



tl

Something to See Show

**REBECCA
NEUMANN, PH.D.**

**MEGAN
KILLEEN, M.A.**

1
00:00:25,269 --> 00:00:23,109

[Music]

2
00:00:28,390 --> 00:00:25,279

hello everyone this is martin willis and

3
00:00:30,310 --> 00:00:28,400

this is the everything else show uh this

4
00:00:33,190 --> 00:00:30,320

is where i selfishly talk about things

5
00:00:35,270 --> 00:00:33,200

that interest me and issues that i think

6
00:00:39,190 --> 00:00:35,280

are important which i think tonight is

7
00:00:40,950 --> 00:00:39,200

important um it's about climate change i

8
00:00:43,670 --> 00:00:40,960

i know i already got a comment in the

9
00:00:45,910 --> 00:00:43,680

message uh box already that climate

10
00:00:47,510 --> 00:00:45,920

change has happened forever yes we'll

11
00:00:48,470 --> 00:00:47,520

talk about that we'll talk about all

12
00:00:51,270 --> 00:00:48,480

sides

13
00:00:52,229 --> 00:00:51,280

and i have some wonderful ladies with me

14

00:00:54,549 --> 00:00:52,239

tonight

15

00:00:55,350 --> 00:00:54,559

one of them is a professor

16

00:00:57,590 --> 00:00:55,360

uh

17

00:01:00,150 --> 00:00:57,600

what i think i can call a professor yes

18

00:01:02,470 --> 00:01:00,160

rebecca newman how are you becca good

19

00:01:03,430 --> 00:01:02,480

you like to be called becca welcome yes

20

00:01:06,070 --> 00:01:03,440

thank you

21

00:01:07,030 --> 00:01:06,080

and we also have megan colleen

22

00:01:08,070 --> 00:01:07,040

welcome

23

00:01:12,070 --> 00:01:08,080

thank you

24

00:01:14,070 --> 00:01:12,080

this show i think it's i think it's a

25

00:01:17,350 --> 00:01:14,080

very important topic and right off the

26

00:01:20,230 --> 00:01:17,360

but um we might as well address what we

27

00:01:22,870 --> 00:01:20,240

we already had as uh as a comment let me

28

00:01:24,550 --> 00:01:22,880

get that up here um and

29

00:01:26,310 --> 00:01:24,560

that climate change has been around us

30

00:01:27,990 --> 00:01:26,320

since the start of time the world is

31

00:01:30,950 --> 00:01:28,000

seeing many changes

32

00:01:33,270 --> 00:01:30,960

so true it's a true

33

00:01:35,429 --> 00:01:33,280

statement we have i mean that's how this

34

00:01:38,069 --> 00:01:35,439

earth has developed we've you know over

35

00:01:40,710 --> 00:01:38,079

the four billion years we've been here

36

00:01:43,270 --> 00:01:40,720

um you know can you imagine what

37

00:01:45,429 --> 00:01:43,280

not very livable for a lot of it anyone

38

00:01:47,670 --> 00:01:45,439

want to um address that

39

00:01:51,350 --> 00:01:47,680

comment right off the bat

40

00:01:54,310 --> 00:01:51,360

sure um so that's true uh we have

41

00:01:56,310 --> 00:01:54,320

experienced some extraordinary uh

42

00:01:58,550 --> 00:01:56,320

temperature changes throughout earth's

43

00:02:00,630 --> 00:01:58,560

history and we have been around for a

44

00:02:03,510 --> 00:02:00,640

very long time this planet i mean this

45

00:02:06,709 --> 00:02:03,520

planet not we as people um but the issue

46

00:02:07,749 --> 00:02:06,719

really is the rate of change

47

00:02:09,830 --> 00:02:07,759

this

48

00:02:12,070 --> 00:02:09,840

fossil fuel driven the combustion of

49

00:02:13,990 --> 00:02:12,080

fossil fuels this industrial revolution

50

00:02:16,470 --> 00:02:14,000

this change driven by the industrial

51
00:02:17,750 --> 00:02:16,480
revolution has occurred orders of

52
00:02:20,630 --> 00:02:17,760
magnitude

53
00:02:23,430 --> 00:02:20,640
faster than nature has ever ever

54
00:02:25,990 --> 00:02:23,440
accomplished this change um we've done

55
00:02:26,869 --> 00:02:26,000
this in a couple hundred years about 300

56
00:02:27,670 --> 00:02:26,879
years

57
00:02:30,070 --> 00:02:27,680
um

58
00:02:32,630 --> 00:02:30,080
meanwhile it took earth tens of

59
00:02:35,190 --> 00:02:32,640
thousands to hundreds of thousands of

60
00:02:37,910 --> 00:02:35,200
years to go through glacial and

61
00:02:40,790 --> 00:02:37,920
interglacial periods and that gave all

62
00:02:44,070 --> 00:02:40,800
of the organisms on on earth time to

63
00:02:48,150 --> 00:02:44,080

adapt time to evolve time to adjust

64

00:02:49,270 --> 00:02:48,160

we bipedal um primates humans homo

65

00:02:50,949 --> 00:02:49,280

sapiens

66

00:02:52,949 --> 00:02:50,959

we've only been around for about two

67

00:02:55,110 --> 00:02:52,959

million years and the last three million

68

00:02:57,509 --> 00:02:55,120

years have been dominated by the glacial

69

00:02:59,030 --> 00:02:57,519

interglacial cycles

70

00:03:00,949 --> 00:02:59,040

that we

71

00:03:03,509 --> 00:03:00,959

know about because they happen most

72

00:03:04,710 --> 00:03:03,519

recently 20 000 years ago

73

00:03:07,990 --> 00:03:04,720

so we

74

00:03:11,430 --> 00:03:08,000

as a species are only

75

00:03:14,790 --> 00:03:11,440

adapted to live in a certain window of

76

00:03:15,750 --> 00:03:14,800

temperatures and we're skyrocketing

77

00:03:17,830 --> 00:03:15,760

to

78

00:03:19,509 --> 00:03:17,840

carbon dioxide levels not seen since the

79

00:03:21,910 --> 00:03:19,519

cretaceous period and that's when

80

00:03:25,030 --> 00:03:21,920

dinosaurs were roaming around so we are

81

00:03:26,869 --> 00:03:25,040

not adapted to live in conditions that

82

00:03:29,509 --> 00:03:26,879

we are careening toward very very

83

00:03:31,190 --> 00:03:29,519

rapidly in an exponential rate

84

00:03:33,910 --> 00:03:31,200

right what they call the hockey stick

85

00:03:36,070 --> 00:03:33,920

anything you want to add to that becca

86

00:03:39,750 --> 00:03:36,080

um yeah i guess i would just try to

87

00:03:41,589 --> 00:03:39,760

re-emphasize that point you know that um

88

00:03:43,830 --> 00:03:41,599

there are natural climate change and

89

00:03:46,470 --> 00:03:43,840

natural climate cycles but we need to

90

00:03:49,110 --> 00:03:46,480

focus on you know making the earth

91

00:03:50,789 --> 00:03:49,120

someplace where we as humans can live

92

00:03:53,030 --> 00:03:50,799

and thrive and

93

00:03:54,550 --> 00:03:53,040

you know um have healthy productive

94

00:03:56,309 --> 00:03:54,560

lives and

95

00:03:58,470 --> 00:03:56,319

you know the

96

00:04:01,429 --> 00:03:58,480

climate change that we are causing

97

00:04:03,190 --> 00:04:01,439

through our actions is pushing us into a

98

00:04:05,830 --> 00:04:03,200

space where we aren't going to be able

99

00:04:07,350 --> 00:04:05,840

to live the type of life that

100

00:04:10,470 --> 00:04:07,360

we're used to living

101

00:04:11,990 --> 00:04:10,480

and it is also a result of our actions

102

00:04:15,509 --> 00:04:12,000

so it's also something that we can

103

00:04:17,349 --> 00:04:15,519

change you know the the big large cycles

104

00:04:19,509 --> 00:04:17,359

that mother nature

105

00:04:21,670 --> 00:04:19,519

is going through on these long geologic

106

00:04:23,909 --> 00:04:21,680

time scales we don't control that right

107

00:04:26,070 --> 00:04:23,919

but we do control the emission of carbon

108

00:04:29,350 --> 00:04:26,080

dioxide into the atmosphere

109

00:04:31,830 --> 00:04:29,360

and it's been concretely

110

00:04:33,670 --> 00:04:31,840

and indisputably linked to

111

00:04:35,110 --> 00:04:33,680

this climate warming that we're going

112

00:04:37,590 --> 00:04:35,120

through right now

113

00:04:41,270 --> 00:04:37,600

now when we had this that we had just

114

00:04:43,909 --> 00:04:41,280

like last year we had the short break of

115

00:04:45,990 --> 00:04:43,919

when we were locked down and

116

00:04:47,590 --> 00:04:46,000

there was no flights for a while and

117

00:04:49,110 --> 00:04:47,600

people were saying oh my god i can see

118

00:04:51,270 --> 00:04:49,120

the mountains i've never saw the

119

00:04:53,830 --> 00:04:51,280

mountains and did that

120

00:04:55,749 --> 00:04:53,840

make any change at all i mean is that

121

00:04:58,150 --> 00:04:55,759

was that just such a brief time that it

122

00:05:00,950 --> 00:04:58,160

didn't really matter it was kind of a

123

00:05:03,430 --> 00:05:00,960

blip really um and it was really good

124

00:05:06,150 --> 00:05:03,440

for local air quality and uh but like

125

00:05:07,749 --> 00:05:06,160

the decrease in emissions was like fewer

126

00:05:10,550 --> 00:05:07,759

i don't even think it was ten percent it

127

00:05:13,029 --> 00:05:10,560

was like uh in the single digits percent

128

00:05:13,909 --> 00:05:13,039

decrease in emissions so

129

00:05:16,870 --> 00:05:13,919

um

130

00:05:18,790 --> 00:05:16,880

that's actually worth mentioning is that

131

00:05:21,830 --> 00:05:18,800

like it's not really just up to

132

00:05:24,230 --> 00:05:21,840

individuals like we we could completely

133

00:05:26,469 --> 00:05:24,240

reduce our personal consumption as an

134

00:05:28,469 --> 00:05:26,479

individual down to practically nothing

135

00:05:30,950 --> 00:05:28,479

but we need to work together as a

136

00:05:33,350 --> 00:05:30,960

society to make big structural changes

137

00:05:36,629 --> 00:05:33,360

that we can't achieve as

138

00:05:39,270 --> 00:05:36,639

as one person or as a handful of people

139

00:05:41,749 --> 00:05:39,280

um and that includes big projects like

140

00:05:43,430 --> 00:05:41,759

decarbonizing our energy grid like that

141

00:05:46,070 --> 00:05:43,440

is that is up to

142

00:05:48,710 --> 00:05:46,080

the nation to the governments and to

143

00:05:50,790 --> 00:05:48,720

corporations working in unity working

144

00:05:53,270 --> 00:05:50,800

together toward a shared goal of

145

00:05:54,390 --> 00:05:53,280

decarbonizing our electrical grid and

146

00:05:56,629 --> 00:05:54,400

keeping

147

00:05:59,029 --> 00:05:56,639

oil and natural gas and coal in the

148

00:06:00,950 --> 00:05:59,039

ground and find alternate

149

00:06:03,749 --> 00:06:00,960

sources of energy it's it's not up to

150

00:06:06,150 --> 00:06:03,759

the individual and we're all partly

151
00:06:08,309 --> 00:06:06,160
culpable living in the system like i

152
00:06:10,150 --> 00:06:08,319
just flew home you know last year for my

153
00:06:12,469 --> 00:06:10,160
sister's wedding so like that put you

154
00:06:15,029 --> 00:06:12,479
know a ton or two i guess

155
00:06:18,150 --> 00:06:15,039
i i i slightly disagree with that like

156
00:06:22,070 --> 00:06:18,160
so i 100 agree that we need um

157
00:06:24,469 --> 00:06:22,080
structural change but i also believe in

158
00:06:27,510 --> 00:06:24,479
in the idea that

159
00:06:30,150 --> 00:06:27,520
you know okay my carbon footprint is

160
00:06:32,070 --> 00:06:30,160
this you know drop in a much larger

161
00:06:34,870 --> 00:06:32,080
bucket right it i think of it like

162
00:06:37,510 --> 00:06:34,880
voting right when you go out to vote

163
00:06:39,830 --> 00:06:37,520

you think oh my individual vote doesn't

164

00:06:42,710 --> 00:06:39,840

matter right but you get enough

165

00:06:44,150 --> 00:06:42,720

individuals voting and suddenly you have

166

00:06:46,950 --> 00:06:44,160

millions

167

00:06:49,029 --> 00:06:46,960

of people casting ballots and if every

168

00:06:50,710 --> 00:06:49,039

mill if all those million individuals

169

00:06:52,390 --> 00:06:50,720

decided that it didn't matter they

170

00:06:54,390 --> 00:06:52,400

shouldn't go to the polls

171

00:06:56,550 --> 00:06:54,400

right then the outcome is really

172

00:06:59,909 --> 00:06:56,560

different and so i strongly think that

173

00:07:01,430 --> 00:06:59,919

like as individuals we can take personal

174

00:07:03,909 --> 00:07:01,440

action and

175

00:07:06,469 --> 00:07:03,919

recognize that like

176

00:07:08,629 --> 00:07:06,479

we are that drop in the bucket but if we

177

00:07:11,589 --> 00:07:08,639

talk about that and

178

00:07:14,309 --> 00:07:11,599

and you know connect and have like this

179

00:07:15,670 --> 00:07:14,319

larger ripple effect then

180

00:07:18,070 --> 00:07:15,680

you know it's like

181

00:07:19,749 --> 00:07:18,080

yeah it's like the individual

182

00:07:21,350 --> 00:07:19,759

if we all just throw up our hands and

183

00:07:22,870 --> 00:07:21,360

say i can't do anything i mean

184

00:07:24,950 --> 00:07:22,880

ultimately

185

00:07:27,110 --> 00:07:24,960

the carbon is the sum of all of our

186

00:07:29,110 --> 00:07:27,120

actions and and i actually took kind of

187

00:07:31,510 --> 00:07:29,120

a different takeaway from the shutdown

188

00:07:36,710 --> 00:07:31,520

like

189

00:07:38,950 --> 00:07:36,720

yes okay we we

190

00:07:40,950 --> 00:07:38,960

but we did have an impact on emissions

191

00:07:43,110 --> 00:07:40,960

right like it showed that

192

00:07:45,430 --> 00:07:43,120

if we choose to fly less they're gonna

193

00:07:47,749 --> 00:07:45,440

fly fewer airplanes right if we make

194

00:07:49,670 --> 00:07:47,759

these choices there's gonna be responses

195

00:07:50,629 --> 00:07:49,680

in the system um

196

00:07:54,950 --> 00:07:50,639

so

197

00:07:57,110 --> 00:07:54,960

in the chat already here and here's

198

00:07:58,550 --> 00:07:57,120

here's a good one here nope i used

199

00:08:00,710 --> 00:07:58,560

google earth and checked multiple

200

00:08:02,710 --> 00:08:00,720

shorelines and not a single one has

201
00:08:04,550 --> 00:08:02,720
changed in the past 50 years

202
00:08:06,629 --> 00:08:04,560
i didn't know google earth was 50 years

203
00:08:08,070 --> 00:08:06,639
old did you

204
