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6 SECURING AMERICA'S FUTURE:

7 SUPPLY CHAIN SOLUTIONS FOR A CLEAN ENERGY ECONOMY

8 TUESDAY, NOVEMBER 16, 2021

9 House of Representatives,

10 Subcommittee on Environment and Climate Change,

11 joint with the

12 Subcommittee on Energy,

13 Committee on Energy and Commerce,

14 Washington, D.C.

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18 The subcommittees met, pursuant to call, at 10:03 a.m.,

19 in the John D. Dingell Room, 2123 Rayburn House Office

20 Building, Hon. Paul Tonko [chairman of the Subcommittee on

21 Environment and Climate Change], presiding.

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24

25 Present from the Committee on Environment and Climate

26 Change: Representatives Tonko, DeGette, Schakowsky,

27 Sarbanes, Clarke, Peters, Dingell, Barragan, McEachin, Blunt

28 Rochester, Soto, O'Halleran, Pallone (ex-officio); McKinley,
29 Johnson, Mullin, Hudson, Carter, Duncan, Palmer, Curtis,
30 Crenshaw, and Rodgers (ex-officio).

31 Present from the Committee on Energy: Representatives
32 Rush, Peters, Doyle, McNerney, Tonko, Veasey, Schrier,
33 DeGette, Butterfield, Matsui, Castor, Welch, Schrader,
34 Kuster, Barragan, McEachin, Blunt Rochester, O'Halleran,
35 Pallone (ex officio); Upton, Burgess, Latta, McKinley,
36 Kinzinger, Griffith, Johnson, Bucshon, Walberg, Duncan,
37 Palmer, Pence, Armstrong, and Rodgers (ex officio).

38 Also present: Representative Joyce.

39

40 Staff Present: Adam Fischer, Professional Staff Member;
41 Waverly Gordon, Deputy Staff Director and General Counsel;
42 Tiffany Guarascio, Staff Director; Perry Hamilton, Clerk;
43 Zach Kahan, Deputy Director Outreach and Member Service; Rick
44 Kessler, Senior Advisor and Staff Director, Energy and
45 Environment; Mackenzie Kuhl, Press Assistant; Brendan Larkin,
46 Policy Coordinator; Tyler O'Connor, Energy Counsel; Kaitlyn
47 Peel, Digital Director; Tim Robinson, Chief Counsel; Nikki
48 Roy, Policy Coordinator; Andrew Souvall, Director of
49 Communications, Outreach, and Member Services; Medha
50 Surampudy, Professional Staff Member; Rebecca Tomilchik,
51 Policy Analyst; Michael Cameron, Minority Policy Analyst,
52 CPC, Energy, Environment; Jerry Couri, Minority Deputy Chief
53 Counsel for Environment; Nate Hodson, Minority Staff
54 Director; Emily King, Minority Member Services Director; Mary
55 Martin, Minority Chief Counsel, Energy & Environment; Brandon
56 Mooney, Minority Deputy Chief Counsel for Energy; Peter
57 Spencer, Minority Senior Professional Staff Member, Energy;
58 and Michael Taggart, Minority Policy Director.

59

60 *Mr. Tonko. The Subcommittee on Environment and Climate
61 Change and the Subcommittee on Energy will now come to order.

62 Today the subcommittees are holding a hearing entitled,
63 "Securing America's Future: Supply Chain Solutions for a
64 Clean Energy Economy.''

65 Due to the COVID-19 public health emergency, members can
66 participate in today's hearing either in person or remotely,
67 via online video conferencing.

68 Members, staff, and members of the press present in the
69 hearing room must wear a mask, in accordance with the updated
70 guidance issued by the attending physician.

71 For members participating remotely, your microphones
72 will be set on mute for the purpose of eliminating
73 inadvertent background noise. Members participating remotely
74 will need to unmute your microphone each time you choose to
75 speak. Please note that, once you unmute your microphone,
76 anything that is said in Webex will be heard over the
77 loudspeakers in the committee room, and subject to be heard
78 by the live stream and C-SPAN.

79 Since members are participating from different locations
80 at today's hearing, all recognition of members, such as for
81 questions, will be in the order of full committee seniority.

82 Documents for the record can be sent to Rebecca
83 Tomilchik at the email address where -- we have provided to
84 staff. All documents will be entered into the record at the

85 conclusion of the hearing.

86 Before we get started I want to recognize that Friday
87 was the last day for the committee's long-serving chief
88 environmental counsel, Jackie, Jacqueline Cohen. Jackie is a
89 tremendous public servant, and was instrumental to the
90 development and enactment of numerous historic environmental
91 laws, including TSCA reform, which I remember well, and
92 reauthorization of the drinking water SRF. And hopefully,
93 the Build Back Better Act will soon be added to that list. I
94 want to express my gratitude for her years of service, and
95 wish Jackie and her family the best.

96 We wish you well, and we are going to truly miss you,
97 Jackie. So godspeed.

98 I now recognize myself for five minutes for an opening
99 statement.

100 The Biden Administration and Democratic members of this
101 committee have proposed ambitious climate targets: at least
102 50 percent economy-wide greenhouse gas emissions reductions
103 from 2005 levels by the year 2030; at least half of new
104 vehicle sales are electric by 2030; and a carbon-free
105 electricity system by 2035; as well as the policies that will
106 ensure these targets are met.

107 Achieving these goals will require serious commitments
108 and immediate action. It will also require building an
109 immense amount of new infrastructure and manufacturing

110 capacity. Production of clean energy technologies, including
111 wind turbines, solar panels, batteries, advanced vehicles,
112 charging equipment, and electric appliances will need to be
113 ramped up significantly. And we will need low-emissions
114 construction materials, like that of steel and cement, to
115 support clean energy deployment.

116 The sustainable economy of the future will definitely
117 need to be built and manufactured. The question that remains
118 to be seen is whether it will be manufactured by Americans.

119 In recent years we have heard bipartisan concerns about
120 our increasing reliance on China and other foreign
121 competitors for clean energy technologies. This is
122 especially true of certain critical minerals. Today, some
123 foreign sources of lithium, cobalt, and nickel involved --
124 involve environmentally harmful practices, and unsafe and
125 unethical labor practices and conditions.

126 In order for the United States to fully seize the
127 opportunities of the clean energy economy, we need to develop
128 our own resilient supply chains. This may include domestic
129 sources of critical minerals, as well as processing,
130 manufacturing, and recycling capabilities. Ambitious climate
131 action requires nothing less than fundamental changes to our
132 economy and our energy system.

133 Any change on this scale will have its challenges. I
134 acknowledge that. These challenges, including the need to

135 develop domestic supply chains, are not reasons not to act,
136 but rather, reasons to discuss how to best overcome these
137 issues in a way that benefits America's workers and her
138 entrepreneurs.

139 Members of Congress have two options: use this as an
140 excuse to oppose our domestic energy transition, and
141 guarantee that our foreign competitors dominate the global
142 economy of the future; or we can do something about it. We
143 can support Federal policies that will enable American
144 workers to benefit from the transition, ensuring that we are
145 researching, developing, and deploying the next generation of
146 clean energy technologies right here, in the United States,
147 and exporting them around the world.

148 This effort is already underway in Congress. Last year
149 I worked with Congressman Curtis on a Science Committee bill
150 to authorize a battery and critical mineral recycling
151 research program at DoE, which was enacted in the Energy Act
152 of 2020. These R&D efforts can make batteries more
153 recyclable, and future breakthroughs could support
154 development of alternative materials and chemistries that are
155 less reliant on critical minerals.

156 And yesterday, President Biden signed the bipartisan
157 Infrastructure Investment and Jobs Act into law. This bill
158 included billions of dollars to support the development of
159 domestic clean energy supply chains, particularly for battery

160 manufacturing.

161 And similarly, the Build Back Better Act, if enacted,
162 would refresh the 48C tax credit for investment in clean
163 energy manufacturing facilities.

164 Our committee's title of Build Back Better includes
165 billions of dollars for DoE grant and loan programs that will
166 support manufacturing of zero-emission vehicles, charging
167 equipment, and other innovative technologies and their
168 components, as well as financial assistance to decarbonize
169 energy-intensive manufacturing. These investments will help
170 revitalize American manufacturing, making us less dependent
171 on foreign nations with inadequate worker and environmental
172 protections.

173 But this alone will not be sufficient. We must also
174 enhance the recycling and reuse of critical minerals and
175 these clean energy systems.

176 In Europe, more than 60 percent of the lithium in the
177 economy is recovered through recycling. Today only five
178 percent of lithium ion batteries are recycled in the United
179 States. For comparison, the U.S. recycles 97 percent of
180 traditional lead acid batteries. Recycling policies and
181 investments, as those proposed in the Clean Future Act, would
182 reduce our reliance on foreign nations resource extraction,
183 growing our own supply of these minerals, while creating
184 American jobs.

185 As we will hear today from Dr. Switzer, there is a
186 strong business case for this work. We know trillions of
187 dollars will be invested in clean energy in the years ahead,
188 and supporting every stage of clean energy technology
189 development will indeed be necessary to position the United
190 States to be the leader of the global clean energy economy.

191 By understanding the future needs and challenges of this
192 transition, Congress can develop Federal policies that will
193 enable us to rebuild resilient, domestic clean energy
194 technology supply chains, and support millions of American
195 manufacturing jobs.

196 I look forward to our witnesses' testimony, and I do
197 hope this might be an area where we can work together to
198 support emerging American industries, while reducing our
199 reliance on foreign materials and products.

200 [The prepared statement of Mr. Tonko follows:]

201

202 *****COMMITTEE INSERT*****

203

204 *Mr. Tonko. With that I now recognize the ranking
205 member of the Subcommittee on Environment and Climate Change,
206 Representative David McKinley, for five minutes, please.

207 *Mr. McKinley. Thank you, Mr. Chairman. Here, in the
208 United States, inflation is at a 30-year high, and energy
209 prices are the highest they have been in 7 years. At the
210 same time, Europe and countries like China are experiencing
211 blackouts and energy rationing. They simply don't have
212 enough capacity to meet the needs, the demands. According to
213 the IEA, the International Energy Agency, global energy
214 demand is expected still to increase five percent this year,
215 four percent next year and there on after.

216 Unfortunately, in its rush to meet our dependence -- to
217 lessen our dependence on reliable fossil fuels and nuclear in
218 the near term, renewables simply can't keep up with the
219 demand.

220 So let's take a step back. Rather than this rush to 100
221 percent renewable energy by 2030 or 2035, wouldn't it make
222 more sense for the United States to invest in carbon capture,
223 and use fossil fuels as a bridge over the next several
224 decades, until we can build out our renewables?

225 According to NETL, the U.S. is on the brink of capturing
226 carbon in a cost-effective manner. And in so doing, fossil
227 fuels will have zero emissions, just like wind, solar,
228 nuclear. And the U.S., in the meantime, can be developing a

229 long-term strategy for developing our critical minerals and
230 acquiring them, working -- developing a long-term solution on
231 our supply chain.

232 So -- but put this in perspective. The World Bank Group
233 and the Center for Strategic and International Studies
234 estimate the demand for mineral production, critical
235 minerals, could increase by 500 to 1,000 percent by the year
236 2050. Where are we going to get these materials?

237 Even the Administration's own environmental justice
238 report has said -- they published earlier this year -- said
239 no additional mining. But the United States is entirely too
240 dependent on China and other nations for the minerals needed
241 for renewables. For example, according to the NMA, the
242 National Mining Association, the United States still imports
243 76 percent of its cobalt and 100 percent of its graphite from
244 countries like China and the Congo, places with systemic and
245 significant human rights issues.

246 But this Administration seems more interested in
247 pursuing an anti-fossil fuel agenda by restricting mining in
248 places like Arizona and Minnesota. Remember, just last year,
249 in this very room, former Energy Secretary Moniz said -- told
250 us the United States should be mining more, not less.

251 So, Mr. Chairman, think about what you are doing here.
252 We are restricting mining in America to acquire these
253 critical minerals that we need for renewables, but you don't

254 like getting them from China or Congo, yet demand is clearly
255 outpacing capacity. I have to say you can't have your cake
256 and eat it, too.

257 I look forward to today's discussion, and I hope that we
258 can come up with a sensible, common-sense approach in this --
259 and adult conversation, as we go through this. We need to
260 find some solutions with this, and I don't think this rush is
261 going to be productive.

262 [The prepared statement of Mr. McKinley follows:]

263

264 *****COMMITTEE INSERT*****

265

266 *Mr. McKinley. So I yield back the balance of my time.

267 *Mr. Tonko. The gentleman yields back. The chair now
268 recognizes Representative Rush, chair of the Subcommittee on
269 Energy, for five minutes, Mr. Chair, for your opening
270 statement.

271 [Pause.]

272 *Voice. Ask him to unmute.

273 *Mr. Tonko. Chairman Rush, can you please unmute?

274 [Pause.]

275 *Mr. Rush. Sorry, Mr. Chairman. Thank you so very
276 much. Good morning to you, and to all the witnesses, and to
277 the other member of the subcommittees, of the joint
278 subcommittees. I would like first to thank you, Mr.
279 Chairman, for working really closely with me and with my
280 entire staff and the Energy Subcommittee to make today's
281 joint hearing possible.

282 As we have heard time and time again in my subcommittee,
283 the clean energy transition represents both a challenge and
284 an opportunity. It would be a difficult test, but one that
285 we can achieve to get to net-zero emissions by 2050.

286 That said, the clean energy transition also represents
287 an enormous opportunity, and it will enable us to move energy
288 production from foreign countries like Saudi Arabia to right
289 back here at home, and to ensure that our clean energy
290 workforce better mirrors the tremendous diversity of America,

291 and also to make energy more affordable for all Americans.

292 Frankly, Mr. Chairman, we are way behind in our efforts.
293 According to DoE, the United States only produced 3 percent
294 of the world's solar panels last year, and relied upon
295 imports for roughly 40 percent of the average onshore wind
296 projects. Rather than despairing, though, Mr. Chairman,
297 these facts should inspire us to action. Rather than
298 surrendering to a tepid reaction, we must vigorously commit
299 to a robust, take-no-prisoners type of absolute action
300 strategy.

301 The reality is that we have to compare our clean energy
302 supply chain to the traditional fossil supply chain that we
303 are suffering under today. Despite years of hearing about
304 energy independence from the past Administration, according
305 to the EIA in August, we are still relying on crude imports
306 for nearly 40 percent of the oil that was produced and
307 processed in American refineries.

308 At a time when volatility in energy prices is causing so
309 many consumers pain, we need to speed up the pace at which we
310 make investments in the clean energy supply chain. And any
311 vote to keep our dependence on fossil fuels is a vote to keep
312 America's energy prices volatile, and to expose Americans to
313 unnecessary economic uncertainty.

314 Finally, Mr. Chairman, as many of my colleagues know, I
315 am passionate about ensuring that the next energy generation

316 economy does not replicate the mistakes of the old one. We
317 too released a report a few months ago, clearly showing that
318 fossil energy has disproportionately excluded Black and Brown
319 workers, along with women of all colors. The clean energy
320 has yet to do significantly better. Mr. Chairman, this is
321 totally disgraceful and unacceptable.

322 With that, Mr. Chairman, I look forward to today's
323 discussion about the clean energy supply chain.

324 [The prepared statement of Mr. Rush follows:]

325

326 *****COMMITTEE INSERT*****

327

328 *Mr. Rush. And with that I yield back the balance of my
329 time.

330 *Mr. Tonko. Thank you, sir.

331 The gentleman yields back. Now the chair recognizes
332 Representative Upton, the ranking member of the Subcommittee
333 on Energy, for five minutes, Mr. Chair, for your opening
334 statement, please.

335 *Mr. Upton. Well, thank you, Mr. Chairman. And thanks
336 to our witnesses for appearing before us today.

337 I have to say America's economy is in trouble. Under
338 President Biden, inflation is surging to record levels,
339 driving up household bills and wiping out savings. Yes, we
340 are in an energy crisis. The average price for a gallon of
341 gas in my Michigan district is over \$3.40, the price at the
342 pump has nearly doubled from last year.

343 We are also in a supply chain crisis, we know that.
344 Shipping backlogs and trucker shortages reveal how critically
345 dependent we are on imports from China and other parts of
346 Asia. Congestion in U.S. ports is also hurting American
347 small businesses and farmers, who depend on a smooth supply
348 chain to send their goods to market. American families and
349 businesses are stuck in the middle on shipping delays and
350 supply chain disruptions.

351 The worldwide semiconductor chip shortage, and the
352 cascading impact across hundreds of industries -- thousands

353 of industries -- proves what is at stake when we become
354 overly dependent upon China and overseas manufacturers. As a
355 result of the chip shortage, the Americans -- consumers are
356 paying record amounts for new cars, and electronics, and
357 appliances, while dealerships and stores struggle to maintain
358 their inventory.

359 I am concerned that we are also dependent on China for
360 nearly 90 percent of the critical minerals and materials that
361 are required for some clean energy technologies like wind
362 turbines, solar power panels, batteries.

363 When it comes to energy, we want to make sure that the
364 supply chain is here, in the U.S., so that our electric bills
365 do not spike simply because of supply chain issues.

366 In March I introduced the Securing America's Critical
367 Minerals Supply Act to require DoE to address our energy
368 supply chain vulnerabilities, and encourage domestic
369 production and processing.

370 And over the last decade-and-a-half, the U.S. has
371 emerged as the world's leading producer of oil and gas, and a
372 global energy superpower. After decades of relying on the
373 Middle East for energy imports, the U.S. became a net
374 exporter, a -- in 2019, and that is because of the work here,
375 in this committee. America's shale revolution enabled the
376 U.S. to create hundreds of thousands of jobs to undertake a
377 clean energy transition, while at the same time household

378 energy prices dropped to the lowest levels in recent history.
379 America benefitted, and we got used to \$2 gasoline and cheap
380 electricity. And those folks now are thinking, why should we
381 have to pay more?

382 Mr. Chairman, I plan to use today's hearing to explore
383 what is at stake, and what steps Congress ought to take to
384 strengthen our supply chain and address the energy crisis.

385 Last week the Energy and Commerce Republicans wrote to
386 request hearings on the energy crisis, and preparations for
387 the upcoming winter. It is here. We have serious concerns
388 about rapidly rising energy prices and the negative impact
389 that the price increases are having on the U.S. economy,
390 inflation, and household bills.

391 We are deeply concerned that the Administration's anti-
392 fossil fuel agenda is significantly contributing to the
393 energy crisis. Revoking pipeline permits; threatening
394 punitive regulations and taxes, such as the proposed natural
395 gas tax in the Build Back Better plan discourages U.S.
396 production. Even more alarming, the Administration is asking
397 OPEC and Russia to drill more, while threatening U.S. workers
398 with a ban on exports, or artificially flooding the domestic
399 market with oil from SPR, the Strategic Petroleum Reserve.

400 This committee needs to conduct oversight over DoE's
401 handling of the energy crisis to understand better its
402 actions, and what steps Congress may need to take ahead of

403 the upcoming winter.

404 We also should investigate how regulations may be
405 causing or contributing to energy price increases, and
406 whether the Administration's potential shutdown of Michigan's
407 Line 5 pipeline -- this is a pipeline that goes from Canada
408 through Michigan to a refinery in Southeast Michigan -- will
409 increase prices even further.

410 Mr. Chairman, I look forward to today's hearing and
411 working with you to schedule additional hearings in the
412 future to examine the energy crisis.

413 [The prepared statement of Mr. Upton follows:]

414

415 *****COMMITTEE INSERT*****

416

417 *Mr. Upton. Thank you, and I yield back.

418 *Mr. Tonko. The gentleman yields back. The chair now
419 recognizes Chair Pallone, who is the chair of the full
420 committee.

421 And you recognized, Mr. Chairman, for five minutes for
422 your opening statement, please.

423 *The Chairman. Thank you, Chairman Tonko and Chairman
424 Rush, also, for convening this important joint subcommittee
425 hearing this morning on supply chain solutions for a clean
426 energy economy.

427 This committee and the Biden Administration are
428 committed to the clean energy transition, and to ambitious
429 decarbonization goals, including a goal of generating 100
430 percent clean electricity by 2035.

431 Now, the clean energy transition is underway across the
432 world. Last year annual renewable capacity additions
433 increased by 45 percent worldwide, and that was despite the
434 pressures and challenges of the global COVID-19 pandemic.
435 Domestically, the Energy Information Administration projects
436 the share of renewables in the electricity generation mix to
437 double by 2050. And this is a huge industry that is only
438 getting bigger.

439 Unfortunately, we are not fully prepared right now to
440 meet this growing demand, and I am concerned that we risk
441 falling behind other countries as they invest in the

442 industries of the future. As an example, today China
443 dominates the production and the assembly of solar
444 photovoltaic modules. China controls over 70 percent of the
445 solar PV module assembly, while over the last year the United
446 States produced only 3 percent of the modules sold globally.
447 China also has over 75 percent of global cell fabrication
448 capacity, a crucial stage in the battery manufacturing
449 process. In the meantime, the United States has less than 10
450 percent of the market share for capacity across major battery
451 components and cell fabrication.

452 With skyrocketing projections for electric vehicle
453 adoption, and the growing necessity of energy storage
454 solutions, this is an industry guaranteed to boom. And as we
455 look ahead, the question is whether we want the United States
456 to lead or follow in the clean energy transition. And I
457 strongly believe that we must lead that transition, so we no
458 longer have to rely on other countries' clean energy supply
459 chains.

460 It is becoming increasingly clear that key components
461 needed for clean energy technologies are sourced from
462 countries with unacceptable labor and environmental
463 practices. Now, fortunately, the Biden Administration has
464 taken decisive action to halt the import of some goods
465 sourced from countries that violate fundamental human rights.
466 But we can and we must do more.

467 It is also important to remember that the fossil fuel
468 industry faces some of these same problems. Extraction
469 processes and labor concerns have plagued the traditional
470 energy supply chain for decades. We must build a clean
471 energy economy that tackles the climate crisis by eliminating
472 the historic polluting and poor labor practices of the
473 international fossil fuel industry.

474 Now, this is one of the many reasons it is critical that
475 Congress pass the Build Back Better Act, which invests
476 heavily in our clean energy future. It includes investments
477 in the deployment of innovative technologies and American
478 manufacturing of zero-emission transportation technologies.
479 This important funding will increase demand for clean energy
480 domestically, while also supporting the development of clean
481 energy supply chains right here, in the United States.

482 And as we develop these supply chains, it is vital we
483 focus not only on the manufacture of products and
484 technologies, but also on what happens to those goods at the
485 end of their useful lifetime. In the coming decades, as
486 batteries and wind turbines and solar panels reach the end of
487 their lives, we must manage their disposal and recycling in a
488 way that is safe and economically beneficial. Creating
489 circular supply chains that enable collection and re-use of
490 these technologies at the end of their useful lifetimes will
491 not only reduce waste, but also reduce cost and the amount of

492 material needed for the clean energy transition.

493 So for our nation's future, it is crucial that we
494 support this industry. A strong domestic clean energy
495 industry will ensure we are able to meet our own clean energy
496 goals, and provide millions of jobs for Americans. It will
497 also ensure that, as the world transitions to clean energy,
498 the United States is not left behind. We must work to build
499 these industries here, and we must be competitive, and we
500 must not miss this enormous opportunity for our nation's
501 economy and the global climate.

502 I did want to mention also, before I yield back, Mr.
503 Chairman, I wanted to thank, as you mentioned, Jacquelyn
504 Cohen for her tremendous contributions to this committee over
505 the last 12 years. As Chairman Tonko mentioned, she played
506 an instrumental role in the passage of the landmark
507 Lautenberg Chemical Safety Act, which modernized the Toxic
508 Substances Control Act for the first time in 40 years. And
509 over the last 12 years Jacqueline's fingerprints are
510 certainly found on any bill that became law out of our
511 Environment and Climate Change Subcommittee. She had a
512 particular passion for ensuring that all Americans have
513 access to safe drinking water, and for protecting and
514 strengthening the Safe Drinking Water Act. And she is really
515 going to be missed, and I wish her the best in her future
516 endeavors.

517 [The prepared statement of The Chairman follows:]

518

519 *****COMMITTEE INSERT*****

520

521 *The Chairman. And with that, Mr. Chairman, I yield
522 back.

523 *Mr. Tonko. The Chairman yields back. The chair now
524 recognizes Representative Rodgers, who serves as ranking
525 member of the full committee.

526 Mrs. Rodgers, you are recognized for five minutes,
527 please, for your opening statement.

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

529 Record inflation, spiking prices, empty store shelves
530 and car lots, growing risk of blackouts: families are
531 learning what failing energy and economic policies feel like.
532 Global supply chain disruptions and demand shocks from the
533 COVID pandemic have taken a toll.

534 Now the Administration is making this crisis worse with
535 its reckless inflationary spending and an anti-American
536 energy agenda: shutting down pipelines, banning oil and gas
537 lease sales, imposing new energy taxes, and systematically
538 shutting down American energy.

539 Unbelievably, President Biden is even considering
540 shutting down a major -- another major energy infrastructure
541 project, Michigan's Line 5 pipeline, right before winter.
542 Closing Line 5 would cost thousands of jobs, and increase the
543 price of heating fuels like propane, which are already in
544 short supply across the nation. This is threatening people's
545 livelihoods.

546 We have requested hearings with the Secretary of Energy
547 so that we can examine this immediate crisis, especially the
548 surging costs right before winter.

549 This oversight should also question what the rush to
550 green regulatory agenda means for supplies and affordability
551 of energy. Policies to make sure people have access to
552 affordable, reliable energy must remain central to this
553 committee's work, and that is especially true for today's
554 hearing. We must recognize the amazing value of our existing
555 energy infrastructure for economic growth, and ensuring that
556 people have a chance for a better life and strengthening
557 national security. Energy security is national and financial
558 security.

559 We have witnessed the wide-ranging benefits of the
560 American energy renaissance brought about by the shale
561 revolution, lifting people out of poverty, raising the
562 standard of living to the highest level ever. This has
563 revitalized communities, created hundreds of billions of
564 dollars of jobs in economic activity, and thousands of new
565 jobs. It has provided strong security benefits in America,
566 and lowered carbon emissions more than any other nation in
567 the world, more than the next 12 combined. We win the future
568 by building on the foundations of this energy infrastructure,
569 not by destroying it.

570 This rush to green radical agenda attacks American

571 energy, mandates expansion of weather-dependent wind and
572 solar and massive electrification. This vision is to replace
573 our energy infrastructure at a pace and scale that defies
574 historical experience. To say that it is possible is
575 divorced from reality. It will lead to higher cost, less
576 reliable energy. It will create energy poverty, and reduce
577 our quality of life.

578 This is why Republicans have repeatedly raised concerns
579 about the economic and security dangers of the rush to green.
580 The World Bank estimates renewable mandates will increase
581 global demand for certain critical minerals 500 percent over
582 current rates -- that is a lot of mining and processing --
583 and massive growth in our domestic mining and industrial
584 infrastructure. New mandates will require more reliance on
585 foreign supplies of minerals and materials. That means a
586 dangerous dependence upon China and its use of slave labor
587 and abusive practices in the renewable and EV supply chains.

588 All of us should be asking how do Americans benefit, if
589 President Biden trades our strategic advantage in energy
590 infrastructure for more dependence on China supply chains?
591 We should never let that happen.

592 So how do we develop our own secure supplies for these
593 minerals? Accelerate the mining, processing, and permitting.
594 The International Energy Agency concluded in a recent report
595 that it takes more than 16 years to bring a mine from

596 discovery to initial production. How does that timeline fit
597 with the 2020, 2035, 2050, whatever mandate, from the Biden
598 Administration? I hope we can get some answers today.

599 Radical green mandates seek to replace extraction of
600 energy minerals, oil, gas, coal, and uranium with extraction
601 of non-energy minerals of lithium, cobalt, rare Earths in
602 magnets and batteries. I am all for increasing our domestic
603 supply of critical minerals, but the reality is keep-it-in-
604 the-ground movements apply to fossil fuels and critical
605 minerals. This drive to renewables has a host of land use,
606 disposal, and environmental costs beyond greenhouse gas
607 emissions.

608 We need a smart strategic approach, rooted in reality,
609 to secure a cleaner energy future. We should be using our
610 abundant resources and American ingenuity and creativity.
611 That is the American way. That means shale, gas, hydropower,
612 and, of course, nuclear energy. It is oddly absent from
613 today's hearing.

614 We must lead, lead the American way, protect people's
615 livelihoods, and ensure that we continue to raise the
616 standard of living.

617 [The prepared statement of Mrs. Rodgers follows:]

618

619 *****COMMITTEE INSERT*****

620

621 *Mrs. Rodgers. I yield back

622 *Mr. Tonko. The gentlelady yields back.

623 The chair reminds members that, pursuant to committee
624 rules, all members' written opening statements shall be made
625 part of the record.

626 I now move to introduce the witnesses for today's
627 hearing.

628 We will be beginning with Mr. Ethan Zindler, head of
629 Americas, Bloomberg NEF. He will be followed by Ms. Roxanne
630 Brown, international vice president at large with the United
631 Steelworkers, to be followed by Dr. Jackson Switzer, senior
632 director of business development of Redwood Materials, and
633 then, finally, Mr. Lucian Pugliaresi, president of Energy
634 Policy Research Foundation, Inc.

