risk at
3641 any one time. So it's maybe more tolerable.

3642 *Mr. Allen. Well, I am out of time. Thank you all for
3643 being here and with that, Mr. Chairman, I yield back.

3644 *Mr. Curtis. The gentleman yields. The Chair
3645 recognizes Mr. Balderson.

3646 *Mr. Balderson. Thank you, Mr. Chairman. That was
3647 quick.

3648 Thank you all for being here today and for your
3649 patience. My first question is for Dr. Gehin. In your
3650 testimony you mentioned the schedule and fees structures
3651 should be reflective of the scale and complexity of the
3652 reactor designs.

3653 How could the fee structure be improved to encourage
3654 reactor demonstrations and investments?

3655 *Dr. Gehin. Yes. So some thoughts on that. First of
3656 all, and the question I got from the Chairman related to the

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3657 fraction of cost for a plant. Obviously, if you're building
3658 a large plant, that's different than if you're building say a
3659 10-megawatt micro-reactor, where you really need to minimize
3660 those for fees and costs.

3661 This should be right sized to the risk; it should be
3662 risk-informed approach based on the size of the reactor.
3663 There are also costs and fees of just entering into the
3664 regulatory process through pre-application meetings, things
3665 like that.

3666 That could also be the offset to lower a barrier to
3667 entering that regulatory process.

3668 *Mr. Balderson. I'm somewhat caught off guard here, so
3669 hold on. You're next.

3670 And Mr. Bucshon asked part of my question on the 53
3671 issue, that's why I am kind of jumping around here. But Mr.
3672 Harrell, thank you.

3673 There is a significant market for nuclear energy abroad,
3674 obviously, and we have talked about that all afternoon. We
3675 have talked about the trip. I was part of the codel that we
3676 went with my colleague and friend Mr. Pfluger.

3677 China, Russia, Poland, they all are at a pretty good

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3678 place. We do know about the issue that just happened with
3679 Germany being shut down. How imperative is it that the
3680 United States continues to lead the way in developing these
3681 new innovative technologies?

3682 *Mr. Harrell. It's an imperative as I discussed a
3683 little bit. It's not a zero-sum game here. The countries
3684 who are interested in nuclear here, if the US doesn't partner
3685 with them, it doesn't mean they're not going to pursue
3686 nuclear, it just means they're going to do with China or
3687 Russia, most likely or maybe other international competitors,
3688 but the US really has the position to seize this opportunity.

3689 Some of our friends at Third Way and Energy for Growth
3690 Hub did an analysis that by 2050, the global nuclear market
3691 could be \$360 billion annually. That's a market that we want
3692 to seize economically here, right? And we have cutting edge
3693 designs. Our entrepreneurs are ready to come to the
3694 commercial marketspace.

3695 And so let's get the economic benefits, let's get the
3696 energy security benefits and ultimately forge these century
3697 long partnerships with some of these allies, rather than
3698 China and Russia.

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3699 *Mr. Balderson. Okay. Thank you. I have spoken at
3700 previous hearings about the global environment benefits of
3701 exporting our clean natural gas, especially to these
3702 developing nations.

3703 Can you discuss the possible environmental benefits that
3704 nuclear energy exports could provide? It's an easy one for
3705 you.

3706 *Mr. Harrell. Yes. It's a great question. IEA's, the
3707 expectation is that we need to double nuclear globally by
3708 2050, to have any shot of meeting a deep emissions reduction
3709 goals.

3710 So it's a huge, huge opportunity. A huge economic
3711 opportunity for the US and so we should be exporting clean US
3712 natural gas, and we should be exporting these exciting zero-
3713 emission nuclear technologies.

3714 *Mr. Balderson. All right. Thank you very much. Mr.
3715 Chairman, I yield back.

3716 *Mr. Curtis. Thank you. The gentleman yields. The
3717 Chair recognizes the gentleman from Texas, Mr. Pfluger.

3718 *Mr. Pfluger. Thank you, Mr. Chairman.