00:08:10,230 --> 00:08:08,080
no listen

205
00:08:12,230 --> 00:08:10,240
these people that are in denial i'm

206
00:08:15,189 --> 00:08:12,240
sorry um

207
00:08:17,830 --> 00:08:15,199
we literally did not have okay we didn't

208
00:08:19,990 --> 00:08:17,840
have satellites to okay but

209
00:08:23,270 --> 00:08:20,000
anyway um

210
00:08:26,550 --> 00:08:23,280
these people i understand denial and

211
00:08:28,790 --> 00:08:26,560
denial is based on fear and all that but

212
00:08:29,990 --> 00:08:28,800
there is something happening and we're

213
00:08:32,469 --> 00:08:30,000

causing it

214

00:08:35,110 --> 00:08:32,479

um there's no denying it i mean look at

215

00:08:37,350 --> 00:08:35,120

our weather our weather for one and

216

00:08:39,029 --> 00:08:37,360

um you know i mean

217

00:08:41,750 --> 00:08:39,039

think of all the things that have

218

00:08:43,589 --> 00:08:41,760

changed in just the what is it at one

219

00:08:44,949 --> 00:08:43,599

degree temperature rise something like

220

00:08:47,910 --> 00:08:44,959

that

221

00:08:50,630 --> 00:08:47,920

celsius um

222

00:08:53,590 --> 00:08:50,640

we've had uh i've never even heard of

223

00:08:56,230 --> 00:08:53,600

fire nato's until now but the wildfires

224

00:08:58,870 --> 00:08:56,240

have increased beetle kill

225

00:09:00,710 --> 00:08:58,880

uh they call it mutant weather changes i

226
00:09:02,470 --> 00:09:00,720
mean these are things we're all going to

227
00:09:03,509 --> 00:09:02,480
be involved in we're all going to have

228
00:09:05,829 --> 00:09:03,519
these

229
00:09:07,110 --> 00:09:05,839
floods droughts if we don't do anything

230
00:09:09,190 --> 00:09:07,120
about this

231
00:09:12,230 --> 00:09:09,200
well uh i'll i'll just say i do agree

232
00:09:13,990 --> 00:09:12,240
with you um becca that we absolutely

233
00:09:15,910 --> 00:09:14,000
individuals do have a choice we can eat

234
00:09:17,750 --> 00:09:15,920
less meat we can fly less like there are

235
00:09:19,750 --> 00:09:17,760
lots of things that we can take agency

236
00:09:22,230 --> 00:09:19,760
over i was just trying to get more at

237
00:09:25,350 --> 00:09:22,240
the like no one person is responsible

238
00:09:28,230 --> 00:09:25,360

for climate change it is like all right

239

00:09:30,310 --> 00:09:28,240

the summation of all of us um we are in

240

00:09:32,630 --> 00:09:30,320

a system that's designed a certain you

241

00:09:34,790 --> 00:09:32,640

know to yeah like have us be burning

242

00:09:36,630 --> 00:09:34,800

fossil fuels but like for us to survive

243

00:09:38,630 --> 00:09:36,640

this extreme weather we do need

244

00:09:40,710 --> 00:09:38,640

infrastructure that's better adapted to

245

00:09:43,030 --> 00:09:40,720

it and more prepared and that's going to

246

00:09:44,870 --> 00:09:43,040

take collaborative effort to

247

00:09:47,110 --> 00:09:44,880

care for the most people

248

00:09:49,430 --> 00:09:47,120

under extreme situations that will

249

00:09:51,350 --> 00:09:49,440

become more frequent and more severe um

250

00:09:53,829 --> 00:09:51,360

so i think there are a lot of like

251
00:09:55,590 --> 00:09:53,839
weak points that could be strengthened

252
00:09:56,550 --> 00:09:55,600
right our armor is not as strong as it

253
00:09:57,430 --> 00:09:56,560
could be

254
00:09:58,550 --> 00:09:57,440
um

255
00:10:06,150 --> 00:09:58,560
and

256
00:10:08,470 --> 00:10:06,160
it's re it's real it's scary uh we had

257
00:10:10,389 --> 00:10:08,480
half a million acres burned just in my

258
00:10:12,630 --> 00:10:10,399
county um

259
00:10:15,030 --> 00:10:12,640
which is huge you know like

260
00:10:17,590 --> 00:10:15,040
and that's a combination of factors like

261
00:10:19,269 --> 00:10:17,600
climate changes and the ignition you

262
00:10:20,470 --> 00:10:19,279
need like a spark like a lightning

263
00:10:21,350 --> 00:10:20,480

strike or

264

00:10:23,269 --> 00:10:21,360

um

265

00:10:25,509 --> 00:10:23,279

you know a cigarette butt or something

266

00:10:26,550 --> 00:10:25,519

to like start the fire but climate

267

00:10:29,670 --> 00:10:26,560

change is

268

00:10:31,990 --> 00:10:29,680

is drying out vegetation and soils

269

00:10:34,310 --> 00:10:32,000

because it's so hot that means that the

270

00:10:35,590 --> 00:10:34,320

flux of moisture out of the soils and

271

00:10:37,509 --> 00:10:35,600

vegetation

272

00:10:39,509 --> 00:10:37,519

is much greater

273

00:10:41,590 --> 00:10:39,519

so the flux of evaporation is much

274

00:10:44,710 --> 00:10:41,600

greater than precipitation at least in

275

00:10:46,630 --> 00:10:44,720

the arid west and so that's making

276

00:10:50,150 --> 00:10:46,640

these overgrown

277

00:10:51,509 --> 00:10:50,160

poorly managed um forests that that

278

00:10:53,670 --> 00:10:51,519

suffered from just suppression

279

00:10:56,550 --> 00:10:53,680

suppression only tactics

280

00:10:59,030 --> 00:10:56,560

through um the us forest services

281

00:11:01,430 --> 00:10:59,040

efforts for the last hundred years or so

282

00:11:03,670 --> 00:11:01,440

they're primed to just light up like

283

00:11:06,790 --> 00:11:03,680

torches they're super dry

284

00:11:08,630 --> 00:11:06,800

they're overgrown um so it's not just

285

00:11:09,990 --> 00:11:08,640

like climate change is the only reason

286

00:11:12,710 --> 00:11:10,000

we're having these

287

00:11:16,230 --> 00:11:12,720

extraordinary devastating fires it's a

288

00:11:17,509 --> 00:11:16,240

lot of other factors rolled into one um

289

00:11:19,350 --> 00:11:17,519

but yeah no

290

00:11:21,829 --> 00:11:19,360

no place is safe really i mean you've

291

00:11:23,350 --> 00:11:21,839

got like devastating flooding happening

292

00:11:26,630 --> 00:11:23,360

um in the more

293

00:11:28,630 --> 00:11:26,640

wet humid um eastern side of the united

294

00:11:29,509 --> 00:11:28,640

states and those are

295

00:11:30,550 --> 00:11:29,519

i mean

296

00:11:35,509 --> 00:11:30,560

just

297

00:11:37,110 --> 00:11:35,519

like more precipitation than you could

298

00:11:39,750 --> 00:11:37,120

even believe coming out of the sky in a

299

00:11:41,670 --> 00:11:39,760

short amount of time so um

300

00:11:44,150 --> 00:11:41,680

climate change is really speeding up the

301
00:11:45,509 --> 00:11:44,160
hydrological cycle really intensifying

302
00:11:47,350 --> 00:11:45,519
it um

303
00:11:49,269 --> 00:11:47,360
really uh

304
00:11:51,190 --> 00:11:49,279
fire areas are going to get drier and

305
00:11:53,269 --> 00:11:51,200
wetter areas are going to get wetter

306
00:11:55,110 --> 00:11:53,279
yeah is and

307
00:11:57,430 --> 00:11:55,120
is it true that like the

308
00:11:58,710 --> 00:11:57,440
equator is really they're gonna really

309
00:11:59,509 --> 00:11:58,720
be suffering

310
00:12:01,190 --> 00:11:59,519
from

311
00:12:03,509 --> 00:12:01,200
drought most likely

312
00:12:05,190 --> 00:12:03,519
in general

313
00:12:07,509 --> 00:12:05,200

they're gonna be suffering from extreme

314

00:12:10,629 --> 00:12:07,519

heat um and we talked about

315

00:12:13,030 --> 00:12:10,639

briefly uh earlier the wet bulb

316

00:12:15,110 --> 00:12:13,040

temperature um so the equator is really

317

00:12:17,269 --> 00:12:15,120

humid right that's where like you have

318

00:12:19,190 --> 00:12:17,279

tropical rainforests they create their

319

00:12:20,710 --> 00:12:19,200

own clouds um

320

00:12:22,870 --> 00:12:20,720

so there's a lot of moisture there but

321

00:12:25,350 --> 00:12:22,880

it's also

322

00:12:26,870 --> 00:12:25,360

because earth is round and i'm gonna get

323

00:12:29,269 --> 00:12:26,880

some flat earthers yelling at me in the

324

00:12:30,790 --> 00:12:29,279

comments but because earth is round the

325

00:12:33,430 --> 00:12:30,800

equator is

326

00:12:36,230 --> 00:12:33,440

the most direct angle to the sun it's

327

00:12:38,150 --> 00:12:36,240

getting the full force of all the watts

328

00:12:41,190 --> 00:12:38,160

of power coming from the sun right

329

00:12:44,069 --> 00:12:41,200

directly on it at a direct angle and so

330

00:12:45,670 --> 00:12:44,079

this combination of humidity and extreme

331

00:12:48,150 --> 00:12:45,680

heat um

332

00:12:50,230 --> 00:12:48,160

because i guess i'll say briefly like

333

00:12:52,069 --> 00:12:50,240

the atmosphere is a blanket and carbon

334

00:12:53,509 --> 00:12:52,079

dioxide are feathers so we're sticking

335

00:12:55,190 --> 00:12:53,519

more feathers into the blanket we're

336

00:12:57,350 --> 00:12:55,200

holding more heat against the surface of

337

00:13:00,069 --> 00:12:57,360

the earth so

338

00:13:01,190 --> 00:13:00,079

between this heating that's caused due

339

00:13:03,910 --> 00:13:01,200

to

340

00:13:06,870 --> 00:13:03,920

carbon dioxide keeping this heat tucked

341

00:13:09,829 --> 00:13:06,880

up against us and the humidity

342

00:13:11,269 --> 00:13:09,839

it's becoming unlivable so

343

00:13:13,910 --> 00:13:11,279

human beings

344

00:13:16,710 --> 00:13:13,920

can't withstand a wide range of

345

00:13:18,470 --> 00:13:16,720

temperatures um if our internal

346

00:13:20,069 --> 00:13:18,480

temperature reaches 105 degrees

347

00:13:23,750 --> 00:13:20,079

fahrenheit we die it's called

348

00:13:25,509 --> 00:13:23,760

hypothermia um just as if we were to

349

00:13:28,710 --> 00:13:25,519

have our core temperature drop to the

350

00:13:31,269 --> 00:13:28,720

low 90s or upper 80s fahrenheit we would

351

00:13:33,790 --> 00:13:31,279

die of hyper hype

352

00:13:37,350 --> 00:13:33,800

so hypothermia i'm sorry it's cold

353

00:13:39,269 --> 00:13:37,360

hyperthermia is heat we we can't survive

354

00:13:41,829 --> 00:13:39,279

these temperatures and so

355

00:13:43,430 --> 00:13:41,839

um you know people at the equator would

356

00:13:45,590 --> 00:13:43,440

cool themselves through evaporative

357

00:13:47,990 --> 00:13:45,600

cooling through sweating but because

358

00:13:50,230 --> 00:13:48,000

it's so humid the air cannot take any

359

00:13:52,790 --> 00:13:50,240

more moisture it can't wick any more

360

00:13:55,110 --> 00:13:52,800

moisture after off their skin

361

00:13:58,710 --> 00:13:55,120

because it's already saturated

362

00:14:01,990 --> 00:13:58,720

so you know it becomes easier to

363

00:14:03,670 --> 00:14:02,000

die of hyperthermia of heat when it's

364

00:14:05,350 --> 00:14:03,680

extremely humid because you have no

365

00:14:06,629 --> 00:14:05,360

evaporative cooling available to you

366

00:14:08,389 --> 00:14:06,639

anymore so

367

00:14:10,470 --> 00:14:08,399

um you know that's why we see people

368

00:14:13,189 --> 00:14:10,480

migrating away from the equator is

369

00:14:16,470 --> 00:14:13,199

because it's too dang high it really is

370

00:14:18,470 --> 00:14:16,480

it's not conducive to human life i think

371

00:14:20,389 --> 00:14:18,480

also they've shown that those warm

372

00:14:22,870 --> 00:14:20,399

temperatures um are going to make it

373

00:14:25,350 --> 00:14:22,880

really difficult to grow food

374

00:14:26,389 --> 00:14:25,360

like also plants

375

00:14:28,470 --> 00:14:26,399

crops

376

00:14:30,550 --> 00:14:28,480

they have specific temperature ranges

377

00:14:32,470 --> 00:14:30,560

that they need to operate in in order to

378

00:14:35,110 --> 00:14:32,480

grow food and so i think it's been

379

00:14:36,790 --> 00:14:35,120

pretty clearly shown that the equator in

380

00:14:37,750 --> 00:14:36,800

particular those temperatures are going

381

00:14:39,189 --> 00:14:37,760

to get

382

00:14:40,550 --> 00:14:39,199

up into

383

00:14:41,829 --> 00:14:40,560

um

384

00:14:44,069 --> 00:14:41,839

yeah they're going to get warm enough

385

00:14:46,150 --> 00:14:44,079

that it becomes very difficult to to

386

00:14:48,310 --> 00:14:46,160

actually grow food and continue living

387

00:14:50,310 --> 00:14:48,320

in that part of the world

388

00:14:52,629 --> 00:14:50,320

um i think we just i just want to get

389

00:14:55,030 --> 00:14:52,639

this part over with because this and i

390

00:14:56,870 --> 00:14:55,040

don't want to boot this guy out but i'm

391

00:14:59,269 --> 00:14:56,880

i'm close to it

392

00:15:01,829 --> 00:14:59,279

uh what about sea level rise let's let's

393

00:15:03,509 --> 00:15:01,839

discuss that so we can get him to calm

394

00:15:05,590 --> 00:15:03,519

down a little bit because

395

00:15:08,310 --> 00:15:05,600

um the shorelines haven't changed

396

00:15:10,629 --> 00:15:08,320

according to him in the world now i know

397

00:15:11,670 --> 00:15:10,639

i watched uh a video up in alaska where

398

00:15:13,829 --> 00:15:11,680

they're having

399

00:15:15,670 --> 00:15:13,839

you know a terrible time the short the

400

00:15:17,509 --> 00:15:15,680

shores eroding away and they they can't

401
00:15:19,750 --> 00:15:17,519
live their life on the ice like yeah

402
00:15:24,150 --> 00:15:19,760
they've had to relocate whole

403
00:15:25,910 --> 00:15:24,160
communities in alaska because um of the

404
00:15:28,069 --> 00:15:25,920
yeah the erosion of the coast that

405
00:15:30,230 --> 00:15:28,079
they're living on um

406
00:15:32,629 --> 00:15:30,240
the other thing i would

407
00:15:34,710 --> 00:15:32,639
keep in mind is that you know

408
00:15:37,110 --> 00:15:34,720
the changes that we're talking about are

409
00:15:39,749 --> 00:15:37,120
gonna you know are occurring gradually

410
00:15:41,910 --> 00:15:39,759