635 And I welcome all of our witnesses today, and thank you
636 for your time and your information that you will share. At
637 this time the chair will recognize each witness for five
638 minutes to provide his or her opening statement.

639 Before we begin, I would like to explain the lighting
640 system. In front of our witnesses is a series of lights.
641 The light will initially be green. The light will turn
642 yellow when you have one minute remaining. Please begin to
643 wrap up your testimony at that point. And the light will
644 turn red when your time has expired.

645 So we begin now by recognizing Mr. Zindler for five

646 minutes to provide an opening statement, please.

647

648 STATEMENT OF ETHAN ZINDLER, HEAD OF AMERICAS, BLOOMBERGNEF;
649 ROXANNE BROWN, INTERNATIONAL VICE PRESIDENT AT LARGE, UNITED
650 STEELWORKERS; JACKSON SWITZER, PH.D., SENIOR DIRECTOR OF
651 BUSINESS DEVELOPMENT, REDWOOD MATERIALS; AND LUCIAN
652 PUGLIARESI, PRESIDENT, ENERGY POLICY RESEARCH FOUNDATION,
653 INC. (EPRINC)

654

655 STATEMENT OF ETHAN ZINDLER

656

657 *Mr. Zindler. There we go. Good morning, and thank you
658 for this opportunity, Chairman Tonko, and Chairman Rush, and
659 Ranking Members Upton and McKinley.

660 I am here today in my role as an analyst at
661 BloombergNEF, a division of financial information provider
662 Bloomberg L.P. Our group provides investors, utilities, oil
663 majors, policymakers, and others with data and insights on
664 the energy world, and other sectors of the global economy
665 undergoing fundamental rapid transformation. My remarks
666 today represent my views alone, not the corporate positions
667 of Bloomberg L.P., and, of course, they do not represent
668 specific investment advice.

669 Progress in the energy industry and transportation
670 industry used to be measured in decades. Its sheer scale
671 meant that the adoption of fuels or technologies was, by
672 definition, slow and laborious. Today, however, how the

673 world generates, delivers, and consumes energy are all not
674 only being transformed radically, but also very rapidly.
675 Both around the world and here, in the U.S., clean energy
676 technologies are no longer at the margins, but very much at
677 the center of change.

678 In 2020, wind, solar, geothermal, and biomass accounted
679 for 12 percent of global electricity production. That was up
680 from 9 percent in 2018, and just 4 percent in 2011. Two-
681 fifths of global power came from zero-carbon sources,
682 including nuclear power. In the U.S., the wind and solar
683 share of power generation has doubled in a decade, and 20
684 percent of our power in 2020 came from all renewable sources,
685 including hydro. The vast majority of new capacity added to
686 the grid in the last two years has been wind and solar.

687 A similar transformation is underway in road
688 transportation, albeit at an earlier stage. In 2015,
689 consumers purchased about half-a-million electric vehicles,
690 worldwide. This year we are on track to see at least 5
691 million EVs sold, and EVs' share versus internal combustion
692 engine cars has nearly tripled since 2019, to 7.2 percent in
693 the first half of 2021.

694 Government policies, most notably in China and the EU,
695 have boosted EV sales, but public acceptance and outright
696 enthusiasm for EVs is growing, as well. The cars run
697 quieter, they generally require less maintenance, and they

698 have fewer moving parts. They offer outstanding
699 acceleration, and anybody who has driven one will tell you
700 they are also a lot of fun to drive.

701 Clean energy's growth has, of course, created major
702 economic development opportunities. Our firm, BloombergNEF,
703 has tracked over \$4 trillion invested in this space since
704 2004. But far more lucrative opportunities lie ahead.
705 Renewable power projects alone will track no less than \$10
706 trillion through 2050, our firm projects. Grid expansions
707 and upgrades will top about \$11 billion. Charging
708 infrastructure will need at least \$600 billion in the next 20
709 years.

710 With this fundamental transformation underway, the
711 question is which companies and which countries stand to reap
712 the most economic benefits. Despite its extraordinary
713 resources, most notably its human resources, today the U.S.
714 is not positioned to lead in these rapidly-expanding segments
715 of the global economy. The reasons why are detailed in
716 several reports that I shared with the committee, and that we
717 produced with the Center for Strategic and International
718 Studies. But here are a couple of quick takeaways.

719 When it comes to manufacturing solar PV equipment, the
720 U.S. today is, effectively, a bit player, despite being the
721 second-largest demand market for such equipment. Chinese
722 companies dominate virtually every segment of the

723 manufacturing value chain for silicon PV modules.

724 In wind turbine production, the story is a bit more
725 complex, in part because these are such specialized pieces of
726 equipment, and partly because they are expensive to ship.

727 When it comes to electric vehicles, the most critical
728 and costly component is the battery. In terms of volume, the
729 U.S. today is a laggard in the final assembly of such
730 batteries, and in the production of battery components.
731 China and South Korea are primary suppliers, with Europe
732 coming on very quickly.

733 What specific policies could trigger U.S. clean energy
734 manufacturing growth? For clues, it is worth examining the
735 challenges and successes Germany, India, and, particularly,
736 China have achieved.

737 In our research with CSIS, we found that, to attract the
738 private investment required to scale manufacturing,
739 equipment-makers must believe that significant local demand
740 exists for their products, both in the short and the long
741 term. I raise this point because, in the context of China,
742 which is not only the largest supplier of clean energy goods
743 on Earth by far, but the largest demand market for such
744 equipment, as well, there has been a lot of attention paid to
745 how China subsidizes manufacturing of clean energy equipment
746 by making low or zero-interest loans available. While that
747 is certainly true, China has also created significant demand

748 for clean energy goods and services by offering higher
749 tariffs for zero-carbon power, or offering rebates for the
750 purchases of electric vehicles.

751 I am going to close real quick by just offering one
752 final comment.

753 Before today, Congress has legislation that can send the
754 very signals that are required to trigger a U.S. clean energy
755 manufacturing scale-up. The infrastructure bill passed the
756 other day marked an important step in this direction, with
757 its support for transmission, EV charging, and other
758 technologies, including carbon capture and nuclear power.
759 But it is the currently pending Build Back Better legislation
760 that stands to make a far bigger impact in this area. By
761 focusing both on the supply and demand side of the clean
762 energy equation, the bill has the potential to unleash an
763 unprecedented wave of investment and manufacturing capacity
764 on U.S. soil.

765 Thank you again for this opportunity. I look forward to
766 your questions.

767 [The prepared statement of Mr. Zindler follows:]

768

769 *****COMMITTEE INSERT*****

770

771 *Mr. Tonko. Well, we thank you, Mr. Zindler and, again,
772 welcome.

773 And now we welcome Ms. Brown.

774 You are recognized for five minutes, please.

775

776 STATEMENT OF ROXANNE BROWN

777

778 *Ms. Brown. Chairman Pallone, Ranking Member Rodgers,
779 Chairman Tonko, Chairman Rush, Ranking Member McKinley,
780 Ranking Member Upton, and members of the subcommittees, my
781 name is Roxanne Brown, and I am proud to serve as
782 international vice president at large for the United
783 Steelworkers Union. Thank you for the opportunity to testify
784 today at this important hearing to discuss supply chains for
785 the clean energy economy.

786 As the largest industrial union in North America, USW
787 members make the products, components, subcomponents, and raw
788 materials that underpin our manufacturing economy now, and
789 which will be necessary to build the clean energy economy.
790 Manufacturing is where much of the economic benefit will lie
791 for communities and workers, as new technologies are
792 deployed, and as we rebuild our nation's infrastructure. It
793 can and must be a driver of the creation and retention of
794 good, family-supporting union jobs throughout the economy.

795 But I have to be honest. Not everyone is looking
796 forward to the transition of the U.S. and global economy to a
797 clean energy one. American manufacturing workers have a
798 great deal of skepticism about what this will mean for their
799 jobs, for them, and for their communities. That skepticism
800 is well-founded, after so many decades of policy-making have

801 left manufacturing communities hollowed out.

802 Our union has been having the green jobs conversation
803 with our members for almost 20 years now. And for many of
804 them, that promise has not been realized. We have so many
805 examples of USW members working in clean energy supply chains
806 who have lost jobs, instead of those jobs flourishing.
807 Whether it is our members at Rotek in Aurora, Ohio, who, 10
808 years ago, made a higher share of large diameter bearings for
809 onshore wind, but were impacted by foreign-made bearings
810 coming into the market, or our members at Corning and PPG
811 Industries, who made glass for solar panels at one time, but
812 couldn't compete, once China's industrial policies sought to
813 dominate the global market.

814 Earlier this year, USW member Joe Wrona testified before
815 the Senate Finance Committee about how his plant announced
816 efforts to expand into the solar supply chain, only to close
817 less than a decade later, in part because of China's
818 dominance in the industry.

819 This regrettable history does not have to continue into
820 the future. For this transition to be successful,
821 manufacturing workers and their communities must be the
822 leaders of these -- of this transition, not the victims of
823 it. We have an opportunity to reverse what has happened in
824 manufacturing sectors across the United States supply chain,
825 and we -- and have our members, you know, believe our union,

826 believe Congress, believe the Administration when we all say
827 that manufacturing will be the driver of the clean energy
828 economy.

829 The policy environment is creating some opportunities,
830 as we will see, once this infrastructure bill that was signed
831 tomorrow is implemented -- yesterday, was implemented. But
832 more can be done to ensure both economic and environmental
833 sustainability as we move towards a clean energy economy.
834 Our union is committed to seeing both of these things
835 through. But if we do one, and not the other, then we don't
836 succeed. My written testimony details the policy pieces our
837 union believes are necessary to help achieve both of these
838 goals, but I would like to highlight a few.

839 First, policymakers must consider the broad suite of
840 clean energy technologies like wind, solar, geothermal,
841 nuclear, and battery storage, and develop strategies for the
842 supply chain for each of them. This should also include
843 supply chains for building materials for energy efficiency,
844 carbon management like utilization and direct air capture,
845 batteries and charging stations for electric vehicles, and
846 emerging fuels like hydrogen.

847 Second, secure domestic supply chains will only grow if
848 intentional choices are made to develop sound industrial
849 policy, and a strategy for investing in the manufacture of
850 these technologies. This is what other countries are doing,

851 and it is necessary for us to compete globally.

852 Finally, a foundational bedrock of investing in
853 manufacturing is Buy America policy. It creates demand for
854 manufacturing and materials, and provides certainty to
855 companies, which is necessary when those companies take risks
856 to retool and make materials for new technologies. Taxpayers
857 overwhelmingly support their dollars being spent to create
858 jobs here in the United States.

859 Our union looks forward to working with you to make our
860 vision a reality for manufacturing workers. I have spent a
861 lot of time over the last 15 years testifying, and speaking
862 on panels about the hope of the clean energy economy for my
863 members and, really, for domestic industry. And it has been
864 too long to be having this conversation. We have a real
865 opportunity right now to make our goals and our vision about
866 what the domestic manufacturing can do for the clean energy
867 sector a reality, and we look forward to working with you to
868 get that done. Thank you.

869 [The prepared statement of Ms. Brown follows:]

870

871 *****COMMITTEE INSERT*****

872

873 *Mr. Tonko. Thank you, Ms. Brown. And now we move to
874 Dr. Switzer.

875 Again, welcome, and you are recognized for five minutes,
876 please.

877

878 STATEMENT OF JACKSON SWITZER

879

880 *Dr. Switzer. Thank you. Chairmen Rush and Tonko,
881 Ranking Members McKinley and Upton, members of the House
882 Energy and Commerce Subcommittees on Energy, Environment, and
883 Climate Change, thank you for the invitation to testify at
884 today's hearing.

885 My name is Jackson Switzer. I am the senior director
886 for business development at Redwood Materials. Prior to
887 joining Redwood, I spent over seven years at Albemarle
888 Corporation, the world's largest lithium mining and refining
889 company. I have a technical background, with a doctorate in
890 chemical engineering from Georgia Tech, and a bachelor's
891 degree in chemistry from the University of Alabama.

892 Representative Scalise, I don't see you here, and no
893 offense to your alma mater, but Roll Tide.

894 Redwood Materials was founded by Tesla co-founder and
895 longtime chief technology officer, JB Straubel, in 2017. JB
896 founded Redwood to transform the battery supply chain, making
897 it more sustainable, faster, and less costly. We aim to do
898 this by offering large-scale domestic sources of battery
899 materials that can go directly to U.S. battery manufacturers,
900 like our partners, Panasonic and Ford. Our battery materials
901 will be produced from recycled batteries, augmented with
902 sustainably-mined material.

903 By 2030, Redwood intends to produce enough material to
904 supply over six million electric vehicles, annually. We feel
905 that quickly ramping a domestic battery material supply
906 chain, using the highest possible percent of local, recycled
907 raw materials, is the best way we can help meet the U.S.'s
908 clean energy goals.

909 As Ethan at Bloomberg highlighted, our world is rapidly
910 transitioning to electric vehicles. EVs are projected to
911 account for nearly 100 percent of new cars sold in 2040.
912 Ford, General Motors, and Stellantis have each made
913 declarations to go all-in on electrifying their fleets over
914 the next decade. And EV manufacturers Tesla and Rivian plan
915 to exponentially ramp production. This expanding demand for
916 EVs presents an opportunity for the U.S. economy,
917 particularly the automotive sector, which accounts for
918 roughly three percent of our nation's GDP.

919 Building out domestic EV battery and materials
920 manufacturing capabilities can help position our country as a
921 competitive international player in the global automotive
922 space. Central and critical to this is establishing U.S.
923 leadership across the battery supply chain.

924 The two battery materials we are focused on at Redwood
925 are cathode materials and copper foils, which together make
926 up nearly 65 percent of the cost of a battery, and,
927 therefore, have major consequences to EV manufacturing.

928 Cathode materials have a long and complex supply chain
929 today that involves mining and refining metal ores on
930 multiple continents. Often, these materials travel greater
931 than 50,000 miles before reaching an EV in the U.S. In
932 total, the U.S. cathode demand is expected to increase by 600
933 percent over the decade. If the supply chain is left as is,
934 to keep pace the U.S. would need to import greater than 2
935 million tons of cathode materials through 2030. This also
936 translates to a lost economic value of over \$85 billion U.S.

937 However, there is tremendous opportunity to generate our
938 own supply of these materials over time, here in the U.S.
939 Cathode material elements like lithium, cobalt, and nickel
940 are infinitely recyclable. Copper foil supply chain is
941 similarly dominated by other countries, particularly by
942 Chile, Peru, and China. If its supply chain is left as is,
943 the U.S. would need to import greater than 800,000 metric
944 tons of copper foil through 2030, with another lost of
945 economic value of greater than \$13 billion.

946 Interestingly, the U.S. currently exports about the same
947 amount annually, 800,000 metric tons of copper scrap, to Asia
948 each year. This actually presents a tremendous opportunity
949 for copper foil manufacturing within our country, capturing a
950 valuable resource that we are currently exporting. The
951 supply chain localization opportunity here is enormous.

952 We are confident Redwood Materials can be part of the

953 solution.

954 Look, the transportation to electric transportation and
955 clean energy is coming. As a nation, we must ask ourselves
956 if we want to create the infrastructure and jobs to support
957 that shift here in the United States, or will we allow other
958 nations to develop the manufacturing capacity overseas, as
959 has happened with most of the clean energy economy to date.
960 Redwood Materials is committed to localizing the battery
961 material supply chain to the U.S., but we are just one of
962 many innovative American companies developing cutting-edge
963 technologies that support electrification.

964 Implementing the right policies now is critical to
965 helping these companies drastically and quickly scale their
966 production in America. Policies like the Battery
967 Manufacturing and Recycling Grant Program, which was
968 spearheaded by Representative Doyle, and included in the
969 Bipartisan Infrastructure Investment and Jobs Act, will help
970 launch innovative solutions to strengthen the supply chain.
971 Reinstating the 48C tax credits to support clean energy
972 manufacturing, as proposed in the Build Back Better Act, will
973 also help companies invest in the United States and create
974 high-quality jobs.

975 In closing, creating a circular supply chain for
976 electric vehicles and clean energy products in the United
977 States is a win-win, allowing our country to counteract an

978 important environmental risk, while creating economic
979 security, tens of thousands of jobs, bolstering our supply
980 chain, and ensuring that the billions of dollars that will be
981 invested in the battery industry land here in the U.S.

982 Thank you to both subcommittees for holding this
983 important hearing. I look forward to the discussion.

984 [The prepared statement of Dr. Switzer follows:]

985

986 *****COMMITTEE INSERT*****

987

988 *Mr. Tonko. Thank you, Dr. Switzer.

989 We now move to Mr. Pugliaresi.

990 Welcome, and you are recognized for five minutes,

991 please.

992

993 STATEMENT OF LUCIAN PUGLIARESI

994

995 *Mr. Pugliaresi. Thank you, Chairman Tonko, Chairman
996 Rush, Chairman Pallone, Ranking Members McKinley, Rodgers,
997 and Upton. I very much appreciate this opportunity to give
998 my views on today's topic.

999 My name is Lucian Pugliaresi. I am president of the
1000 Energy Policy Research Foundation. I have personally worked
1001 on a broad range of energy security issues, both in and out
1002 of government, since the 1973-74 Arab oil embargo.

1003 I would like to make just a few brief points to
1004 summarize my testimony. I hope the members will get a chance
1005 to look at some of the figures we put together there.

1006 The energy system is highly complex. It is
1007 interconnected regionally and globally in ways that are not
1008 always apparent. The transition presents a new set of supply
1009 and price risks for consumers and manufacturers.

1010 Achieving net zero in the developed world -- I am
1011 talking about the OECD -- is a prodigious and, actually,
1012 unlikely task. And even if we do that, we will only
1013 eliminate 20 percent of global emissions, versus a range of
1014 business-as-usual forecasts for 2050. It is -- everything is
1015 about the developing world: Asia-Pacific, Africa.

1016 Regulatory programs, as well as private-sector
1017 commitments to accelerate the energy transition, whether it

1018 is mandates, targets, financial, or Federal procurement
1019 guidelines, create uncertainty and financial risks that will
1020 limit needed investments in a broad range of legacy fuels,
1021 particularly oil and gas.

1022 While most of the escalation in energy prices can be
1023 tied to dislocations in oil and gas supply chains, largely
1024 from the COVID pandemic, recently-announced policy decisions,
1025 such as the halt on leasing on Federal lands, the
1026 cancellation of the Keystone Pipeline, the potential
1027 cancellation of Line 5 and bringing Canadian crude oil to the
1028 United States, rising regulatory requirements, and permitting
1029 delays are all threatening North American oil and gas
1030 production. We undermine this strategic asset at our peril.

1031 Oil and gas production is going to be needed throughout
1032 the transition. Today, after government support, we have put
1033 tens of billions of dollars into wind and solar. But if you
1034 look at its contribution to primary energy supply in the
1035 U.S., it only represents four percent. In fact, wind and
1036 solar today still require vast sums of Federal support in the
1037 form of production tax credits. And today, the oil and gas
1038 development in the U.S. still generates large revenues to the
1039 Federal Government. This is the fundamentals of the
1040 marketplace. This doesn't represent the values of these two
1041 fuels, it just tells us how society values these two
1042 technologies.

1043 The current energy crisis in Europe is a cautionary
1044 tale, and we should learn from it. I have my colleague from
1045 London here with me today, and he has been briefing us on the
1046 situation there. The European crisis has its roots in
1047 policies that sought rapid decarbonization without accounting
1048 for the associated supply risks.

1049 Policy initiatives which seek to accelerate the U.S.
1050 transition to a fully renewable energy complex before these
1051 technologies are cost effective will have global
1052 implications. And we are going to cede our energy security
1053 to China, Russia, and the Middle East. They will all gain
1054 positional advantage if we don't do this right.

1055 The transition will create unprecedented new demands,
1056 and add new energy security threats to existing ones. We
1057 are, essentially, trading a secure, independent energy
1058 complex for one with new and poorly-understood risks. I
1059 recommend you look -- we issued a chart of the week by one of
1060 our senior researchers, Max Pyziur, and there is an
1061 interesting statistic in there: a smart battery phone uses 3
1062 grams of lithium, a Tesla uses 140 pounds. Think about the
1063 requirements, as we accelerate electric vehicles in the U.S.

1064 Investment and adaptation should be part of our
1065 discussion, going forward.

1066 And finally, and most importantly, policy measures
1067 should be robust against uncertainty. We have a long list of

1068 things we have done with Congress and past administrations,
1069 which sounded like a good idea at the time. But the world
1070 changed. So one of the things I hope the committee will take
1071 under consideration, however we proceed with these measures,
1072 that we think about strategies that hold up against a broad
1073 range of uncertainties.

1074 Thank you for your time.

1075 [The prepared statement of Mr. Pugliaresi follows:]

1076

1077 *****COMMITTEE INSERT*****

1078

1079 *Mr. Tonko. Thank you very much, Mr. Pugliaresi.

1080 We now move to member questions, and I will start by
1081 recognizing myself for five minutes.

1082 When we discuss clean energy goals, they can often be
1083 difficult to wrap our heads around. But Mr. Zindler, I am
1084 hoping you can help give us a better sense of the scale of
1085 our national, or even global energy transition. Can you give
1086 us any estimates on how much investment is required,
1087 necessary to achieve an ambitious emissions reduction goal?

1088 [Pause.]

1089 *Mr. Tonko. Can you activate your mike? Thanks.

1090 [Pause.]

1091 *Mr. Tonko. No.

1092 [Pause.]

1093 *Mr. Tonko. Thank you. Ms. Brown to the rescue.

1094 *Mr. Zindler. -- Ms. Brown for a minute.

1095 The -- first, just a comment, I -- if I could just make
1096 one quick comment, which is that I heard a lot about --
1097 talking about how this is some kind of a rush, that we are --
1098 that this is a policy that is a rush. Only here in the U.S.
1099 is this viewed as a rush.

1100 There are 10 countries already which get more than 25
1101 percent of their power from wind and solar today, and these
1102 are not tiny countries. There are countries like UK and
1103 Spain and Portugal and Germany. They have already -- or

1104 Uruguay. They are not all in Europe, where we have seen this
1105 kind of transition already underway. So there is nothing
1106 particularly, actually, new. If anything, we are well behind
1107 on a transition that is taking place around the globe.

1108 We have been seeing about 500 billion -- Mr. Chairman,
1109 to your question -- we have been seeing about \$500 billion a
1110 year invested in what we would call energy transition
1111 technologies, overall. That number, basically, has to double
1112 to start to get where we need to go, in terms of trying to
1113 achieve some of the net-zero targets that have been declared.

1114 *Mr. Tonko. Thank you. And can you give us a sense of
1115 what that means, in terms of manufacturing, or critical
1116 mineral needs?

1117 Like, how many more solar panels, wind turbines, and
1118 batteries are necessary, are needed in a world where those
1119 targets are achieved?

1120 *Mr. Zindler. Well, I mean, we have been consistently
1121 seeing the demand for solar rise each year, anywhere from 10
1122 to 20 percent, depending on which year you are talking about,
1123 mainly because the technologies, I would point out, are, in
1124 many parts of the world right now, the lowest-cost option.
1125 And that is, really, what is proliferating a lot of the
1126 growth.

1127 So we expect, for the U.S. to try and hit its clean
1128 energy goals, the ones that have been declared, to try and

1129 get to zero percent carbon by 2035, we need to go from
1130 building about 40 gigawatts a year to building about 80 per
1131 year in the United States, which mean about a, roughly,
1132 doubling in the investment in the short run, but, obviously,
1133 the costs have been coming down, so that will reduce that
1134 somewhat.

1135 *Mr. Tonko. Thank you. And based on today's testimony,
1136 it seems, for at least some technologies and components, are
1137 not currently U.S. firms positioned to fully take advantage
1138 of these massive emerging markets (sic). The Build Back
1139 Better Act would help change that. Any comments about what
1140 might be inspirational with the Build Back Better Act?

1141 *Mr. Zindler. So, I mean, for our work that we did for
1142 the Center for Strategic and International Studies, we tried
1143 to look at some of the successful industrial policies in
1144 other parts of the world.

1145 And as I noted in my testimony, China -- you -- any one
1146 of these sectors, but if you -- particularly, we looked at
1147 the electric vehicle sector about 10 years ago -- put
1148 together a plan in which they determined that they wanted to
1149 be the world's largest producer of electric vehicles, and the
1150 largest consumer of them, as well. And they set about
1151 creating both supply and demand-side policies to support
1152 that.

1153 We do not have long-term certainty at the moment about

1154 what the demand for electric vehicles will be, just to give
1155 one example. The corporate average fuel economy standards,
1156 which are certainly being, you know, are -- have been
1157 revised, but are constantly being challenged, provide some
1158 additional certainty to automakers. And we have certainly
1159 seen these declarations from Stellantis, from Ford, from GM
1160 that they plan to do EVs.

1161 But I would say that, if you were to press them, many of
1162 them would not say that the U.S. is the primary market that
1163 they think will be the demand market, because there is a lot
1164 more certainty from Europe and other parts of the world.

1165 *Mr. Tonko. Thank you. And I will move over to Ms.
1166 Brown now.

1167 And when we talk about climate jobs, we often think
1168 about construction jobs being -- building transmission lines,
1169 installing EV charging stations, or retrofitting buildings.
1170 Could you share for the subcommittees where you see the
1171 biggest opportunities for clean energy manufacturing jobs?

1172 *Ms. Brown. Absolutely, and thank you so much for the
1173 question, Mr. Chairman.

1174 You know, everywhere, in a nutshell, everywhere. When
1175 you think about the types of clean energy technologies that
1176 we are talking about, whether it is onshore or offshore wind,
1177 there is a significant amount of steel that is required for
1178 both of those technologies. If we are talking about solar,

1179 the glass that is needed for solar panels, the aluminum, the
1180 copper that is needed for solar panels, are all made by
1181 steelworker members. If we are talking about energy
1182 efficiency, manufacturing facilities won't only benefit from
1183 those technologies, but can actually make those technologies,
1184 and steelworker members actually make energy efficiency
1185 technologies.

1186 So for us, it is -- the possibilities are endless, and
1187 vast, and really stretch across each of these technologies,
1188 and I think we are just waiting to do the work.

1189 *Mr. Tonko. Thank you so much. We will now recognize
1190 Mr. McKinley, Subcommittee on Environment and Climate Change
1191 ranking member.

1192 And Representative McKinley, you are recognized for five
1193 minutes for your questions.

1194 *Mr. McKinley. Thank you and thank you, again, Mr.
1195 Chairman, and thank you for the panel. It is interesting to
1196 see, you know, some of the perspectives, and we could learn
1197 from this. But I would like to address my questions
1198 primarily to Mr. Pugliaresi.

1199 *Mr. Pugliaresi. Pugliaresi, yes.

1200 *Mr. McKinley. Pugliaresi. And speaking for the
1201 Administration in Scotland, John Kerry said there that the
1202 United States should eliminate the use of coal by 2030,
1203 period. And he reinforced how other fossil fuels -- oil, gas

1204 -- would be eliminated by 2035. And as you point out in your
1205 testimony, that is going to result in an expedited shift to
1206 renewables in the next few years -- we could do the count
1207 until 2030 -- and that is going to require large quantities
1208 of critical minerals.

1209 But the U.S. still imports the vast majority of its
1210 mineral needs for renewables, and is entirely relying on
1211 foreign nations for some of them that I talked about in my
1212 opening statement. So do you believe that America will be
1213 able to supply itself the critical minerals needed by 2030
1214 and by 2035?

1215 *Mr. Pugliaresi. No one who --

1216 *Mr. McKinley. Use your mike, please.

1217 *Mr. Pugliaresi. Yes. No one who understands how we do
1218 permitting, how we go through the development, the NEPA
1219 reviews, believes that that is even possible. It is just not
1220 going to happen.

1221 And in fact, I think the biggest -- if you look -- the
1222 biggest concern we have with the power sector is, if you push
1223 it too fast, it is going to become very brittle. It is going
1224 to become brittle because the fuels we use are going to be
1225 much more narrow, and we are going to be also subject to more
1226 complex systems, which are subject to failure modes that we
1227 don't even fully understand yet.

1228 *Mr. McKinley. Thank you. The administration has been

1229 focused on this need to increase the domestic supply chain,
1230 and I think we have had a good dialogue, and we understand
1231 the need for that to be addressed for renewables. But that,
1232 as I pointed out in my opening remarks, that is going to
1233 require a lot -- a significant increase in domestic mining,
1234 processing, and manufacturing. And we know that China, right
1235 now, is the lead firm -- nation that processes the bulk of
1236 these renewables. And then they ship them around the
1237 country, around the world.

1238 And we said before, the U.S. is going to need -- to meet
1239 the demand, we are going to need 500 to 1,000 percent more
1240 minerals than we have today. So do you believe that the
1241 current permitting process will allow the United States to
1242 increase its domestic processing of critical minerals?

1243 *Mr. Pugliaresi. You can bet that is not going to
1244 happen. You don't -- I mean, it is -- we have the process --
1245 look, you just look at the scale problems that we face. We
1246 have been working on wind and solar for 30 or 40 years, and
1247 we have had grandiose plans. But, as I pointed out,
1248 deploying it is something else. It still only represents
1249 four percent of primary energy.