3719 I would like to thank you for holding this hearing. I

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3720 think it's critical. As has been mentioned that there was
3721 travel by this Committee abroad and really one of the things
3722 that came out of trip and we know this, but it was
3723 highlighted especially by the Polish government, the Prime
3724 Minister, the President of the Czech Republic on just how
3725 important energy security is.

3726 Very happy to see Eastern Europe that literally has been
3727 the victim of the weaponization of Putin and Putin's energy
3728 plays, moving towards a realistic view.

3729 I kind of want to get into some numbers here. Mr.
3730 Cohen, I think you mentioned some of the numbers with regards
3731 to actual the wattage that nuclear power can provide. Let's
3732 just look at estimates in the United States of the
3733 electricity demand that we are going to have.

3734 Concerned about the Biden Administration's move to
3735 mandate some of the electric vehicles and not have enough
3736 electricity for this. So what can nuclear do in providing
3737 the supply that this country needs?

3738 *Mr. Cohen. Thank you, Congressman, for that question.
3739 So in the testimony we cite at least one study that suggests
3740 that between vehicle electrification, industrial

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3741 electrification, and just under underlying growth, we'll
3742 probably need to do something like double to triple kilowatt
3743 hours produced in America in the next three decades, just an
3744 absolute hyper leap.

3745 So and if we are to meet climate goals, all that is
3746 going to have to be zero-carbon, and we're going to have to
3747 replace all the unabated fossils, like, if you want to meet
3748 that objective.

3749 So you're really talking about a massive amount of stuff
3750 and the question is, you know, what can nuclear contribute to
3751 that?

3752 We do know that France was able to decarbonize its grid
3753 in 15 or 17 years with repeat builds, standardized designs.
3754 If we can get to that, I would guess that we could meet 30,
3755 35 percent, 40 percent of that total build with nuclear, but
3756 we're going to have to get busy.

3757 *Mr. Pfluger. Which is double or triple what we are
3758 currently seeing right now?

3759 *Mr. Cohen. Yes. So we're probably -- what that means
3760 is we're probably something like quadrupling our current --

3761 *Mr. Pfluger. So is nuclear power baseload capable?

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3762 *Mr. Cohen. It has proven to be.

3763 *Mr. Pfluger. The softball question. I think, of
3764 course, we all know that it does provide reliable,
3765 affordable, and also security wise is a great option.

3766 Mr. Harrell, I love your comments on and Mr. Cohen,
3767 yours too on how if we don't do this here, and this question
3768 was just posed, and it's going to be export. Somebody else
3769 is going to do it.

3770 So both for security reasons, to remain competitive and
3771 also for climate reasons, we have to export what we're doing
3772 here. And can you expand on if we don't just how vulnerable
3773 that makes us on a demand issue, but also on a security
3774 issue?

3775 *Mr. Harrell. Yes. I'll give you a perfect example.
3776 There's been increased partnership with Romania over the last
3777 couple of years. We're going to build some small modular
3778 reactors in Romania.

3779 They directly cancelled partnerships with China because
3780 they saw the direct impact of that type of relationship with
3781 China. China was going to control their reactor builds, have
3782 a significant influence over their grids. They thought the

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3783 US is a better partner than it's a perfect model.

3784 It's why countries like Poland are really excited and
3785 cutting one of the single largest clean energy deals in the
3786 history of this country to build five, six gigawatts of the
3787 beautiful AP 100 reactors that are being completed in Georgia
3788 right now.

3789 And so it's a huge opportunity for us as we drive
3790 forward and we should use our technological prowess and those
3791 inherent advantages to kind of spread affordable, clean,
3792 reliable, secure energy across the globe.

3793 *Mr. Pfluger. I'm actually not an advocate for all of
3794 the above. I am an advocate for the best of the above. And
3795 when you have the ability and the technology and it makes
3796 sense, then we should use it.

3797 One of the concerns I have is about storage and for
3798 either of you gentlemen, in West Texas we have a tremendous
3799 amount of energy. All types of energy. There's an interim
3800 storage facility that has caused quite a commotion. I don't
3801 know that it's gone through procedurally, at least for our
3802 community, the right steps.