and are going to kind of keep occurring

411
00:15:44,710 --> 00:15:41,920
over time even if we start to reverse

412
00:15:47,590 --> 00:15:44,720
our actions we've set things in motion

413
00:15:48,710 --> 00:15:47,600

and so not all of the things that you

414

00:15:50,069 --> 00:15:48,720

know are

415

00:15:51,910 --> 00:15:50,079

going to happen are something we're

416

00:15:53,189 --> 00:15:51,920

going to see and none of them are

417

00:15:55,990 --> 00:15:53,199

probably anything we're going to see in

418

00:15:58,310 --> 00:15:56,000

a one five you know 10-year

419

00:16:01,110 --> 00:15:58,320

time span um

420

00:16:03,829 --> 00:16:01,120

and and there's variability too so

421

00:16:05,749 --> 00:16:03,839

well i know miami's underwater half lots

422

00:16:06,870 --> 00:16:05,759

lots of segments of miami's underwater

423

00:16:09,910 --> 00:16:06,880

they're having a lot of problems with

424

00:16:12,230 --> 00:16:09,920

that you know just for one example

425

00:16:13,590 --> 00:16:12,240

yeah and you know miami's had to invest

426
00:16:16,230 --> 00:16:13,600
a lot of money into the flood

427
00:16:17,749 --> 00:16:16,240
infrastructure so i'm sure megan has a

428
00:16:18,949 --> 00:16:17,759
lot to add

429
00:16:20,870 --> 00:16:18,959
there

430
00:16:22,710 --> 00:16:20,880
sea level's been rising a couple

431
00:16:25,030 --> 00:16:22,720
millimeters per year but it's it's

432
00:16:26,790 --> 00:16:25,040
getting a little bit faster and and

433
00:16:28,150 --> 00:16:26,800
really like yeah we have to pay

434
00:16:30,389 --> 00:16:28,160
attention to

435
00:16:32,389 --> 00:16:30,399
the ice sheets because the ones that are

436
00:16:34,230 --> 00:16:32,399
on land i mean we've watched our sea ice

437
00:16:36,389 --> 00:16:34,240
decrease but sea ice doesn't contribute

438
00:16:39,030 --> 00:16:36,399

to sea level rise because it's like an

439

00:16:41,269 --> 00:16:39,040

ice cube melting in a cup of water it

440

00:16:43,030 --> 00:16:41,279

doesn't it just it just

441

00:16:44,949 --> 00:16:43,040

is solid and then it's water and it

442

00:16:47,990 --> 00:16:44,959

doesn't cause the

443

00:16:50,710 --> 00:16:48,000

um the glass of water to overflow but

444

00:16:53,110 --> 00:16:50,720

the continental ice sheets on land on

445

00:16:54,550 --> 00:16:53,120

the land masses when they start to melt

446

00:16:56,710 --> 00:16:54,560

which they are they're getting thinner

447

00:16:57,829 --> 00:16:56,720

they're they're getting shorter

448

00:17:00,710 --> 00:16:57,839

um

449

00:17:03,350 --> 00:17:00,720

yeah we are seeing sea level rise and we

450

00:17:04,870 --> 00:17:03,360

will continue to see that um

451
00:17:06,789 --> 00:17:04,880
into the future because of something

452
00:17:08,870 --> 00:17:06,799
called residence time so all the carbon

453
00:17:11,110 --> 00:17:08,880
dioxide we've emitted

454
00:17:13,429 --> 00:17:11,120
stays in the atmosphere for a hundred

455
00:17:15,829 --> 00:17:13,439
years so we're we're still experiencing

456
00:17:17,350 --> 00:17:15,839
heating from carbon dioxide that was

457
00:17:18,549 --> 00:17:17,360
emitted by

458
00:17:21,510 --> 00:17:18,559
the model t

459
00:17:23,270 --> 00:17:21,520
ford you know in the 1920s it's still in

460
00:17:24,710 --> 00:17:23,280
the atmosphere it hasn't come it hasn't

461
00:17:27,189 --> 00:17:24,720
been pulled out of the atmosphere

462
00:17:30,070 --> 00:17:27,199
through geologic processes yet and so

463
00:17:32,549 --> 00:17:30,080

the carbon dioxide we're emitting today

464

00:17:36,950 --> 00:17:32,559

will stay in the atmosphere until

465

00:17:38,710 --> 00:17:36,960

21 21 22 21 22 right i mean it's it's

466

00:17:41,110 --> 00:17:38,720

gonna be around for a long time it's

467

00:17:43,110 --> 00:17:41,120

bait the warming is baked into the cake

468

00:17:44,950 --> 00:17:43,120

it's baked into the atmosphere it's

469

00:17:48,549 --> 00:17:44,960

already been set in motion

470

00:17:51,110 --> 00:17:48,559

um as as rebecca said and it will

471

00:17:52,710 --> 00:17:51,120

um if we continue to build upon that

472

00:17:55,990 --> 00:17:52,720

it's going to continue to spiral out of

473

00:17:57,990 --> 00:17:56,000

control in a faster and faster manner um

474

00:18:00,630 --> 00:17:58,000

and i think there's you know some things

475

00:18:02,470 --> 00:18:00,640

that are irreversible right so if we

476

00:18:04,470 --> 00:18:02,480

lose these continental ice sheets and

477

00:18:05,270 --> 00:18:04,480

sea level rises that's not something we

478

00:18:06,390 --> 00:18:05,280

can

479

00:18:08,310 --> 00:18:06,400

reverse

480

00:18:09,909 --> 00:18:08,320

yeah there are a bunch of tipping points

481

00:18:11,909 --> 00:18:09,919

climate tipping points and one of them

482

00:18:15,110 --> 00:18:11,919

also is like permafrost milk because

483

00:18:17,590 --> 00:18:15,120

permafrost is full of methane so if we

484

00:18:20,789 --> 00:18:17,600

yeah if we emit too much methane by

485

00:18:22,710 --> 00:18:20,799

thawing the arctic which we're doing um

486

00:18:25,190 --> 00:18:22,720

that's going to push us into another

487

00:18:27,669 --> 00:18:25,200

tipping point um and and they're also

488

00:18:29,270 --> 00:18:27,679

feedback loops in the climate system so

489

00:18:31,430 --> 00:18:29,280

there are non-linear relationships like

490

00:18:33,350 --> 00:18:31,440

exponential growth and there are

491

00:18:35,270 --> 00:18:33,360

feedback loops that can be positive

492

00:18:36,230 --> 00:18:35,280

meaning they amplify a change and they

493

00:18:39,270 --> 00:18:36,240

make it

494

00:18:40,950 --> 00:18:39,280

happen faster in a bigger better way um

495

00:18:43,669 --> 00:18:40,960

or they can be dampening they can be

496

00:18:45,430 --> 00:18:43,679

negative um but if we start pushing the

497

00:18:47,669 --> 00:18:45,440

system um

498

00:18:49,669 --> 00:18:47,679

you know earth is like a ball perched on

499

00:18:51,110 --> 00:18:49,679

top of a hill and we're poking it down

500

00:18:53,190 --> 00:18:51,120

so that it's going to roll off the hill

501

00:18:56,230 --> 00:18:53,200

pretty soon here into a valley

502

00:18:58,230 --> 00:18:56,240

and we want to hold on to the ball and

503

00:19:00,310 --> 00:18:58,240

make sure that we don't pass those

504

00:19:03,510 --> 00:19:00,320

thresholds and push it off

505

00:19:05,909 --> 00:19:03,520

the precipice into an entirely new

506

00:19:09,590 --> 00:19:05,919

climate equilibrium one in which we may

507

00:19:10,710 --> 00:19:09,600

not be prepared or able to survive

508

00:19:12,789 --> 00:19:10,720

one of the questions i was thinking

509

00:19:14,230 --> 00:19:12,799

about um did you want to add something

510

00:19:15,430 --> 00:19:14,240

to that becca

511

00:19:17,430 --> 00:19:15,440

were you talking about i mean i just

512

00:19:19,110 --> 00:19:17,440

think that you know the the main point

513

00:19:21,590 --> 00:19:19,120

that i think megan and i are driving

514

00:19:24,549 --> 00:19:21,600

home is that you know yes there there

515

00:19:27,110 --> 00:19:24,559

are natural geologic changes but what we

516

00:19:31,110 --> 00:19:27,120

really need to be focused on is like the

517

00:19:33,029 --> 00:19:31,120

window of livable climate and we are

518

00:19:36,230 --> 00:19:33,039

moving through our actions moving

519

00:19:39,430 --> 00:19:36,240

ourselves into um a space where it's not

520

00:19:40,950 --> 00:19:39,440

livable and you know and these changes

521

00:19:43,270 --> 00:19:40,960

are you know

522

00:19:45,510 --> 00:19:43,280

gonna be hard to

523

00:19:46,710 --> 00:19:45,520

i think for an individual to kind of see

524

00:19:48,390 --> 00:19:46,720

and absorb

525

00:19:50,470 --> 00:19:48,400

you know because we like we tend to

526

00:19:53,190 --> 00:19:50,480

learn through our experiences and we see

527

00:19:56,630 --> 00:19:53,200

the world and and something like climate

528

00:19:59,190 --> 00:19:56,640

change is this slow kind of gradual

529

00:20:00,710 --> 00:19:59,200

march and so i think it can be hard for

530

00:20:03,270 --> 00:20:00,720

us to

531

00:20:06,710 --> 00:20:03,280

to kind of feel that in our in our

532

00:20:08,549 --> 00:20:06,720

intuition or in our life experience um

533

00:20:09,909 --> 00:20:08,559

and i think that's one of the biggest

534

00:20:11,350 --> 00:20:09,919

challenges associated with climate

535

00:20:12,870 --> 00:20:11,360

change i feel like

536

00:20:15,350 --> 00:20:12,880

some of the recent

537

00:20:17,909 --> 00:20:15,360

really extreme weather events we've been

538

00:20:19,669 --> 00:20:17,919

experiencing have helped drive home this

539

00:20:21,430 --> 00:20:19,679

message you know with the fires and the

540

00:20:23,029 --> 00:20:21,440

droughts and the floods you know these

541

00:20:24,549 --> 00:20:23,039

things are gonna become more common

542

00:20:27,350 --> 00:20:24,559

they've always happened but the

543

00:20:30,230 --> 00:20:27,360

frequency of these things are gonna

544

00:20:32,549 --> 00:20:30,240

to start to be more common in people's

545

00:20:33,830 --> 00:20:32,559

lives and and unfortunately i would hate

546

00:20:36,870 --> 00:20:33,840

for us to get to this point where

547

00:20:38,710 --> 00:20:36,880

suddenly everyone's like oh crap like

548

00:20:41,029 --> 00:20:38,720

it's too late fifth flood i've

549

00:20:42,789 --> 00:20:41,039

experienced and this is you know

550

00:20:44,549 --> 00:20:42,799

now now i want to try to do something

551
00:20:45,510 --> 00:20:44,559
about it i mean at some point we're

552
00:20:47,669 --> 00:20:45,520
gonna

553
00:20:50,470 --> 00:20:47,679
you know we yeah we set this thing in

554
00:20:52,390 --> 00:20:50,480
motion there's positive feedbacks

555
00:20:53,510 --> 00:20:52,400
you know and and we can

556
00:20:55,430 --> 00:20:53,520
you know

557
00:20:56,950 --> 00:20:55,440
try to then pivot and make the good

558
00:20:58,470 --> 00:20:56,960
choice but there we just have to know

559
00:20:59,510 --> 00:20:58,480
that there's going to be changes that

560
00:21:02,950 --> 00:20:59,520
have been

561
00:21:05,190 --> 00:21:02,960
started that we can't pull back on now

562
00:21:08,390 --> 00:21:05,200
about co2 just

563
00:21:11,190 --> 00:21:08,400

just i i don't understand how co2

564

00:21:12,390 --> 00:21:11,200

uh carbon dioxide was there a certain

565

00:21:14,710 --> 00:21:12,400

amount

566

00:21:17,350 --> 00:21:14,720

that when the earth was created that

567

00:21:19,430 --> 00:21:17,360

existed that keeps fluctuating over the

568

00:21:20,870 --> 00:21:19,440

existence is there some type of process

569

00:21:23,590 --> 00:21:20,880

that it goes through

570

00:21:25,510 --> 00:21:23,600

or is it created from something that of

571

00:21:28,630 --> 00:21:25,520

some type of process

572

00:21:30,549 --> 00:21:28,640

it's pretty complicated um so it's

573

00:21:32,549 --> 00:21:30,559

released through volcanoes and also it

574

00:21:34,870 --> 00:21:32,559

can fluctuate with how much biomass you

575

00:21:35,830 --> 00:21:34,880

have on earth um

576

00:21:38,070 --> 00:21:35,840

but

577

00:21:41,029 --> 00:21:38,080

it's not like there's like only so much

578

00:21:42,630 --> 00:21:41,039

it um it just exists in multiple forms

579

00:21:44,950 --> 00:21:42,640

it exists as carbon dioxide in the

580

00:21:48,149 --> 00:21:44,960

atmosphere it exists as fossil fuels

581

00:21:50,630 --> 00:21:48,159

which are plant matter like coal is dead

582

00:21:51,510 --> 00:21:50,640

trees that fell into a swamp and then

583

00:21:53,029 --> 00:21:51,520

over

584

00:21:55,270 --> 00:21:53,039

hundreds of millions of years was

585

00:21:58,070 --> 00:21:55,280

compressed and heated up and through

586

00:22:01,190 --> 00:21:58,080

diagenesis became coal takes a long time

587

00:22:04,710 --> 00:22:01,200

to make it takes a very long time um

588

00:22:05,909 --> 00:22:04,720

plankton makes natural gas plankton is

589

00:22:07,590 --> 00:22:05,919

also a

590

00:22:09,830 --> 00:22:07,600

a photosynthesizer

591

00:22:11,830 --> 00:22:09,840

um that eventually sinks to the bottom

592

00:22:13,990 --> 00:22:11,840

of the ocean when it dies and is also

593

00:22:16,470 --> 00:22:14,000

compressed and heated and through

594

00:22:18,950 --> 00:22:16,480

geologic processes becomes natural gas

595

00:22:21,029 --> 00:22:18,960

um so it just exists in different

596

00:22:24,390 --> 00:22:21,039

spheres of the earth atmosphere

597

00:22:26,710 --> 00:22:24,400

geosphere um in different biosphere

598

00:22:28,789 --> 00:22:26,720

biosphere there's there's

599

00:22:30,870 --> 00:22:28,799

it's all over the place and it is

600

00:22:32,630 --> 00:22:30,880

constantly cycling through those spheres

601
00:22:34,630 --> 00:22:32,640
and and transforming into different

602
00:22:35,830 --> 00:22:34,640
forms um

603
00:22:38,470 --> 00:22:35,840
but

604
00:22:40,470 --> 00:22:38,480
we're definitely uh we're focusing a lot

605
00:22:43,029 --> 00:22:40,480
on the atmosphere because it is so

606
00:22:46,630 --> 00:22:43,039
sensitive and temperature is also very

607
00:22:48,870 --> 00:22:46,640
closely linked with carbon dioxide

608
00:22:50,630 --> 00:22:48,880
i i'd like to play a question from this

609
00:22:53,510 --> 00:22:50,640
is a friend of mine

610
00:22:55,430 --> 00:22:53,520