1250 *Mr. McKinley. Then why isn't Congress and the
1251 Administration -- why aren't they listening to you?

1252 We -- if it can't happen, you --

1253 *Mr. Pugliaresi. I actually --

1254 *Mr. McKinley. I mean, seriously. You know, it is a --
1255 get out of this politics, and just the reality. I am a civil
1256 engineer, I am a licensed civil engineer. I deal in facts.
1257 I don't understand why we are letting emotion get into this,
1258 rather than the facts that you are pointing out.

1259 We just simply can't get there now, and that was why I
1260 was making -- in my opening remarks, saying, "Give us time,
1261 we are going to get there, but I would like to have this
1262 fossil fuel -- the use of fossil fuels to bridge until we can
1263 get those things taken care of.''

1264 But in the meantime, we are dealing with -- and then
1265 there is the last question I would like to ask, is having to
1266 do with critical minerals, again.

1267 What are the labor and environmental benefits if we
1268 process these critical minerals in the United States, as
1269 compared to what they are doing in China and elsewhere?

1270 How -- because we have been concerned about
1271 environmental justice, and I have understood some of the
1272 components of that. But what are we doing now?

1273 If we bring this back home, are we going to improve --
1274 and it should, hopefully, increase the environmental benefits
1275 by producing them here. Can you elaborate a little bit on
1276 that?

1277 *Mr. Pugliaresi. Clearly, we have an enormous number of
1278 environmental standards that all industry has to adhere to.

1279 So the -- from a global point of view, it will be produced in
1280 a much cleaner, responsible way.

1281 And -- but it also is going to require a scale. I think
1282 we really don't appreciate the scale of the problem before
1283 us. I mean, people talk about Denmark. There are five
1284 million people in Denmark. There are 300 million people in
1285 Indonesia, and they all want an air conditioner. And they
1286 don't want to spend a lot of money for their power. So the
1287 real dilemma for us is we have to have -- we have to let our
1288 technology mature, so that it is cost effective, so that the
1289 American consumers don't see escalating costs as we try to
1290 wrench the system before the technology is ready to be
1291 deployed.

1292 *Mr. McKinley. Mr. Pugliaresi, I can't agree with you
1293 more. Thank you for testifying here, and I yield back my
1294 time.

1295 *Mr. Tonko. The gentleman yields back. The chair now
1296 recognizes Chairman Rush of the Subcommittee on Energy.

1297 Chairman Rush, you are recognized for five minutes,
1298 please.

1299 *Mr. Rush. Well, thank you, Mr. Chairman. One of the
1300 comments that struck me this morning, Mr. Chairman, was
1301 coming from Mr. Zindler, his testimony.

1302 Mr. Zindler, you stated that the clean energy provisions
1303 of the Build Back Better Act, which this subcommittee --

1304 these subcommittees helped to write, stand to make the
1305 biggest impact in expanding the clean energy supply chain.
1306 Would you explain how passing the BBB will establish and grow
1307 the domestic clean energy supply chain?

1308 *Mr. Zindler. Thank you, Mr. Chairman, and, yes, I
1309 would be happy to respond to that.

1310 But can I -- I do want to just come back on a couple of
1311 things, a comment that has been made twice about wind and
1312 solar only providing four percent of primary energy in the
1313 United States. I will just state a basic fact. Wind and
1314 solar is used for electricity purposes. We don't put wind
1315 turbines on our cars. We get -- energy is not just
1316 electricity. The electricity sector is 40 percent of our
1317 energy usage. So to say that it is only 4 percent of total
1318 energy is correct, but it is 10 percent of power, and it was
1319 0 percent, basically, 15 years ago, 10 years ago, even. So I
1320 just want to clarify that, because that is not really a
1321 fundamentally accurate way to depict this, unless someone
1322 here would like to put, you know, wind turbines on cars soon.

1323 Now, to the question about what is in the Build Back
1324 Better legislation, I think what is critical in there is that
1325 it looks at this from both the supply and a demand side. I
1326 talked about the China example earlier. If you look at the
1327 support that the Build Back Better bill provides, it both
1328 provides incentives to consumers to buy EVs, it provides

1329 incentives -- pardon, tax credits -- for those to build wind
1330 and solar. But it also has supply-side supports in the form
1331 of tax credits for specific segments of the manufacturing
1332 value chain, overall, which will -- which could help to
1333 ensure that, as the market scales, the manufacturing takes
1334 place more within the U.S. than it would elsewhere.

1335 *Mr. Rush. Can you -- Ms. Brown, can you talk about
1336 whether you -- the United Steelworkers sees, in terms of the
1337 impact on job creation from a build-out of the clean energy
1338 supply chain, and could we see the -- can you tell us again
1339 what is the expected impact that job creation for Black and
1340 Brown workers under the Build Back Better Act?

1341 *Ms. Brown. Thank you for the question, Chairman Rush.
1342 I just want to actually echo something that Mr. Zindler said,
1343 in terms of just the tax pieces that are included in Build
1344 Back Better.

1345 For the first time, there are actual requirements
1346 attached to clean energy taxes that, you know, make it a
1347 requirement to use and source domestically-produced materials
1348 for any clean energy projects. That is something that our
1349 union has been working really hard to do, really, since 2006,
1350 with the Production Tax Credit and the Investment Tax
1351 Credits. For the first time, we were able to work with the
1352 Senate Finance Committee to achieve that. That is huge.

1353 I can't emphasize what a boon that is for the supply

1354 chain, when it comes to sourcing the iron, the steel, or the
1355 other manufactured goods, whether it is cement or other
1356 manufactured goods that go into these clean energy projects.
1357 That, if it is able to stick, is something that is critically
1358 important to Steelworker members.

1359 The other thing that I will say is there is significant
1360 money in the BBB to repurpose brownfields, and a lot of the
1361 brownfields are in Black and Brown communities, to your
1362 question, Chairman Rush. And I want to point to a real-world
1363 example in Baltimore here, just up the street from us here,
1364 in Washington, D.C., on the former ground of the Bethlehem
1365 Steel Sparrows Point facility.

1366 That was the Beast of the East. That is what our union
1367 used to call that facility. It employed 50,000 steel workers
1368 at one point, making steel. That facility closed in 2012.
1369 No more steel, basic steel, was made in the State of Maryland
1370 with the closure of that facility.

1371 Recently, work -- our union worked with U.S. Wind to
1372 bring steel back to Maryland, and Sparrows Point Steel was
1373 born. And they are going to be fabricating monopiles for the
1374 offshore wind industry at this facility in Baltimore. At the
1375 end, 500 jobs will be created. That is a community that has
1376 been devastated by the loss of manufacturing jobs. It is a
1377 Black and Brown community. It is a community that has been
1378 dying for investment.

1379 Those are the types of things that the Build Back Better
1380 will help to do, and we are eager to see that happen.

1381 *Mr. Rush. Thank you, Mr. Chairman. I yield back.

1382 *Mr. Tonko. Chairman Rush yields back. The chair now
1383 recognizes Representative Upton, Subcommittee on Energy
1384 Ranking Member. I recognize him for five minutes to ask
1385 questions, please.

1386 *Mr. Upton. Well, thank you, Mr. Chairman. It is an
1387 important hearing. Energy is on the minds of every -- all of
1388 our constituents.

1389 And I -- Mr. Pugliaresi, I am looking at a story that I
1390 know you haven't seen, but it is something you are aware of.
1391 The UK power prices soar about -- above 2,000 pounds on low
1392 winds. Britain is set to end the use of coal within 3 years,
1393 and make power generation free of fossil fuel by 2035. But
1394 for now it falls back on high-emission coal when wind drops
1395 or demand increases. Wind generation on Monday this week was
1396 meeting just six percent of total demand, national grid data
1397 shows, while gas contributed 55 percent and coal 2 percent,
1398 which is one of the reasons why the cost is so much higher.

1399 And I just know, as we try to put U.S. costs compared to
1400 Europe, in Europe they are paying about 5 to \$8 a gallon for
1401 gasoline, and their electric rates are already 2 to 3 times
1402 higher than what we pay in Michigan.

1403 I support renewable fuels, always have, but it is part

1404 of the all-of-the-above strategy, and you have got to have
1405 something there for when the wind doesn't blow and the sun
1406 doesn't shine, which is exactly what happened in England this
1407 last week.

1408 So what do we do about that? What do we do about these
1409 surging gas prices that are practically double where they
1410 were a year ago?

1411 And what signals should we be sending to American
1412 consumers across the country to -- whether it is encouraging
1413 more domestic energy supplies, and trying to get control of
1414 some of these gasoline prices?

1415 *Mr. Pugliaresi. Right. First, in terms of the power
1416 sector, we have -- we are completely technology agnostic.
1417 But it is really important to understand that intermittent
1418 electricity is not the same product as baseload electricity.
1419 It doesn't have the same value because, when you turn the
1420 switch, it might not be there.

1421 I actually asked Chairman Chatterjee once, "Why don't we
1422 have everybody bid firm power? At least we would have some
1423 price discovery.'" We would find out what -- you know, what
1424 -- because we have these levelized cost estimates, but we
1425 really need to understand what it means to integrate these
1426 intermittent fuels into our power system.

1427 We have data out of Japan now that suggests they
1428 accelerate dramatically once you get past 30 percent of the

1429 grid. So some of our technology is just not ready yet. We
1430 don't have good backup systems, like batteries. So -- and
1431 Germany is a classic case. One of the reasons gas demand is
1432 spiking in Germany is they shut down their coal facilities,
1433 they pulled back on the nuclear plants, and they ended up
1434 with a very brittle system, which was not able to deal with
1435 uncertainties in the power demand.

1436 *Mr. Upton. So I am going to -- want to raise what I
1437 will call a Michigan issue, but it is probably more of a
1438 Midwestern issue, if you look at it, and that is Line 5, and

1439 I don't know how familiar you are with that. But for
1440 those that are watching this hearing, Line 5 is a pipeline
1441 that was built under the Straits of Mackinac, connecting the
1442 lower and upper peninsulas in the 1950s. It contains not
1443 only propane going to the north to help heat the Upper
1444 Peninsula, there is electric lines, as well as crude oil that
1445 is -- goes down to a Marathon refineries in Michigan here,
1446 down in the southeast corner of the state.

1447 That refinery, as I understand it, produces about 15
1448 million gallons of fuel a day. Michigan's consumption is
1449 about 10 million. There are efforts to eliminate the -- or
1450 to shut down that pipeline. It needs to be replaced. There
1451 is work that has been done, starting with Governor Snyder
1452 back a number of years ago with Enbridge, the pipeline
1453 company, to try and do that.

1454 There is a -- the Biden Administration is considering
1455 closing the pipeline, as I understand it, as they look at
1456 treaty obligations between Canada and the U.S. What would
1457 happen to energy prices if that pipeline gets shut down?

1458 *Mr. Pugliaresi. So, as you know, Michigan, I think,
1459 gets about 750,000 gallons a day of propane. It gets,
1460 probably -- I think I had some data on this, I saw 400 -- it
1461 is 14.7 million gallons a day of gasoline, diesel, and jet
1462 fuel.

1463 So this is, actually, a more serious problem than we
1464 understand, because the reason we have this valuable
1465 strategic asset, this whole North American production
1466 platform, is because we solve a whole bunch of very
1467 complicated transportation issues every year to allow the
1468 platform to be efficient, to grow, and to put us as the
1469 largest oil and gas producer in the world.

1470 So it is going to have immediate regional effects, it is
1471 going to spike prices. They are going to have to find more
1472 truckers to move material. And there are very -- as we know,
1473 we have a shortage of drivers and truckers.

1474 So I would -- we have a PHSMA, you know, the Pipeline
1475 Hazardous Material Safety Administration, it is --

1476 *Mr. Upton. I know my time has expired, but in -- a
1477 one-word answer would be "catastrophic"?

1478 *Mr. Pugliaresi. It would be catastrophic.

1479 *Mr. Upton. Thank you.

1480 *Mr. Pugliaresi. And it would be very harmful to the
1481 consumers, very harmful.

1482 *Mr. Upton. Thank you. I yield back.

1483 *Mr. Tonko. Mr. Upton yields back. The chair now
1484 recognizes, virtually, Representative Doyle, who happens to
1485 serve as chair of the Subcommittee on Communications and
1486 Technology.

1487 Mr. Doyle, welcome. You are recognized for five
1488 minutes, please.

1489 *Mr. Doyle. Well, thank you, Mr. Chairman. As we have
1490 seen over the last year-and-a-half, we are too reliant on
1491 foreign supply chains for a wide variety of products, even
1492 critically-important products like semiconductors. As we
1493 continue to recover from the pandemic, we should be investing
1494 in bringing home manufacturing for as many supply chains as
1495 possible, but especially for critical materials.

1496 In the effort to create a cleaner future and build as
1497 strong an economy as possible, I am a firm believer in using
1498 all the tools at our disposal. That means a diverse
1499 portfolio of renewables, nuclear, hydrogen, and carbon
1500 capture technology.

1501 And if you really want to make America truly energy
1502 independent, we should focus on building out the domestic
1503 supply chains for technologies that take advantage of fuel

1504 sources that aren't reliant on volatile global price
1505 fluctuations.

1506 With the limitations of international supply chains on
1507 display, and human rights violations in numerous major
1508 supplier nations, investing in building a domestic supply
1509 chain for clean energy technologies, as Mr. McKinley, Mrs.
1510 Dingell, and Mr. Veasey and I did, through including our
1511 Battery Material Processing and Component Manufacturing Act
1512 in the Infrastructure and Jobs Act is critically important.

1513 This is also an opportunity to invest in new, innovative
1514 companies. Companies like Redwood and EOS Energy in my
1515 district are creating new, innovative technologies to recycle
1516 materials, build components, and pioneer new technologies.
1517 Building a strong domestic supply chain for clean energy
1518 technologies will create opportunities for American companies
1519 to lead the world, create jobs, and make America a truly
1520 independent leader in a cleaner future.

1521 Let me first ask Mr. Switzer.

1522 Can you explain how a grant program for battery
1523 manufacturing, like we included in the infrastructure bill,
1524 could help companies like yours expand your operations?

1525 And how will that help impact the growth of the whole
1526 supply chain?

1527 *Dr. Switzer. Sure, thank you, Representative Doyle.
1528 And, you know, on behalf of Redwood Materials, we certainly

1529 appreciate all of the work that you put in to that provision.

1530 I think, you know, to use a word that someone else used,
1531 it is just the scale of it all, the scale and the level of
1532 investment that will be needed. You know, for our battery
1533 materials facilities that we are planning to construct here,
1534 in the U.S., you know, the total scale is going to be on the
1535 order of several billion dollars. And that -- you know, that
1536 alone actually doesn't even completely solve the problem,
1537 right? Like, we need several Redwood materials throughout
1538 the country to, essentially, kind of build this supply chain
1539 for the future.

1540 So I think, you know, all of the provisions in the
1541 grants, I think, will be put to good use to help stand up and
1542 accelerate our efforts there.

1543 *Mr. Doyle. You know, it is my understanding that we
1544 can recycle significant amounts of critical materials from
1545 used batteries and from other scrap metals. What is the
1546 percentage of the materials that we recover from a used
1547 battery?

1548 And how much of the supply chain could come from
1549 recycled material, if we had strong recycling programs?

1550 *Dr. Switzer. Sure. I think that is -- you know, I
1551 think there is a great point to make in there.

1552 And first, you know, to answer your question, of the,
1553 you know, recoverable percent of the battery materials, and

1554 the end-of-life battery of, you know, nickel, and cobalt, and
1555 lithium, we can actually recover and recycle and reuse
1556 greater than 90 percent of those elements.

1557 So it is -- you know, it is -- I think that is a key
1558 point, is that it is not like we are extracting these
1559 minerals, and then we use them once and they are gone. It is
1560 something that we -- you know, once they are extracted, and
1561 they are in a battery, we can actually use them over and over
1562 again. And we can do that here, in the U.S.

1563 So I think that, you know, expanding, continually
1564 expanding recycling efforts, as well as collection efforts,
1565 to make sure that we collect those end-of-life batteries is
1566 absolutely critical.

1567 *Mr. Doyle. Thank you.

1568 Ms. Brown, how can we ensure that, as we domesticate
1569 supply chains, that these jobs are good-paying, union jobs,
1570 located in areas that have lost manufacturing, or have been
1571 historically disadvantaged?

1572 *Ms. Brown. Thank you so much for the question,
1573 Congressman Doyle, and thank you. I have to say you have
1574 been such a champion and a friend of our union's, and on this
1575 issue in particular, going all the way back to Waxman-Markey
1576 with the Inslee-Doyle provisions that sought to ensure
1577 domestic competitiveness of the domestic industry. So thank
1578 you very much.

1579 You know, I would say, for our union and any labor
1580 organization, the first thing we would say is to pass the PRO
1581 Act. Protecting the Right to Organize Act is the first way
1582 that we can make sure that the jobs that are created, our
1583 union jobs.

1584 Our experience, unfortunately, has been that a lot of
1585 clean energy companies are very resistant to unions. And,
1586 you know, our union and others have fought really hard, and
1587 have tried for years to organize, and to make those jobs good
1588 union jobs.

1589 You know, if you look at jobs in the energy sector,
1590 there -- or the manufacturing sector, there is a certain
1591 standard of living associated with those jobs. On average,
1592 our members in the steel or aluminum sector make, you know,
1593 \$85,000-plus a year, with benefits. It is not --

1594 *Mr. Doyle. Yes, I see my time has expired, and I
1595 hope --

1596 *Ms. Brown. I am sorry, go ahead.

1597 *Mr. Doyle. -- take advantage of -- I am a stickler
1598 when I am the subcommittee chair about time, so I don't want
1599 to break one of my own rules.

1600 But thank you for your testimony, and I want to thank
1601 all the members for their testimony.

1602 Mr. Chairman, I will yield back.

1603 *Mr. Tonko. Thank you.

1604 Chairman Doyle yields back. The chair now recognizes
1605 Representative Rodgers, full committee ranking member, for
1606 five minutes, please, to ask questions.

1607 *Mrs. Rodgers. Thank you, Mr. Chairman. I do think it
1608 is important that we take a step back, and really look at
1609 what these policy mandates mean, what it is going to mean on
1610 American families. I think we just heard the word
1611 "catastrophic."

1612 Now, Mr. Chairman, you said at the very beginning, it is
1613 difficult sometimes to get our head around this, that these
1614 are ambitious energy goals. I would respond to that. The
1615 reason it is difficult to get our head around it is because
1616 it is divorced from reality. As Mr. McKinley said, we need
1617 to focus on reality, we need to focus on the facts.

1618 What the majority is promoting right now under -- they
1619 say it is a transition to a clean energy future. Yet the
1620 reality is it is wind, solar, and electric batteries at the
1621 exclusion of everything else. It is not technology neutral.
1622 You might want to -- you want -- you include hydropower, for
1623 example, in your list of renewables. Well, in Washington
1624 State, Governor Inslee is working hard to tear out the dams
1625 in Washington State that produce the clean, renewable,
1626 reliable, affordable electricity. It is being threatened
1627 right now.

1628 We would welcome a debate around American leadership in

1629 reducing carbon emissions, but the frustration is that we are
1630 -- we seem to be focused solely on mandating wind, solar, and
1631 batteries. And telling us to "Trust us, just trust us,"
1632 that is why it is hard to get our head around it.

1633 One person -- well, and is it a clean transition, or are
1634 we really focused on reducing carbon emissions? Let's get --
1635 let's have the debate around reducing carbon emissions.
1636 Let's have that debate, not mandating from Washington, D.C.,
1637 the Federal Government mandating what qualifies and what not.
1638 Let's have really technology neutral.

1639 I met with the Steelworkers last week in Spokane,
1640 Steelworkers from Kaiser Aluminum. I am very proud of the
1641 work that they do for helping of manufacturing of aircraft in
1642 the United States of America, very proud of the work that
1643 they have done to help reduce carbon emissions, the carbon
1644 intensity of their products, their commitment to clean water.

1645 You know what? They are fearful, though. They are
1646 fearful of what is happening. They are fearful of China.
1647 They are fearful about losing their jobs. They are fearful
1648 of the current approach, that it is divorced from reality.

1649 Mr. Pugliaresi, I wanted to ask you. Well, yes, and
1650 there is the California model. Coming from Washington State,
1651 we seem to be really wanting to focus on the California
1652 example, and I am very concerned. California, they don't
1653 have reliability. They don't have confidence that, when they

1654 need to heat their homes, they are going to be able to heat
1655 their homes. And now they are going to take the generators
1656 away that people were buying to try to help keep their homes
1657 heated. So they don't have reliability, they don't have
1658 affordability, they have the highest gas prices in America.

1659 You, in your testimony, you mentioned the example of
1660 Germany. Germany has headed down this path, lots of
1661 mandates. And what are they doing now? They are signing a
1662 pipeline with Russia to get their gas.

1663 I just -- would you speak to affordable energy, the
1664 demand for oil and gas globally, and what it is going to
1665 mean, when the United States is shutting down American
1666 energy, and what does that mean for global energy security
1667 reliance, and especially on the people in the world that are
1668 living without electricity today that need energy?

1669 *Mr. Pugliaresi. Yes. So the first thing, I think we
1670 sort of forgot. Between 2010 and 2019, the United States
1671 provided 80 percent of the incremental world demand in
1672 petroleum. It was quite a remarkable achievement. And the
1673 notion that somehow -- you know, and world demand for
1674 petroleum is back onto trend. We are somewhere approaching
1675 100 million barrels a day.

1676 Now, at some point, we will use less petroleum. But
1677 that is going to take a long time. And if we proceed with a
1678 strategy to sort of disarm or to shut down our oil and gas

1679 production in the U.S., it is just going to shift the
1680 production to somewhere else, and it is going to shift it to
1681 the Middle East and Russia. And that is going to impose a
1682 very high cost, and a tremendous strategic loss for us. We
1683 have spent 40 years --

1684 *Mrs. Rodgers. Yes.

1685 *Mr. Pugliaresi. -- becoming energy independent.

1686 *Mrs. Rodgers. Right, right.

1687 *Mr. Pugliaresi. We shouldn't give that up --

1688 *Mrs. Rodgers. That is right.

1689 *Mr. Pugliaresi. -- until the replacement fuels are
1690 ready to go.

1691 *Mrs. Rodgers. I completely agree, and it seems to be
1692 okay to get our -- you know, ask OPEC for more oil, but shut
1693 down pipelines in America. This makes no sense.

1694 *Mr. Pugliaresi. It makes no sense.

1695 *Mrs. Rodgers. It is divorced from reality. Let's get
1696 focused on the real goal of American leadership, reducing
1697 carbon emissions, and continuing to lead the world in
1698 reducing carbon emissions. Let's -- that should be the goal,
1699 not wind, solar, and batteries only.

1700 I yield back.

1701 *Mr. Tonko. The gentlelady yields back. The chair now
1702 recognizes Representative DeGette, who serves as chair of the
1703 Subcommittee on Investigations and Oversight.

1704 Representative DeGette, you are recognized for five
1705 minutes for questions, please.

1706 *Ms. DeGette. Thank you so much, Mr. Chairman. And let
1707 me just hook on to what Mrs. McMorris Rodgers just asserted.
1708 Some of us don't think we should just limit ourselves to wind
1709 and solar, so we think that we need to -- we do think that we
1710 need to have the goal of reducing emissions.

1711 But, you know, there is a lot of hyper-partisanship in
1712 this committee and around Congress these days. And I think
1713 that is a real shame. Because I think some of these issues
1714 that we are talking about today, about supply chain and
1715 energy development and minerals, that we can solve these in a
1716 bipartisan way that still is environmentally sound.

1717 And so I am going to channel my inner John Dingell for a
1718 few minutes, and ask the witnesses if they can please answer
1719 the following questions in a yes-or-no way. And I make it
1720 easy, because the questions are drafted so you can do that.

1721 The first one is, do you think we should do -- be doing
1722 more mining of the critical inputs needed for these
1723 technologies, here in the U.S., while staying clear of
1724 critical water and ecological resources, and respecting the
1725 rights of tribal nations and other communities?

1726 Mr. Zindler?

1727 *Mr. Zindler. Yes, if you want an independent --

1728 *Ms. DeGette. Thank you.

1729 *Mr. Zindler. -- energy independence.

1730 *Ms. DeGette. Ms. Brown?

1731 *Ms. Brown. Yes.

1732 *Ms. DeGette. Thank you.

1733 Dr. Switzer?

1734 *Dr. Switzer. I think it is a bit complicated. It is
1735 -- you know, it is hard to say that it is a really, like, a
1736 yes-or-no question.

1737 *Ms. DeGette. Okay, so you can't answer it. You don't
1738 -- so do you think it would be a good goal to mine these
1739 things here in the U.S., while respecting the rights of
1740 tribes and others?

1741 *Dr. Switzer. I think that, in general, the world will
1742 need more mining, but --

1743 *Ms. DeGette. Okay, so what about you? Can you
1744 pronounce your name for --

1745 *Mr. Pugliaresi. Pugliaresi.

1746 *Ms. DeGette. Mr. Pugliaresi, what about you?

1747 *Mr. Pugliaresi. Yes.

1748 *Ms. DeGette. Okay, thank you. Now, should it be a
1749 goal of Congress and the Administration within, say, five
1750 years, to do most of the manufacturing required to produce
1751 our clean energy here, in the U.S., or at least be partners
1752 upholding the same high labor and environmental standards?

1753 Mr. Zindler?

1754 *Mr. Zindler. Yes, it should be the goal.

1755 *Ms. DeGette. Ms. Brown?

1756 *Ms. Brown. Yes.

1757 *Ms. DeGette. Dr. Switzer?

1758 *Dr. Switzer. I think our goal should be to transition
1759 to clean energy, and then we should continually work in
1760 parallel to bring that manufacturing here.

1761 *Ms. DeGette. I totally agree. Mr. Pugliaresi?

1762 *Mr. Pugliaresi. Yes.

1763 *Ms. DeGette. Now, should it be a matter of U.S.
1764 policy to do the mining necessary for clean energy here, in
1765 the U.S. and in countries upholding the same labor and --
1766 high labor and environmental standards that we have here?

1767 Mr. Zindler?

1768 *Mr. Zindler. Yes, assuming we have the resources here.

1769 *Ms. DeGette. Absolutely.

1770 Ms. Brown?

1771 *Ms. Brown. Yes.

1772 *Ms. DeGette. Dr. Switzer?

1773 *Dr. Switzer. I would also say yes, with the same
1774 caveat around the resources and their economic viability.

1775 *Ms. DeGette. Mr. Pugliaresi?

1776 *Mr. Pugliaresi. Yes.

1777 *Ms. DeGette. And should it be a matter of U.S. policy
1778 to invest in technologies that reduce the amount of raw

1779 materials that need to be extracted in the first place?

1780 Mr. Zindler?

1781 *Mr. Zindler. Yes.

1782 *Ms. DeGette. Ms. Brown?

1783 *Ms. Brown. Yes.

1784 *Ms. DeGette. Dr. Switzer?

1785 *Dr. Switzer. Yes.

1786 *Ms. DeGette. Mr. Pugliaresi?

1787 *Mr. Pugliaresi. Yes.

1788 *Ms. DeGette. See, we can find agreement. I really
1789 appreciate it, and I know it is -- and Dr. Switzer, in
1790 fairness to you, I know that it is not always a simple
1791 answer.

1792 But in fact, I think we can all agree that our goal
1793 should be to mine these materials as much as possible,
1794 economically and practically in the U.S., or in places where
1795 the same high environmental and labor standards that we have
1796 in the U.S. are happening. And that is something that the
1797 Democrats agree with. And I know it is something that my
1798 Republican colleagues agree with.

1799 So I look forward to working with my friends on the
1800 other side of the aisle, Mr. Chairman, to make sure that
1801 these things can happen, and I yield back.

1802 *Mr. Tonko. The gentlelady yields back. The chair now
1803 recognizes Dr. Burgess, please, for five minutes.

1804 *Mr. Burgess. Thank you, Mr. Chairman, and I wonder if
1805 I might continue just for a moment in the yes-and-no variety
1806 of questions, and we will just go down the list, as
1807 Chairwoman DeGette was doing.

1808 Would a real infrastructure bill have included a title
1809 on mining, Mr. Zindler?

1810 *Mr. Zindler. I don't know, I am not a legislator.

1811 *Mr. Burgess. Ms. Brown?

1812 *Ms. Brown. I can't answer that in a yes or no.

1813 *Mr. Burgess. The answer is yes. But Dr. Switzer?

1814 *Dr. Switzer. I am the recycling guy.

1815 *Mr. Burgess. Mr. Pugliaresi?

1816 *Mr. Pugliaresi. Yes.

1817 *Mr. Burgess. All right. Well, thank you for that.

1818 And it is important, because we do a lot of big policy things
1819 here, in this committee. And we sometimes, I am afraid, lose
1820 sight of the implications of that.