3803 I am interested, when it comes to storage, in finding a

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3804 permanent solution or a permanent facility what your thoughts
3805 are? I know we have 25 seconds left.

3806 *Dr. Gehin. Yes. As I've talked about it, you know, as
3807 far as interim, the approach that's being pursued is a
3808 consent-based approach to put interim storage where it's
3809 welcome type of thing.

3810 Long term, you know, again, I think you'd use a consent-
3811 based approach, but we're going to need a repository --

3812 *Mr. Pfluger. Permanent site.

3813 *Dr. Gehin. A permanent repository at some part,
3814 regardless of what we do.

3815 *Mr. Pfluger. Okay.

3816 *Dr. Gehin. So we'll have to get there.

3817 *Mr. Pfluger. I will have to take yours for the record
3818 in a written form. I am out of time, but thank you so much.

3819 With that, I yield back, Mr. Chairman.

3820 *Mr. Duncan. [Presiding] I thank the gentleman. I now
3821 go to Georgia to Mr. Carter for five minutes.

3822 *Mr. Carter. Thank you, Mr. Chairman. I appreciate you
3823 letting me waive on this Committee. This is extremely
3824 important to me and I have a high interest in it and that's

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3825 why I asked, as a member of the full Committee to waive on
3826 this Subcommittee.

3827 And I am, like you, Mr. Chairman, I am very excited
3828 about the future of nuclear. Very excited and it's going to
3829 provide our country with reliable, clean, secure baseload
3830 power. And as you just mentioned we, in the state of
3831 Georgia, are very proud of the fact that we have the first
3832 two nuclear reactors that are going to be going online and
3833 one of them is already online and connected to the grid,
3834 producing electricity.

3835 So we are very, very excited about that. The first time
3836 in decades that we have had one in this country and there
3837 have been 31 reactors that have commenced construction since
3838 the beginning of 2017, and 27 are either Russian or Chinese.

3839 We have got to get past this and we have got to, not
3840 only in this country, but we have got to convince our allies
3841 that this is the way to go. I am convinced of it and then we
3842 hear the exciting news that the NRC approved the first
3843 advanced SMR nuclear design and the breakthroughs in fusion.

3844 So exciting times in energy and thank my colleague from
3845 Texas, because he's right. I want the best of the above.

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3846 Yes, all of the above is important, but I want the best of
3847 the above and I am convinced that nuclear is part of that.

3848 Venture capitalists have been putting money into this,
3849 we know that as well. And that is very important and we are
3850 encouraged to hear that, but we are missing the boat and we
3851 have been missing the boat for quite a while now with not
3852 investing in nuclear.

3853 And the nuclear reactor market is valued at \$500 to \$750
3854 billion over the next 10 years. We need to be part of that
3855 here in the United States. That is why, along with my
3856 colleague, Representative Scott Peters, we have introduced
3857 legislation, the Global Nuclear Energy Assessment and
3858 Cooperation Act.

3859 This is a multi-pronged approach to what we are trying
3860 to do. First of all, it will prohibit us from importing the
3861 fuels from hostile foreign nations like Russia and China.
3862 That will encourage energy independence and to prevent our
3863 country from becoming reliant on other countries, on our
3864 enemies for our nuclear energy needs.

3865 Secondly, it will introduce a program, the International
3866 Nuclear Reactor Export and Innovation Branch. It will

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3867 introduce that program at the Nuclear Regulatory Commission
3868 to focus our international nuclear efforts, including
3869 training and sharing expertise with our allies.

3870 That's something I hope that you will agree, and I think
3871 you will, that we need to be doing. We don't have to do this
3872 by ourself, but we need to encourage our allies to be in this
3873 with us.

3874 So with this growing appetite for nuclear power around
3875 the world, and clearly, we would much rather help provide
3876 that than Russia and China, who will only use it for
3877 leverage.

3878 Mr. Harrell, let me ask you, do we have a comprehensive
3879 idea of all the countries that want to pursue nuclear energy
3880 and would be happy to work with us to get what it would take
3881 to make it happen?