he's an astronomer mark d'antonio and

611
00:22:56,870 --> 00:22:55,440
i'd like to play this question and have

612
00:23:01,990 --> 00:22:56,880
your your uh

613
00:23:06,950 --> 00:23:04,310

thank you for for joining for this uh

614

00:23:09,190 --> 00:23:06,960

for this uh statement and basically

615

00:23:11,590 --> 00:23:09,200

question so

616

00:23:13,990 --> 00:23:11,600

yeah so go ahead if you would

617

00:23:15,190 --> 00:23:14,000

sure i mean in a little bit of a

618

00:23:17,510 --> 00:23:15,200

preface here

619

00:23:19,830 --> 00:23:17,520

uh you know i've i've written a book

620

00:23:21,590 --> 00:23:19,840

called the populated universe and it

621

00:23:23,350 --> 00:23:21,600

talks about the potential that

622

00:23:25,510 --> 00:23:23,360

extraterrestrial life is

623

00:23:27,990 --> 00:23:25,520

more prevalent in the universe than many

624

00:23:30,630 --> 00:23:28,000

people think but

625

00:23:34,549 --> 00:23:30,640

it also discusses the issues we have on

626
00:23:37,110 --> 00:23:34,559
the planet earth with our energy

627
00:23:39,669 --> 00:23:37,120
generation mechanisms the future of

628
00:23:42,390 --> 00:23:39,679
fossil fuels and so forth and what we

629
00:23:44,149 --> 00:23:42,400
have to do to get out of that that

630
00:23:45,830 --> 00:23:44,159
wicked spiral that we're in of just

631
00:23:46,710 --> 00:23:45,840
using up fossil fuels

632
00:23:49,190 --> 00:23:46,720
so

633
00:23:51,669 --> 00:23:49,200
the problem that i see

634
00:23:53,830 --> 00:23:51,679
is that in order for us to

635
00:23:54,870 --> 00:23:53,840
get rid of fossil fuels we literally

636
00:23:56,390 --> 00:23:54,880
have to

637
00:23:59,190 --> 00:23:56,400
use

638
00:24:01,350 --> 00:23:59,200

10 times as much that we do today we

639

00:24:03,510 --> 00:24:01,360

can't cut back we have to exploit it and

640

00:24:05,750 --> 00:24:03,520

use it in order to build the new

641

00:24:07,750 --> 00:24:05,760

infrastructure take that leap and go to

642

00:24:09,990 --> 00:24:07,760

that next level where we actually get

643

00:24:14,149 --> 00:24:10,000

past our dependence

644

00:24:15,190 --> 00:24:14,159

on oil and and coal and uh and natural

645

00:24:16,950 --> 00:24:15,200

gas

646

00:24:18,710 --> 00:24:16,960

without doing so

647

00:24:22,070 --> 00:24:18,720

we'll never be able to achieve a

648

00:24:23,669 --> 00:24:22,080

full-blown fully active and well-built

649

00:24:26,470 --> 00:24:23,679

infrastructure

650

00:24:27,990 --> 00:24:26,480

that will allow us to

651
00:24:30,870 --> 00:24:28,000
utilize

652
00:24:33,029 --> 00:24:30,880
wind solar and tidal power

653
00:24:34,230 --> 00:24:33,039
which we want to get at because it's

654
00:24:36,710 --> 00:24:34,240
it's free

655
00:24:38,549 --> 00:24:36,720
and that's that kind of thing is the uh

656
00:24:42,070 --> 00:24:38,559
the conundrum that we face our nation

657
00:24:45,029 --> 00:24:42,080
has a demand of x amount of millions of

658
00:24:47,669 --> 00:24:45,039
barrels of oil that we require all right

659
00:24:49,269 --> 00:24:47,679
natural gas and so forth

660
00:24:51,269 --> 00:24:49,279
well

661
00:24:53,029 --> 00:24:51,279
i don't know how we're gonna be able to

662
00:24:55,110 --> 00:24:53,039
put this new infrastructure in place by

663
00:24:56,390 --> 00:24:55,120

picking off some of that

664

00:24:57,909 --> 00:24:56,400

to create this new infrastructure it's

665

00:25:00,310 --> 00:24:57,919

not like it's so easy to create over

666

00:25:02,789 --> 00:25:00,320

here it's not easy it's hard and we have

667

00:25:05,830 --> 00:25:02,799

to make these new delivery systems

668

00:25:08,710 --> 00:25:05,840

all right we don't have that right now

669

00:25:10,710 --> 00:25:08,720

and we can't take the pot that we have

670

00:25:13,110 --> 00:25:10,720

that we use for fossil fuels that says

671

00:25:14,549 --> 00:25:13,120

okay you only get to use this much

672

00:25:16,149 --> 00:25:14,559

this stuff out here we have to hold and

673

00:25:17,590 --> 00:25:16,159

reserve this stuff is all in reserve out

674

00:25:18,630 --> 00:25:17,600

here but in here this is you this is

675

00:25:20,149 --> 00:25:18,640

what we can use to make this new

676

00:25:22,470 --> 00:25:20,159

infrastructure

677

00:25:24,630 --> 00:25:22,480

okay that doesn't work

678

00:25:26,230 --> 00:25:24,640

we have to actually use all this out

679

00:25:28,710 --> 00:25:26,240

here and all this out here to build the

680

00:25:30,870 --> 00:25:28,720

new infrastructure so that we're not

681

00:25:32,390 --> 00:25:30,880

compromising the current energy demand

682

00:25:33,110 --> 00:25:32,400

of our nation

683

00:25:35,029 --> 00:25:33,120

so

684

00:25:36,789 --> 00:25:35,039

i guess i have to ask you know what are

685

00:25:38,950 --> 00:25:36,799

your thoughts about that

686

00:25:40,950 --> 00:25:38,960

and that's something that i think is a

687

00:25:45,350 --> 00:25:40,960

very very

688

00:25:45,360 --> 00:25:49,269

there you go who wants to tackle that

689

00:25:55,990 --> 00:25:52,470

i agree but we should also do it we

690

00:25:57,430 --> 00:25:56,000

can't afford to not do anything at all

691

00:25:59,190 --> 00:25:57,440

we can't afford to keep doing what we're

692

00:26:00,789 --> 00:25:59,200

doing now because it's very clearly

693

00:26:03,750 --> 00:26:00,799

putting us on a path that will lead to

694

00:26:06,870 --> 00:26:03,760

an unlivable climate um the problem is

695

00:26:08,710 --> 00:26:06,880

of course um that yeah to build that

696

00:26:10,230 --> 00:26:08,720

infrastructure requires that we build

697

00:26:11,909 --> 00:26:10,240

wind turbines which are made out of

698

00:26:14,149 --> 00:26:11,919

metal which has to be mined from the

699

00:26:16,310 --> 00:26:14,159

earth which we can only do with

700

00:26:18,470 --> 00:26:16,320

machinery that's also made out of metal

701
00:26:21,110 --> 00:26:18,480
that runs on fossil fuels so it is kind

702
00:26:23,590 --> 00:26:21,120
of a vicious cycle in the sense that we

703
00:26:25,750 --> 00:26:23,600
can't completely stop using them if we

704
00:26:28,789 --> 00:26:25,760
want to rebuild our energy grid because

705
00:26:30,710 --> 00:26:28,799
we need to power our machines enabled to

706
00:26:33,110 --> 00:26:30,720
be able to do that

707
00:26:36,070 --> 00:26:33,120
but but we have

708
00:26:38,070 --> 00:26:36,080
we have renewable energy already we have

709
00:26:40,549 --> 00:26:38,080
these sources available to us and the

710
00:26:43,510 --> 00:26:40,559
technology to harvest that energy so we

711
00:26:45,350 --> 00:26:43,520
should be maximizing those renewables as

712
00:26:48,390 --> 00:26:45,360
much as possible as we make this

713
00:26:51,269 --> 00:26:48,400

transition and an easy economic tool

714

00:26:53,990 --> 00:26:51,279

that could be used would just be

715

00:26:56,549 --> 00:26:54,000

to um implement a carbon tax and i know

716

00:26:59,269 --> 00:26:56,559

everyone's like oh god a carbon tax

717

00:27:01,110 --> 00:26:59,279

yeah i mean it we we want to keep the

718

00:27:03,909 --> 00:27:01,120

carb we want to keep fossil fuels in the

719

00:27:06,870 --> 00:27:03,919

ground um so we need to and we've been

720

00:27:10,310 --> 00:27:06,880

subsidizing fossil fuel extraction

721

00:27:14,070 --> 00:27:10,320

heavily as an industrialized nation we

722

00:27:16,549 --> 00:27:14,080

the g20 countries spent three trillion

723

00:27:19,430 --> 00:27:16,559

dollars in subsidies since 2015 when the

724

00:27:21,350 --> 00:27:19,440

climate accord in paris was done um

725

00:27:23,269 --> 00:27:21,360

three trillion dollars is what we've

726

00:27:25,190 --> 00:27:23,279

spent subsidizing

727

00:27:27,190 --> 00:27:25,200

fossil fuel production because you don't

728

00:27:29,190 --> 00:27:27,200

it's hit or miss you don't know if the

729

00:27:30,389 --> 00:27:29,200

if the well that you're drilling is

730

00:27:32,630 --> 00:27:30,399

gonna strike

731

00:27:35,350 --> 00:27:32,640

the resource you're trying to access

732

00:27:37,830 --> 00:27:35,360

um and so if we took those subsidies

733

00:27:40,070 --> 00:27:37,840

away from fossil fuels it would be

734

00:27:41,990 --> 00:27:40,080

uh more of a heavy burden

735

00:27:43,990 --> 00:27:42,000

on on those companies and yeah on

736

00:27:47,350 --> 00:27:44,000

consumers too but we would take that

737

00:27:51,029 --> 00:27:47,360

money and subsidize the production of of

738

00:27:53,350 --> 00:27:51,039

renewable energies and um that we we

739

00:27:55,430 --> 00:27:53,360

have we have to i mean we have it

740

00:27:56,950 --> 00:27:55,440

available and we have the technology we

741

00:27:58,630 --> 00:27:56,960

just don't have the political will and

742

00:28:00,630 --> 00:27:58,640

we don't have the economic will and we

743

00:28:03,269 --> 00:28:00,640

do not have the cultural or societal

744

00:28:05,350 --> 00:28:03,279

will to do it um and that's really the

745

00:28:08,149 --> 00:28:05,360

biggest problem and

746

00:28:10,710 --> 00:28:08,159

you know boy it's tiring constantly just

747

00:28:13,350 --> 00:28:10,720

uh having to to fight with people who

748

00:28:15,430 --> 00:28:13,360

are so adamantly in denial of reality

749

00:28:17,269 --> 00:28:15,440

and so unwilling to face the very real

750

00:28:19,029 --> 00:28:17,279

problems that we're facing

751
00:28:20,710 --> 00:28:19,039
uh because you can't solve a problem if

752
00:28:24,549 --> 00:28:20,720
you can't face it

753
00:28:27,510 --> 00:28:24,559
and um i guess i would add to the to

754
00:28:31,269 --> 00:28:27,520
the marco's comment and what you're

755
00:28:32,789 --> 00:28:31,279
saying megan that um

756
00:28:34,389 --> 00:28:32,799
yeah certainly

757
00:28:37,669 --> 00:28:34,399
because of where we're starting we're

758
00:28:40,710 --> 00:28:37,679
gonna need fossil fuel to to help us you

759
00:28:41,750 --> 00:28:40,720
know make this transition to using

760
00:28:44,389 --> 00:28:41,760
um

761
00:28:45,990 --> 00:28:44,399
solar panels and batteries and wind

762
00:28:48,630 --> 00:28:46,000
turbines but

763
00:28:50,710 --> 00:28:48,640

i don't think we need to

764

00:28:52,549 --> 00:28:50,720

assume that we have to use all of our

765

00:28:55,110 --> 00:28:52,559

fossil fuel reservoirs in order to do

766

00:28:57,190 --> 00:28:55,120

that like i i think the idea is that you

767

00:28:59,990 --> 00:28:57,200

you use as little of the fossil fuel as

768

00:29:01,990 --> 00:29:00,000

you need right to then like if you think

769

00:29:04,710 --> 00:29:02,000

about the transition that's happening

770

00:29:05,830 --> 00:29:04,720

now a lot of cars are going to electric

771

00:29:07,269 --> 00:29:05,840

and yes

772

00:29:09,909 --> 00:29:07,279

there is

773

00:29:12,149 --> 00:29:09,919

negative things associated with mining

774

00:29:13,590 --> 00:29:12,159

the materials needed for batteries right

775

00:29:15,029 --> 00:29:13,600

but

776

00:29:16,870 --> 00:29:15,039

when you shift

777

00:29:19,269 --> 00:29:16,880

you know suddenly you start making

778

00:29:21,909 --> 00:29:19,279

electric cars and we start using those

779

00:29:25,110 --> 00:29:21,919

right then that's a lot less gasoline

780

00:29:26,630 --> 00:29:25,120

needed for everyone's automobiles and

781

00:29:28,389 --> 00:29:26,640

um

782

00:29:30,630 --> 00:29:28,399

i just i think that there is this feed

783

00:29:32,710 --> 00:29:30,640

forward situation that we can get

784

00:29:35,029 --> 00:29:32,720

ourselves into so certainly we're gonna

785

00:29:36,789 --> 00:29:35,039

have to use some fossil fuels to make

786

00:29:39,510 --> 00:29:36,799

this transition but

787

00:29:41,750 --> 00:29:39,520

i would hope that we don't

788

00:29:43,430 --> 00:29:41,760

access you know all of those fossil

789

00:29:45,430 --> 00:29:43,440

fuels because

790

00:29:47,110 --> 00:29:45,440

again you know

791

00:29:48,950 --> 00:29:47,120

the temperature response the amount of

792

00:29:51,110 --> 00:29:48,960

co2 we put in the atmosphere and there

793

00:29:52,710 --> 00:29:51,120

are these tipping points right so i

794

00:29:54,789 --> 00:29:52,720

looked it up and i think if we were to

795

00:29:57,750 --> 00:29:54,799

use all the fossil fuel buried below

796

00:30:01,590 --> 00:29:57,760

ground we would increase up to about 18

797

00:30:05,110 --> 00:30:02,950

like we would be

798

00:30:07,190 --> 00:30:05,120

like back in the dinosaur age where

799

00:30:08,950 --> 00:30:07,200

things are really hot so you know i i

800

00:30:10,230 --> 00:30:08,960

don't think like that's the solution we

801
00:30:11,990 --> 00:30:10,240
don't want to go

802
00:30:14,470 --> 00:30:12,000
full bore because then we've killed

803
00:30:15,909 --> 00:30:14,480
ourselves but we have like a electric

804
00:30:17,110 --> 00:30:15,919
grid so

805
00:30:19,430 --> 00:30:17,120
and also

806
00:30:21,269 --> 00:30:19,440
yeah we should be combining this because

807
00:30:23,590 --> 00:30:21,279
we also do we're developing the

808
00:30:25,590 --> 00:30:23,600
technology to actually capture carbon

809
00:30:27,830 --> 00:30:25,600
dioxide from the atmosphere and to

810
00:30:29,510 --> 00:30:27,840
either store it underground geologic

811
00:30:31,830 --> 00:30:29,520
reserves which we've already drilled

812
00:30:33,590 --> 00:30:31,840
into so just get back down there or

813
00:30:35,350 --> 00:30:33,600