1821 And Mr. Pugliaresi, you have provided us with a series
1822 of very intriguing figures at the end of your written
1823 testimony. And it seems to me, as I look at those, a
1824 recurrent theme through that is the timeline from where we
1825 are now, roughly 2020, to 2050, which was where we purport to
1826 be at a zero-carbon emission energy production. The amount
1827 of energy required is going to go up by a lot. It varies,
1828 granted, but in your figure 11 on the number of -- required,

1829 it looks like it could go up a bunch. Was that a fair
1830 statement?

1831 *Mr. Pugliaresi. Yes, particularly when you consider
1832 the economic growth and the population growth we are going to
1833 see throughout the Asia-Pacific and Africa, large regions
1834 which are very energy short now, and, as economic growth
1835 takes place, energy demand is going to accelerate.

1836 *Mr. Burgess. So, in order to account for that delta,
1837 where we are now and what will be required in 2050 -- that is
1838 the year that energy production is zero net carbon -- is it
1839 possible to accommodate that increase that is going to be
1840 required?

1841 Is it possible to accommodate that with the traditional
1842 renewable methods, wind, solar, geothermal?

1843 *Mr. Pugliaresi. Absolutely not. You cannot get the
1844 density of power these countries need unless we have some
1845 major breakthroughs in these technologies. And even if they
1846 are possible, if they are costly, I can tell you they will
1847 not adopt them.

1848 *Mr. Burgess. So there is a bill that Congress may be
1849 voting on before the week is over called the Build Back
1850 Better Act. And I had the occasion to spend 16 hours on the
1851 floor of the House last Friday dealing with the rule to
1852 debate that bill.

1853 And as best as I can determine, there is not one dollar

1854 in the Build Back Better Act for research and deployment of
1855 new nuclear technology. And it would seem to me, in order to
1856 accommodate that delta of energy available and energy that is
1857 going to be required, it seems to me that nuclear will have
1858 to be part of that complement.

1859 *Mr. Pugliaresi. I couldn't agree more. Nuclear power
1860 is the only dense, not -- carbon-free fuel alternative that
1861 we really have. All the other carbon-free alternatives are -
1862 - you know, the density of energy they provide is much, much
1863 too little to achieve these goals in the developing world.

1864 *Mr. Burgess. Well, I do want to thank you for
1865 providing us, I think, some significant facts in your
1866 testimony, and certainly the cautionary tale of what has
1867 happened in Germany with the too, too quick -- the fragility
1868 that it has impacted into the system by going too quickly,
1869 and abandoning the traditional sources of energy.

1870 Again, I believe that is a cautionary tale for us. And
1871 being from Texas, we witnessed what fragility of your energy
1872 supply looks like. We only have one week of winter in Texas,
1873 but it was a bad one. You may have read about it, it was in
1874 all the papers. So fragility in the system is something that
1875 I am pretty sensitive to.

1876 We heard on this committee years and years ago, without
1877 energy life is cold, brutal, and short. And we kind of saw
1878 that up close and personal. So would you worry about

1879 imparting that kind of fragility into -- and I am just
1880 talking about the United States now -- into the United
1881 States, with too rapid a transition?

1882 *Mr. Pugliaresi. Yes, of course, you know, the power
1883 systems are very complex. But integrating renewable
1884 intermittent sources in which we don't have a very
1885 sophisticated or ample system to back up this power is -- we
1886 should move with extreme caution.

1887 *Mr. Burgess. You know, one of the probably more
1888 frightening things I have heard from a policy perspective --
1889 and granted, it came from Senators, which is always
1890 concerning, but the desire to abandon the United States being
1891 able to export crude oil, to put the ban back on export of
1892 crude oil. That is the one policy change in the last 10
1893 years that really, I think, has made a difference, as far as
1894 making America energy independent. And I really think we
1895 should be loathe to give up that independence.

1896 *Mr. Pugliaresi. So while we don't have a lot of time
1897 now, the -- if we were to begin to shut down U.S. -- banned
1898 exports, we would actually lose production and have higher
1899 prices.

1900 *Mr. Burgess. Thank you, and I yield back.

1901 *Mr. Tonko. The gentleman yields back. The chair now
1902 recognizes, virtually, Representative Schakowsky, who serves
1903 as chair of the Subcommittee on Consumer Protection and

1904 Commerce. And so we recognize Chair Schakowsky now for five
1905 minutes, please.

1906 *Ms. Schakowsky. Thank you, Mr. Chairman. Now, these
1907 are difficult issues to deal with, because all of us, I
1908 think, want to make sure that we have a sufficient energy
1909 supply. I think all of us probably want to -- definitely
1910 want to see more of a supply chain here, in the United
1911 States.

1912 But one of the things that has frustrated me the most --
1913 and, Ms. Brown, I am going to ask you to respond to this
1914 concern of mine -- is that there seems to be this thing about
1915 making choices between having enough energy, having enough
1916 good-paying jobs by using the incumbent fuels and the
1917 incumbent manufacturing that we have right now.

1918 And my concern is, you know, we just came off of an
1919 international report on how we are really at ground zero for
1920 climate change, and the international conference discussing
1921 how we are going to protect our planet, you know, into the
1922 future for our children and grandchildren.

1923 So I guess the -- well, the question that I want to ask,
1924 is this a choice between clean energy and good jobs?

1925 And how are we going to make sure that, as we make this
1926 transition, that we can guarantee -- because we know -- and
1927 you actually mentioned in your testimony, and explained that
1928 many workers are skeptical of the transition to clean energy.

1929 And what is it that we can do to make sure that we don't have
1930 to choose between the environment and these -- and our energy
1931 security and good jobs?

1932 *Ms. Brown. Thank you so much for that question,
1933 Congresswoman, and a shout-out to the sign that is in the
1934 back, there.

1935 No. It is a false choice. And, you know, our former
1936 president, Leo Gerard, you know, would say this all the time,
1937 that we don't need to choose between good jobs and a good
1938 environment. We can achieve both. And that, quite
1939 literally, has been the work of our union, going back for
1940 more than 40 years, around economic and environmental
1941 sustainability. We have always taken the position that it is
1942 partially our job to make sure that the employers that our
1943 members work for, the companies that they work for, are
1944 actually doing their part to be good environmental stewards.

1945 This goes all the way back to the first Clean Air Act up
1946 to today, where we stand here, encouraging Congress to move
1947 forward with good climate policy, but that you do it by
1948 putting workers first, by focusing on domestic industry, by
1949 looking at the existing capacity that we have here, in the
1950 United States, in each of the sectors that helped to build
1951 this economy.

1952 There is a lot of conversation here today about the auto
1953 industry and EVs. Domestic industry and domestic workers

1954 were such a big part of building that industry in this
1955 country. Our members today remain a big part of the auto
1956 industry, and bringing that into the future. We represent
1957 the largest workers in the auto supply chain.

1958 The entire domestic industry -- steel, rubber, cement,
1959 glass, aluminum, copper, we -- I could, literally, go down
1960 the list, in terms of all of the products that Steelworker
1961 members make. All of those products can play a role in the
1962 U.S. clean energy economy. In 10 years the global market
1963 around clean energy technologies will be \$23 trillion. We
1964 should not cede the capacity that we have here, in the United
1965 States, to other nations that are racing to get that. We
1966 should be building on what we have.

1967 And so, you know, we just -- we stand here, you know, we
1968 have been here, like I said, for 40-plus years in this fight,
1969 and we want to make sure that, as we do this, workers are at
1970 the center.

1971 Thank you for the question.

1972 *Ms. Schakowsky. Well, I appreciate that answer. I
1973 think this idea that, unless we continue to do things as we
1974 have -- and certainly, there are many people that -- we have
1975 to do a really good job about a transition. But if we don't,
1976 I think we are in real trouble, and I think that I am
1977 grateful that the workers in these industries are part of the
1978 solution. So thank you very much for your response.

1979 I yield back.

1980 *Mr. Tonko. The gentlelady yields back. The chair now
1981 recognizes Representative Latta, the gentleman from Ohio, for
1982 five minutes, please.

1983 *Mr. Latta. Well, thank you very much, Mr. Chairman,
1984 and thanks to our witnesses for being with us today.

1985 And before we look to the future, I believe it is
1986 important that it is -- we acknowledge the real challenges
1987 that are currently facing our energy producers, and the
1988 consequences that will result from the recent political
1989 proposals to shut down energy delivery systems in this
1990 country. And specifically, I am referring to the operation
1991 of Line 5. And as my friend from Michigan has already
1992 alluded to, Line 5 is essential to the Midwest.

1993 Earlier this month, after reading press reports from the
1994 Biden Administration examining the consequences of shutting
1995 down Line 5, I led a letter with 12 of my colleagues to
1996 President Biden outlining our grave concerns with this
1997 possible action.

1998 Line 5 is essential to heating homes and operating
1999 businesses, to our farming operations, and to the continued
2000 economic vitality in northern Ohio. Terminating Line 5's
2001 operation will exasperate shortages and price increases in
2002 home heating fuels like natural gas and propane at a time
2003 when Americans are facing inflationary challenges.

2004 Thankfully, it appears the President read our letter,
2005 because his White House has walked back their comments, and
2006 have said they are no longer considering shutting down Line 5
2007 at this time. We need to continue to make clear that we
2008 should be working to improve the lives of hard-working
2009 Americans, and not playing political games with their
2010 livelihoods or well-being.

2011 Mr. Pugliaresi, you state in your testimony other
2012 measures under consideration, such as halting crude oil
2013 exports or release of the Strategic Petroleum Reserve without
2014 a genuine supply disruption, are likely to be
2015 counterproductive. What do you mean by counterproductive,
2016 especially when we know that, with the -- we have the oil in
2017 the ground?

2018 Shouldn't we be tapping into the SPR at this time?

2019 *Mr. Pugliaresi. So the question of the SPR is that it
2020 has traditionally -- and, in my own experience with it, it
2021 should be for a true emergency, for a crisis that threatens
2022 national security, or the economic security of the country.
2023 And if we tend to use it as a kind of commodity adjuster, I
2024 think we are going to diminish its reliability as an
2025 important source for emergencies.

2026 Unfortunately, the Congress has also looked at the
2027 strategic reserve and, through a series of budget measures
2028 that have been passed over the years to reduce its size -- we

2029 have generally not thought that was a good idea, but, you
2030 know, the Congress will -- proceeds with its will on this
2031 issue.

2032 So once again, if we are going to reduce its size over
2033 time, what we have remaining, we would suggest, be kept in
2034 reserve for a true critical emergency.

2035 *Mr. Latta. Well, and again, when you think of the oil
2036 that we have in the ground at this time, and being able to
2037 reduce Saudi Arabia and Russia -- I would say it is not a
2038 good time to be using it.

2039 And you also state one of the reasons the U.S. has
2040 achieved energy independence is that production at the
2041 production platform is efficient. How do you mean efficient?

2042 *Mr. Pugliaresi. So if you think about the United
2043 States, it is a very large continental landmass. The notion
2044 that you could solve our problems by banning exports is a
2045 kind of -- not too thoughtful, let's say. For example, a
2046 refiner in Hawaii may want to purchase his crude from
2047 Indonesia. Well, a -- an exporter out of Texas may want to
2048 ship his light crude to more efficient processing facility
2049 abroad.

2050 But all of that, the fact that we solved this massive
2051 transportation solution in the U.S., has ended up in the U.S.
2052 being a net exporter. I don't -- right now we may be a
2053 slight net importer, but -- and so we end up exporting some

2054 crude oil, but we also end up exporting a lot more highly-
2055 valued petroleum products. All of this allows the crude oil
2056 to be produced more efficiently, and it also allows us to be
2057 one of the largest refiners in the world. And that it -- it
2058 is that efficient platform which gives us the capacity to
2059 expand production over time, and to deal with large
2060 variations in crude oil demand.

2061 *Mr. Latta. In my last 45 seconds I would like to
2062 switch over to -- on the nuclear side, because right now the
2063 U.S. is importing over 80 percent of the uranium from other
2064 countries.

2065 You know, what are the potential energy and security
2066 challenges to the U.S. if we don't invest more in our own
2067 domestic mining?

2068 *Mr. Pugliaresi. Well, you know, for uranium, of
2069 course, we have a series of not just trade arrangements, but
2070 treaty arrangements. I am sure you are well aware of those.
2071 But probably, you know, if we can find ways to cost
2072 effectively produce more here at home, we should do that. If
2073 there are regulatory impediments that are prohibiting that,
2074 we would say, okay, we should take a hard look at those, and
2075 see what we can do to have a cost effective strategy for
2076 producing uranium, as well.

2077 *Mr. Latta. Well, thank you.

2078 Mr. Chairman, my time has expired, and I yield back.

2079 *Mr. Tonko. The gentleman yields back. The chair now
2080 recognizes, virtually, the gentlelady from California.

2081 Representative Matsui, you are recognized for five
2082 minutes, please, to ask questions.

2083 *Ms. Matsui. Thank you very much, Mr. Chairman, and I
2084 want to thank the witnesses for being with us today.

2085 We know that we are at the crossroads of an economic and
2086 technological transition. Support for clean energy
2087 deployment keeps rising, and production costs continue
2088 dropping.

2089 But as a person who is very interested in new
2090 technologies, I know that increased production demand --
2091 increased demand does not always translate into robust
2092 domestic production. And that is why I am proud to champion
2093 the CHIPS Act, legislation to strengthen the U.S.
2094 semiconductor industry, an industry which, as you may know,
2095 has experienced a growing influence of foreign companies.

2096 To truly prepare for a clean energy future, I believe it
2097 is crucial that we establish industrial leadership here, in
2098 the United States, to secure our supply chain and bolster our
2099 competitiveness in the 21st century.

2100 Now, as we transition to a clean energy economy, we have
2101 the opportunity to do what the fossil fuel industry never
2102 did, to set out from the beginning to better protect the
2103 communities and environments impacted by energy development.

2104 It is my understanding that robust investments in a domestic
2105 circular economy for critical minerals is crucial to
2106 establish the sustainable supply chain.

2107 Dr. Switzer, can critical mineral recycling help meet
2108 the growing demand for these materials?

2109 *Dr. Switzer. Thank you. Yes, it most certainly can,
2110 and I think -- you know, one important -- maybe, like, just
2111 an example to highlight on recycling, in particular, and, you
2112 know, with regards to cobalt, is there is often a lot of talk
2113 of cobalt and cobalt mining.

2114 But the really interesting thing with recycling is that,
2115 you know, the batteries that we are putting on the road today
2116 in the latest and greatest electric vehicles actually use
2117 much less cobalt than the batteries that are coming off the
2118 road, or that are coming out of, you know, cell phones and
2119 such. So we can actually thrift that cobalt to recycle it,
2120 and use it to go farther into -- for using -- for use in EVs,
2121 such that, you know, Redwood Materials actually thinks --

2122 *Ms. Matsui. Okay, can I ask you, Dr. Switzer --

2123 *Dr. Switzer. Yes? Yes, go ahead.

2124 *Ms. Matsui. What efforts should Congress prioritize to
2125 support the establishment of more critical mineral recycling
2126 facilities and better collection infrastructure?

2127 *Dr. Switzer. Yes, I think, you know, with regards to
2128 consumer electronics, we certainly -- we most certainly need

2129 to improve our, you know, collection infrastructure, and that
2130 is one of the things that Redwood Materials is working on.

2131 But I also think, you know, further investment in things
2132 like recycling technologies, recycling facilities, as well
2133 as, you know, the refining and battery materials
2134 manufacturing side of the industry is absolutely critical.

2135 *Ms. Matsui. Okay, fine. Now, transportation is the
2136 most polluting sector in our economy, making electric vehicle
2137 adoption critical to improve air quality for our communities
2138 and combat climate change.

2139 Mr. Zindler, in your testimony you mentioned that, when
2140 it comes to electric vehicles, the most critical and costly
2141 component is the battery. Will domestic manufacturing of
2142 lithium ion batteries accelerate domestic production and
2143 adoption of EVs?

2144 *Mr. Zindler. So thank you for that question. I would
2145 say this, that what we have seen in other parts of the world
2146 is that, when there is a clear signal sent about long-term
2147 demand for EVs, fairly quickly an ecosystem of battery
2148 production crops up. And that happened in China, which,
2149 obviously, had a sort of a history of producing batteries.
2150 But China, South Korea, and now Europe very quickly is
2151 ramping up. And once there is that signal sent, then very
2152 quickly you can see all the various components of battery
2153 manufacturing sort of grouped together. But until that

2154 signal is sent, you do a lot of importing. And so I think a
2155 lot of what the market is waiting for is a clear, clear
2156 signal on this.

2157 And I would just point out one thing, which was
2158 mentioned earlier, which is to say that the Administration
2159 has only supported wind, solar, and batteries.
2160 Unfortunately, Congressman Burgess has left, but I, just for
2161 the record, would like to point out that there was \$10
2162 billion in funding for hydrogen in the infrastructure bill;
2163 \$6 billion in funding for conventional nuclear reactors,
2164 which is critical if we want to achieve decarbonization; \$11
2165 billion for carbon capture and storage; and another \$3.2
2166 billion for advanced nuclear reactors. So it was a bill that
2167 covered a lot of technologies that certainly were not wind or
2168 solar or batteries, and it is now law.

2169 *Ms. Matsui. Okay. Quickly, one of the emissions
2170 comparisons between a newly-manufactured battery and a
2171 recycled one -- we need to look at everything here.

2172 *Mr. Zindler. I am sorry, I didn't quite catch that
2173 question --

2174 *Ms. Matsui. Okay. What are the emissions comparisons
2175 between a newly-manufactured battery and a recycled one?

2176 *Mr. Zindler. What are the nearest comparisons?

2177 *Ms. Matsui. No, emissions.

2178 *Mr. Zindler. Oh, the emissions comparison. Oh, I

2179 couldn't tell you right off the top of my head. Maybe Dr.
2180 Switzer can weigh in on that one.

2181 *Ms. Matsui. Okay.

2182 *Dr. Switzer. It is a drastic improvement, obviously,
2183 because, you know, in a battery, you have got all of those
2184 elements in one place that you need, typically at higher
2185 concentrations than are in mined ores. It is a dramatic
2186 improvement over mining.

2187 *Ms. Matsui. Okay. Well, I really wanted to know
2188 between a manufactured one and a recycled one, but I will
2189 leave that question for someone else to ask.

2190 I yield back, thank you.

2191 *Mr. Tonko. You are most welcome. The gentlelady
2192 yields back. The chair now recognizes the gentleman from
2193 Virginia.

2194 Representative Griffith, you are recognized for five
2195 minutes, please.

2196 *Mr. Griffith. Thank you, Mr. Chairman. In the
2197 National Highway System Designation Act of 1995, the
2198 Coalfields Expressway was designated as "a congressional
2199 high-priority corridor." Coalfields Expressway, in my part
2200 of Virginia, is not built. It is not close to being built.
2201 The Coalfields Expressway opens up, as you might guess, the
2202 Virginia coal fields, so we can shift our economy. But it is
2203 not built. It opens up Dickinson and Buchanan Counties.

2204 We haven't kept our promises from the past. And yet I
2205 hear all kinds of laudatory comments today about last week's
2206 infrastructure bill. The new money in that bill for highways
2207 and bridges coming to all of Virginia is a few billion
2208 dollars, at best. Coalfields Expressway will cost 30
2209 billion-plus to complete.

2210 Now, we spent lots of money on new promises, and funding
2211 rich folks to buy electric cars, and all kinds of charging
2212 station money. And I checked. The cheapest electric car
2213 that I could find was 39,999. A battery to replace a battery
2214 in a car that starts to degrade around 65,000 miles, and is
2215 generally guaranteed up to 100,000, but only -- but that
2216 doesn't mean it is at 100 percent, but to 100,000 miles -- a
2217 new battery costs between 5,000 and 15,000. Dickinson
2218 County, Coalfields Expressway. According to an article in
2219 today's online news, the Cardinal News, household income
2220 under 30,000.

2221 Mass transit in rural counties is not an option. The
2222 folks I represent can't afford an electric car. It doesn't
2223 matter how wonderful it is. And when used ones come along,
2224 they are not going to be able to afford those either, because
2225 just a new battery will cost them 5,000 to \$15,000.

2226 I know there are a lot of good intentions. And
2227 sometimes I think we live in two different worlds. Because
2228 Virginia has -- in Northern Virginia -- has five of the

2229 wealthiest counties in the country. But the part I
2230 represent, the whole area I represent, 29 different
2231 jurisdictions, including Blacksburg, Virginia and Montgomery
2232 County, which has some wealth, and the Roanoke area that has
2233 some wealth, the house -- median household income is about
2234 48,000, a little over 48,000.

2235 So, Dr. Switzer, I am all for your recycling. Can you
2236 bring a plant to my area? Can you bring jobs to my area?

2237 *Dr. Switzer. I think there is a tremendous opportunity
2238 for, one, domesticating the supply chain for -- so for
2239 bringing plants to the United States. I think those plants
2240 do come with thousands of jobs.

2241 Another point on the cost is, you know, the cost of --

2242 *Mr. Griffith. Will they come -- but will they come to
2243 an area that doesn't have a good highway system, and takes
2244 you about an hour to get to an interstate?

2245 You don't have to answer that question. It was a
2246 rhetorical question. Let me get on to what I originally was
2247 going to talk about before I got fired up about folks
2248 thinking all of this was going to solve all the problems of
2249 the world.

2250 Would it make sense for you all to build in an existing
2251 plant, to expand an existing plant, or to retool an existing
2252 plant that is already there? Would that make some sense for
2253 you?

2254 *Dr. Switzer. Yes, we are evaluating all options,
2255 including, you know, what we would call brownfield or
2256 existing plants.

2257 *Mr. Griffith. I appreciate that. And what type of air
2258 emissions and waste will your facilities produce, do you all
2259 know?

2260 *Dr. Switzer. So we are targeting net zero. I mean,
2261 you know, our mission is really around driving the reduction
2262 of emissions, so we think we need to lead that space, and are
2263 really targeting zero emissions, with as little to no waste,
2264 re-purposing any waste, essentially, as byproducts that can
2265 be sold into the market.

2266 *Mr. Griffith. Mr. Pugliaresi, anything you want to add
2267 to what I have had to say, and the questions I have asked Dr.
2268 Switzer?

2269 *Mr. Pugliaresi. Yes. So I do think that one dilemma
2270 we face is that, well, we have this aspirational goal. We
2271 need to move to technologies that are actually more cost
2272 effective, cheaper than what we are using now. Because, for
2273 large parts of our national economy, if transition to the
2274 fuels of the future mean their bills go way up, I think they
2275 are going to -- we are going to be very unhappy, because they
2276 are going to resist these things.

2277 *Mr. Griffith. And when those fuel costs go up, it is
2278 going to cost the people in my district a lot of money. And

2279 it is not just a few pennies here and there, as some might
2280 feel, but it is real pain.

2281 I have to yield back. I appreciate all of you. Thank
2282 you.

2283 *Mr. Tonko. The gentleman yields back. The chair now
2284 recognizes the gentlelady from Florida, who serves as chair
2285 of the Select Committee on Climate, and I recognize the
2286 representative for five minutes, please.

2287 *Ms. Castor. Well, thank you, Chair Tonko and Chair
2288 Rush. Thank you to our witnesses. This is a very important
2289 topic, because developing a low-carbon supply chain here, in
2290 America, is how we are going to create new jobs, and reduce
2291 costs on consumers, and boost our economy. It also has the
2292 side benefits of improving public health and reducing harmful
2293 carbon pollution.

2294 The -- I think the clean energy economy is the surest
2295 way to reduce household energy costs over the long term, and
2296 ensure reliable energy in the face of volatile fossil fuel
2297 markets. So let's talk a little bit about that.

2298 And it really is exciting for you all to be here and
2299 talking about this the day after we signed this historic
2300 Infrastructure Investment and Jobs Act. It was great to see
2301 the bipartisan attendance there on the South Lawn yesterday.
2302 And back home in Florida, folks are so excited to get to work
2303 now on clean energy and resilience, and making sure that our

2304 kids have a more livable planet.

2305 But everyone across the globe is dealing with the
2306 volatility in the fossil fuel markets, and uncertainty from
2307 the ongoing pandemic, and that includes businesses and
2308 factories making the products that we buy, especially when it
2309 comes to all of the components that go into clean energy.
2310 These volatile fossil fuel prices are yet another reason we
2311 should be moving as quickly as possible to cheaper, cleaner
2312 energy.

2313 So Mr. Switzer, given the impact of high fossil fuel
2314 prices across the globe, wouldn't it -- wouldn't benefit --
2315 wouldn't businesses benefit by decoupling supply chains from
2316 increasingly volatile fossil fuel markets?

2317 *Dr. Switzer. Yes, I think so. I think not only
2318 decoupling them, but also localizing them to the United
2319 States.

2320 *Ms. Castor. Go into that in greater detail. I mean,
2321 this is a big country. We have different resources all
2322 across the country. The Biden Administration is focused on
2323 implementing those kind of strategies. What advice would you
2324 give them across this big, beautiful, diverse country?

2325 *Dr. Switzer. I think, you know, one of the things that
2326 has brought this to light so recently is the semiconductor
2327 situation, and, you know, kind of the havoc that it has
2328 wreaked throughout the supply chain. And I think a lot of

2329 our partners and -- are starting to really evaluate kind of
2330 how their supply chains are set up, and what the risk is
2331 across the supply chain.

2332 So we think that there is, you know, a certain degree of
2333 supply chain security that can be had by localizing
2334 manufacturing here, to the U.S. But we also think, you know,
2335 coupled with that, there is, of course, jobs. And then,
2336 coupled with that, there is the idea that we can reduce the
2337 cost by doing so. So it seems like it would be a win-win, to
2338 us.

2339 *Ms. Castor. Mr. Zindler, would you like to add your
2340 views?

2341 *Mr. Zindler. Just -- was a couple of quick thoughts,
2342 which is just to point out the basic thing, which is that,
2343 you know, renewable energy, effectively, has zero marginal
2344 cost. So, you know, unless you know differently, you don't
2345 have to pay for wind, and you don't have to pay for sun. So
2346 typically, in competitive electricity markets, it is wind and
2347 solar that are reducing the cost of electricity, not raising
2348 it.

2349 When we think about some of the factors that have
2350 affected the spikes in prices around the world, typically we
2351 are talking about higher fossil fuel prices that have been
2352 contributing to that, and some -- frankly, some political
2353 actions from Vladimir Putin and others that have had some

2354 real effects on that, as well.

2355 So I think it is just worth pointing that -- making that
2356 one basic point, because we have heard a lot about higher
2357 energy costs, and there is no question that they are higher.
2358 But actually, the electricity prices have not been going up
2359 as much as gasoline prices. And part of that is because of
2360 renewables.

2361 And the last thing I would point out is also, is we
2362 think about the 800 million people who lack any electricity
2363 access in the world right now. The lowest cost potential
2364 solution for that is solar plus a battery. It is cheaper
2365 than a diesel generator, and it is particularly cheaper now
2366 that diesel costs are higher. And so the opportunities for
2367 export and for global proliferation of these technologies
2368 remains, thanks to the current conditions.

2369 *Ms. Castor. And we want America to be in the lead. We
2370 want to build these industries, and improve our supply chains
2371 to help the world in the transition to clean energy.

2372 I am hopeful -- I am out of time, but I am hopeful that
2373 the Steelworkers can be an integral part of that, as well.
2374 So thank you very much for appearing here today.

2375 I yield back my time.

2376 *Mr. Tonko. The gentlelady yields back. The chair now
2377 recognizes the gentleman from Ohio, Representative Johnson.

2378 You are recognized for five minutes, please.

2379 *Mr. Johnson. Thank you, Mr. Chairman. You know, I
2380 might point out that the cause of the uncertainty right now
2381 in energy costs in America has more to do with the policies
2382 of this Administration that is making it difficult for
2383 investors to invest and producers to produce. And the only
2384 thing volatile about fossil fuels is how efficiently and low
2385 cost they burn to heat and fuel America's homes.

2386 But, you know, as we sit here today, America is going
2387 through an unprecedented energy and inflation crisis. And
2388 unfortunately, the Energy and Commerce Committee, the
2389 committee that has the authority and the power to do
2390 something about it, is not rising to the occasion.

2391 Just a couple of weeks ago, as reports predicting
2392 winter's price spikes for gasoline, propane, and heating oil
2393 made headlines, what did this committee do? It hosted a
2394 hearing on offshore wind mills. You heard that right,
2395 windmills. Now we are back here again, using our limited
2396 time and resources discussing batteries, solar panels, and
2397 renewable power projects, all of which dangerously rely on
2398 China for the processing and manufacturing of critical
2399 components.

2400 Friends, winter is here. If the United States Congress
2401 is going to do something about this current energy crisis, it
2402 is our job, as the Energy and Commerce Committee, to hold
2403 hearings on it. Republicans have asked for hearings, Mr.

2404 Chairman, but that call has gone unanswered by the majority.
2405 The hardworking families we represent need to heat their
2406 homes, not be lectured to by Democrats fresh off their
2407 Scotland trip, hobnobbing with the international elite on how
2408 we must rush to a decarbonized, green future.