3882 *Mr. Harrell. Yes. There's roughly 50 countries and a
3883 little more that have expressed interest in either starting
3884 nuclear programs or growing their nuclear programs in the
3885 last couple of years.

3886 And so it's an immense global market opportunity.

3887 *Mr. Carter. So how would having a strategy, such as I

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3888 mentioned here, and I am self-serving. This is our
3889 legislation. It's bipartisan legislation, by the way,
3890 Representative Peters is on the other side of the aisle, but
3891 we both believe in it strongly.

3892 So what would having a strategy and a full picture of
3893 the potential nuclear market benefit the US? How would it
3894 benefit us?

3895 *Mr. Harrell. I think there's license harmonization
3896 that you mentioned is a really key piece. Armond actually
3897 mentioned this a little bit as well. We need to be able to
3898 use the NRC standard and then ultimately have that translate
3899 over to building in Poland, into Romania, and to Ghana or
3900 wherever it may be.

3901 And so this direct partnership among the regulators and
3902 literally opening up global markets. If there's an easy
3903 translation there, of course the country is going to be more
3904 excited about partnering with the US, because they can build
3905 off our expertise and then ladder it up.

3906 It's exactly what we're seeing with Canada, US, and
3907 Poland with the GE Hitachi, but --

3908 *Mr. Carter. And that's what we need to do. There's no

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3909 need to reinvent the wheel. We need to be sharing our
3910 knowledge and sharing our expertise here and we need to be
3911 gaining as well.

3912 I will go to the rest of the panel. I know that we are
3913 at the end and I am probably the last one, I am not sure.
3914 But anyway, how does the US nuclear energy, or excuse me, the
3915 US nuclear industry standards compare to China and Russias?
3916 Anyone want to take a stab at that?

3917 *Dr. Gehin. Yes, maybe others can comment. I don't
3918 have deep knowledge of China and Russia. I know we have the,
3919 if you just look at the operations of our plant, Mr. Repko
3920 can talk about are our plants highest capacity factors. We
3921 get the most energy out of them. They are most economically
3922 run.

3923 Just based on what we know about ourselves, I think we
3924 are world leaders with the existing fleet.

3925 *Mr. Cohen. The cheeky answer would be, how would we
3926 know? But I'll just share one data point. We asked a
3927 experienced MIT nuclear engineer who had actually help build
3928 some of the China plants to go back and see if they were
3929 being operated safely.

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3930 And his conclusion was, basically Western standards are
3931 being applied in the safety -- he did an audit. You
3932 couldn't go much farther than that. They don't do much
3933 publicly, but --

3934 *Mr. Carter. Right.

3935 *Mr. Cohen. -- he said, I don't lose a lot of sleep
3936 over that. For whatever that's worth.

3937 *Mr. Carter. Good. I'm glad to hear that. Well,
3938 again, I'm excited.

3939 Mr. Chairman, thank you for letting me waive on this
3940 Committee and thank you all for being here.

3941 *Mr. Duncan. I thank the gentleman. Seeing there are
3942 no further members wishing to ask questions. I would like to
3943 thank all of the witnesses for being here. Your testimony
3944 was phenomenal and I think you saw the bipartisan nature.

3945 I wish more of the Democrats would have shown up and
3946 engaged in this, but they are going to have some opportunity
3947 because I have asked staff to put together a summary of the
3948 key takeaways so that we can start crafting legislative
3949 package, have a markup, and push some legislation through
3950 Congress to really expedite and propagate nuclear power in

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3951 this country and get us back on track.

3952 So I want to thank you.

3953 I ask unanimous consent to insert in the record the

3954 documents included on the staff hearing documents list?

3955 Without objection, that will be the order.

3956 And pursuant to Committee Rules, I remind members that

3957 they have 10 legislative business days to submit additional

3958 questions for the record and I ask witnesses to submit their

3959 response within 10 business days upon receipt of the

3960 questions.

3961 And so that will conclude the American Nuclear Energy

3962 Expansion; Powering a Clean and Secure Future Hearing. And

3963 without objection, the Subcommittee will stand adjourned.

3964 [Whereupon, at 5:30 p.m., the subcommittee was

3965 adjourned.]