actually find a way to turn it into like

814

00:30:38,710 --> 00:30:35,360

a briquette that you could recycle and

815

00:30:40,710 --> 00:30:38,720

burn for for fuel all over again um and

816

00:30:42,470 --> 00:30:40,720

like there's a plant up in like squamish

817

00:30:44,230 --> 00:30:42,480

or somewhere um

818

00:30:47,510 --> 00:30:44,240

somewhere in british columbia where it's

819

00:30:50,149 --> 00:30:47,520

a hydro-powered plant that's drawing

820

00:30:52,789 --> 00:30:50,159

carbon dioxide out of the air and and

821

00:30:53,830 --> 00:30:52,799

finding ways to to store it as a solid

822

00:30:55,510 --> 00:30:53,840

and so

823

00:30:58,070 --> 00:30:55,520

the technology exists it's just not

824

00:30:59,830 --> 00:30:58,080

scaled up it's really small still it's

825

00:31:02,149 --> 00:30:59,840

startups but um

826

00:31:05,190 --> 00:31:02,159

if we could combine our revamped

827

00:31:07,269 --> 00:31:05,200

infrastructure with the technology to

828

00:31:09,350 --> 00:31:07,279

capture some of some of some of what

829

00:31:10,870 --> 00:31:09,360

we're emitting while also simultaneously

830

00:31:13,029 --> 00:31:10,880

keeping as much

831

00:31:14,710 --> 00:31:13,039

fossil fuel as many fossil fuels in the

832

00:31:17,430 --> 00:31:14,720

ground as possible keep them in the

833

00:31:19,830 --> 00:31:17,440

ground if you can and use them sparingly

834

00:31:22,470 --> 00:31:19,840

um then it's it's doable and it's worth

835

00:31:24,630 --> 00:31:22,480

doing it really is because without a

836

00:31:26,310 --> 00:31:24,640

planet we don't have an economy you know

837

00:31:28,389 --> 00:31:26,320

so if like you want to use an economic

838

00:31:31,590 --> 00:31:28,399

argument like if you don't have people

839

00:31:33,750 --> 00:31:31,600

living if you don't have anything left

840

00:31:35,110 --> 00:31:33,760

on earth yeah you killed the economy

841

00:31:36,950 --> 00:31:35,120

along with

842

00:31:39,509 --> 00:31:36,960

all the people i'd also say that you

843

00:31:41,269 --> 00:31:39,519

know our we've um

844

00:31:43,590 --> 00:31:41,279

you know our renewable

845

00:31:45,590 --> 00:31:43,600

energy has really reached this point

846

00:31:48,389 --> 00:31:45,600

where it's now actually more affordable

847

00:31:50,389 --> 00:31:48,399

to put like a renewable power plant in

848

00:31:51,350 --> 00:31:50,399

than to build you know a fossil fuel

849

00:31:54,230 --> 00:31:51,360

powered

850

00:31:56,549 --> 00:31:54,240

power plant uh so you know i i do think

851
00:31:58,389 --> 00:31:56,559
that there is this you know economics

852
00:32:01,830 --> 00:31:58,399
always plays into the decisions people

853
00:32:03,990 --> 00:32:01,840
make and um

854
00:32:06,389 --> 00:32:04,000
so minus subsidies to the fossil fuel

855
00:32:08,230 --> 00:32:06,399
industry and you know let's keep

856
00:32:10,389 --> 00:32:08,240
advancing what we're doing with the

857
00:32:12,070 --> 00:32:10,399
renewable energy i think it will become

858
00:32:15,350 --> 00:32:12,080
this point where

859
00:32:18,070 --> 00:32:15,360
uh you know uh someone deciding what

860
00:32:19,750 --> 00:32:18,080
plant to put in between a and b

861
00:32:21,190 --> 00:32:19,760
the renewable plant is now more

862
00:32:23,669 --> 00:32:21,200
affordable

863
00:32:26,470 --> 00:32:23,679

and cheaper and so we're actually seeing

864

00:32:28,549 --> 00:32:26,480

growth in um switching towards

865

00:32:29,909 --> 00:32:28,559

renewables because of that economic

866

00:32:32,710 --> 00:32:29,919

aspect

867

00:32:35,350 --> 00:32:32,720

this uh this question that comes up here

868

00:32:37,750 --> 00:32:35,360

and and thanks for that and my my

869

00:32:38,950 --> 00:32:37,760

personal thoughts on nuclear power

870

00:32:41,430 --> 00:32:38,960

plants is

871

00:32:42,549 --> 00:32:41,440

uh and i mentioned this off here is the

872

00:32:45,509 --> 00:32:42,559

fact that

873

00:32:47,350 --> 00:32:45,519

you know we're using for 100 years worth

874

00:32:49,590 --> 00:32:47,360

of use we're

875

00:32:51,990 --> 00:32:49,600

having to protect the waste supposedly

876
00:32:54,549 --> 00:32:52,000
for 5000 generations ahead and we don't

877
00:32:56,710 --> 00:32:54,559
even know our history anywhere near that

878
00:32:59,190 --> 00:32:56,720
and backwards from here

879
00:33:01,990 --> 00:32:59,200
all i'm saying is that it's very selfish

880
00:33:05,029 --> 00:33:02,000
for us to put that on future generations

881
00:33:07,029 --> 00:33:05,039
in my opinion um but it

882
00:33:09,669 --> 00:33:07,039
you know you hear about nuclear power

883
00:33:12,950 --> 00:33:09,679
being uh the clean energy and all that

884
00:33:15,590 --> 00:33:12,960
but i guess the question i have we do

885
00:33:18,789 --> 00:33:15,600
we could use another alternative there

886
00:33:19,830 --> 00:33:18,799
is has always been talk about um

887
00:33:20,950 --> 00:33:19,840
fusion

888
00:33:22,470 --> 00:33:20,960

and

889

00:33:24,950 --> 00:33:22,480

i would love to see something like that

890

00:33:26,870 --> 00:33:24,960

happen because it uses it can you see

891

00:33:28,789 --> 00:33:26,880

water i think you can use uh

892

00:33:31,590 --> 00:33:28,799

and there's no you know there's no waste

893

00:33:32,389 --> 00:33:31,600

per se compared to fission

894

00:33:35,430 --> 00:33:32,399

and

895

00:33:36,870 --> 00:33:35,440

have either one of you heard about any

896

00:33:40,310 --> 00:33:36,880

um

897

00:33:42,549 --> 00:33:40,320

work toward getting you know that as a

898

00:33:44,549 --> 00:33:42,559

reality either one of you

899

00:33:47,590 --> 00:33:44,559

so i i recently learned that actually

900

00:33:49,590 --> 00:33:47,600

here in washington where i'm living um

901
00:33:50,950 --> 00:33:49,600
a startup company i think it's called

902
00:33:54,389 --> 00:33:50,960
helion

903
00:33:58,870 --> 00:33:54,399
has um actually started building uh

904
00:34:00,149 --> 00:33:58,880
a power plant a fusion power plant um so

905
00:34:05,029 --> 00:34:00,159
it's

906
00:34:06,389 --> 00:34:05,039
the implementation phase um which

907
00:34:08,869 --> 00:34:06,399
is pretty exciting

908
00:34:11,030 --> 00:34:08,879
so we'll see if that can get scaled

909
00:34:12,310 --> 00:34:11,040
the other thing i'd say about nuclear is

910
00:34:14,389 --> 00:34:12,320
um

911
00:34:15,909 --> 00:34:14,399
my sense is that it would it's the

912
00:34:18,950 --> 00:34:15,919
smartest thing for the climate to

913
00:34:22,230 --> 00:34:18,960

continue using existing nuclear power

914

00:34:24,550 --> 00:34:22,240

plants um they're up and running and so

915

00:34:26,869 --> 00:34:24,560

let's keep using those but it's very

916

00:34:29,349 --> 00:34:26,879

expensive to build

917

00:34:31,030 --> 00:34:29,359

power plants and so building new ones

918

00:34:33,430 --> 00:34:31,040

just doesn't really make a lot of sense

919

00:34:35,669 --> 00:34:33,440

especially now as i was saying in this

920

00:34:37,909 --> 00:34:35,679

space where renewables like solar and

921

00:34:39,909 --> 00:34:37,919

wind have become

922

00:34:42,470 --> 00:34:39,919

so affordable

923

00:34:44,550 --> 00:34:42,480

right right and there's i know there's

924

00:34:47,270 --> 00:34:44,560

some work on

925

00:34:50,950 --> 00:34:47,280

some type of reactor that's going to use

926
00:34:54,710 --> 00:34:50,960
the waste and make it less volatile or

927
00:34:57,109 --> 00:34:54,720
less uh potent um another star a nuclear

928
00:34:58,950 --> 00:34:57,119
yeah it's some type of nuclear yeah i do

929
00:35:02,790 --> 00:34:58,960
think that there is a technology where

930
00:35:04,950 --> 00:35:02,800
it can recycle the the fuel um

931
00:35:06,230 --> 00:35:04,960
i think they're called breeder reactors

932
00:35:09,030 --> 00:35:06,240
and

933
00:35:10,630 --> 00:35:09,040
um i think we tend to not use those

934
00:35:12,550 --> 00:35:10,640
because what happens is you keep

935
00:35:13,829 --> 00:35:12,560
refining and you end up with kind of

936
00:35:14,829 --> 00:35:13,839
weapons grade

937
00:35:23,190 --> 00:35:14,839
um

938
00:35:25,990 --> 00:35:23,200

security issue there yeah i can see that

939

00:35:28,069 --> 00:35:26,000

now there is i think it's iceland where

940

00:35:31,990 --> 00:35:28,079

they're they're pumping

941

00:35:33,829 --> 00:35:32,000

co2 back into the basalt down 2000 feet

942

00:35:36,550 --> 00:35:33,839

there's some a lot of companies are are

943

00:35:37,510 --> 00:35:36,560

trying to figure out ways to get carbon

944

00:35:38,950 --> 00:35:37,520

back

945

00:35:39,750 --> 00:35:38,960

into the earth

946

00:35:41,510 --> 00:35:39,760

um

947

00:35:44,870 --> 00:35:41,520

do you think that's viable it seems like

948

00:35:47,510 --> 00:35:44,880

it would be so miniscule

949

00:35:49,829 --> 00:35:47,520

i mean would have to be in such a big

950

00:35:52,390 --> 00:35:49,839

it's it's not a silver bullet like it's

951
00:35:54,950 --> 00:35:52,400
not the only solution and there needs to

952
00:35:56,630 --> 00:35:54,960
be um there needs to be reforestation

953
00:35:58,630 --> 00:35:56,640
there needs to be protection of existing

954
00:36:01,030 --> 00:35:58,640
forests there needs to be an overall

955
00:36:02,790 --> 00:36:01,040
decrease in um

956
00:36:04,069 --> 00:36:02,800
red meat consumption like there's

957
00:36:05,190 --> 00:36:04,079
there's a bunch of things that we need

958
00:36:07,670 --> 00:36:05,200
to do

959
00:36:09,750 --> 00:36:07,680
to make this work and carbon capture is

960
00:36:11,910 --> 00:36:09,760
just one of them and it is a technology

961
00:36:13,589 --> 00:36:11,920
that's available so we should be making

962
00:36:15,990 --> 00:36:13,599
full use of it

963
00:36:17,030 --> 00:36:16,000

as is technologically economically

964

00:36:17,829 --> 00:36:17,040

feasible

965

00:36:19,670 --> 00:36:17,839

um

966

00:36:21,190 --> 00:36:19,680

so it's not going to be

967

00:36:22,950 --> 00:36:21,200

it's not going to be a get out of jail

968

00:36:24,630 --> 00:36:22,960

free card where it's like oh we figured

969

00:36:26,790 --> 00:36:24,640

out how to take all of the carbon

970

00:36:29,670 --> 00:36:26,800

dioxide back out of the atmosphere so

971

00:36:31,190 --> 00:36:29,680

therefore we don't have to limit

972

00:36:33,030 --> 00:36:31,200

what we're emitting

973

00:36:35,510 --> 00:36:33,040

it's just that it becomes

974

00:36:37,030 --> 00:36:35,520

um one piece of the puzzle of the

975

00:36:39,030 --> 00:36:37,040

solution

976
00:36:40,790 --> 00:36:39,040
one of the the questions i have is kind

977
00:36:42,630 --> 00:36:40,800
of a side step has nothing to do with

978
00:36:44,150 --> 00:36:42,640
well not really has anything to do with

979
00:36:46,310 --> 00:36:44,160
climate change but

980
00:36:47,750 --> 00:36:46,320
we we suck all these you know

981
00:36:49,510 --> 00:36:47,760
millions and

982
00:36:51,670 --> 00:36:49,520
millions of barrels of oil out of the

983
00:36:53,589 --> 00:36:51,680
earth out of the shale or whatever it's

984
00:36:55,430 --> 00:36:53,599
in

985
00:36:57,990 --> 00:36:55,440
what happens to that space where it's

986
00:36:59,990 --> 00:36:58,000
sucked out of i mean does does it become

987
00:37:01,750 --> 00:37:00,000
weakened or does something else go in

988
00:37:03,270 --> 00:37:01,760

its place does anyone

989

00:37:04,790 --> 00:37:03,280

i know it's a yeah when you're trying

990

00:37:06,550 --> 00:37:04,800

when you're talking about shale that's

991

00:37:08,470 --> 00:37:06,560

specifically natural gas and that's

992

00:37:11,670 --> 00:37:08,480

what's called hydraulic fracturing or

993

00:37:13,510 --> 00:37:11,680

fracking um and so yeah there is there

994

00:37:15,990 --> 00:37:13,520

is seismic activity that results

995

00:37:19,349 --> 00:37:16,000

oklahoma um since they started fracking

996

00:37:22,470 --> 00:37:19,359

has had um many like two three

997

00:37:24,870 --> 00:37:22,480

on the richter scale earthquakes um

998

00:37:26,390 --> 00:37:24,880

2.0 3.0 sorry i was like the way i said

999

00:37:27,510 --> 00:37:26,400

that sounded weird um

1000

00:37:29,349 --> 00:37:27,520

but

1001
00:37:31,750 --> 00:37:29,359
nothing nothing goes in there except for

1002
00:37:32,790 --> 00:37:31,760
the the fracking fluid breaking the rock

1003
00:37:34,710 --> 00:37:32,800
apart

1004
00:37:37,430 --> 00:37:34,720
and then that does allow for a little

1005
00:37:38,310 --> 00:37:37,440
bit of instability and cracking to occur

1006
00:37:40,870 --> 00:37:38,320
so there

1007
00:37:42,630 --> 00:37:40,880
there are local consequences to fracking

1008
00:37:45,589 --> 00:37:42,640
as well as global consequences to

1009
00:37:48,150 --> 00:37:45,599
continuing um to to continuing

1010
00:37:49,510 --> 00:37:48,160
combusting natural gas as well

1011
00:37:50,550 --> 00:37:49,520
um

1012
00:37:53,190 --> 00:37:50,560
yeah

1013
00:37:55,589 --> 00:37:53,200

um so we're we're on this

1014

00:37:57,750 --> 00:37:55,599

i would call it we're oh i have a friend

1015

00:37:59,750 --> 00:37:57,760

that calls it we're addicted to oil

1016

00:38:00,630 --> 00:37:59,760

as it as a society

1017

00:38:03,510 --> 00:38:00,640

and

1018

00:38:05,510 --> 00:38:03,520

but i i do think you know with the

1019

00:38:07,109 --> 00:38:05,520

the the electric car coming out people

1020

00:38:09,910 --> 00:38:07,119