2409 So speaking of Europe, Mr. Pugliaresi, in your testimony
2410 you mentioned Europe as a cautionary tale that we, as
2411 policymakers here, should learn from. For example, it has
2412 been widely reported that Germany is the country who has gone
2413 down the rush to green path the furthest, resulting in German
2414 citizens paying some of the highest prices for energy in the
2415 entire world. Recently, White House Press Secretary Jen
2416 Psaki, in response to concerns about energy price spikes here
2417 at home, said that we need to "double down on our investment
2418 and our focus on clean energy options."

2419 Mr. Pugliaresi, drawing on your expertise, studying
2420 European energy policies, will my constituents and
2421 constituents around this country pay more or less for
2422 electricity, gasoline, and propane if Democrats double down
2423 on weather-dependent renewables, while continuing this war on
2424 oil and gas production here at home?

2425 *Mr. Pugliaresi. So thank you so much for that
2426 question. Actually, just yesterday, Tudor Pickering issued a
2427 very interesting report, and they showed that the price of
2428 electricity was highly correlated to the penetration of

2429 renewable fuels. Because even though, admittedly, wind and
2430 solar can be quite cheap, integrating them into the power
2431 system is not. And as the percentage rises in those systems,
2432 as they have in Germany, and as they have in the UK,
2433 intermittent sources are cheap when they are working. When
2434 they are not working, they can provide system instability and
2435 rising costs, because the fuels are so expensive to back them
2436 up.

2437 *Mr. Johnson. So the basic answer to your question is,
2438 if they double down on this --

2439 *Mr. Pugliaresi. You are going to have --

2440 *Mr. Johnson. -- we can expect our constituents to have
2441 higher prices.

2442 *Mr. Pugliaresi. Absolutely.

2443 *Mr. Johnson. Well, Mr. Pugliaresi, in 2019 the U.S.
2444 became a net energy exporter, and achieved the most energy
2445 secure position we could possibly be in. Energy prices were
2446 affordable, and consumers benefited across the entire
2447 country. Under the Biden Administration, gas prices have
2448 nearly doubled since last year. Inflation is surging across
2449 the board, a major factor being the energy cost to get
2450 products to market. And yet Democrats want to keep America's
2451 abundant and affordable oil and gas resources in the ground,
2452 raising taxes, and increasing regulations.

2453 What effect will this flawed Biden strategy have on

2454 energy prices this winter, and looking ahead to next year?

2455 *Mr. Pugliaresi. So, you know, I am reluctant to blame
2456 the short-term thing on all the measures that the
2457 Administration has undertaken, but -- because I think they
2458 are largely related to the COVID pandemic.

2459 But they are setting a set of expectations. And
2460 expectations -- even though expectations do show up in
2461 current behavior, in storage ideas, how much money people are
2462 -- you know, how we are going to deal with supplies. And so
2463 I think the mistake the Administration is making is they are
2464 creating an expectation of pessimism regarding the U.S.
2465 capacity to produce more oil and gas, the restrictions on
2466 Federal lands, the hostility towards oil and gas, when it is
2467 the fundamental fuel the world is continuing to use.

2468 So I think they are sending the wrong signals, and those
2469 are showing up in the marketplace, but it is hard to measure
2470 them.

2471 *Mr. Johnson. Thank you.

2472 Thanks for the indulgence, Mr. Chairman. I yield back.

2473 *Mr. Tonko. The gentleman yields back. The chair now
2474 recognizes, virtually, the gentleman from Maryland.

2475 Representative Sarbanes, you are recognized, please, for
2476 five minutes.

2477 *Mr. Sarbanes. Thank you very much, Mr. Chairman. I
2478 appreciate the opportunity. And I want to thank the

2479 witnesses who have joined us today.

2480 I am very pleased to see this recognition that, in
2481 addition to being a very critical step, obviously, in
2482 improving the health of our environment, this ongoing
2483 transition to a clean energy and renewable future, and the
2484 manufacturing that can go with it, has the potential to be a
2485 real leading edge in economic growth for the country.

2486 Creating, deploying clean energy technologies offers a
2487 really valuable opportunity for this to foster growth in
2488 American manufacturing industries, which can help them
2489 thrive, obviously, and to create jobs and rebuild the
2490 economy. This is particularly true for communities like
2491 Baltimore, that I represent, that were historically
2492 manufacturing hubs, and still retain significant
2493 manufacturing resources.

2494 Ms. Brown, could you speak to some of the specific ways
2495 that developing renewable energy projects can provide jobs
2496 and revitalize communities that used to be more active in
2497 manufacturing?

2498 In other words, thinking about how we reclaim some of
2499 these manufacturing hubs with the clean energy jobs,
2500 opportunities that we are speaking about.

2501 *Ms. Brown. Thank you for the question, Congressman.
2502 And earlier I mentioned Sparrows Point Steel, which is the
2503 new steel fabrication facility that is on the hallowed

2504 grounds of the former Bethlehem Steel in Baltimore. And, you
2505 know, I think how that project came together is actually a
2506 model for what can be done, as we look at communities around
2507 the country that really do need to be revitalized. That was
2508 a true partnership between our union and U.S. Wind.

2509 You know, I think there was a respect there, on the part
2510 of U.S. Wind, for what that facility meant to our union, how
2511 important it was to our DNA. But also, they saw the, you
2512 know, the Baltimore area as one that really did need an
2513 infusion of economic activity. And so we came together to
2514 work towards that project really being developed, and we
2515 continue to work together. We are going to work with them to
2516 attract the workers for this facility so on the other side of
2517 it, again, you know, we will have about 500 folks working at
2518 that facility, and they will all be members of the
2519 Steelworkers Union. So that is a model that we support.

2520 *Mr. Sarbanes. That is terrific. Let me talk a little
2521 bit about this idea that, while we want to explore the
2522 opportunities to restore manufacturing as we make these green
2523 components of a clean energy future, that we want the
2524 manufacturing process itself to also be green.

2525 And maybe, Ms. Brown, you could speak to this, and also
2526 Mr. Zindler. How do we ensure that the types of
2527 manufacturing that we are talking about today are themselves
2528 low emissions, so we are getting that green current, in a

2529 sense, to all aspects of the operation?

2530 *Ms. Brown. I will speak quickly, so that we can get to
2531 Mr. Zindler, but the Department of Energy plays a huge role
2532 here. We have a huge feat to decarbonize the industrial
2533 sector, broadly. And they are rich in resources and
2534 innovation to help the industrial sector get there. And so
2535 we have worked with them really closely over the years. We
2536 continue to work with them now to identify the technologies
2537 like direct capture, carbon capture, and others that,
2538 hopefully, policies will pull forward to help decarbonize the
2539 industrial sector.

2540 *Mr. Sarbanes. Thank you.

2541 Mr. Zindler?

2542 *Mr. Zindler. If I understood, the question was around
2543 making sure lower emissions around the manufacturing of clean
2544 energy goods.

2545 *Mr. Sarbanes. Correct.

2546 *Mr. Zindler. Hard to answer that in 40 seconds. And I
2547 know Dr. Switzer probably better. But I would just say that,
2548 in particular, up the value chain, batteries, as we think
2549 about it, and mining is probably an area for real focus, both
2550 from -- at the very beginning of life, and the very end of
2551 life, in terms of recycling. And some of the policies that,
2552 frankly, are not -- which have not been adopted yet, I think
2553 are worth closer consideration to incentivize that type of

2554 activity.

2555 *Mr. Sarbanes. Great, thanks very much.

2556 I yield back, Mr. Chair.

2557 *Mr. Tonko. The gentleman yields back. The chair now
2558 recognizes the gentleman from Indiana.

2559 Dr. Bucshon, you are recognized for five minutes,
2560 please.

2561 *Mr. Bucshon. Thank you, Mr. Chairman.

2562 Mr. Zindler, are you an economist?

2563 *Mr. Zindler. Am I a what?

2564 *Mr. Bucshon. An economist.

2565 *Mr. Zindler. I have been an energy industry analyst
2566 for 15 years.

2567 *Mr. Bucshon. Okay, an economist, not a trained --

2568 *Mr. Zindler. I have --

2569 *Mr. Bucshon. You are an analyst.

2570 *Mr. Zindler. I --

2571 *Mr. Bucshon. You are a journalist.

2572 *Mr. Zindler. I have an MBA. I don't know what you --

2573 *Mr. Bucshon. Okay, so you are a --

2574 *Mr. Zindler. I don't have a Ph.D.

2575 *Mr. Bucshon. The reason I am asking is because you are
2576 talking about a lot of economy stuff, and you are a
2577 journalist that covers the -- and commentator that covers --

2578 *Mr. Zindler. My firm --

2579 *Mr. Bucshon. -- the clean energy industry, correct?

2580 *Mr. Zindler. Could I answer the question?

2581 *Mr. Bucshon. Yes.

2582 *Mr. Zindler. My firm has been providing research to
2583 major investors in clean energy --

2584 *Mr. Bucshon. Okay.

2585 *Mr. Zindler. -- and all energy, including, I would
2586 add, oil majors and others for 15 years.

2587 *Mr. Bucshon. Okay, I just wanted to clarify that,
2588 since you seem to be talking about the economy.

2589 The other thing I want to say is all of us up here on
2590 the dais represent different areas of the United States of
2591 America. We don't represent Germany, France, England, or
2592 anywhere. So I know there has been a lot of comments -- I am
2593 not directing this to you, I am just saying in general --
2594 about what other countries are doing. I don't really care.
2595 I care about what the people in southwest Indiana are doing.
2596 That is who I represent, just as Morgan Griffith talked about
2597 Virginia. So I just want to clarify that.

2598 When I saw the hearing I thought we were going to be
2599 talking about supply chain things that would help my
2600 constituents, who are spending more of their money than ever
2601 for Thanksgiving meals, Christmas presents, et cetera.
2602 Unfortunately, again, we are focusing on creating supply
2603 chains for wind and solar energy.

2604 Don't get me wrong, I support that. I believe it is
2605 important for private industry to continue innovating to
2606 reliable -- reliably, affordably, and sustainably to meet our
2607 energy needs. And I am supportive of an all-of-the-above
2608 technology, innovative process. However, at this time, my
2609 constituents in Indiana are experiencing rising inflation,
2610 paying gas prices at the pump that are nearly 70 percent
2611 higher than last year, and seeing their energy bills increase
2612 just in time for them to need to heat their homes in the
2613 winter. That is what I am concerned about. This committee's
2614 attention needs to be focused on those things.

2615 And as it relates to the current energy crisis, COVID
2616 has had a major effect, no doubt. But I am concerned that
2617 the Administration's unfriendly policies toward domestic
2618 energy producers and the -- I mean, dramatically unrealistic
2619 goals -- I mean, I get it, but the elephant standing over in
2620 the corner of the room is everybody in this room knows that
2621 these goals are unrealistic and can't be accomplished. We
2622 all know that, right? It is a political thing. It is trying
2623 to help certain industries, because it is political. We all
2624 know this is unrealistic timelines, I mean, we should just
2625 quit fooling ourselves.

2626 And also we are surrendering our energy future to
2627 foreign countries, and hurting ratepayers at home, when the
2628 foreign countries don't even like us.

2629 And as we look for the supply chain of wind and solar, I
2630 would be remiss if I didn't join my colleague in pointing out
2631 that a more certain, reliable supply chain, if we opened our
2632 lands to mining critical minerals and rare Earth elements in
2633 environmentally safe -- in an environmentally safe way,
2634 rather than being dependent on child and slave labor -- that
2635 is what it is, that is the other elephant in the room -- we
2636 all know what is happening in China and other areas of the
2637 world. We look the other way, because it is benefiting our
2638 green energy goals here, in the United States.

2639 And I do find it interesting the same people promoting
2640 this massive expansion in demand for batteries, and a massive
2641 expansion that has been talked about, are the same people
2642 supporting the environmentalists who are shutting down our
2643 ability to mine fossil fuels in this country. And if you
2644 don't think their next step is going to be not allowing
2645 domestic production of the minerals we need to expand our
2646 clean energy goals as it relates to battery technology, you
2647 are fooling yourself. It is just craziness.

2648 So Mr. Pugliaresi, again -- and I know we have gone over
2649 a lot of this -- I am further down here -- but could you
2650 describe again the extent in which our country is reliant
2651 upon foreign countries like China to supply the key
2652 components needed to build solar panels and wind turbines?

2653 *Mr. Pugliaresi. So yes. So if you look at some of the

2654 critical components there in the charts, it is quite
2655 interesting that the demand for these components accelerates
2656 dramatically as we rely more on renewable technologies. And
2657 that is not an area where we have an advantage right now.
2658 And the area we do have an advantage is oil and gas. We are
2659 the world's largest oil producer, the world's largest gas
2660 producer. We are a dominant player. We can affect what
2661 happens to prices if we ensure that the industry remains
2662 efficient and can produce at capacity.

2663 *Mr. Bucshon. So let me say I have -- I am intrigued by
2664 the recycling situation -- and this isn't a question for you,
2665 but just -- in my own office, years ago, I started -- okay,
2666 what are we going to do with all these solar panels, you
2667 know, when their end of life -- 25 years, or whatever. You
2668 know they all go to landfills right now, right? They have,
2669 like, all kinds of bad metals in them, including lead and
2670 others. We just throw them -- in the United States, we throw
2671 them in a landfill. I think everybody knows that.

2672 So I started looking into, well, what are we going to do
2673 about that? What does Europe do? Well, they recycle. And,
2674 you know, they are trying to do that. And so I approached
2675 the industry that produces them, potentially, in the United
2676 States, and they were adamantly against recycling. Adamantly
2677 against it. And you know why? They said, "Because we can't
2678 compete with China already. How are we going to compete if

2679 you force us to put recycling in the life -- in the entire
2680 life of our solar panels, here in the U.S.?''

2681 So we are looking the other way when it comes to
2682 recycling. Everybody should look at just throwing all these
2683 things in landfills, because that is what we are going to do.
2684 You know, if we want -- we are truly interested in this,
2685 let's quit being hypocrites, and look at the entire life
2686 chain, or whatever you want to call it, of renewable
2687 projects.

2688 I yield back.

2689 *Mr. Tonko. The gentleman yields back. The chair now
2690 recognizes the gentleman from California. Mr. McNerney is
2691 recognized for five minutes, please.

2692 *Mr. McNerney. Well, I thank the chair, and I thank the
2693 witnesses for your testimony this morning.

2694 I also ask that the gentleman from Indiana please
2695 refrain from speaking for me on the committee here in these
2696 hearings.

2697 Today we are already in the era of disruptive climate
2698 change. Decades of inaction have now required us to rapidly
2699 decarbonize our economy, or else subject future years to
2700 disaster after disaster.

2701 And, you know, any Energy and Commerce hearing would not
2702 be complete without one of the Republicans off-based
2703 California bashing. Today I will thank the ranking member of

2704 the full committee for that honor. But as we saw in
2705 February's winter storm in Texas, having a domestic supply
2706 chain of fossil fuel is not sufficient for energy resilience.
2707 Instead, it demonstrated a need to rebuild our energy system
2708 based on resilience.

2709 And I agree again with my Republican colleagues that we
2710 need to invest in nuclear energy, including advanced nuclear
2711 energy, and that is why I voted for the bipartisan
2712 infrastructure bill, which includes support for nuclear
2713 energy innovation, funding to keep existing nuclear plants
2714 online, and \$6 billion for micro-reactors, small modular
2715 reactors, and advanced nuclear reactors.

2716 It is also why I support the Build Back Better Act,
2717 which includes a nuclear energy tax credit and \$500 million
2718 for high-assay, low-enriched uranium, both of which are
2719 important investments in our nuclear generation capability.

2720 If my Republican colleagues want to walk the walk on
2721 nuclear energy, they should have voted for the bipartisan
2722 infrastructure bill, and they should vote for the Build Back
2723 Better bill.

2724 So I am very excited this morning to hear from Dr.
2725 Switzer about how much our battery supply needs can be met by
2726 recycling of battery -- existing batteries.

2727 Dr. Switzer, are there other battery chemistry and
2728 storage technologies available that are less reliant on

2729 critical minerals, or use more readily available material
2730 inputs?

2731 *Dr. Switzer. Thank you for the question. I would like
2732 to answer your question, but just, you know, one kind of
2733 point of clarification from a previous comment around the
2734 recycling of solar panels is actually that Redwood Materials,
2735 you know, only just recently announced that we are actually
2736 recycling solar panels, in partnership with a company called
2737 ERI out of California. So I do think that recycling of solar
2738 panels can be done, and we can recover those minerals out of
2739 solar panels economically.

2740 *Mr. McNerney. Good.

2741 *Dr. Switzer. With regards to battery chemistries and
2742 reducing the reliance on any given mineral, I think that is
2743 happening. There are a number of different battery
2744 chemistries under development. Some are being commercialized
2745 today, and the chemistries are constantly changing with
2746 respect to the elements they contain.

2747 And again, to a specific example, there would be cobalt
2748 and the continuing reduction of cobalt in battery
2749 chemistries.

2750 *Mr. McNerney. What kind of Federal support is needed,
2751 then, to diversify material inputs for grid scale batteries?

2752 *Dr. Switzer. I think continued investment and support
2753 of not only kind of research, but also the manufacturing that

2754 needs to happen here in the U.S. is critical. I think we
2755 can't only focus on the front end of research. We have also
2756 got to focus on the commercialization and manufacturing.

2757 *Mr. McNerney. Thank you. I am very pleased to see
2758 that the U.S. has built on my early work in wind energy
2759 technology development by creating a robust wind energy
2760 manufacturing industry operating across more than 500
2761 facilities. The industry has now reached a point of
2762 maturity, where the early wind turbines have reached the end
2763 of their operational lives.

2764 Mr. Zindler, are there investments being made in
2765 identifying new recycling processes or bases to recycle wind
2766 turbine blades?

2767 *Mr. Zindler. There are, although, to be honest with
2768 you, I can't recall exactly where at this point. Happy to
2769 follow up with you afterwards.

2770 *Mr. McNerney. Okay, thank you.

2771 Ms. Brown, in your testimony you discussed mistakes the
2772 U.S. solar energy made in -- that resulted in offshoring of
2773 much of the manufacturing. Are there lessons to be learned
2774 from the onshore wind industry, which has a relatively robust
2775 domestic manufacturing presence?

2776 And how could these be applied to more nascent clean
2777 energy industries?

2778 *Ms. Brown. Actually, thank you for the question,

2779 Congressman, and it actually goes back to the remarks I made
2780 earlier about the work that was done with the onshore wind
2781 industry and our union. We, many years ago, worked with the
2782 American -- then-American Wind Energy Association to increase
2783 the domestic content used in onshore wind, because at one
2784 point it was abysmal.

2785 And, you know, ultimately, after that work that we did
2786 together, the percentages were upwards of 50 percent. But it
2787 came with a partnership, and a willingness on their part to
2788 make different investments. So I think that is a model,
2789 again, that we can follow, is look at other technologies.

2790 *Mr. McNerney. Thank you.

2791 Mr. Chairman, I will yield back.

2792 *Mr. Tonko. The gentleman yields back. The chair now
2793 recognizes the gentleman from South Carolina.

2794 Representative Duncan, you are recognized for five
2795 minutes, please.

2796 *Mr. Duncan. Thank you, Mr. Chairman. I want to thank
2797 Mr. McNerney for his mentioning of nuclear power, and I agree
2798 with him. I think we ought to take it up in a separate bill
2799 dealing with the next generation of nuclear power, and not in
2800 a socialist \$3.5 trillion spending bill.

2801 But we have heard a lot about the infrastructure bill
2802 just signed into law by President Biden yesterday. But I
2803 believe that the Tax Cut and Jobs Act created more jobs

2804 because it did it through private dollars and tax savings,
2805 incentivized innovation and development in the private
2806 sector, versus spending American tax dollars, \$1.2 trillion
2807 in American tax dollars, to try to create jobs with
2808 government money.

2809 Let's follow the science and the facts. Let's not use
2810 manipulated computer models, or hockey sticks, or unrealistic
2811 timelines. The United States of America, without being
2812 mandated to comply with wealth redistribution treaties and
2813 accords coming out of Kyoto or Paris, has actually lowered
2814 its carbon emissions below the targets that were set by those
2815 accords. And they didn't do it because they were mandated;
2816 they did it because American innovation and technology -- why
2817 and how? Innovation, period.

2818 The problem with these accords and treaties, including
2819 the recent climate summit in Glasgow, is less about what was
2820 in those treaties and accords and more about who wasn't
2821 there, and who wasn't party to that, and that is China and
2822 Russia, period.

2823 Mr. Chairman, if we are really serious about global
2824 climate, instead of further hurting the American economy,
2825 American families paying much higher prices at the pump and
2826 in their utility bills, and attempting to kill the robust and
2827 thriving American energy industry -- well, it was thriving
2828 before Joe Biden became President Joe Biden -- we should hold

2829 a hearing on the true polluters, China and Russia, and
2830 massive emitters of carbon that were not present and part of
2831 these accords.

2832 If the world wants to really address global carbon
2833 emissions that many believe are contributing to climate
2834 change, how do we do that when China can continue to pump
2835 carbon at higher and higher levels through, what, 2030, 2035?
2836 And Democrats want to penalize American industries and
2837 require average American families to pay more to heat and
2838 cool their homes, to drive their kids to school, or drive
2839 their car to attend their worship service at their church.

2840 America needs and Americans demand a 24/7, 365 baseload
2841 power supply.

2842 Now, Ms. Brown represents the United Steelworkers, and
2843 in order to make steel, and refine aluminum, and manufacture
2844 titanium products, these industries require huge amounts of
2845 power generation, huge. The smelters run on a heck of a lot
2846 of power, and it has to be always on, and always available,
2847 because you don't want that puppy to cool.

2848 Mr. Chairman, we need a hearing on nuclear power, and
2849 how it will play a part in the energy security and in our
2850 energy future, especially when you think in terms of that
2851 24/7, 365 reliability.

2852 And Ms. Brown, this is rhetorical: Have the
2853 Steelworkers thought in terms of 24/7, 365 baseload power

2854 powering furnaces to smelt iron into steel?

2855 You see, you say in your testimony that a transition to
2856 a clean energy economy can and will, with government support,
2857 will ensure the preeminence of American manufacturing sector
2858 for the rest of the 21st century. You went through a list of
2859 United Steelworkers -- and you represent steel, glass,
2860 rubber, paper, concrete. But the manufacturing of all these
2861 requires tremendous energy usage. I understand that your
2862 members want to manufacture the clean energy components, and
2863 I want to manufacture them here, as well, because I believe
2864 they are part of the future. And I would much rather
2865 manufacture them here than have China or somewhere else
2866 manufacture them.

2867 But right now China does, as well as they mine most of
2868 the rare Earth minerals that make it all possible, because
2869 they control the mineral rights and do the mining. China can
2870 do all this much cheaper than here, in the United States,
2871 because they don't have to pay union wages, and they operate
2872 state-owned entities.

2873 We did a hearing on legislation to address the future of
2874 nuclear power, the next generation, because, guess what?
2875 That is another area that China is beating us, is in the
2876 future of nuclear technology.

2877 Let me end with this, and my time. Socialism controls
2878 and pushes its version of the future onto a populace. Free

2879 markets create the renovation and investments. Let's unleash
2880 the American ingenuity and innovation, and create our own
2881 energy future.

2882 I believe, as many Republicans do, that wind and solar
2883 and hydrogen, and all these emerging technologies, ought to
2884 be part of the energy matrix. We truly believe that. And we
2885 believe -- because we have seen it -- that the American
2886 economy, the innovators and entrepreneurs, will create these
2887 products. They will, if there is a market for it, and if
2888 they truly believe in it. It shouldn't be a socialist
2889 government pushing that down.

2890 We can do that, while we continue doing what we have
2891 done over the last 20 years, and that is lower America's
2892 carbon emissions without being held hostage to these accords
2893 that punish the United States, and punish the United States
2894 manufacturers, punish our energy sector, punish moms and dads
2895 by paying higher prices at the pump, higher prices for their
2896 utilities to heat and cool their homes, and we allow our
2897 adversaries to continue unfettered. And that is not fair to
2898 America.

2899 And with that, I yield back.

2900 *Mr. Tonko. The gentleman yields back. We now
2901 recognize, virtually, the gentlelady from New York, former
2902 vice chair of the full committee, standing Committee on
2903 Energy and Commerce.

2904 Representative Clarke, you are recognized for five
2905 minutes.

2906 *Ms. Clarke. Thank you very much, Mr. Chairman. And I
2907 thank our ranking members for holding today's hearing on the
2908 importance of strengthening our domestic supply chains and
2909 investing in clean energy -- in a clean energy economy.

2910 And to our witnesses, who have graciously joined us
2911 today, allow me to thank you for your testimony.

2912 As a nation, we will not address the existential threat
2913 of climate change with a singular solution. Rather, we will
2914 need to utilize all the tools in our arsenal, especially bold
2915 investments and advancements in renewable energy. I believe
2916 it is important we continue to build out this industry, and I
2917 am happy to see the Biden Administration's plan to expand the
2918 country's wind energy output to 110 gigawatts by 2050.

2919 I strongly believe that we -- me and my constituents in
2920 Brooklyn -- have a prime opportunity to ensure that the
2921 Administration achieves this crucial goal, while tackling the
2922 climate crisis. So in Brooklyn we have the opportunity to --
2923 an ability to lead the nation when it comes to offshore wind
2924 production. Already, plans are in place to build a new wind
2925 turbine assembly plant in the South Brooklyn Marine Terminal
2926 to expand offshore wind farms in Long Island, which will
2927 generate a total of 3.3 gigawatts of energy per year, enough
2928 to power more than 1.8 million homes.

2929 We talk all the time about bringing forth a Green New
2930 Deal, and how important it is that we create new green jobs
2931 and the clean energy economy. Well, now is the time. And
2932 bold investments in offshore wind is a big part of how we do
2933 it.

2934 So, Ms. Brown, the Federal Government has several tools,
2935 including the Department of Energy's Loan Programs Office,
2936 the Department of the Interior's offshore leasing process
2937 that support the financing or permitting of offshore wind
2938 projects. Do you think the Federal Government can or should
2939 use those programs to ensure that federally-supported
2940 projects are making investments and building a domestic
2941 offshore wind supply chain?

2942 *Ms. Brown. Thank you for the question, Congresswoman,
2943 and absolutely.

2944 But I also think there needs to be some additional work
2945 done. There is not enough done to actually connect the dots
2946 between what is domestically available, when it comes to
2947 offshore wind, and that work needs to be done.

2948 There was a video, actually, that our president sent
2949 around to a few of us the other day that really lays out the
2950 tremendous array of components that go into an offshore
2951 turbine. And we really need to do a full-scale scope-out of
2952 what is domestically available, so that we can then connect
2953 those domestic producers to those projects. That is the work

2954 that our union is focused on right now, to make sure that we
2955 are identifying the supply chain, and that we are connecting
2956 that supply chain, whether they are in Ohio, or Virginia, or
2957 South Carolina, or Georgia, or wherever they are in this
2958 country, to the projects that are being created in Long
2959 Island, and Maryland, and other places around the country.

2960 *Ms. Clarke. Thank you, Ms. Brown.

2961 Mr. Zindler, in your testimony you detail some of the
2962 complexities associated with wind turbine production. Can
2963 you elaborate on the current state of our domestic
2964 manufacturing capabilities, as well as their potential?

2965 *Mr. Zindler. So, for onshore wind turbines, at the
2966 moment, there is only six countries in the world that can
2967 produce every component of a wind turbine, and the U.S. is
2968 one of them.

2969 And so, for the final wind turbines that have been built
2970 onshore -- and I am focusing on onshore, because we basically
2971 built almost nothing offshore -- the U.S. primarily meets its
2972 own demand with our own supply for the final turbine.
2973 However, there is a considerable portion, typically, of these
2974 turbines -- maybe 30, 40 percent -- that consist of
2975 components that are often imported, including from places
2976 like China.

2977 So, you know, it is a more localized supply chain.
2978 Certainly, in the solar industry, it has been. But it is not

2979 fully, 100 percent U.S.-made, typically, for a typical wind
2980 turbine that gets installed.

2981 *Ms. Clarke. Thank you.

2982 Ms. Brown, given a well-trained workforce is critical to
2983 the development of a competitive supply chain, what measures
2984 is the USW taking to ensure that its members are prepared for
2985 the clean-energy jobs of today and tomorrow?

2986 And is there a role for the Federal Government to
2987 further support those workforce development efforts?

2988 *Ms. Brown. Thank you again for the question. I will
2989 reverse my response.

2990 Yes, there is a huge role for the Federal Government to
2991 support workforce training programs, absolutely. We have to
2992 make sure that, as we are looking at where to make the
2993 investments in specific communities -- we have talked a lot
2994 about Baltimore -- there are other communities around the
2995 country, rural areas. As we are making investments in these
2996 communities to bring manufacturing or whatever, that we are
2997 then also lining that up with workforce training in those
2998 communities.

2999 In terms of our union, you know, we are not a building
3000 trades union, so we don't run a hiring hall, but we do work
3001 really closely with our employers to make sure that there is
3002 consistent on-the-job training, as these technologies are
3003 being advanced and created.

3004 *Ms. Clarke. Thank you.

3005 Mr. Chairman, I yield back, and I appreciate your
3006 indulgence.

3007 *Mr. Tonko. The gentlelady yields back. The chair now
3008 recognizes the gentleman from Michigan.