are thinking more

1021

00:38:12,310 --> 00:38:09,920

of heading in that direction and um i

1022

00:38:13,990 --> 00:38:12,320

know uh one of us in this group has one

1023

00:38:15,829 --> 00:38:14,000

of those

1024

00:38:18,230 --> 00:38:15,839

and uh uh

1025

00:38:21,349 --> 00:38:18,240

i think that is going to be the way of

1026

00:38:23,589 --> 00:38:21,359

the future but um the difference and it

1027

00:38:24,790 --> 00:38:23,599

does still use fossil fuels unless of

1028

00:38:27,190 --> 00:38:24,800

course it's

1029

00:38:30,950 --> 00:38:27,200

the getting charged off a nuke plant or

1030

00:38:32,390 --> 00:38:30,960

solar or whatever but um

1031

00:38:35,030 --> 00:38:32,400

do you think that

1032

00:38:35,829 --> 00:38:35,040

we will be able to get to that point

1033

00:38:38,069 --> 00:38:35,839

where

1034

00:38:40,550 --> 00:38:38,079

most people are driving electric cars

1035

00:38:42,630 --> 00:38:40,560

and and here's here's the other thing

1036

00:38:43,510 --> 00:38:42,640

with that i mean make no mistake we are

1037

00:38:46,790 --> 00:38:43,520

using

1038

00:38:49,190 --> 00:38:46,800

fossil fuel to charge that but they get

1039

00:38:50,069 --> 00:38:49,200

an equivalent of something like 130

1040

00:38:51,270 --> 00:38:50,079

miles

1041

00:38:53,670 --> 00:38:51,280

per gallon

1042

00:38:54,630 --> 00:38:53,680

because of the way the electric motor

1043

00:38:56,230 --> 00:38:54,640

works

1044

00:38:57,430 --> 00:38:56,240

um so

1045

00:38:58,550 --> 00:38:57,440

do you think we're heading in that

1046

00:39:00,550 --> 00:38:58,560

direction

1047

00:39:03,589 --> 00:39:00,560

um i

1048

00:39:04,950 --> 00:39:03,599

i i recently bought an electric car

1049

00:39:09,829 --> 00:39:04,960

um

1050

00:39:11,829 --> 00:39:09,839

true right you're getting electricity

1051
00:39:14,550 --> 00:39:11,839
from the grid and so it does depend

1052
00:39:17,270 --> 00:39:14,560
where you live in the country in terms

1053
00:39:19,109 --> 00:39:17,280
of you know what is the source of

1054
00:39:20,870 --> 00:39:19,119
energy

1055
00:39:23,109 --> 00:39:20,880
that you're getting for your car so

1056
00:39:26,390 --> 00:39:23,119
where i live in washington state most of

1057
00:39:28,950 --> 00:39:26,400
our electricity is hydropower

1058
00:39:31,349 --> 00:39:28,960
so it's a renewable form you know so by

1059
00:39:33,349 --> 00:39:31,359
me driving an electric car you know i've

1060
00:39:37,270 --> 00:39:33,359
moved myself off of

1061
00:39:39,430 --> 00:39:37,280
um gasoline and on basically hydropower

1062
00:39:42,069 --> 00:39:39,440
um

1063
00:39:43,829 --> 00:39:42,079

powering my my car so if you're in

1064

00:39:47,510 --> 00:39:43,839

another part of the country say that

1065

00:39:49,589 --> 00:39:47,520

uses coal to you know power uh um a

1066

00:39:51,910 --> 00:39:49,599

plant to produce energy that go

1067

00:39:55,030 --> 00:39:51,920

electricity that goes into your car

1068

00:39:57,109 --> 00:39:55,040

um it still ends up being better

1069

00:39:59,670 --> 00:39:57,119

um on the on the whole because of what

1070

00:40:00,470 --> 00:39:59,680

you said martin about the

1071

00:40:03,190 --> 00:40:00,480

um

1072

00:40:05,349 --> 00:40:03,200

you know the you you still get kind of

1073

00:40:07,349 --> 00:40:05,359

mile per carbon is still better in

1074

00:40:09,349 --> 00:40:07,359

electric car even if you're in a state

1075

00:40:12,150 --> 00:40:09,359

that's depending on

1076

00:40:13,030 --> 00:40:12,160

say coal to produce that electricity

1077

00:40:13,829 --> 00:40:13,040

so

1078

00:40:15,510 --> 00:40:13,839

um

1079

00:40:17,990 --> 00:40:15,520

will we get to a point where we all

1080

00:40:19,910 --> 00:40:18,000

switch over um

1081

00:40:21,510 --> 00:40:19,920

you know that's like most things that's

1082

00:40:23,430 --> 00:40:21,520

like political will and the

1083

00:40:25,589 --> 00:40:23,440

infrastructure has to be there you know

1084

00:40:27,430 --> 00:40:25,599

like it's sometimes a chicken and egg

1085

00:40:28,950 --> 00:40:27,440

thing right where it's like

1086

00:40:30,790 --> 00:40:28,960

you know you don't want to put in an

1087

00:40:32,550 --> 00:40:30,800

electric charging station until there's

1088

00:40:33,829 --> 00:40:32,560

cars that are going to use it but cars

1089

00:40:36,630 --> 00:40:33,839

aren't going to want to switch until

1090

00:40:39,030 --> 00:40:36,640

there's electric charging stations um

1091

00:40:40,550 --> 00:40:39,040

and so i think you know there at least

1092

00:40:42,790 --> 00:40:40,560

in the part of the country that i'm

1093

00:40:45,670 --> 00:40:42,800

living you know the electric charging

1094

00:40:47,510 --> 00:40:45,680

was at a point where i felt comfortable

1095

00:40:48,390 --> 00:40:47,520

that i could get anywhere that i needed

1096

00:40:51,030 --> 00:40:48,400

to

1097

00:40:53,430 --> 00:40:51,040

you know using that infrastructure um

1098

00:40:55,589 --> 00:40:53,440

and so i feel like

1099

00:40:57,030 --> 00:40:55,599

it's only going to increase as you know

1100

00:40:59,829 --> 00:40:57,040

more and more of that infrastructure

1101
00:41:02,470 --> 00:40:59,839
gets gets put in and people can feel

1102
00:41:04,230 --> 00:41:02,480
more safe and secure

1103
00:41:06,790 --> 00:41:04,240
right about

1104
00:41:09,510 --> 00:41:06,800
switching to that form of transportation

1105
00:41:11,349 --> 00:41:09,520
yeah i mean i have a friend that has one

1106
00:41:13,109 --> 00:41:11,359
a tesla and he said that

1107
00:41:14,790 --> 00:41:13,119
um it's not really that much of a hassle

1108
00:41:16,470 --> 00:41:14,800
to drive along and you can get these

1109
00:41:18,069 --> 00:41:16,480
quick charges in 20 minutes you can be

1110
00:41:20,150 --> 00:41:18,079
on your way get a cup of coffee and golf

1111
00:41:22,550 --> 00:41:20,160
so it's a little longer than fueling up

1112
00:41:24,470 --> 00:41:22,560
so uh jan is asking did you see the

1113
00:41:26,309 --> 00:41:24,480

article today that the core of the earth

1114

00:41:28,790 --> 00:41:26,319

is cooling faster than expected

1115

00:41:30,550 --> 00:41:28,800

indicating it is becoming inactive

1116

00:41:32,829 --> 00:41:30,560

like other planets meaning in time

1117

00:41:37,510 --> 00:41:32,839

humans can't live here

1118

00:41:40,230 --> 00:41:37,520

anymore yo excuse me like mars and uh

1119

00:41:41,670 --> 00:41:40,240

that yeah that does cause uh that does

1120

00:41:44,550 --> 00:41:41,680

cause problems

1121

00:41:46,829 --> 00:41:44,560

did you see that article anyone

1122

00:41:50,150 --> 00:41:46,839

i'd rather not see that article

1123

00:41:53,109 --> 00:41:50,160

no and i mean i guess i would say that

1124

00:41:57,030 --> 00:41:54,950

yeah i mean things are happening on

1125

00:41:58,309 --> 00:41:57,040

geologic time scales and so at some

1126

00:42:01,430 --> 00:41:58,319

point the world is going to be

1127

00:42:04,309 --> 00:42:01,440

inhabitable if you humans i feel like

1128

00:42:06,069 --> 00:42:04,319

like don't want a huge long time scale

1129

00:42:07,589 --> 00:42:06,079

we don't want to speed it up and i would

1130

00:42:09,510 --> 00:42:07,599

say no climate

1131

00:42:11,670 --> 00:42:09,520

climate change

1132

00:42:12,550 --> 00:42:11,680

is happening

1133

00:42:17,510 --> 00:42:12,560

in the

1134

00:42:18,790 --> 00:42:17,520

atmosphere it doesn't affect um it

1135

00:42:20,630 --> 00:42:18,800

doesn't affect

1136

00:42:23,109 --> 00:42:20,640

the core of the earth we can't we

1137

00:42:25,190 --> 00:42:23,119

literally can't touch it right we're

1138

00:42:27,910 --> 00:42:25,200

very far away from it we aren't having a

1139

00:42:30,150 --> 00:42:27,920

direct influence on it um and you know

1140

00:42:32,309 --> 00:42:30,160

and the core has done all kinds of weird

1141

00:42:36,230 --> 00:42:32,319

stuff like we the the polls reverse

1142

00:42:37,430 --> 00:42:36,240

their magnetism um on on a on a geologic

1143

00:42:40,230 --> 00:42:37,440

scale so

1144

00:42:42,069 --> 00:42:40,240

that's interesting but we can't affect

1145

00:42:43,670 --> 00:42:42,079

we we have no effect on that we don't

1146

00:42:45,750 --> 00:42:43,680

have the ability to

1147

00:42:48,150 --> 00:42:45,760

make any change like that

1148

00:42:49,910 --> 00:42:48,160

i want to put this up because um a few

1149

00:42:51,270 --> 00:42:49,920

people in chat have said i was mean by

1150

00:42:53,190 --> 00:42:51,280

kicking out the guy that kept saying

1151
00:42:55,270 --> 00:42:53,200
about the shorelines being the same so i

1152
00:42:58,390 --> 00:42:55,280
guess you can go back in time

1153
00:43:00,870 --> 00:42:58,400
somehow through google earth

1154
00:43:02,309 --> 00:43:00,880
so the shorelines look the same around

1155
00:43:03,349 --> 00:43:02,319
florida and beaches

1156
00:43:05,109 --> 00:43:03,359
and

1157
00:43:07,030 --> 00:43:05,119
uh mark at different points blah blah

1158
00:43:08,710 --> 00:43:07,040
blah anyone want to want to tackle that

1159
00:43:11,510 --> 00:43:08,720
because that's coming up a lot in in

1160
00:43:13,510 --> 00:43:11,520
chat you know i have i i'm sure megan

1161
00:43:16,150 --> 00:43:13,520
has a lot to say um i have one thing to

1162
00:43:17,190 --> 00:43:16,160
say is you know i went to north carolina

1163
00:43:19,589 --> 00:43:17,200

um

1164

00:43:22,950 --> 00:43:19,599

for christmas and we went to the beach

1165

00:43:24,950 --> 00:43:22,960

and because the shoreline was eroding

1166

00:43:28,069 --> 00:43:24,960

there had been this big investment to

1167

00:43:30,390 --> 00:43:28,079

take all of the sand and pump it

1168

00:43:32,630 --> 00:43:30,400

off of the ocean floor back up onto the

1169

00:43:34,309 --> 00:43:32,640

coastline in order to maintain the coast

1170

00:43:37,109 --> 00:43:34,319

so that people could continue living

1171

00:43:38,069 --> 00:43:37,119

there so if we're not seeing changes you

1172

00:43:42,790 --> 00:43:38,079

know

1173

00:43:44,710 --> 00:43:42,800

live on these coastlines we're investing

1174

00:43:46,470 --> 00:43:44,720

money in maintaining them

1175

00:43:49,349 --> 00:43:46,480

um that was at least what's happening

1176

00:43:53,270 --> 00:43:49,359

along the coast of north carolina um

1177

00:43:56,150 --> 00:43:53,280

active kind of re-building of these um

1178

00:43:57,990 --> 00:43:56,160

degrading coastlines so another a kind

1179

00:43:59,349 --> 00:43:58,000

of a strange question are there some

1180

00:44:02,309 --> 00:43:59,359

places where

1181

00:44:05,589 --> 00:44:02,319

the sea level seems higher than other

1182

00:44:07,190 --> 00:44:05,599

places because of uh like uh the moon's

1183

00:44:09,910 --> 00:44:07,200

orbit or something like that i mean does

1184

00:44:11,670 --> 00:44:09,920

do things change on the planet as far as

1185

00:44:12,630 --> 00:44:11,680

what we see in height

1186

00:44:15,430 --> 00:44:12,640

change

1187

00:44:17,510 --> 00:44:15,440

or is it all the same even evenly

1188

00:44:18,710 --> 00:44:17,520

there's spring tides and neap tides and

1189

00:44:20,829 --> 00:44:18,720

that kind of has to do with the

1190

00:44:22,550 --> 00:44:20,839

alignment

1191

00:44:25,990 --> 00:44:22,560

of um

1192

00:44:27,510 --> 00:44:26,000

the earth sun and moon altogether um

1193

00:44:29,270 --> 00:44:27,520

but

1194

00:44:31,670 --> 00:44:29,280

i mean i wouldn't say there's only one

1195

00:44:33,589 --> 00:44:31,680

place that has like a faster rate of sea

1196

00:44:35,829 --> 00:44:33,599

level change than anywhere else it's

1197

00:44:37,750 --> 00:44:35,839

it's they're all the oceans are all

1198

00:44:40,790 --> 00:44:37,760

connected you know they're all

1199

00:44:43,190 --> 00:44:40,800

um just a big body of water that is

1200

00:44:46,150 --> 00:44:43,200

broken up somewhat by these floating

1201

00:44:48,550 --> 00:44:46,160

pieces of land um so

1202

00:44:51,190 --> 00:44:48,560

yeah i mean where where did these people

1203

00:44:53,670 --> 00:44:51,200

get there i'm wondering if they have any

1204

00:44:54,470 --> 00:44:53,680

satellite experience or if they know how

1205

00:44:55,430 --> 00:44:54,480

to

1206

00:44:57,990 --> 00:44:55,440

um

1207

00:44:59,030 --> 00:44:58,000

you know maybe maybe they do maybe they

1208

00:45:01,270 --> 00:44:59,040

have

1209

00:45:03,750 --> 00:45:01,280

remote sensing experience and know how

1210

00:45:06,309 --> 00:45:03,760

to look at this imagery in a really

1211

00:45:07,750 --> 00:45:06,319

finely nuanced way

1212

00:45:09,990 --> 00:45:07,760

well i know there's there's a lot of

1213

00:45:11,990 --> 00:45:10,000

work in new orleans

1214

00:45:13,990 --> 00:45:12,000

for the shoreline there's a lot of work

1215

00:45:15,109 --> 00:45:14,000

as i mentioned before miami has done a

1216

00:45:16,790 --> 00:45:15,119

lot of work

1217

00:45:18,870 --> 00:45:16,800

um there's a lot of

1218

00:45:21,670 --> 00:45:18,880

places that are planning to raise

1219

00:45:23,670 --> 00:45:21,680

places up to accommodate it i mean it's

1220

00:45:24,710 --> 00:45:23,680

a real thing i don't know

1221

00:45:28,150 --> 00:45:24,720

um

1222

00:45:30,630 --> 00:45:28,160

maybe it can't be seen maybe

1223

00:45:32,150 --> 00:45:30,640

through the google earth system time

1224

00:45:32,950 --> 00:45:32,160

machine they have there i'm not really

1225

00:45:34,470 --> 00:45:32,960

sure

1226

00:45:35,430 --> 00:45:34,480

um but

1227

00:45:41,109 --> 00:45:35,440

it's

1228

00:45:44,069 --> 00:45:41,119

the rise in and the water is measurable

1229

00:45:47,030 --> 00:45:44,079

and so i just looked it up and um

1230

00:45:49,430 --> 00:45:47,040

our government says that global mean sea

1231

00:45:52,230 --> 00:45:49,440

level has risen about eight to nine

1232

00:45:54,150 --> 00:45:52,240

inches since 1880 so

1233

00:45:55,670 --> 00:45:54,160

you know i guess the question you know i

1234

00:45:57,510 --> 00:45:55,680

think this is getting at some of what i

1235

00:45:59,190 --> 00:45:57,520

was trying to say is that these changes

1236

00:46:01,910 --> 00:45:59,200

are happening

1237

00:46:04,550 --> 00:46:01,920

you know gradually right so eight to

1238

00:46:07,510 --> 00:46:04,560

nine inches over a long period of time

1239

00:46:09,990 --> 00:46:07,520

and so when we go back and we expect to

1240

00:46:13,270 --> 00:46:10,000

see these things in our lifetime

1241

00:46:15,510 --> 00:46:13,280

um that can be a little bit i think hard

1242

00:46:17,829 --> 00:46:15,520

um because these are these are slow

1243

00:46:19,910 --> 00:46:17,839

moving changes and but then they're

1244

00:46:21,990 --> 00:46:19,920

gonna keep changing there's like

1245

00:46:23,270 --> 00:46:22,000

there is inertia to them there's

1246

00:46:25,030 --> 00:46:23,280

momentum

1247

00:46:28,230 --> 00:46:25,040

they're gonna you know you set them in

1248

00:46:30,950 --> 00:46:28,240

motion they're gonna keep going um so

1249

00:46:33,829 --> 00:46:30,960

maybe we can't see eight to nine inches

1250

00:46:35,109 --> 00:46:33,839

since 1880 using google satellites but

1251

00:46:36,790 --> 00:46:35,119

you know

1252

00:46:39,670 --> 00:46:36,800

that doesn't mean that

1253

00:46:41,750 --> 00:46:39,680

it's not a real thing and again i also

1254

00:46:44,150 --> 00:46:41,760

yeah highlight that on our shorelines

1255

00:46:46,550 --> 00:46:44,160

we're actively working to maintain them

1256

00:46:48,390 --> 00:46:46,560

so there's also anthropogenic human

1257

00:46:49,589 --> 00:46:48,400

influence

1258

00:46:52,230 --> 00:46:49,599

that we're seeing

1259

00:46:55,030 --> 00:46:52,240

right here human is snap we see such a

1260

00:46:57,750 --> 00:46:55,040

small part of it and so it's helpful to

1261

00:47:00,069 --> 00:46:57,760

have instrumental records that

1262

00:47:01,910 --> 00:47:00,079

that live beyond what a human being can

1263

00:47:03,990 --> 00:47:01,920

live and go back further in time than

1264

00:47:06,470 --> 00:47:04,000

we're able to um

1265

00:47:08,630 --> 00:47:06,480

to live for um because yeah it's

1266

00:47:10,790 --> 00:47:08,640

happening over a time frame that's

1267

00:47:13,030 --> 00:47:10,800

longer than just one human's lifespan

1268

00:47:16,069 --> 00:47:13,040

but it's going it's yeah it's gaining

1269

00:47:18,950 --> 00:47:16,079

steam it's gaining momentum

1270

00:47:20,790 --> 00:47:18,960

uh i want to talk i i do want to end the

1271

00:47:22,710 --> 00:47:20,800

show where we're going to try to figure

1272

00:47:24,470 --> 00:47:22,720

out a way to

1273

00:47:25,750 --> 00:47:24,480

end on a positive note but one of the

1274

00:47:28,630 --> 00:47:25,760

things i do want to talk about you

1275

00:47:31,430 --> 00:47:28,640

mentioned megan earlier the red meat

1276

00:47:33,190 --> 00:47:31,440

ingestion and the cow methane i have a

1277

00:47:37,349 --> 00:47:33,200

friend that talks about this

1278

00:47:40,230 --> 00:47:37,359

um and methane is 80 times has 80 time

1279

00:47:41,990 --> 00:47:40,240

times the warming power of co2

1280

00:47:44,470 --> 00:47:42,000

and you know we do have a problem with

1281

00:47:46,630 --> 00:47:44,480

that with the permafrost melting and all

1282

00:47:49,030 --> 00:47:46,640

that you mentioned before but as far as

1283

00:47:49,910 --> 00:47:49,040

cows go from what i understand they

1284

00:47:53,270 --> 00:47:49,920

cause

1285

00:47:55,349 --> 00:47:53,280

as much um while global warming

1286

00:47:57,190 --> 00:47:55,359

um like you said the feathers up there

1287

00:47:59,750 --> 00:47:57,200

or whatever uh

1288

00:48:01,270 --> 00:47:59,760

as like all the transportation

1289

00:48:03,670 --> 00:48:01,280

in the world

1290

00:48:05,670 --> 00:48:03,680

i don't know if that's a true statistic

1291

00:48:07,190 --> 00:48:05,680

or not but uh

1292

00:48:09,670 --> 00:48:07,200

there's not really the only thing we can

1293

00:48:11,430 --> 00:48:09,680

do is become vegetation vegetarians

1294

00:48:14,309 --> 00:48:11,440

really i mean this what else can we do

1295

00:48:16,230 --> 00:48:14,319

as far as the cow methane goes

1296

00:48:18,710 --> 00:48:16,240

well it is it is like

1297

00:48:19,589 --> 00:48:18,720

um like rebecca said you know it's not

1298

00:48:22,390 --> 00:48:19,599

that

1299

00:48:24,309 --> 00:48:22,400

one individual has to eat zero meat it's

1300

00:48:26,950 --> 00:48:24,319

like millions of people need to cut out

1301

00:48:30,150 --> 00:48:26,960

meat once a week you know it it's the

1302

00:48:32,790 --> 00:48:30,160

power of large numbers working in tandem

1303

00:48:34,870 --> 00:48:32,800

um but there's also the effect of like

1304

00:48:37,670 --> 00:48:34,880

the reason the rain forest in brazil is

1305

00:48:40,150 --> 00:48:37,680

being deforested is for meat and soybean

1306

00:48:42,230 --> 00:48:40,160

meat production and soybean production

1307

00:48:44,790 --> 00:48:42,240

and so they're they're burning down

1308

00:48:47,990 --> 00:48:44,800

these jungle trees in order to make it

1309

00:48:50,309 --> 00:48:48,000

more conducive for agriculture and for

1310

00:48:53,270 --> 00:48:50,319

livestock raising and

1311

00:48:55,109 --> 00:48:53,280

and the rainforests are dubbed the lungs

1312

00:48:56,870 --> 00:48:55,119

of the world right we need these large

1313

00:48:59,270 --> 00:48:56,880

trees and this um

1314

00:49:00,069 --> 00:48:59,280

rich biomass to take carbon dioxide out

1315

00:49:04,230 --> 00:49:00,079

of the

1316

00:49:06,710 --> 00:49:04,240

the methane being really problematic

1317

00:49:09,349 --> 00:49:06,720

being more powerful than carbon dioxide

1318

00:49:11,349 --> 00:49:09,359

as a as a greenhouse gas but also the

1319

00:49:13,270 --> 00:49:11,359

fact that we're losing a carbon sink in

1320

00:49:15,190 --> 00:49:13,280

the form of the forest and

1321

00:49:16,549 --> 00:49:15,200

therefore emitting more carbon dioxide

1322

00:49:18,150 --> 00:49:16,559

in the process it

1323

00:49:20,150 --> 00:49:18,160

builds on top of itself there are

1324

00:49:23,030 --> 00:49:20,160

multiple factors that are

1325

00:49:25,829 --> 00:49:23,040

creating positive feedback loops that

1326
00:49:28,710 --> 00:49:25,839
build upon themselves and contribute um

1327
00:49:29,670 --> 00:49:28,720
to the problem again and again

1328
00:49:33,190 --> 00:49:29,680
i

1329
00:49:35,270 --> 00:49:33,200
um

1330
00:49:37,750 --> 00:49:35,280
the carbon footprint of beef relative to

1331
00:49:39,270 --> 00:49:37,760
other meat sources so there there's just

1332
00:49:42,309 --> 00:49:39,280
like beef is

1333
00:49:44,390 --> 00:49:42,319
beef is the most water intensive

1334
00:49:46,470 --> 00:49:44,400
kind of agriculture product it's the

1335
00:49:48,870 --> 00:49:46,480
most carbon intensive agricultural

1336
00:49:51,910 --> 00:49:48,880
product and a lot of these soybeans that

1337
00:49:53,829 --> 00:49:51,920
people are growing is to feed the beef

1338
00:49:55,430 --> 00:49:53,839

to grow the beef so

1339

00:49:58,790 --> 00:49:55,440

you know it's also that you know we're

1340

00:50:00,470 --> 00:49:58,800

growing food so then to grow beef for us

1341

00:50:01,589 --> 00:50:00,480

to eat um

1342

00:50:04,470 --> 00:50:01,599

and so

1343

00:50:06,470 --> 00:50:04,480

uh you know i still have hamburgers

1344

00:50:08,630 --> 00:50:06,480

every now and then but you know i think

1345

00:50:10,549 --> 00:50:08,640

in general i've tried to shift away from

1346

00:50:11,589 --> 00:50:10,559

that just just because

1347

00:50:14,630 --> 00:50:11,599

you know

1348

00:50:17,109 --> 00:50:14,640

things like chicken and um other protein

1349

00:50:19,030 --> 00:50:17,119

even if you don't want to go vegetarian

1350

00:50:21,670 --> 00:50:19,040

you know the the carbon and the water

1351
00:50:24,309 --> 00:50:21,680
footprint of those other meat sources is

1352
00:50:26,870 --> 00:50:24,319
a is dramatically smaller than it is you

1353
00:50:29,030 --> 00:50:26,880
know per kilocalorie per

1354
00:50:30,950 --> 00:50:29,040
weight per anything that you want to

1355
00:50:31,910 --> 00:50:30,960
divide by for beef

1356
00:50:34,470 --> 00:50:31,920
and also

1357
00:50:36,790 --> 00:50:34,480
when for anyone who didn't know we have

1358
00:50:39,109 --> 00:50:36,800
a lot of water on the planet but only

1359
00:50:41,190 --> 00:50:39,119
one percent of it is fresh water so

1360
00:50:42,470 --> 00:50:41,200
we're not working with a lot of fresh

1361
00:50:44,630 --> 00:50:42,480
water for the

1362
00:50:46,870 --> 00:50:44,640
seven billion people on the planet who

1363
00:50:48,950 --> 00:50:46,880

all need water to survive and then you

1364

00:50:51,829 --> 00:50:48,960

consider how much water goes into living

1365

00:50:53,990 --> 00:50:51,839

raising that livestock as well um so

1366

00:50:56,309 --> 00:50:54,000

like you know we got to protect what we

1367

00:50:58,710 --> 00:50:56,319

have it's it's critical it literally

1368

00:51:00,470 --> 00:50:58,720

water is literally life

1369

00:51:02,069 --> 00:51:00,480

and and back i know that's your more or

1370

00:51:04,630 --> 00:51:02,079

less your specialty

1371

00:51:07,670 --> 00:51:04,640

is is water and

1372

00:51:09,670 --> 00:51:07,680

so we need so many gallons per person

1373

00:51:11,910 --> 00:51:09,680

fresh water per person per day not just

1374

00:51:14,069 --> 00:51:11,920

for consumption but food

1375

00:51:17,190 --> 00:51:14,079

food raising and all that right

1376
00:51:19,750 --> 00:51:17,200
um yeah agriculture is the largest use

1377
00:51:21,829 --> 00:51:19,760
of water globally i mean in the us but

1378
00:51:23,910 --> 00:51:21,839
also globally so you look at like what

1379
00:51:26,870 --> 00:51:23,920
is freshwater used for

1380
00:51:29,670 --> 00:51:26,880
and like 70 of it is used

1381
00:51:33,510 --> 00:51:29,680
um for food production

1382
00:51:35,589 --> 00:51:33,520
and um i guess another point is that uh

1383
00:51:37,910 --> 00:51:35,599
in favor of renewable energy sources is

1384
00:51:40,230 --> 00:51:37,920
they use a lot less water than like a

1385
00:51:41,349 --> 00:51:40,240
fossil fuel power plant does so

1386
00:51:43,589 --> 00:51:41,359
you know

1387
00:51:46,069 --> 00:51:43,599
we're moving into this kind of future

1388
00:51:48,150 --> 00:51:46,079

where we have these uncertain hydrologic

1389

00:51:50,390 --> 00:51:48,160

patterns we have drier air is getting

1390

00:51:53,030 --> 00:51:50,400

drier wetter air is getting wetter you

1391

00:51:55,430 --> 00:51:53,040

know water scarcity water stress

1392

00:51:57,990 --> 00:51:55,440

and um

1393

00:52:00,150 --> 00:51:58,000

anyway like i think there we can get

1394

00:52:02,309 --> 00:52:00,160

these synergistic impacts right so if we

1395

00:52:04,150 --> 00:52:02,319

move to renewable energies we have both

1396

00:52:05,430 --> 00:52:04,160

the carbon benefit but also a water

1397

00:52:07,990 --> 00:52:05,440

benefit

1398

00:52:10,230 --> 00:52:08,000

yeah and i know places like california

1399

00:52:12,870 --> 00:52:10,240

have a lot of water struggles and you

1400

00:52:15,589 --> 00:52:12,880

know their almond raisin uses a lot more

1401

00:52:16,630 --> 00:52:15,599

water than a lot of other uh almonds i

1402

00:52:19,109 --> 00:52:16,640

can't remember what is something like

1403

00:52:20,870 --> 00:52:19,119

1900 gallons a pound or something like

1404

00:52:22,470 --> 00:52:20,880

that uh so

1405

00:52:24,790 --> 00:52:22,480

california has water i know this is

1406

00:52:27,270 --> 00:52:24,800

about climate change water issues

1407

00:52:29,190 --> 00:52:27,280

arizona's aquifers are you know they

1408

00:52:31,589 --> 00:52:29,200

have to go deeper and deeper to get to

1409

00:52:34,390 --> 00:52:31,599

them it's it's human activity it's

1410

00:52:36,630 --> 00:52:34,400

always about human activity that is uh

1411

00:52:39,030 --> 00:52:36,640

that is a problem

1412

00:52:40,549 --> 00:52:39,040

um for where we're going here jan has

1413

00:52:41,829 --> 00:52:40,559

another question here this can be quite

1414

00:52:44,069 --> 00:52:41,839

overwhelming do you have one or two

1415

00:52:45,589 --> 00:52:44,079

things each of us could do collectively

1416

00:52:48,069 --> 00:52:45,599

that could make an impact on slowing

1417

00:52:49,670 --> 00:52:48,079

down climate change good question

1418

00:52:50,710 --> 00:52:49,680

yeah thanks jana

1419

00:52:52,870 --> 00:52:50,720

um

1420

00:52:55,430 --> 00:52:52,880

yeah so i think it does feel

1421

00:52:57,349 --> 00:52:55,440

overwhelming and you know i'm i study

1422

00:52:59,190 --> 00:52:57,359

climate for my career so there are days