3009 Representative Walberg, you are recognized for five
3010 minutes, please.

3011 *Mr. Walberg. Thank you, Mr. Chairman, and thanks to
3012 the panel for being here today.

3013 Mr. Chairman, with all due respect, we may sound like a
3014 broken record here, but that is only because the majority
3015 continues to ignore the reality that there is an energy
3016 crisis raging across our country and in my state of Michigan
3017 right now. Gas prices are soaring by 80 percent, heating
3018 bills are projected to be nearly 60 percent more expensive
3019 this winter, and supplies are waning, and that is a big deal
3020 for Michigan in the winter.

3021 Our President admitted that he has no solutions, and our
3022 Energy Secretary, our former governor in Michigan, laughed.
3023 She laughed at American families struggling to afford to heat
3024 their home or drive their cars.

3025 This hearing is supposed to be about the supply chain
3026 challenges of a zero-carbon economy. How about instead we
3027 first focus on the supply chain crisis of the current energy
3028 economy?

3029 Mr. Pugliaresi, I am sure you have read the recent
3030 reports that the Biden Administration is considering shutting
3031 down Line 5, as Michigan Governor Whitmer is attempting to do
3032 in court. Some reports are saying the decision may solely be
3033 based on political pressures. That is a scary thought.

3034 You have decades of experience in dealing with energy
3035 security issues at the highest level of government. In your
3036 opinion, what would be the impact of a Line 5 shutdown, as it
3037 relates to our national energy strategy?

3038 *Mr. Pugliaresi. So, in my view, that is two -- first,
3039 it is a horrible idea. Let's just get that out there, it is
3040 a horrible idea.

3041 *Mr. Walberg. And unnecessary.

3042 *Mr. Pugliaresi. It is very unnecessary. And also, it
3043 is -- I don't believe -- of course, I don't want to speak on
3044 legal matters, but the pipeline and Hazardous Materials and
3045 Safety Administration is responsible for this.

3046 This is a regulatory matter to be handled under treaty
3047 between the United States and Canada, and it is in this
3048 manner for a good reason. We view the construction of
3049 pipelines as part of the sort of foundation, you know,
3050 infrastructure within the U.S., and it should not be affected
3051 by short-term political whims.

3052 I really think, you know, we went through this period of
3053 low oil prices and low gasoline prices, and, in a sense, we

3054 have -- we sort of forgot how valuable all the investments in
3055 infrastructure and the revolution we had in technologies that
3056 made us such a large oil and gas producer.

3057 *Mr. Walberg. And it had a positive impact, didn't it?
3058 And --

3059 *Mr. Pugliaresi. It had an enormous impact. It is one
3060 of the main reasons our emissions of carbon are declining, so
3061 -- have declined so rapidly over the last 10 years.

3062 *Mr. Walberg. Far cleaner petroleum resources coming
3063 from our suppliers, both Canada and the United States, as
3064 opposed to Russia, isn't it?

3065 *Mr. Pugliaresi. Absolutely.

3066 *Mr. Walberg. In your testimony you state that the
3067 public support for clean energy transition will hinge on the
3068 availability of reliable and affordable energy, which remains
3069 the lifeblood of our economy and our national security, and
3070 that cutting off production of legacy fuels will backfire
3071 horribly and erode public support for a clean energy
3072 transmission.

3073 In your opinion, will shutting down existing safe and
3074 reliable oil and gas pipelines increase or decrease public
3075 support for a clean energy transition? Why or why not?

3076 *Mr. Pugliaresi. They will dramatically decrease it,
3077 because the public is not prepared and unwilling to pay the
3078 very high prices of a transition program which is --

3079 accelerates so quickly that it raises the cost of power and,
3080 you know, energy, generally.

3081 *Mr. Walberg. It is a pocketbook issue, isn't it?

3082 *Mr. Pugliaresi. Yes, there is a pocketbook issue.
3083 There will be no -- there is no political support for this, I
3084 can assure you.

3085 I mean, remember, four pillars of modern civilization
3086 still do not have a cost-effective alternative, from a --
3087 from fossil fuels: steel, cement, plastics, and fertilizer.

3088 *Mr. Walberg. Yes. So I guess what I am hearing you
3089 say is that, by cutting off existing pipelines, this will
3090 actually undermine a clean energy transition, as was the case
3091 in Germany. Am I correct?

3092 *Mr. Pugliaresi. Yes, I believe we are going to see a
3093 great deal of public dissatisfaction with the winter crisis
3094 throughout the European continent. And it is already
3095 creating a lot of political divisions, and a lot of political
3096 turmoil.

3097 *Mr. Walberg. To what degree do you think political
3098 decisions to shut down oil and gas infrastructure will impact
3099 energy prices, moving forward, as we recover from the COVID-
3100 19 pandemic?

3101 *Mr. Pugliaresi. If we undermine our ability to
3102 efficiently produce, transport, and distribute traditional
3103 legacy fuels such as oil and gas, gasoline, propane, it is

3104 going to have a very negative political impact, because the
3105 American public is used to the reliability and the resilience
3106 of the system.

3107 *Mr. Walberg. And the pocketbook issue comes back.

3108 *Mr. Pugliaresi. It is a pocketbook issue.

3109 *Mr. Walberg. Thank you, Mr. Chairman. I yield back.

3110 *Mr. Soto. [Presiding] The gentleman yields back. The
3111 chair now recognizes Representative Peters for five minutes
3112 to ask questions.

3113 *Mr. Peters. Thank you, Mr. Chairman. I had a question
3114 for Mr. Zindler.

3115 You know, different technologies have different demands
3116 for critical materials. We are talking about a lot of
3117 electric cars, which will take a lot of batteries, obviously.
3118 We are talking about using battery storage for -- to deal
3119 with the intermittency of renewable energy. And I am
3120 wondering whether we should be making strategic decisions
3121 about which nascent technologies to support, given the amount
3122 of critical minerals they demand.

3123 So in particular, should we be looking more aggressively
3124 at hydrogen for large vehicles, for buses?

3125 Should we be looking more aggressively at things like
3126 advanced nuclear for power generation, because we may not be
3127 able to get all the batteries that we need for storage?

3128 What do you think about the direction we should be

3129 taking, with respect to that scarcity?

3130 *Mr. Zindler. So it is a good question. And, you know,
3131 we used to hear a lot more about it an all-of-the-above
3132 energy strategy, I think, than we do now, even -- frankly,
3133 even from Republicans. And yet it does seem like that -- we
3134 really have major challenges in the short and the long term,
3135 if we think about this transition.

3136 And longer term, you potentially do need technologies
3137 like advanced nuclear reactors. You need technologies like
3138 hydrogen to be used in various ways. And, like I said
3139 earlier, that is why, at least to me, it is encouraging that
3140 some of these are well supported in the infrastructure bill
3141 that passed recently. But you also need to support
3142 technologies that are more viable today.

3143 But as Mr. Pugliaresi points out, I mean, you know,
3144 these industrial processes, there is no easy fix. And this
3145 is why hydrogen, for instance, or advanced nuclear, is
3146 important to try to find ways to decarbonize those areas, as
3147 well.

3148 But in addition, there should be support for the
3149 technologies that are viable today. And I would note,
3150 really, that they are viable. And for -- we can pretend that
3151 there isn't competition here, but the reality is that the
3152 number of electric vehicles that are being sold around the
3153 world has been surging, particularly this year. And I would

3154 argue that it is not just because there is policy support,
3155 though there has been that, but it is also because,
3156 ultimately, these are superior products.

3157 So you can bury your head in the sand and say, "We just
3158 like internal combustion engine vehicles," but eventually
3159 there will be a transition.

3160 *Mr. Peters. You are starting to address a different
3161 point. I mean, obviously, my concern grows out of the
3162 popularity of electric vehicles, out of the commitment of our
3163 -- laudable commitment of our automakers to sell only
3164 electric vehicles -- California, only electric vehicles after
3165 2035, so it is our only emission-free vehicle. So I just
3166 think -- I suspect we should be giving some thought to the
3167 effect of -- scarcity of battery technology doesn't change,
3168 in particular.

3169 Let me also ask you -- so critical minerals are,
3170 obviously, a complex problem. In addition to the potential
3171 of onshoring recycling, it seems like we should be working
3172 with our allies to develop new mines and factories for clean
3173 energy technologies in more favorable locations, like when we
3174 utilized the U.S. Export-Import Bank to help develop the
3175 world's liquefied natural gas market.

3176 Can the U.S. collaborate with its allies to create more
3177 secure and sustainable supply chains for critical minerals
3178 and low-carbon technologies?

3179 In other words, if we can't have it here, onshore it,
3180 can we friend-shore it?

3181 *Mr. Zindler. I think the answer is yes. And, I mean,
3182 if you look at where the production of a lot of these
3183 elements are, they -- both where they are, and where they
3184 could be, it is a pretty heterogeneous group of countries.

3185 But where you look -- if you look at where a lot of the
3186 refining of the elements takes place, the majority of it is
3187 in China. And so that is one area where you could say you
3188 would immediately potentially want to diversify, so that you
3189 have a greater -- less reliance on these elements making a
3190 stop in China before they proceed along the value chain. And
3191 that certainly is, potentially, an area that our foreign
3192 development agencies could look at.

3193 But the refining itself, to be clear, is something that
3194 could also be done in the United States. That is not
3195 contingent on a local resource of something under the ground.

3196 *Mr. Peters. All right. Thank you very much for being
3197 here.

3198 And Mr. Chairman, I yield back.

3199 *Mr. Soto. The gentleman yields back. The chair now
3200 recognizes Mr. Carter for five minutes to ask questions.

3201 *Mr. Carter. Thank you, Mr. Chairman, and thank all of
3202 you for being here today. We appreciate your indulgence. I
3203 know it has been a long day, thus far, but we are almost

3204 home.

3205 Mr. Pugliaresi, I want to ask you, this hearing today
3206 comes at a most appropriate time, because we are suffering
3207 from supply chain issues in our country. And, you know,
3208 whereas I think we can resolve these in the near term, I
3209 think it is a different story about the long term, and
3210 particularly when it relates to -- when we are talking about
3211 supply chain of critical minerals.

3212 And I know we have spoken about that today, you have,
3213 but I -- you know, if all this were to go through, all these
3214 priorities, and these -- with the Green New Deal and
3215 everything, you know, knowing how dependent we are on China,
3216 knowing how dependent we are on other countries to get these
3217 minerals, and knowing how long it takes to be able to get
3218 them here in this country if we were to be able to process
3219 them and to be able to get minerals here, what is the
3220 repercussions, both politically and economically, if we
3221 become so dependent on China for our critical minerals, if we
3222 were almost completely dependent on them for this?

3223 *Mr. Pugliaresi. We are all going to suffer a strategic
3224 loss if we -- if the components we need to transition to the
3225 fuels or the technologies of the future, or in -- you know,
3226 regions in -- which are unfriendly or subject to disruption.

3227 If you think about the traditional way we thought about
3228 energy security, we were vulnerable in the petroleum -- from

3229 petroleum, due to a concentration of low-cost reserves in
3230 unstable parts of the world, right? That imposed two risks
3231 on us. One, a few folks could get together and lower
3232 production and extract wealth from the United States; or two,
3233 right, there could be a major disruption. It doesn't even
3234 have to be state actor. It could just be acts of terrorism.

3235 But we were so dependent on that. And the emergence of
3236 the U.S. as a major oil producer in the world has virtually
3237 eliminated this problem. Yes, other players can do things,
3238 and this is the problem, if we try to transition too fast and
3239 too deep with these alternative, these alternative fuels.

3240 *Mr. Carter. Thank you for mentioning that. I often
3241 cite just what you said. You are old enough, I am old enough
3242 to remember the late 1970s, when we were dependent on other
3243 countries, particularly in the Middle East, for our energy
3244 needs, and we knew it, but we realized it when gasoline got
3245 up to be \$5 or \$6 a gallon. And we did something about it.
3246 We set out to become energy independent, and we achieved
3247 that. We even achieved energy dominance.

3248 And I remember our former Secretary of State, Mike
3249 Pompeo, saying that it was such a tool in his tool chest,
3250 when he could go worldwide, knowing that we had energy
3251 dominance, it gave us something that other people didn't
3252 have, and that we could utilize on a foreign playing field,
3253 if you will, and how important that was.

3254 I want to get to something else, because I am really
3255 interested in this, and that is just how clean some of this
3256 stuff is. When we talk about clean energy, what about the
3257 waste?

3258 And the title of today's hearing is, "Clean Energy
3259 Economy.'" But in your testimony you mention the high cost
3260 of materials and commodities needed to build enough clean
3261 energy projects that could replace the output of a natural
3262 gas plant. In fact, according to the Manhattan Institute,
3263 the energy equivalent of 100 barrels of oil, as used in the
3264 process, is to fabricate a single battery that can store the
3265 equivalent of one battery of -- one barrel of oil.

3266 How much cleaner are wind, solar, and battery
3267 technology, when they require so much more in terms of
3268 materials processing and land?

3269 *Mr. Pugliaresi. Right. So one of the problems is we
3270 have kind of a unidimensional view towards the environment.
3271 Everything is focused on carbon emissions, and we forget
3272 about all the other things we need to worry about, which is
3273 land disturbance, how much land we are going to need, how
3274 much power and energy needs to be made to fabricate the steel
3275 for the windmills.

3276 And I would like to thank Mark Mills for his excellent
3277 analysis of this problem, because there are no free lunches.

3278 *Mr. Carter. Absolutely. And I appreciate you

3279 mentioning this. I represent South Georgia, a very rural
3280 area, and I have been -- I have visited some counties where
3281 the state and Federal Government are offering tax incentives
3282 for them to switch for -- from farmland to solar farms.

3283 And let me preface and say, look, I am a big clean
3284 energy advocate. I am very proud that I was just -- I just
3285 received an award, as a conservative clean energy person of
3286 the year in Georgia, and I take it very seriously, and I am
3287 all for clean energy. But I also want to be accurate, and I
3288 also want to make sure we understand.

3289 But I was -- what I was saying is some of these
3290 counties, we are using up ag land for solar farms, and some
3291 of the counties have even put moratoriums on it now, because
3292 all of the ag land is being turned into solar farms.

3293 *Mr. Pugliaresi. Well, if we are using a set of price
3294 signals which don't reflect the actual costs of production,
3295 and the actual value of the products, we are going to have
3296 these distortions. And so we should be cautious and careful
3297 about the pace at which we do these things.

3298 *Mr. Carter. Again, I thank you all for being here. I
3299 just want to make clear -- and I am a strong advocate for
3300 clean energy, but I want us to be -- go with our eyes open on
3301 it, and make sure we understand just how clean it is.

3302 Thank you, and I yield back.

3303 *Mr. Soto. The gentleman's time has expired. Next the

3304 chair recognizes Representative Dingell for five minutes to
3305 ask questions.

3306 *Mrs. Dingell. Thank you, Mr. Chairman, and I thank
3307 both of our chairmen for holding today's important joint
3308 hearing on domestic supply chains for clean energy. This
3309 hearing couldn't come at a more critical time, as we look
3310 towards the future and American competitiveness.

3311 We have seen over the last two years how a global
3312 pandemic can negatively impact our domestic supply chains,
3313 and we cannot afford to be caught flat-footed as we embark on
3314 this transformational shift to a clean economy. That is
3315 important for both American prosperity, but also for our
3316 national security.

3317 And I just want to say I need to get to my questions
3318 pretty fast, because I care deeply about electric vehicles,
3319 but I am hearing my colleagues, who I have a great deal of
3320 respect for, make comments about clean air energy. I
3321 remember when Michigan went to renewable resources, how
3322 everybody was so worried about wind and solar, and how
3323 expensive it was going to be. And it has turned out to be
3324 far less expensive than anybody thought, and less than gas
3325 and oil.

3326 And the Secretary of Energy is my friend, and I just
3327 have to -- she is not laughing at anybody having to pay
3328 increased costs for anything. I think the -- her comment was

3329 taken out of context. We all care about Line 5. We care
3330 about energy supply in the State of Michigan, but we also
3331 care about the Great Lakes, and what would happen in an oil
3332 spill. It is a far more complicated subject than a one-
3333 minute sound bite in our committee, and maybe we could get to
3334 that someday in committee.

3335 But having said that, I would like to focus on the
3336 critical mineral supply chains needed to support electric
3337 vehicles, and how innovative companies are rethinking clean
3338 energy supply chains.

3339 First of all, Mr. Zindler, in your expert opinion, do we
3340 currently have the robust domestic supply chains for critical
3341 minerals and processing needed to lead the world in the
3342 development, production, and deployment of electric vehicles
3343 to meet the President's 2030 EV goal? Yes or no?

3344 *Mr. Zindler. No.

3345 *Mrs. Dingell. I agree with you.

3346 *Mr. Zindler. No.

3347 *Mrs. Dingell. We don't have the supply chain needed,
3348 which is why I would like to explore the recent partnership
3349 announced between Redwood Materials and Ford.

3350 So the recent collaboration between Redwood Materials
3351 and Ford -- and, by the way, I agree with my -- I am not old,
3352 but I am seasoned. I remember sitting in lines, and our
3353 dependency upon foreign oil, and we never want to get that

3354 way again. And China is making too many of our batteries,
3355 but we have the resources to do it here, and protect our own
3356 national security.

3357 So Dr. Switzer, the recent collaboration between Redwood
3358 Materials and Ford to make electric vehicles more sustainable
3359 and affordable for America represents a partnership between
3360 an emerging -- American company that are rethinking clean
3361 energy supply chains, and encouraging large companies, namely
3362 the automakers, to do the same. So can you speak on the
3363 innovative business models you are pursuing, for instance, on
3364 how Redwood is centering its business around circulatory, for
3365 those that -- the domestic supply chain, and how the industry
3366 is reacting to this approach?

3367 *Dr. Switzer. Yes, sure, thank you for the question,
3368 and highlighting our recent partnership with Ford Motor
3369 Company. You know, they have been very exciting to work
3370 with, as they really are forward-leaning, in terms of the
3371 electrification of their fleet.

3372 When we talk about our partnership with Ford, it really
3373 is, you know -- it encompasses all of what you said, as in
3374 circularity. We are interested in how do we, you know,
3375 collect and recycle Ford's end-of-life batteries from their
3376 electric vehicles they place on the market?

3377 But not only how do we collect and recycle those. It is
3378 important that we also refine and then re-manufacture those

3379 into battery materials that Ford can use, here in the U.S.,
3380 wherever their plants are.

3381 *Mrs. Dingell. So can you -- because I am going to run
3382 out of time already -- talk about how that increases
3383 efficiencies in battery manufacturing, and how that helps us
3384 in American production?

3385 *Dr. Switzer. Yes, I think that is a key point of it
3386 all, is that -- you know, there has been a lot of talk today
3387 about how, you know, domestic manufacturing can't compete,
3388 whereas, as we would actually maybe contend the opposite.
3389 And I think that is why Ford is so interested, is that -- you
3390 know, we think that, by bringing these material -- this
3391 material manufacturing into the U.S., we can actually drive
3392 costs down, and help reduce the cost of the battery, which is
3393 the single most expensive component of an EV.

3394 *Mrs. Dingell. I am out of time. I may, Mr. Chairman,
3395 with permission, do some questions for the record, and thank
3396 the witnesses, and yield back the balance of my time.

3397 *Mr. Soto. The gentlelady yields back, and questions
3398 will be submitted for the record.

3399 [The information follows:]

3400

3401 *****COMMITTEE INSERT*****

3402

3403 *Mr. Soto. The chair now recognizes Mr. Curtis for five
3404 minutes to ask questions.

3405 *Mr. Curtis. Thank you, Mr. Chair, and thank you to our
3406 witnesses.

3407 I recently arrived back from Glasgow, Scotland, where I
3408 attended COP. And I know what you are thinking. A
3409 Republican, right? Attended COP?

3410 I had many fascinating conversations over there, and one
3411 of those fascinating conversations with -- was with the
3412 president of Scottish Power. And he started our conversation
3413 by saying, "We are 100 percent renewable.'" And having run a
3414 utility before I couldn't let that go. I had to ask him more
3415 questions.

3416 "Well, what do you mean?'"

3417 He said, "Well, we have so much wind. We don't know --
3418 you know, we have more wind than we can possibly use,'" and
3419 they have built an infrastructure around Scotland for -- to
3420 capture the wind.

3421 And so I asked the next logical question, which is,
3422 "What happens when the wind doesn't blow?'"

3423 And he said, "Oh, we have to import power, and it is
3424 usually from natural gas.'" And then he went on three or
3425 four more times to reiterate that he was 100 percent
3426 renewable, and didn't see that, at least in my mind, which
3427 was the catch to his claim.

3428 The next day I had a conversation to speak with an
3429 organization that works in Scotland to balance power. So
3430 they take power coming in, and make sure that the power going
3431 out is equal. They actually pay homes to not use power, so
3432 that they can make it equal. And I brought up this because
3433 it was haunting me all day, this baseload issue, right, if
3434 you have got this much wind.

3435 And the gentleman I talked to said, "You know, I haven't
3436 heard the word 'baseload' in five years.'" It is not even
3437 part of their conversation.

3438 And so, as far as I know, it is a fact that we don't
3439 have the technology to store this type of renewable at scale.
3440 I get that we can do it, but at scale.

3441 It is also a fact that their nation is dependent on
3442 outside energy from outside of their borders.

3443 And it is also a fact that this vulnerability leads to
3444 unstable prices and uncertainty. As a matter of fact, I had
3445 a conversation where we learned of one woman who has a home
3446 -- several hundred square feet -- that was paying \$1,000 U.S.
3447 for her utility bill. And we actually saw in that room,
3448 where they were balancing power, that power had doubled,
3449 tripled, and quadrupled as they became dependent on the
3450 natural gas coming into their system. I call this, the
3451 emperor has no clothes moment, something that happens, I
3452 think, a lot in these discussions.

3453 There is other the emperor has no clothes moments, and
3454 one of those, to me, is the demonization of fossil fuels. It
3455 makes us feel good to shut down pipelines like the Keystone
3456 Pipeline. But the reality of it is, I believe, shutting down
3457 the Keystone Pipeline increases greenhouse gas emissions,
3458 because we simply use fuel from dirtier sources, or we truck
3459 that fuel in. As a matter of fact, in Glasgow they were
3460 joking that we should name the Keystone Pipeline Nord Stream
3461 III, and we could get it approved and passed.

3462 Another elephant-in-the-room moment is the moratorium on
3463 Federal leases, which makes us dependent on China for
3464 critical minerals. We have talked about that today.

3465 So we remain locked in a tug of war of words and
3466 ideology. I don't believe it needs to be that way. In fact,
3467 it is clear to me that, no matter your answer, renewables,
3468 emerging technologies like new nuclear, hydrogen, or fossil
3469 fuels, they all lack one major component, and that is
3470 innovation. Every single one of those lacks innovation that
3471 it needs to be.

3472 As a matter of fact, no matter who you talk to, when
3473 they say we are going to be carbon neutral by 2050, or we are
3474 going to cut that in half by 2030, they all put a little
3475 asterisk by it that says, "We don't know how to get there
3476 yet," and we are lacking serious innovation in these three
3477 areas.

3478 So I asked myself and, in the few moments that we have,
3479 I would like to ask you, and I will start with Mr.
3480 Pugliaresi, what are the barriers to innovation right now,
3481 and what is keeping us from breaking through some of these
3482 barriers in innovation?

3483 *Mr. Pugliaresi. First, you know, I think we sort of
3484 looked at what was happening with our iPhones, and silicon,
3485 and chips, and we said, "Well, we should be able to do this
3486 for energy.'" But in fact, these are a much harder problem.
3487 They bump against some fundamental problems of physics. And
3488 so we are going to have to invest a lot in research and
3489 development to make sure that the technologies we deploy are
3490 cost effective.

3491 My biggest concern, from an energy security point of
3492 view, is that we begin to deploy technologies that are not
3493 actually ready to be cost effective, are not resilient
3494 enough, because we -- our aspirational goals kind of exceed
3495 our sort of pragmatic views of the world.

3496 *Mr. Curtis. We have also just heard recently about
3497 lifecycle costs, right, that we don't always look at
3498 lifecycle cost.

3499 Mr. Zindler, I can tell that you have had a lot of good
3500 answers throughout this hearing, and I can tell there have
3501 been a lot of things you have wanted to respond to. I would
3502 love you to respond to this innovation gap, right?

3503 And if we are not careful, this turns into a, you know,
3504 a Republican-Democrat fight. But I don't think innovation
3505 needs to be.

3506 What are our barriers to innovation, in your mind?

3507 *Mr. Zindler. Well, I will try and be really quick,
3508 because I know we are at time.

3509 But first, thank you for a really thoughtful question,
3510 and for your time in going to Glasgow. And I think you
3511 pinpoint a real challenge, which is long-term, long-duration
3512 storage is an issue, and it is one that we don't have solved
3513 now, and it is one that we need to invest in over the long
3514 haul.

3515 Certainly, batteries that can provide -- lithium ion
3516 batteries can provide, you know, short discharges, and help
3517 with cars and everything, but that is an area where we need
3518 to focus.

3519 *Mr. Curtis. And I am going to cut you off, because the
3520 chair is going to cut me off, and I know we are out a time.

3521 Let me also suggest a level playing field and
3522 permanency, so that corporations can invest, knowing that
3523 they have got permanency.

3524 And I hear your gavel, Mr. Chairman, I yield my time.
3525 Thank you.

3526 *Mr. Soto. The gentleman's time is expired. The chair
3527 now recognizes Representative Veasey for five minutes to ask

3528 questions.

3529 *Mr. Veasey. Mr. Chairman, thank you very much. With
3530 electric vehicles poised to grow tremendously -- and we are
3531 looking at here, and in Fort Worth, we are on the short list
3532 for a large electric vehicle company that is thinking about
3533 actually moving their headquarters here.

3534 We, obviously, need to take seriously the sourcing of
3535 these materials, and not just, you know, gloss over them, and
3536 pretend like it is not a problem. But it is also critical
3537 that we are thinking and preparing for what to do with the
3538 materials at the end of their life.

3539 Earlier this summer, with Representative Doyle, we
3540 introduced H.R. 4864, the Battery Material Processing and
3541 Component Manufacturing Act. And this bill makes billions of
3542 dollars of investments in building a domestic battery supply
3543 chain by focusing on material processing, component
3544 manufacturing, and recycling. I worked with my colleagues,
3545 and was pleased to have the bill included as part of the
3546 Infrastructure Investment and Jobs Act that was signed into
3547 law. The Department of Energy will now have the authority
3548 and resources to collaborate with the private sector on how
3549 to responsibly produce and process battery materials, but
3550 also invest in infrastructure needed to manufacture and
3551 recycle batteries here, in the U.S.

3552 We heard today from Dr. Switzer about the importance of

3553 creating a closed-loop domestic supply chain for batteries,
3554 and I would like to give him the opportunity to add anything
3555 else he would like to on the importance of this type of
3556 collaboration.

3557 Dr. Switzer, given your experience at Redwood working to
3558 build a domestic battery business, what further steps does
3559 Congress need to do to support and facilitate businesses like
3560 yours in building domestic battery manufacturing?

3561 *Dr. Switzer. Thank you. I think, to start off with,
3562 conversations like this are a great place to, I think, bring
3563 everyone to that kind of level playing field, and to the same
3564 level of kind of education and awareness of the issues.

3565 I think there has been, in terms of, you know, creating
3566 that closed-loop supply chain, there has been a ton of
3567 announcements and investment around the electrification of
3568 our automotive fleet. You know, the Big Three have all,
3569 really, leaned forward and said, "We are going to go
3570 electric," and I think that is a huge step.

3571 And you know, in front of that, there has been a lot of
3572 investment in battery manufacturing, and a lot of
3573 announcements of battery manufacturers coming to the U.S.
3574 But I think in front of that is where we really need to
3575 focus. And in front of that is the battery material supply
3576 chain, along with, coupled with, the recycling supply chain
3577 that needs to kind of close that circle such that, you know,

3578 once the materials are here in the U.S., they stay here in
3579 the U.S., and can be re-manufactured, essentially, an
3580 infinite number of times to produce new batteries over time.

3581 *Mr. Veasey. No, yes, yes, thank you very much.

3582 And before my next question, I just want to say, Ms.
3583 Brown, thank you, in your opening comments, for really
3584 projecting some reality into this conversation. I thought
3585 that that was very much needed. And I am going to move over
3586 to my state of Texas.

3587 Many people on this call know, because I have talked
3588 about it a lot, that we are -- not only are we the leaders
3589 when it comes to producing oil and gas, but we are also the
3590 leaders when it comes to wind energy in this country. We are
3591 showing the rest of the world and the rest of the country on
3592 exactly how you can wind, and no one can argue that.

3593 And we have quite a bit of solar power, as well, but we
3594 often have a problem with matching generation with load.
3595 Energy storage technologies will be a key part of shifting
3596 energy when it is cheaply generated to when there is demand
3597 on the grid.

3598 Another provision in the infrastructure bill just signed
3599 into law would establish a demonstration project for second-
3600 life applications of EV batteries -- aggregated energy
3601 storage installations on the grid. It is estimated that
3602 lithium ion battery packs in EVs may retain about 70 percent

3603 of their storage capacity at the end of the battery service
3604 life to the vehicle. Mr. Zindler, can you speak about how
3605 recycling EV batteries for use on the grid might complement
3606 the deployment of clean energy, particularly in a state like
3607 Texas?

3608 *Mr. Zindler. It is a good point, and it is a good
3609 question. So yes, we have started to see some of the
3610 recycling of some EVs to be used for storage.

3611 My understanding is it is a little less -- so what you
3612 might traditionally think of as on the grid, but in the so-
3613 called behind-the-meter sense. That is, in people's homes
3614 and businesses, where they want backup power in the case of
3615 outages. And I think there has been something like 40 or
3616 50,000 of these systems sold in California, in particular,
3617 because of all the outages they have had around wildfires.
3618 So the demand for residential storage is definitely growing,
3619 and there is a potential that these batteries can be used in
3620 that application.

3621 *Mr. Veasey. Thank you very much.

3622 Thank you, Mr. Chairman. My time has expired.

3623 *Mr. Tonko. [Presiding] The gentleman yields back. The
3624 chair now recognizes the gentleman from Indiana.

3625 Let's see, Mr. Pence, you are recognized for five
3626 minutes, please.

3627 *Mr. Pence. Okay. Thank you, Mr. Chairman. Thank you,

3628 Chairs Tonko and Rush, and Ranking Members McKinley and
3629 Upton, for holding this hearing today, and thank you all for
3630 being here. I found it very informative, just to be here and
3631 listen to what you all had to say.

3632 Mr. Pugliaresi, I know that you share my concern that
3633 Hoosiers and all Americans are struggling to keep pace with
3634 rising energy prices. That is really all I heard back last
3635 week, when I was out in the district. It is the number-one
3636 issue, the inflation and -- particularly having spent an
3637 entire career in the petroleum distribution industry, they
3638 put their price right out there, so everybody knows whether
3639 the price went up, and they are really getting out of
3640 control, and affecting manufacturers, transportation
3641 industry.

3642 I agree with you that the Biden Administration policies,
3643 such as a halt on oil and gas leasing on Federal lands,
3644 duplicative emission regulations, and the war on pipeline
3645 projects, such as the Keystone XL, have undermined our energy
3646 independence and contributed to a global energy crisis,
3647 because crude oil is an international product movement.

3648 While I support an all-of-the-above approach, like my
3649 peers have all talked about today, this hearing has only
3650 further proved that oil and gas remain necessary to maintain
3651 energy independence, particularly when we don't have the
3652 storage technology at this time to really move it forward in

3653 an expeditious way. And I hope my colleagues are listening
3654 to what a number of the folks have testified about today.

3655 You know, here is where I am going, sir. Innovation has
3656 been a hallmark of the petroleum industry ever since I -- my
3657 family was involved in it. And it -- should we just abandon
3658 support of the oil industry at this time, when they have
3659 shown so much improvement in the environment, in cleanups,
3660 and things like that?

3661 *Mr. Pugliaresi. So, you know, I think one way to look
3662 upon it is that these legacy fuels, particularly oil and gas,
3663 they provide -- they are extremely valuable. And we know
3664 that because they are -- they generate large sums of revenue
3665 directly to the Federal Government.

3666 You take our leasing system between 2005 and 2015. Over
3667 \$110 billion flowed directly to the Federal treasury. A lot
3668 of it was distributed back to the states. In that same
3669 period, we probably spent over \$50 billion for grants and
3670 production tax credits for wind and solar. I am not saying
3671 it is a bad idea, but I am saying this gives us a signal in
3672 the marketplace, in the valuation of this commodity within
3673 our system.

3674 We have a lot of extra economic value, if you like,
3675 showing up. It is because consumers want it, it has the
3676 characteristics that they need. And that is not the case yet
3677 for wind and solar. It is competitive. I am told it is

3678 competitive, but we will know more when we see the industry,
3679 the wind and solar industry, say, okay, let's give -- we
3680 don't need the tax credits any more, we don't need the
3681 production credits --

3682 *Mr. Pence. You are right, you are --

3683 *Mr. Pugliaresi. -- we are ready to bid on land values
3684 in the -- on public lands, just like the oil and gas
3685 industry.

3686 *Mr. Pence. Well, and not only the lease revenues of
3687 110 over a 5-year period, but also motor fuel taxes on a
3688 Federal level are about 51 billion a year, and you could at
3689 least double that for the impact between motor fuel for state
3690 taxes and then sales tax. And that is a lot of income that
3691 would disappear out of the system.

3692 But back to why would we not continue to support or
3693 enable the industry to innovate and improve technologically,
3694 like they have for so many years, is that something we are
3695 not talking about now?

3696 *Mr. Pugliaresi. Apparently not. But the real question
3697 is the pace at which we transition to these fuels of the
3698 future. And the most troubling aspect of a lot of policy
3699 discussions, and some policies, is that we are abandoning
3700 these high-valued fuels before we really have cost-effective
3701 substitutes. And that is a prescription for a lot of
3702 problems.

3703 *Mr. Pence. Yes, sir, and thank you for that. You
3704 know, I am really concerned about the average consumer in the
3705 Indiana district that I represent -- of course, across the
3706 State of Indiana. And I appreciate that we do figure out to
3707 do an all-of-the-above without hammering and doing it at the
3708 expense of the constituents that I represent.

3709 So thank you, Mr. Chair. I yield back.

3710 *Mr. Tonko. The gentleman yields back. The chair now
3711 recognizes the gentlelady from California.

3712 Representative Barragan, you are recognized for five
3713 minutes, please.

3714 *Ms. Barragan. Thank you, Chairman Tonko, for holding
3715 this important hearing on supply chain solutions for the
3716 clean energy economy. It is important that we work toward
3717 having a robust, clean energy supply chain that is not
3718 dependent on countries with poor labor and environmental
3719 standards, especially rivals like China.

3720 Mr. Zindler, this year we have seen the importance that
3721 ports and investing in ports and freight infrastructure has
3722 on keeping goods moving efficiently throughout our country.
3723 How are ports important for supporting our clean energy
3724 supply chain?

3725 And how can investing in domestic clean energy
3726 manufacturing create jobs that uplift ports and surrounding
3727 communities?

3728 *Mr. Zindler. I apologize, I had a little trouble
3729 hearing that. Could -- would you mind repeating the last --
3730 very quickly, just the last bit?

3731 *Ms. Barragan. So how are ports important for
3732 supporting our clean energy supply chain?

3733 And how can investing in domestic clean energy
3734 manufacturing create jobs that uplift ports and surrounding
3735 communities?

3736 *Mr. Zindler. Okay. So in the short run, ports are
3737 tremendously important. And one of the reasons we have seen
3738 a squeeze on pricing in the cost of solar equipment and other
3739 areas of clean energy is for the same reason we have seen
3740 around other things that are putting inflationary pressure
3741 on, which is that -- the ability to get stuff into the U.S.
3742 has been challenged.

3743 Longer term, I guess my honest answer would be that, if
3744 you build more domestic manufacturing, you wouldn't need to
3745 import as much. There is, of course, the potential that
3746 eventually the U.S. could export. But I think we are a long
3747 way from getting there.

3748 *Ms. Barragan. Okay, thank you for that.

3749 Ms. Brown, in December of 2020 a community labor
3750 coalition, including the United Steelworkers Local 675,
3751 joined with the electric bus manufacturer, Proterra, to
3752 announce a community benefits agreement to support union jobs

3753 in their manufacturing, with at least 50 percent from
3754 disadvantaged communities. This shows the promise of a clean
3755 energy economy that we are aspiring to.

3756 What policies can create the conditions for these types
3757 of community benefit agreements throughout the country for
3758 energy manufacturing?

3759 *Ms. Brown. Thank you for the question, Congresswoman.
3760 We are really proud of that, again, partnership. I keep
3761 using that word today, "partnership," between our union and
3762 Proterra and the community to achieve that community benefit
3763 partnership.

3764 You know, and I think it really goes back to tying
3765 really high-value standards to our policies. You know, we
3766 talked earlier about domestic content requirements, but tying
3767 labor standards to our policies also help to ensure these
3768 types of arrangements and agreements. And so that is really
3769 where we focus, is strengthening our policies by layering on
3770 stronger standards.

3771 *Ms. Barragan. Thank you.

3772 Mr. Switzer, there is a lot of untapped potential for
3773 recycling the critical minerals used in electric vehicles,
3774 both in production and when they reach the end of their
3775 useful life. What are the right requirements and incentives
3776 to ensure we are not burying critical minerals in landfills
3777 and scrap yards, given the need will be so great?

3778 *Dr. Switzer. Yes, thank you. I think, you know, I
3779 think, one, supporting the battery recycling industry as it
3780 stands up, and as it demonstrates that we can think of these
3781 batteries coming out of vehicles not as not as liabilities,
3782 but rather as actually assets that have value that can then
3783 be reused and manufactured into new battery materials.

3784 And to your question on ports, I would, you know, just
3785 second the comments around, as we stand up the recycling
3786 industry here in the U.S., and as we stand up the battery
3787 materials industry here, in the U.S., we will be less reliant
3788 on importing material. And I think that is critical, going
3789 forward.

3790 *Ms. Barragan. Well, thank you, and thank you to our
3791 witnesses today for being here.

3792 We have to look ahead, and we need to look at the
3793 future. And, you know, there has been just so much talk
3794 about, you know, worrying about concerns in other countries,
3795 not looking at the concern right here in our own backyard of
3796 what is happening to our communities that are either
3797 communities of color, low-income communities that are living
3798 next to these fossil fuel burning sites, the health impact it
3799 is having, and nobody is putting a value on human life, and
3800 what is happening in our communities. So I do thank the
3801 chairman for the hearing today, and we have got to make sure
3802 we continue to build on the infrastructure bill, and passing

3803 the Build Back Better.

3804 And with that, Mr. Chairman, I yield back.

3805 *Mr. Tonko. The gentlelady yields back. The chair now
3806 recognizes the gentleman from Alabama, Representative Palmer.
3807 You are recognized for five minutes, please.

3808 *Mr. Palmer. Thank you, Mr. Chairman. I want to talk a
3809 little bit about supply chain. And, obviously, our supply
3810 chain consists of rail, and truck, and shipping, airfreight,
3811 but it also consists of pipelines. I just want to know how
3812 much sense it makes to shut down Line 5 in Michigan, and
3813 potentially the pipeline into Missouri providing natural gas
3814 that, I think, originated from Mercatus -- not Mercatus, from
3815 the Marcellus shale formation.

3816 Does that make sense, Mr. Pugliaresi?

3817 *Mr. Pugliaresi. No, as we have discussed previously,
3818 there are enormous strategic and direct economic benefits
3819 from having the entire North American production platform as
3820 efficient and as cost effective and as safe as possible. And
3821 we lose those benefits when we try to make that platform less
3822 efficient.

3823 *Mr. Palmer. Let's talk about how it is going to impact
3824 people, though. A lot of what we discuss here is just kind
3825 of politics, and technical, and I am not sure if -- how many
3826 people really reflect on how it actually impacts people.

3827 But we are on pace to face the biggest surge in

3828 electricity costs since the Obama Administration, and it is a
3829 direct result of the Biden Administration's policies. And I
3830 kind of think that maybe they learned it from the Obama
3831 Administration, since he served as Vice President in that
3832 Administration. It is going to be the costliest winter on --
3833 in decades, I think, maybe, but certainly in years, for
3834 households that are not only going to be hit with high
3835 household utility bills, but they are going to get hit with
3836 much higher costs at the pump.

3837 As a matter of fact, there was a Canadian study that
3838 showed that, when you take into account gasoline prices plus
3839 the increase in household energy costs, that we are talking
3840 -- the bottom quintile, the lowest 20 percent of household
3841 incomes, paying almost 19 percent of their household income,
3842 just on energy. That is going to have a devastating impact
3843 on a lot of lives.

3844 And one of my big concerns -- and here is a study from
3845 Northwestern University Department of Economics on how
3846 inexpensive heating reduces winter mortality. And I brought
3847 this up in the committee before, and I have yet to hear from
3848 one of my colleagues across the aisle express the same
3849 concerns that I do about the number of people who are going
3850 to die this winter because they can't afford to adequately
3851 heat their homes. We know it is a scandal in Europe.

3852 Mr. Zindler mentioned all these nations that have gone

3853 to renewables, and I looked at the ones who have gone to
3854 solar and wind, and there is 30 nations that -- and most of
3855 them in Europe -- as a matter of fact, I think all of them
3856 are in Europe -- that are reporting excess winter deaths, and
3857 the United Kingdom is sixth. And they had 9,700 people die
3858 last winter because, you know, they had respiratory issues,
3859 they had cardiovascular issues, and that really, really hurt
3860 people when they can't afford to adequately heat their homes.

3861 Are you aware of that, Mr. Pugliaresi?

3862 *Mr. Pugliaresi. I don't have the recent data on the
3863 deaths, but let me just say, for large segments of the
3864 American population, rising energy prices are devastating,
3865 because it does become a large percentage of their income.

3866 We did a webinar on the Transportation Climate
3867 Initiative and, in fact, it was -- you know, sort of the
3868 Northeast states. And a primary concern from state
3869 legislators was, well, we are interested in this, but we
3870 don't want to see low-income families hurt.

3871 *Mr. Palmer. Well, it is really going to hurt people in
3872 the Northwest. I looked at Vermont, and the people in the
3873 lowest quintile, their average household income is less than
3874 \$28,000, 18.3 percent -- I mean, in that -- they pay 18.3
3875 percent of their total income. That is 7 times more than the
3876 people in the top 20 percent of household incomes in Vermont.
3877 This is going to have a devastating impact on people living

3878 in those colder climates.

3879 And I am going to get into some other stuff later on,
3880 but when you combine this with inflation that we are already
3881 experiencing, and the fact that energy costs are the most
3882 inflationary component of the economy, we are, literally,
3883 condemning some people to death. And I just think that there
3884 is a cost that is not being calculated here that, apparently,
3885 my colleagues across the aisle are not that concerned about,
3886 but I certainly am, and I am going to speak up for those
3887 people.

3888 With that, Mr. Chairman, I yield back.

3889 *Mr. Tonko. The gentleman yields back. The chair now
3890 recognizes the gentleman from Florida.

3891 Representative Soto, you are recognized for five
3892 minutes, please.

3893 *Mr. Soto. Thank you, Mr. Chair. The challenge.
3894 Climate change is an existential threat to the human race.
3895 In Florida we are facing intensifying hurricanes, rising
3896 seas, and the hottest years on record. But there is hope.

3897 The goal? Reduce greenhouse gases by 50 percent by
3898 2030, and get to net zero by 2050.

3899 The way we are going to do it? A hundred percent clean
3900 electricity by twenty-thirty-five.

3901 We are at 40 percent right now. Nuclear, 20 percent.
3902 Renewables, 20 percent. The fact that people are saying we

3903 can't get the other way with 60 percent -- yes, we can, and
3904 50 percent electric vehicles by 2030.

3905 And Congress is leading the way, with the Build Back
3906 Better infrastructure package, which has billions for
3907 electric vehicle infrastructure and clean energy. I want to
3908 thank both Representatives Upton and McKinley for joining the
3909 Senate, and making this a bipartisan bill.

3910 America must lead the way on this.

3911 And I also want to thank Representative Curtis for
3912 joining so many of the Democrats over at the COP. It shows
3913 that we can work together in a bipartisan fashion.

3914 There are other challenges expanding the clean energy
3915 supply chain, which is what we are here for today:
3916 microchips; rare Earth metals, which, by the way, we could
3917 utilize both coal and coal ash to develop rare Earth metals,
3918 a great way to help in this transition; we need to grow wind
3919 and solar by four times what we have right now; we need next
3920 generation batteries and modular nuclear; and yes, we need
3921 carbon capture, too.

3922 We also must acknowledge the pain suffered by so many of
3923 our constituents with rising gas prices. You know, in
3924 August, NPR had a headline. Hurricane Ida hit an important
3925 oil and gas hub in Louisiana, which will likely drive up gas
3926 prices. And that is exactly what happened. Climate change
3927 supercharged a hurricane that then incapacitated many of our

3928 refineries in Louisiana, causing rising gas prices. Climate
3929 change is helping cause this to happen. If we do nothing, it
3930 will happen again. It will get worse.

3931 And then inflation. A critical question and a critical
3932 quote. Senator Rob Portman said yesterday, when we were at
3933 the bipartisan infrastructure signing, that the bill
3934 represents long-term investments in our nation's hard
3935 infrastructure assets, create hundreds of thousands of jobs
3936 with the bill, make us more efficient and competitive against
3937 countries like China. It adds to the supply side of the
3938 economy, and will be counter-inflationary. It will be
3939 counter-inflationary at a time of rising inflation, and it
3940 does it all without raising taxes on the American economy.
3941 That is from the good Senator from Ohio, and I happen to
3942 agree with him.

3943 The rest, who voted no, put party over country, and the
3944 American people know it.

3945 Also missing from the talking points of today, we had an
3946 impressive 521,000 jobs in October. Unemployment is down to
3947 4.6 percent, and in Florida it is under 5 percent, as well.
3948 COVID cases are way down nationally, and children 5 to 11 can
3949 now be finally vaccinated. So what is the headline? In
3950 short, jobs are up, COVID cases are down, and children are
3951 safer.

3952 Improving the supply chains are part of this critical

3953 effort to combat climate change. So the big question for
3954 this committee: Can we work together, in a bipartisan
3955 fashion, to get this done? I know we can.

3956 Mr. Zindler, the solar supply chain currently relies
3957 heavily on other countries, including China, as we attempt to
3958 build a domestic solar manufacturing supply chain. What are
3959 the places we should target, and what parts of the supply
3960 chain are easier to support and establish leadership?

3961 *Mr. Zindler. Thanks for the question.

3962 The -- first, as I said in my testimony, the U.S.,
3963 essentially, at the moment, is a non-player in the production
3964 of crystalline silicon modules. And the easiest part of the
3965 value chain to address is the final assembly of those
3966 modules, which is, literally, putting them together. But
3967 that is a relatively low-value process, and can be kind of
3968 done anywhere.

3969 The real value is further upstream, when you look at the
3970 production of the cells, and the wafers, and even the
3971 polysilicon production all the way at -- near the beginning
3972 of the process. And so that is -- those are all areas which
3973 China is clearly leading in, and those are areas that could
3974 be supported further, and brought onto the U.S. shores with
3975 the right policies.

3976 *Mr. Soto. Thank you. My time has expired.

3977 *Mr. Tonko. The gentleman yields back. The chair now

3978 recognizes the gentleman from Texas.

3979 Representative Crenshaw, you are recognized for five
3980 minutes, please.

3981 *Mr. Crenshaw. Thank you, Mr. Chairman, and thank you
3982 to the chair and ranking member for holding this important
3983 hearing.

3984 I am going to state the obvious. To improve the so-
3985 called green supply chain, you first need to fix the actual
3986 supply chain. The former cannot exist without the latter,
3987 obviously.

3988 And this supply chain crisis didn't come out of nowhere.
3989 This is a self-inflicted wound, a direct result of bad
3990 progressive policies. Mandates to overregulation, the tax on
3991 American energy have compounded every single problem we are
3992 facing today, from record-high inflation, to slow economic
3993 growth, to shrinking labor force participation, and,
3994 potentially, an energy crisis.

3995 Policies have consequences. Locking down businesses,
3996 though shown to have little impact on the trends of the
3997 pandemic, had a huge impact on employment and economic growth
3998 and, yes, supply chains. A year later, we are still dealing
3999 with that.

4000 Vaccine mandates threaten to scare off employees in
4001 every industry, from logistics to ports to shipping. The
4002 head of the National Association of Wholesale Distributors

4003 put it this way: "Thousands of valued employees will be
4004 forced out of their jobs shortly before the holidays. The
4005 already compromised supply chain will be under added pressure
4006 during the busiest time of the year, and the already tight
4007 labor market will make it immeasurably more difficult to
4008 replace laid-off employees, compounding supply chain
4009 disruption."

4010 In California, where the bottleneck at our busiest port
4011 is exacerbating this crisis, their version of the PRO Act,
4012 which Democrats passed out of the House this year, and which
4013 bans independent contracting, threatens to destroy the
4014 trucking industry. Those truckers are freelance owner-
4015 operators, which California outlawed by banning independent
4016 contracting. Truckers sued California. But if they lose,
4017 their industry will be decimated in the midst of this supply
4018 chain crisis.

4019 It also seems as if President Biden is doing everything
4020 in his power to make energy less affordable and harder to
4021 come by. On day one President Biden shut down the Keystone
4022 Pipeline, of course while also asking OPEC to increase their
4023 production.

4024 The Democrat Party seems intent on nationalizing the
4025 failed energy policies of California, where the price of
4026 electricity has risen six times faster than the rest of the
4027 country. The attack on oil and gas has put a chilling effect

4028 on investments in new production to the benefit of global
4029 competitors like Russia.

4030 These policies impact the poorest Americans the worst.
4031 As energy prices rise, more Americans sink into poverty.
4032 Every 10 percent increase in energy costs leads to 840,000
4033 Americans falling below the poverty line.

4034 Now, instead of holding a hearing to examine how we can
4035 fix the supply chain crisis, deal with skyrocketing energy
4036 costs and unprecedented inflation, we are here to talk about
4037 the clean energy supply chain. And this strikes me as a bit
4038 of a joke, a joke because, in response to the worst supply
4039 chain crisis in our lifetime, the President has offered an
4040 executive order to move clean energy manufacturing back to
4041 the United States.

4042 Now, here is the problem. Every single component in
4043 wind turbines, and solar panels, and electric vehicle
4044 batteries is made with the raw materials that Democrats say
4045 are destroying the planet. So which is it? It seems to me
4046 that, when Democrats said they will create green jobs, they
4047 apparently mean green jobs in China, because they will never
4048 allow the rare Earth mining and refining and processing
4049 necessary to make those things here.

4050 Wind turbines are made with 75 percent steel, which is,
4051 at its most basic, iron core plus carbon. They are made with
4052 resin, which comes from natural gas. They are coated in

4053 chemicals like PFAS.

4054 The Democrats have made mining so politically toxic,
4055 that we now only have seven remaining iron ore mines in the
4056 United States, despite having three billion tons of iron ore
4057 in the United States.

4058 Democrats have turned natural gas into the enemy,
4059 threatening to tax it out of existence in the reconciliation
4060 bill, even though natural gas is the single largest reason
4061 for carbon emission reductions in the United States. Solar
4062 panels and batteries require critical minerals, but
4063 Democrats, even in the Build Back Better Act, impose
4064 staggering royalties on both new and existing hard rock
4065 mineral projects, despite the fact that these minerals are
4066 crucial to the Biden Administration's own clean energy goals.

4067 Even if we could build all of these new renewable power
4068 sources, we would need vast amounts of transmission lines
4069 and, therefore, copper to transport it. In fact, experts
4070 estimate copper demand will double by 2040. But guess what?
4071 The Democrat reconciliation bill specifically shuts down the
4072 Resolution Copper project in Arizona, which could supply up
4073 to 25 percent of domestic copper demand, and provide almost
4074 4,000 jobs.

4075 And can we please stop pretending that we can meet the
4076 demand for rare Earths by recycling more? The testimony
4077 presented here today has already debunked that false

4078 narrative, showing only a fraction of our needs could ever be
4079 met by recycling, not to mention separating and recycling
4080 rare Earth metals takes enormous amounts of heat, something
4081 impossible to produce with renewable energy.

4082 So my point is this: policies have consequences, and
4083 progressive policies are hurting Americans. We can fix this
4084 by giving businesses some breathing room, calling off the
4085 attacks on American energy, and rescinding unconstitutional
4086 vaccine mandates. But instead, we hear about the fantasy of
4087 green supply chains that can never be built, ironically,
4088 because of the barriers put in place by progressive policies.

4089 Thank you, and I yield back.

4090 *Mr. Tonko. The gentleman yields back. The chair now
4091 recognizes the gentleman from Arizona.

4092 Representative O'Halleran, you are recognized for five
4093 minutes, please, for questions.

4094 *Mr. O'Halleran. I want to thank the ranking members
4095 and the chairmen for this hearing.

4096 You know, it has been an interesting discussion today.
4097 But if we are going to move forward, we have to move away
4098 from these type of discussions and on to something that is
4099 more recognizing of the future of our country and our world,
4100 and where we are heading. Fear of change has a tremendously
4101 negative effect on our public policy. We have to change, we
4102 know we do.

4103 I have heard a lot in the discussions today about the
4104 concern for cost. I have that same concern. But it is also
4105 costly in health care today. It is also costly in addressing
4106 the -- and recognizing the ongoing -- the tremendous amount
4107 of natural disasters that are occurring in our world.

4108 Arizona has seen consequences of climate change, up
4109 close: record wildfires, terrible droughts, extreme
4110 flooding. These are all costly.

4111 Now, the best way we can cut carbon emissions is to
4112 encourage the development of clean energy. We should not be
4113 restraining innovation. We should be investing in the
4114 future.

4115 And we should also recognize that many, many lessons in
4116 history has identified clearly that protectionism is not the
4117 course to the future. Recognizing what we have done right is
4118 a good idea. Recognizing that we should not move into the
4119 future is a bad idea. And these investments in new American
4120 jobs and economic activity around the country are needed.
4121 However, bringing new energy sources online is not a simple
4122 switch. We should recognize that also.

4123 But we should plan for it. We should work together on
4124 this. We shouldn't have these types of discussions, where it
4125 is one side against the other side. We, as Americans, should
4126 learn from what our businesses, great businesses in America,
4127 have taught us: work together to find solutions that will

4128 work for the common good of the American people.

4129 I have heard the witnesses today. This transition
4130 requires a careful, long-term planning process that we must
4131 ensure that we are equipped to handle increased demand, and
4132 this means investments in grid modernization. That is what
4133 we are trying to do.

4134 And this also is a national security issue. We can't
4135 rely on China to build our nation's energy infrastructure.
4136 That is just the wrong way to go. We need reliable supply
4137 chains, and we need to recognize the need of the American
4138 people, their health, their safety, their future, the cost of
4139 energy in our country. We need to come together to do that,
4140 though.

4141 Dr. Switzer, securing our energy infrastructure remains
4142 a top priority. In our opinion -- your opinion, I should
4143 say, how would producing clean energy components in America
4144 help protect our energy infrastructure from attack, versus
4145 the current path of buying these components from other
4146 countries?

4147 *Dr. Switzer. Thank you for the question. I think, you
4148 know, investing and building out this battery supply chain
4149 here in the United States will serve several benefits.

4150 One is that it will provide stability. I think it will
4151 also provide supply chain security.

4152 Two is that I think we have to realize that these

4153 investments are happening, and they are going to happen
4154 elsewhere if we don't invest here in the U.S. They are going
4155 to happen not only in China, they are happening in Europe.
4156 They could easily also happen in Canada. I think there is a
4157 tremendous opportunity for us to leverage, and kind of be
4158 proactive in seeking to build that supply chain here, in the
4159 U.S.

4160 And then lastly, you know, along with this, I think we
4161 can't underestimate the number of jobs that come along with
4162 this industry that aren't necessarily tied to a particular
4163 resource that are almost location agnostic.

4164 So those are the reasons why I think it is very
4165 important for us to focus on building this supply chain here,
4166 in the U.S.

4167 *Mr. O'Halleran. Mr. Chairman, I am really concerned
4168 about the direction that we have taken in the past. Not this
4169 committee necessarily, but our country, as to hold back on
4170 recognizing the future, hold back on not creating the changes
4171 necessary, and try to protect the ongoing mistakes that we
4172 have made over time in not recognizing. Many corporations
4173 and businesses in this country have failed, because they have
4174 failed to adapt to an ever-changing environment, and that is
4175 what we live in, an ever-changing environment.

4176 And we need to make this change. We need to do it
4177 together. And we need to also recognize that we have wasted

4178 so much time that some of the reasons why we are in a
4179 position we are with China and other countries is because we
4180 have failed to act fast enough.

4181 Thank you, and I yield.

4182 *Mr. Tonko. The gentleman yields back. The chair now
4183 recognizes the gentleman from North Dakota.

4184 *Mr. Armstrong. Thank you --

4185 *Mr. Tonko. Representative Armstrong, you are
4186 recognized for five minutes.

4187 *Mr. Armstrong. Thank you, Mr. Chair.

4188 Technology and research R&D, we will support that. But
4189 if you think, when the government gets involved in picking
4190 and winners and losers we do a good job, we don't. We never
4191 have. It doesn't matter if it is in clean energy, or
4192 banking, or health care, or tech, or oil and gas, or anything
4193 else. So we need to be able to deal with this, and we need
4194 to be able to deal with the short-term problems and the long-
4195 term solutions.

4196 We can produce rare Earth metal here, we can mine it.
4197 We can produce more and more of these products that we use
4198 for renewable energy. But we can't get it done in the
4199 timelines that are being put out, and we can't do it done
4200 (sic), because we continue to have hearings, and will
4201 continue to move forward, but we don't talk about the
4202 barriers that exist.

4203 We talk about infrastructure build-out for batteries, or
4204 technology that is going to replace lithium for long-term
4205 storage. When that happens, that will rival the microchip as
4206 to what happens with our economy. I agree with that. But we
4207 are not there, and we don't know when it exists.

4208 And we don't have to go very far to look at how these
4209 things work. I will go on with what my friend, Mr. Crenshaw,
4210 said. We have been talking about the supply chain, our
4211 current supply chain and the issues we have with it, in my
4212 office since I got here. And actually, long before, in the
4213 state Senate. We are seeing today that ports along the West
4214 Coast is a problem years in the making that have only been
4215 exasperated by policies and programs pushed by the majority.
4216 Before we can consider the policies necessary to support
4217 massive expansion and build-out of supply chain specifically
4218 for renewables, we have to continue to face the problems we
4219 have in our current supply chain.

4220 And the first thing we need to understand is supply
4221 chains are not linear and independent, not, they never have
4222 been. A change in input or output at any other point in the
4223 process will cause distortions that quickly and easily spread
4224 to the other networks. We know this.

4225 North Dakota is the geographic center in North America,
4226 and we care very much about what happens at ports. Take
4227 trucking. Trucks haul more than 70 percent of our domestic

4228 cargo shipments. Companies, large and small, have been
4229 pleading for years to help address the fact that we cannot
4230 hire enough truck drivers to meet the ever-increasing demand.

4231 Making things worse are inflexible hours of service and
4232 other regulatory requirements that don't accurately reflect
4233 the needs of modern logistics. But don't worry, they don't
4234 make the roads any safer.

4235 Should we shoehorn massive new, renewable supply chains
4236 into a system that already has difficulty meeting current
4237 demands to move goods from point A to B?

4238 And the House majority's PRO Act only looks to further
4239 complicate this picture, particularly when you are trying to
4240 on-source things, and keep our costs low, at a reasonable
4241 level with an international community.

4242 Unless this Administration and the majority change
4243 course, our supply chains will be made less reliable, less
4244 affordable, and more prone to disruption in the short term.
4245 And we cannot solve our long-term problems if we don't take
4246 care of what is going on in the short term.

4247 Mr. Pugliaresi, your testimony states that financial
4248 data does not support the claim that oil and gas companies
4249 are holding stranded assets. Can you explain that?

4250 *Mr. Pugliaresi. Yes. So we have got a little help
4251 from Professor Tice with this one. But if you look at
4252 investment-grade bonds, particularly in the sort of oil and

4253 gas companies, the shape of those -- what we call the yield
4254 curve, it suggests that these are the most -- these tend to
4255 be the very, very conservative investors. The shape of the
4256 yield curve suggests that these assets are not viewed as
4257 risky.

4258 I will keep it as simple as possible, but I really think
4259 this is an important point, because you hear a lot of
4260 commentary that, oh, oil and gas assets are going to be
4261 stranded. Well, and they will be stranded if people are
4262 going to plan to stop using them. I accept that. But, in
4263 fact, what we learned from the bond market is that is not
4264 what the market believes. The market believes those assets
4265 are quite valuable.

4266 *Mr. Armstrong. Do you agree that the greater risk to
4267 secure and affordable energy and, thus -- I mean,
4268 essentially, our entire economy at this point in time -- are
4269 policy decisions that disincentivize capital allocation to
4270 traditional fuel supplies and production?

4271 *Mr. Pugliaresi. So I am really -- we are very much
4272 concerned about the ESG guidelines, which abdicate to
4273 financial institutions decisions about what prominent and
4274 valuable fuels they should invest in or not invest in.

4275 I actually think this is a risk for the financial
4276 companies, because they are going to own this. If this goes
4277 belly-up for them, and there is a crisis, and they -- and the

4278 sort of blame is on them, they are going to own this. And I
4279 really think this abdication by the government -- the
4280 government should set the standards for what kinds of
4281 environmental controls we are going to have or not have, and
4282 that the banks should be -- care about their shareholders.

4283 *Mr. Armstrong. Well, I actually agree with you. I
4284 think eventually what ends up happening with the ESG
4285 portfolios is very much that, where they end up making their
4286 money, and where they come back, because that is how the
4287 market will react to it.

4288 And with that I will yield back.

4289 *Mr. Tonko. The gentleman yields back. The chair now
4290 recognizes, virtually, the gentlelady from Washington State.

4291 Representative Schrier, you are recognized for five
4292 minutes for questions, please.

4293 *Ms. Schrier. Well, thank you so much, Mr. Chairman,
4294 and thank you to our witnesses. I have been listening
4295 attentively, because I am extremely interested in our
4296 transition to clean energy production and storage, and a
4297 broad rollout of electric vehicles. I am also interested in
4298 how we can make this transition to domestic sourcing and
4299 manufacturing truly work.

4300 And I look at the nations that are currently leading in
4301 mineral sourcing, and the production of solar panels and
4302 batteries, and an increasing reliance on those countries is

4303 not in our country's best interest, nor is it in the planet's
4304 best interest. And that is one of the reasons why the U.S.
4305 needs to take a leading role in sourcing and manufacturing
4306 for our own economy, for the environmental stewardship that
4307 we need, and also for ethical working conditions, so we can
4308 establish our leadership position in the world.

4309 Now, onshoring sourcing and manufacturing, it is going
4310 to create family-wage jobs. And by sourcing materials here
4311 and recycling them, we won't need to depend on dirty mining
4312 in China or child labor in Africa.

4313 Now, earlier in this hearing you answered Ms. DeGette's
4314 question about the necessity of mining here in the U.S., and
4315 you pretty much all agreed that it would be necessary to some
4316 degree or another. But even though mining is cleaner in the
4317 United States, minimizing the amount of mining that we need
4318 to do makes it even cleaner. And so, to minimize mining, we
4319 are going to need a robust recycling infrastructure of
4320 lithium, cobalt, copper, other elements, right here at home.

4321 And so, Dr. Switzer, I have some questions for you. I
4322 would love to dive into this topic a little bit more.

4323 First, just a lay of the land. Can you tell me what
4324 the current --

4325 [Audio malfunction.]

4326 *Ms. Schrier. -- for recycling of these materials,
4327 like, from phones, computers, solar panels, lithium

4328 batteries, televisions right here in the U.S.?

4329 *Dr. Switzer. Sure. So, you know, at Redwood
4330 Materials, I think I can highlight that we were founded in
4331 2017 and, you know, already today, it has been a period of
4332 rapid innovation. We are recycling enough materials for
4333 roughly 45,000 vehicles a year, and that is in short order.
4334 And I think, over time, we will continue to expand that.

4335 The key advantage of recycling is it is not something
4336 that is depleted over time, it is something that actually
4337 grows over time. So, as more vehicles are placed onto the
4338 market, that recycling resource only becomes greater and
4339 greater.

4340 You know, today we are able to recover, you know,
4341 roughly, let's say, in terms of the nickel, and cobalt,
4342 copper, and lithium, way greater than 90 percent. I would go
4343 upwards of 95 to 98 percent of those elements we can actually
4344 recover and reuse from the batteries.

4345 And that is not to mention --

4346 *Ms. Schrier. The --

4347 *Dr. Switzer. You know, another thing that was
4348 mentioned, just to highlight, was copper. Copper we actually
4349 export from the United States today. We export roughly
4350 800,000 tons of scrap copper from the United States today,
4351 when there is a drastic opportunity to build a copper foil
4352 manufacturing supply chain for batteries that consumes some

4353 of that copper we are giving away today.

4354 *Ms. Schrier. I really appreciate your noting the issue
4355 of copper, and how we are exporting it and shoring up other
4356 economies instead of our own.

4357 I also -- I am intrigued. You said earlier today that
4358 right now your capability is enough for 45,000 cars. You are
4359 looking at a capability of six million cars in the future. I
4360 guess the other question is, yes, you can extract 90 percent
4361 back. But what about -- how many of those batteries are
4362 coming back to you?

4363 How many -- I mean, how many of these things are ending
4364 up in a recycling facility, as opposed to in the trash?

4365 I just want to make sure we have the infrastructure
4366 everywhere, so that we consistently get 90 percent out.

4367 *Dr. Switzer. I think, in terms of EVs, we will
4368 certainly get the batteries back. I mean, these are -- you
4369 know, we are seeing OEMs like Ford take -- really, take
4370 interest in how to get those batteries back, because they
4371 recognize the inherent value in them.

4372 I think where the challenge comes is in consumer
4373 electronics. You know, today, if any of us have a cell phone
4374 or, you know, a laptop battery that we need to recycle, it is
4375 not easy to figure out what to do with it, where to take it,
4376 who to give it to. And it gets even more complicated when
4377 you talk about consumer electronics devices with batteries

4378 that aren't designed to be removed. Things like electric
4379 toothbrushes, you know, how do we recycle those?

4380 So those are some of the challenges that we are trying
4381 to tackle. And to highlight, though, is that we really do
4382 need to focus and build out that collection infrastructure,
4383 so that it is easy for folks to turn those batteries back in,
4384 so that we can recycle them and extract the valuable metals
4385 contained therein.

4386 *Ms. Schrier. I appreciate your saying that, because
4387 sometimes we have to pay to get them recycled, or wait for a
4388 big dropoff day in our neighborhood to get them recycled.
4389 And so I just know that, as a Member of Congress, I am
4390 excited to work with you and with the industry to make sure
4391 that it is easy, and that we can get all of that material
4392 back, and limit how much extraction we have to do here at
4393 home.

4394 Thank you very much, I yield back.

4395 *Mr. Tonko. The gentlelady yields back. I now
4396 recognize a member from the Subcommittee on Environment and
4397 Climate Change, virtually, being Representative Blunt
4398 Rochester.

4399 The gentlelady from Delaware, you are recognized for
4400 five minutes, please.

4401 *Ms. Blunt Rochester. Thank you, Mr. Chairman, and
4402 chairs, and ranking members, and to the witnesses for your

4403 testimony today and your patience.

4404 As the founder and co-chair of the bipartisan Future of
4405 Work Caucus, one of the areas I have been focusing on is what
4406 we can learn from the pandemic's ongoing impacts on our
4407 economy, and how we can build an economic future that is more
4408 resilient, sustainable, and equitable for all Americans.

4409 We are in the midst of a climate crisis, and the need to
4410 transition to clean energy has never been more necessary.
4411 Not only is this transition essential to protect human health
4412 and the environment, but it is also an enormous opportunity
4413 to strengthen our domestic supply chains and grow onshore,
4414 renewable energy manufacturing.

4415 Last month I introduced two bipartisan pieces of
4416 legislation with Representatives Malinowski and Kinzinger:
4417 H.R. 5495, the Building Resilient Supply Chains Act and H.R.
4418 5492, the Manufacturing Economy and National Security Act.
4419 These bills take crucial steps to stabilize our supply chains
4420 by providing financial support to develop, diversify, and
4421 expand our domestic supply chains.

4422 The Building Resilient Supply Chains Act would establish
4423 a supply chain resiliency and crisis response office within
4424 the Department of Commerce that would help address shortages
4425 of critical goods and services, industrial equipment, and
4426 manufacturing technologies.

4427 Mr. Zindler, why is it so important for the United

4428 States to invest in programs aimed at securing and fortifying
4429 our supply chains, especially for clean energy technologies?

4430 *Mr. Zindler. Well, to be honest with you, I am an
4431 energy industry analyst, not a policymaker, so that is really
4432 a decision for all of you to make.

4433 But I can just sort of tell you the facts, which is
4434 that, at the moment, that if, you know, the U.S., you know,
4435 is going to install roughly 30 gigawatts of solar capacity
4436 this year, and I am guessing 80/90 percent of it will be
4437 imported goods, so -- and that market is poised to grow, and
4438 so the question is whether or not U.S. policymakers are --
4439 that is something you want, or if that is something you would
4440 like to adjust.

4441 So the reality of it is that, for these strategic areas,
4442 you know, there is a lot of imported goods that are being
4443 installed every year.

4444 The one difference I would make is that, you know, once
4445 you do install the equipment, it is here. It is not like oil
4446 that you burn, and then it is gone. You know, you have the
4447 assets locally. You may have gotten them from abroad, but
4448 they end up here permanently.

4449 *Ms. Blunt Rochester. Thank you. And we appreciate
4450 your facts.

4451 Representatives Malinowski and Kinzinger and I took
4452 important steps in crafting this to try to stabilize our

4453 supply chains, while strengthening our national and economic
4454 security. And during the pandemic we saw those
4455 vulnerabilities. How can a heavy reliance on foreign goods
4456 pose a threat to our economic and national security?

4457 And how can a greater focus on onshoring clean energy
4458 supply chains support national security?

4459 *Mr. Zindler. Well, again, I would leave that to all of
4460 you, ultimately.

4461 But, you know, realistically, you know, having the
4462 closer access to the supplies strikes me as a good way to
4463 ensure that, if you need to continue to manufacture new
4464 automobiles that are electric, that you have that stuff
4465 locally, if you do everything from the mining to the
4466 refining, et cetera, here, domestically.

4467 But I would just caveat that slightly in saying that I
4468 know there has been a lot of talk about energy security and
4469 energy independence. To me, it is more about -- I guess
4470 security is probably the better term because, you know, we
4471 live in a big world, in which a lot of the most important
4472 energy components and elements we need are in other
4473 countries. But a number of those are our friends, and we
4474 shouldn't necessarily shut that off in an effort to just have
4475 domestic mining or manufacturing, for that matter.

4476 *Ms. Blunt Rochester. And I want to shift to Ms. Brown
4477 quickly.

4478 First of all, thank you so much for your testimony, and
4479 talking about the history of those kind of fits and starts
4480 and hopes for us moving in this direction. You mentioned --
4481 when Representative Rush was talking, you talked a little
4482 bit, as well, about those communities that historically have
4483 been left out. Can you talk about how they will benefit from
4484 or contribute to this transition?

4485 *Ms. Brown. Absolutely, and thank you for the question.
4486 You know, I think there was a -- with the infrastructure bill
4487 that was passed and signed into law yesterday, you know,
4488 there is a big climate and resiliency component of that bill.
4489 And a lot of equity actually was built into the crafting of
4490 that bill. And I think we will see some direct benefits in
4491 the way of transportation and, you know, making communities
4492 more resilient, and also investment in a lot of these
4493 communities, because there is money to drive specific
4494 investment to attract businesses to these areas.

4495 But I also go back to what I mentioned earlier, in terms
4496 of Black and Brown communities. The best economic engine and
4497 vehicle to getting to the middle class is a union job. And
4498 so, as we are building out the clean energy economy, we have
4499 got to make sure that those jobs are our union jobs.

4500 *Ms. Blunt Rochester. All right. Thank you so much.
4501 Thank you, Mr. Chairman, and I yield back.

4502 *Mr. Tonko. The gentlelady yields back, and I believe

4503 that concludes all of the members from either the -- either
4504 of the subcommittees.

4505 Oh, I am sorry. Virtually?

4506 Okay, virtually, we are joined by Representative Mullin
4507 from Oklahoma.

4508 *Mr. Mullin. Yes, sir.

4509 *Mr. Tonko. So, Representative, you are recognized for
4510 five minutes, please.

4511 *Mr. Mullin. Thank you, and I am sorry about jumping in
4512 here just real late, but, as you guys can understand, we are
4513 running back and forth.

4514 You know, I -- my question is pretty easy, I guess, and
4515 I have to follow it up with maybe some follow-up questions.
4516 But many people, you know, in this committee would like to
4517 see all the -- you know, all the fossil fuels done away with,
4518 as of yesterday. But can someone help explain how natural
4519 gas is a necessity, or is necessary as a bridge fuel for the
4520 transition?

4521 And I kind of leave that open for whoever wants to grab
4522 that question.

4523 *Mr. Zindler. I will jump in first, and just note that
4524 this great decarbonization we have seen of the power sector
4525 has been driven by two factors, which is renewables and by
4526 cheap natural gas. And the fracking revolution, or whatever
4527 you want to call it, the technological advances there have

4528 contributed enormously to moving us away from coal. We were
4529 40 percent of our power generation from coal just 10 years
4530 ago, and now we are down to about 20 percent. And gas has
4531 played an enormous role in decarbonizing the power sector.
4532 That is where we are today.

4533 The question is where do we go in the future, and
4534 whether or not you could continue to have that much gas on
4535 the system, and try and get to some kind of decarbonization
4536 goal, where you actually address the climate crisis.

4537 *Mr. Mullin. You know, well, it was 10 years ago where
4538 we were seeing natural gas as the clean energy. And when you
4539 start seeing what is happening in Germany, and as they are
4540 transitioning, you know, to renewables, you are seeing they
4541 also have an increase on their dependency on natural gas to
4542 offset it. Because the last time that I checked, we were
4543 really having a hard time figuring out how to store
4544 renewables, and be able to meet high-pitch demands when we
4545 are facing peak hours.

4546 For instance, in California, the reason why they have
4547 rolling blackouts is during peak hours you see that sometimes
4548 solar comes offline, especially in the valley. Solar will
4549 come offline around 7:00, 8:00 in the summer, when it is
4550 still 116 degrees, and people are at home, and there is no
4551 way to meet that demand if you don't have on-demand energy --
4552 for instance, natural gas or nuclear.

4553 So my question goes back. How do we make that
4554 transition without natural gas or nuclear still being part of
4555 the portfolio?

4556 *Mr. Pugliaresi. So maybe I could address this. You
4557 know, when you look at California, the so-called duck curve,
4558 we do not have anything else -- and when we use these
4559 intermittent fuel sources, or these intermittent
4560 technologies, when we -- when the sun goes down -- and
4561 sometimes it is combined with not just with losing the sun,
4562 but the wind -- you need dense, massive power to bring up the
4563 power system as the -- as we get into nighttime. And there
4564 is no alternative, other than natural gas or some other
4565 alternative fossil fuel.

4566 *Mr. Mullin. Right, right.

4567 *Mr. Pugliaresi. And until we have, at scale, these
4568 alternatives, this is what we are going to have to do.

4569 *Mr. Zindler. I want to jump in, because I also feel
4570 like there has been a kind of repeated mischaracterization of
4571 what has gone on in Germany.

4572 The reality in Germany is that they very quickly decided
4573 to close all their nuclear power plants. And that is what
4574 has created, in my view, the biggest squeeze on the market
4575 there, and the greater reliance on natural gas, and the
4576 higher power prices. It has certainly been -- they have
4577 pushed for renewables for years, but --

4578 *Mr. Mullin. Well, sir --

4579 *Mr. Zindler. In my view --

4580 *Mr. Mullin. Sir, reclaiming my time here --

4581 *Mr. Zindler. -- the ill-conceived idea about nuclear
4582 is --

4583 *Mr. Mullin. To reclaim my time here --

4584 *Mr. Zindler. -- really what triggered --

4585 *Mr. Mullin. -- when you start looking at what is
4586 happening, we are wanting to do away with nuclear, too. So
4587 if we are going to -- if we are trying to end nuclear, then
4588 you are going to have to have natural gas to fill that gap.

4589 And so we are running down the exact same path that
4590 Germany has, and we are running down it thinking that we are
4591 going to have a different result. And I don't see that
4592 happening. I see this being the definition of insanity.

4593 *Mr. Zindler. Sir, with respect, I agree with you that
4594 20 percent of our power is from nuclear energy, and that is
4595 zero carbon, and shutting that down would be madness if you
4596 want to address climate change.

4597 *Mr. Mullin. So do you think we should --

4598 *Mr. Zindler. But if you look at the -- could I -- just
4599 let me finish, please.

4600 *Mr. Mullin. Yes, but let me --

4601 *Mr. Zindler. The infrastructure bill --

4602 *Mr. Mullin. -- we should --

4603 *Mr. Zindler. -- \$6 billion to keep those nuclear
4604 reactors --

4605 *Mr. Mullin. Sir, hold on a second. Reclaiming my time
4606 here, I just want to get back to you. So and -- we are -- so
4607 let's find some common ground here.

4608 You agree with me on nuclear. So do you think we should
4609 increase our -- decrease our nuclear facilities, then, rather
4610 than shutting them down, like a lot of people on this
4611 committee is wanting to do?

4612 *Mr. Zindler. I think, like I said a moment ago,
4613 closing the existing nuclear reactors in the United States,
4614 if you want to achieve decarbonization, does not make any
4615 sense.

4616 *Mr. Mullin. Do you think we should open more?

4617 *Mr. Zindler. I think it is a technology that should be
4618 invested in.

4619 And again, if you look at the infrastructure bill, there
4620 are billions of dollars to support advanced nuclear reactors.

4621 *Mr. Mullin. I appreciate it. I yield back my time.
4622 Thank you.

4623 *Mr. Tonko. The gentleman yields back.

4624 Ms. Brown, I am informed, I believe, that you need to be
4625 released because of schedule.

4626 *Ms. Brown. Yes, I have a four-year-old who is not
4627 interested in supply chains, but is interested in me picking

4628 her up from school. So --

4629 *Mr. Tonko. Okay. Well, look, we have one more
4630 witness, and I am informed that he has no questions of you.
4631 So let me just thank you in advance for the insight you have
4632 provided, and for the value added you have expressed that the
4633 United Steelworkers will bring to the path going forward.

4634 *Ms. Brown. Thank you so much, Chairman.

4635 *Mr. Tonko. And thank you for your participation today.

4636 *Ms. Brown. Thank you, and thank you for generously
4637 excusing me. Thank you.

4638 *Mr. Tonko. Okay. All the best to the four-year-old.

4639 *Ms. Brown. Thank you.

4640 *Mr. Tonko. Now we will -- I believe all of the members
4641 of the Subcommittees on Environment and Climate Change and
4642 Energy have been recognized. And so now, waived on, we have
4643 the gentleman from Pennsylvania, Representative Doyle --
4644 Representative Joyce, excuse me.

4645 You are recognized for five minutes, please.

4646 *Mr. Joyce. First I want to thank you, Chairman Tonko
4647 and Chairman Rush, for allowing me to waive on to this joint
4648 subcommittee hearing today, and I want to thank the witnesses
4649 for appearing.

4650 As we have heard from many of my colleagues today,
4651 America is in the midst of an energy crisis of our own
4652 making. Just a year ago our nation was energy independent.

4653 And for the first time since 1952, America was a net energy
4654 exporter. Now the Biden Administration's policies have
4655 allowed American energy and the production of it to falter.
4656 And unfortunately, prices are skyrocketing. The President is
4657 even resorting to asking OPEC to increase production.

4658 On Monday morning, at my home in Pennsylvania, there was
4659 already snow on the ground. And this week the lows are in
4660 the twenties. Winter is coming, and my constituents need to
4661 heat their homes. To do that, they are paying 274 percent
4662 more for natural gas, and over 500 percent more for propane
4663 from just a year ago. Americans are now, literally, paying
4664 the price for the Biden Administration's failed energy
4665 policies.

4666 What Americans truly need is affordable and reliable
4667 baseload power. If my colleagues across the aisle are
4668 committed to clean energy, then we need to invest in clean
4669 diesel fuel, nuclear, and hydroelectric power. We need to
4670 invest in innovative technologies that take advantage of the
4671 energy reserves that are beneath our feet, so that we can
4672 keep our coal and our much-needed natural gas power lines
4673 online. We need to find incentives to industry to improve
4674 the grid, and develop greater efficiencies, instead of
4675 punishing them with taxes and penalties. We need to end the
4676 war on liquid fuels, and recognize the progress that is --
4677 that has been made and continues to be made on emission

4678 standards.

4679 Meanwhile, many of these new proclaimed green energy
4680 fixes to our economy are, in fact, harmful to the
4681 environment, though -- through their use of toxins and
4682 hazardous chemicals. For example, the batteries in electric
4683 vehicles are notoriously dangerous, and incredibly difficult
4684 to dispose of.

4685 Dr. Switzer, my first question is for you. Isn't it
4686 true that currently, even when fully discharged, electric
4687 vehicle batteries can still have enough electricity remaining
4688 in the battery to kill the workers that are handling them?

4689 *Dr. Switzer. Thank you for the question. I would say
4690 that, if it is fully discharged, then I think, theoretically,
4691 it has no electricity remaining. But I think we have also
4692 proven that you can scale and handle these batteries safely
4693 to recover the valuable elements contained inside.

4694 *Mr. Joyce. But the potential of a battery to say that
4695 it has been fully discharged, and thus have remaining
4696 electricity in it, could potentially harm the workers who are
4697 dealing with those batteries, correct?

4698 *Dr. Switzer. I think that there will be, of course,
4699 the need for safe -- for training on how to handle these
4700 batteries safely.

4701 *Mr. Joyce. And I think that safety is -- definitely
4702 needs to be addressed, given the danger in handling,

4703 transporting, and recycling electric vehicle batteries.

4704 How will recyclers be paid enough to cover the costs
4705 incurred as these batteries become more prolific in the scrap
4706 yards?

4707 *Dr. Switzer. I think we are working with more and more
4708 partners. But with scale I think we will tilt things one
4709 way.

4710 But I also think that the -- it is not necessarily -- we
4711 don't see it as that we have to be paid to recycle these
4712 batteries. You know, we see it, actually, quite the
4713 opposite, such that we will be returning value to the supply
4714 chain because of the value within the battery.

4715 *Mr. Tonko. Isn't there a potential of leaching
4716 hazardous chemicals from these batteries into our
4717 environment?

4718 *Dr. Switzer. I think, you know, there is potential, if
4719 done completely the wrong way, but I think what has been
4720 shown by us and by others is that it can actually be done
4721 very safely, and at very high yields.

4722 *Mr. Tonko. Lastly, there seem to be sufficient markets
4723 for electric vehicle batteries. How and when will these
4724 markets continue to develop?

4725 *Dr. Switzer. I think the markets -- I think what we
4726 will see is, as I mentioned before, is that these end-of-life
4727 electric vehicle batteries won't be viewed as liabilities,

4728 but rather as assets. And, you know, even as Redwood
4729 Materials -- we will, essentially, be competing with others,
4730 because they will see value in these, and they will be -- we
4731 will, essentially, be competing to return value to the supply
4732 chain, to get access to these batteries to recycle them.

4733 *Mr. Joyce. Currently, I see the value in the resources
4734 that are under the feet of my constituents. I see the
4735 importance of being able to maintain those energy sources to
4736 provide efficient and cost-effective ways for Americans to
4737 heat in this upcoming winter.

4738 First of all, thank you for your summary answers. And I
4739 secondly want to thank Chairman Rush and Chairman Tonko for
4740 allowing me to waive on to this important hearing. Thank
4741 you, and I yield back.

4742 *Mr. Tonko. You are most welcome, Representative Joyce.
4743 And that concludes, I believe, the list of colleagues who
4744 wanted to question our witnesses.

4745 Let me thank our witness panel. You have been great in
4746 providing insight and answering questions that will prove
4747 useful as we move forward with policy development. So I
4748 thank you kindly for all of that commitment, and your
4749 patience.

4750 I remind members that, pursuant to committee rules, they
4751 have 10 business days by which to submit additional questions
4752 for the record to be answered by our witnesses. And I ask

4753 only that our witnesses respond promptly to any such
4754 questions that you may receive.

4755 With that, before we adjourn, I have a request for
4756 unanimous consent to enter the following documents into the
4757 record: a letter from the MP Materials Corporation; we have
4758 a letter from the United States Nuclear Industry Council; we
4759 have a letter from the National Mining Association; we have a
4760 report from the Digital Climate Alliance; we have a report
4761 from the Center for American Progress entitled, "Creating a
4762 Domestic U.S. Supply Chain for Clean Energy Technology"; we
4763 have a report from the Center for Strategic and International
4764 Studies entitled, "Reshore, Reroute, and Rebalance: A U.S.
4765 Strategy for Clean Energy Supply Chains."

4766 I also have a request for a report from CSIS and
4767 BloombergNEF entitled, "Industrial Policy, Trade, and Clean
4768 Energy Supply Claims"; we have a letter from House Energy
4769 and Commerce Republican members to Chairman Pallone; we have
4770 an article from The Wall Street Journal entitled, "Germany's
4771 Economy, Once Europe's Engine, is Holding it Back"; we have
4772 a backgrounder from the Heritage Foundation, "The Need to
4773 Examine the Life Cycles of All Energy Sources: A Closer Look
4774 at Renewable Energy Disposal"; we also include an article
4775 from Greenwire entitled, "Low Pay, Abusive Conditions Rife at
4776 Congolese Cobalt Mines"; we have a report from the Manhattan
4777 Institute entitled, "Mines, Minerals, and Green Energy: A

4778 Reality Check.''

4779 I have a letter from Energy and Commerce Republican
4780 members to Secretary of Energy Jennifer Granholm; we have a
4781 letter from Secretary Granholm to Ranking Member McMorris
4782 Rodgers; and finally, an article from Yahoo Finance entitled,
4783 "UK Power Prices Soar Above £2,000 on Low Winds.''

4784 Without objection, so ordered.

4785 [The information follows:]

4786

4787 *****COMMITTEE INSERT*****

4788

4789 *Mr. Tonko. And with that, that brings to a conclusion
4790 our subcommittee's meeting and hearing. And with that, we
4791 adjourn.

4792 [Whereupon, at 2:52 p.m., the subcommittees were
4793 adjourned.]