1423

00:53:02,230 --> 00:52:59,200

when i just feel like

1424

00:53:03,910 --> 00:53:02,240

you know crushed by the whole thing um

1425

00:53:06,549 --> 00:53:03,920

but i think kind of what i was trying to

1426
00:53:09,270 --> 00:53:06,559
advocate for earlier in the program of

1427
00:53:12,309 --> 00:53:09,280
you know try to try to find ways that

1428
00:53:14,790 --> 00:53:12,319
you can have a positive impact so reduce

1429
00:53:18,069 --> 00:53:14,800
your carbon footprint i calculated what

1430
00:53:19,510 --> 00:53:18,079
my carbon footprint is and my largest

1431
00:53:21,750 --> 00:53:19,520
emission was

1432
00:53:23,910 --> 00:53:21,760
flying you know so

1433
00:53:26,950 --> 00:53:23,920
now i think a little bit harder about do

1434
00:53:28,549 --> 00:53:26,960
i really need to make this flight um you

1435
00:53:30,790 --> 00:53:28,559
know can i

1436
00:53:31,510 --> 00:53:30,800
do this in a different way uh and you

1437
00:53:34,069 --> 00:53:31,520
know

1438
00:53:36,230 --> 00:53:34,079

i've tried to reduce the amount of beef

1439

00:53:38,710 --> 00:53:36,240

that i eat and the amount of meat that i

1440

00:53:40,790 --> 00:53:38,720

eat and i recognize that like you know i

1441

00:53:43,430 --> 00:53:40,800

am just this small little drop in the

1442

00:53:46,470 --> 00:53:43,440

bucket but then you know i think the

1443

00:53:48,710 --> 00:53:46,480

trick is to communicate that so

1444

00:53:51,030 --> 00:53:48,720

talk to your friends and talk to your

1445

00:53:54,309 --> 00:53:51,040

neighbors and talk to your colleagues

1446

00:53:57,109 --> 00:53:54,319

and go on podcasts like this and

1447

00:53:59,109 --> 00:53:57,119

or shows and you know talk about it and

1448

00:54:01,190 --> 00:53:59,119

and hopefully you know you can you can

1449

00:54:03,750 --> 00:54:01,200

be like the drop in the bucket that then

1450

00:54:06,549 --> 00:54:03,760

has ripples right and and

1451
00:54:08,630 --> 00:54:06,559
and then we can have a collective impact

1452
00:54:10,230 --> 00:54:08,640
another thing that um

1453
00:54:12,549 --> 00:54:10,240
i read that i think is a really great

1454
00:54:14,230 --> 00:54:12,559
idea is to also then support

1455
00:54:16,790 --> 00:54:14,240
organizations

1456
00:54:18,790 --> 00:54:16,800
that are um focused on addressing these

1457
00:54:19,910 --> 00:54:18,800
issues kind of at the systemic level

1458
00:54:21,589 --> 00:54:19,920
right so

1459
00:54:24,230 --> 00:54:21,599
maybe an organization that's really

1460
00:54:25,990 --> 00:54:24,240
focused on trying to pass legislation or

1461
00:54:29,030 --> 00:54:26,000
you know support certain

1462
00:54:31,510 --> 00:54:29,040
bills and you know if you can

1463
00:54:33,430 --> 00:54:31,520

give your financial or time financial

1464

00:54:35,589 --> 00:54:33,440

support or time to those organizations

1465

00:54:38,630 --> 00:54:35,599

you know then then that also has that

1466

00:54:40,150 --> 00:54:38,640

kind of ballooning positive effect

1467

00:54:44,630 --> 00:54:40,160

very good i think your cat is

1468

00:54:50,870 --> 00:54:47,750

yeah uh any any thoughts on that also

1469

00:54:54,069 --> 00:54:50,880

megan what what can you do use your

1470

00:54:56,150 --> 00:54:54,079

voice you like please like your voice is

1471

00:54:57,750 --> 00:54:56,160

powerful i was really scared to come on

1472

00:54:59,190 --> 00:54:57,760

this podcast because i was like people

1473

00:54:59,910 --> 00:54:59,200

are going to hunt me down and like you

1474

00:55:04,950 --> 00:54:59,920

know

1475

00:55:08,150 --> 00:55:04,960

but like it's worth it to speak up and

1476

00:55:10,069 --> 00:55:08,160

like we have to work together and we

1477

00:55:12,710 --> 00:55:10,079

have to be willing to talk about this

1478

00:55:14,870 --> 00:55:12,720

and if someone's blatantly saying

1479

00:55:18,150 --> 00:55:14,880

that it's not happening or it's not due

1480

00:55:20,230 --> 00:55:18,160

to human activity that's

1481

00:55:21,829 --> 00:55:20,240

wrong that is factually wrong it doesn't

1482

00:55:24,150 --> 00:55:21,839

mean that person is a bad person it

1483

00:55:26,630 --> 00:55:24,160

doesn't make them less intelligent it's

1484

00:55:28,470 --> 00:55:26,640

just a factually incorrect statement so

1485

00:55:30,549 --> 00:55:28,480

like don't be afraid to stand up to it

1486

00:55:33,670 --> 00:55:30,559

and be like that's not true like

1487

00:55:35,910 --> 00:55:33,680

we know definitively exactly

1488

00:55:38,390 --> 00:55:35,920

what is causing this change to happen so

1489

00:55:40,470 --> 00:55:38,400

rapidly it's us we're doing it we can

1490

00:55:42,789 --> 00:55:40,480

choose to undo it and there is a lot of

1491

00:55:43,589 --> 00:55:42,799

agency that can be found in recognizing

1492

00:55:45,670 --> 00:55:43,599

that

1493

00:55:48,630 --> 00:55:45,680

um we got ourselves into this mess and

1494

00:55:50,789 --> 00:55:48,640

we do have a lot of tools available for

1495

00:55:52,150 --> 00:55:50,799

us to try and get ourselves out of this

1496

00:55:53,670 --> 00:55:52,160

mess and to work toward a more

1497

00:55:56,069 --> 00:55:53,680

sustainable future

1498

00:55:58,470 --> 00:55:56,079

um but yeah you know try and conserve

1499

00:56:00,150 --> 00:55:58,480

water use if you live in a dry place i'd

1500

00:56:02,630 --> 00:56:00,160

say like learn what learn what the

1501

00:56:05,109 --> 00:56:02,640

challenges are in your regional area

1502

00:56:07,030 --> 00:56:05,119

mine is drought and wildfire

1503

00:56:09,270 --> 00:56:07,040

i volunteer at the at the fire

1504

00:56:11,990 --> 00:56:09,280

department because that might save

1505

00:56:14,150 --> 00:56:12,000

someone's house someday you know like i

1506

00:56:16,470 --> 00:56:14,160

i contribute my time and my money in

1507

00:56:17,990 --> 00:56:16,480

ways that try to support the efforts

1508

00:56:20,630 --> 00:56:18,000

that go toward

1509

00:56:23,750 --> 00:56:20,640

making our communities more resilient

1510

00:56:25,270 --> 00:56:23,760

and stronger against these very extreme

1511

00:56:27,589 --> 00:56:25,280

changes and

1512

00:56:30,150 --> 00:56:27,599

you have a lot of power every individual

1513

00:56:31,829 --> 00:56:30,160

person has a lot of agency and so don't

1514

00:56:35,589 --> 00:56:31,839

be afraid to use it and don't be afraid

1515

00:56:37,750 --> 00:56:35,599

to exercise it and yeah if we if we all

1516

00:56:40,069 --> 00:56:37,760

just make small changes together the

1517

00:56:43,510 --> 00:56:40,079

power of large numbers will will bring

1518

00:56:45,589 --> 00:56:43,520

changes that are tangible to fruition

1519

00:56:46,549 --> 00:56:45,599

one of the things that go ahead becca go

1520

00:56:48,549 --> 00:56:46,559

ahead

1521

00:56:50,230 --> 00:56:48,559

i'll interrupt you um

1522

00:56:52,470 --> 00:56:50,240

the other kind of point i want to make

1523

00:56:54,710 --> 00:56:52,480

is that you know each bit of warming

1524

00:56:56,549 --> 00:56:54,720

that we experience the consequences get

1525

00:56:59,670 --> 00:56:56,559

worse and worse and worse and worse you

1526
00:57:02,470 --> 00:56:59,680
know so you know i think every little

1527
00:57:04,230 --> 00:57:02,480
bit that we can do to help kind of keep

1528
00:57:06,390 --> 00:57:04,240
you know the warming

1529
00:57:08,549 --> 00:57:06,400
to like one and a half degrees celsius

1530
00:57:10,870 --> 00:57:08,559
instead of two or three or four degrees

1531
00:57:12,390 --> 00:57:10,880
like that is going to be

1532
00:57:13,910 --> 00:57:12,400
noticeable

1533
00:57:14,870 --> 00:57:13,920
these are going to be noticeably

1534
00:57:17,190 --> 00:57:14,880
different

1535
00:57:19,270 --> 00:57:17,200
you know negative outcomes

1536
00:57:21,109 --> 00:57:19,280
that scale with each kind of increment

1537
00:57:22,710 --> 00:57:21,119
of warming so i think everything that we

1538
00:57:24,950 --> 00:57:22,720

can collectively do

1539

00:57:28,069 --> 00:57:24,960

to limit that warming means like a

1540

00:57:29,910 --> 00:57:28,079

better outcome for the world

1541

00:57:31,670 --> 00:57:29,920

and there's uh

1542

00:57:34,710 --> 00:57:31,680

what do they call it when they geo

1543

00:57:35,670 --> 00:57:34,720

engineering that that kind of scares me

1544

00:57:37,510 --> 00:57:35,680

um

1545

00:57:39,190 --> 00:57:37,520

some of the thoughts what kind of scares

1546

00:57:42,069 --> 00:57:39,200

me is you know

1547

00:57:44,150 --> 00:57:42,079

for every action there's a reaction and

1548

00:57:45,270 --> 00:57:44,160

you can go too far with something and

1549

00:57:47,670 --> 00:57:45,280

you could

1550

00:57:48,870 --> 00:57:47,680

you know tip it the other way and there

1551

00:57:52,870 --> 00:57:48,880

they talk about

1552

00:57:55,030 --> 00:57:52,880

um working on cirrus clouds um

1553

00:57:57,990 --> 00:57:55,040

you know just because they hold in the

1554

00:57:59,990 --> 00:57:58,000

heat they talk about reflective things

1555

00:58:01,349 --> 00:58:00,000

in the atmosphere like in an aerosol

1556

00:58:03,589 --> 00:58:01,359

reflective

1557

00:58:05,270 --> 00:58:03,599

um situation but i i think that's kind

1558

00:58:06,950 --> 00:58:05,280

of messing with mother nature and what

1559

00:58:08,470 --> 00:58:06,960

are your thoughts on that either one of

1560

00:58:10,230 --> 00:58:08,480

you

1561

00:58:12,309 --> 00:58:10,240

yeah first and foremost we got to just

1562

00:58:14,470 --> 00:58:12,319

keep fossil fuels in the ground and and

1563

00:58:15,349 --> 00:58:14,480

harvest energy from other sources that

1564

00:58:20,630 --> 00:58:15,359

is

1565

00:58:22,390 --> 00:58:20,640

goal um and if we were to put aerosols

1566

00:58:24,309 --> 00:58:22,400

in the atmosphere like that's going to

1567

00:58:27,030 --> 00:58:24,319

be a temporary that's a band-aid you

1568

00:58:29,829 --> 00:58:27,040

know it doesn't last forever it's a it's

1569

00:58:31,910 --> 00:58:29,839

a very temporary solution solution i

1570

00:58:32,710 --> 00:58:31,920

won't call it a true solution

1571

00:58:34,069 --> 00:58:32,720

um

1572

00:58:36,309 --> 00:58:34,079

and we don't know

1573

00:58:38,390 --> 00:58:36,319

the the consequences of that are also

1574

00:58:39,910 --> 00:58:38,400

unknown to us the unknown unknowns we

1575

00:58:40,630 --> 00:58:39,920

don't know um

1576

00:58:43,430 --> 00:58:40,640

if

1577

00:58:45,910 --> 00:58:43,440

the materials we choose will be safe to

1578

00:58:49,030 --> 00:58:45,920

go into waterways or if they could have

1579

00:58:51,510 --> 00:58:49,040

other um negative health impacts for

1580

00:58:53,430 --> 00:58:51,520

whatever creatures come into contact

1581

00:58:54,630 --> 00:58:53,440

with those aerosols

1582

00:58:56,630 --> 00:58:54,640

so it really depends on what they're

1583

00:58:59,510 --> 00:58:56,640

made out of but

1584

00:59:01,829 --> 00:58:59,520

it's not going to be a big enough

1585

00:59:03,190 --> 00:59:01,839

solution on its own to the overwhelming

1586

00:59:05,670 --> 00:59:03,200

amount of

1587

00:59:07,430 --> 00:59:05,680

emissions that we're pumping out

1588

00:59:09,990 --> 00:59:07,440

sometimes people talk about

1589

00:59:11,589 --> 00:59:10,000

geoengineering um

1590

00:59:13,750 --> 00:59:11,599

i guess you know i think i would i would

1591

00:59:15,589 --> 00:59:13,760

think of it in two different ways so and

1592

00:59:17,190 --> 00:59:15,599

maybe people define it differently but i

1593

00:59:19,109 --> 00:59:17,200

think if there's engineering where we're

1594

00:59:21,670 --> 00:59:19,119

trying to kind of sequester more of that

1595

00:59:24,069 --> 00:59:21,680

carbon below ground and so

1596

00:59:25,829 --> 00:59:24,079

carbon capture and storage or

1597

00:59:28,470 --> 00:59:25,839

you know doing enhanced mineral

1598

00:59:30,789 --> 00:59:28,480

weathering to try to kind of speed up

1599

00:59:32,630 --> 00:59:30,799

the sequestration and pulling of carbon

1600

00:59:34,630 --> 00:59:32,640

out of the atmosphere into below ground

1601
00:59:37,910 --> 00:59:34,640
reservoirs um

1602
00:59:40,470 --> 00:59:37,920
trying to store carbon in soils

1603
00:59:42,390 --> 00:59:40,480
that level of geoengineering i think is

1604
00:59:44,069 --> 00:59:42,400
actually i feel comfortable with and i

1605
00:59:46,470 --> 00:59:44,079
think would be really positive because

1606
00:59:48,870 --> 00:59:46,480
ultimately that's pulling co2 out of the

1607
00:59:49,829 --> 00:59:48,880
atmosphere and putting it back below

1608
00:59:52,069 --> 00:59:49,839
ground

1609
00:59:53,910 --> 00:59:52,079
yes the type of geoengineering i feel

1610
00:59:56,069 --> 00:59:53,920
uncomfortable with is the like let's

1611
00:59:57,990 --> 00:59:56,079
just keep putting co2 in the atmosphere

1612
00:59:59,589 --> 00:59:58,000
but let's kind of like

1613
01:00:02,230 --> 00:59:59,599

reflect the sun

1614

01:00:03,349 --> 01:00:02,240

off of our atmosphere because

1615

01:00:06,630 --> 01:00:03,359

you know

1616

01:00:09,430 --> 01:00:06,640

the minute those reflectors disappear or

1617

01:00:12,309 --> 01:00:09,440

fall or you know i don't know like

1618

01:00:13,670 --> 01:00:12,319

then we have this huge blanket of co2

1619

01:00:15,109 --> 01:00:13,680

around our atmosphere and we're going to

1620

01:00:18,549 --> 01:00:15,119

get like a

1621

01:00:20,789 --> 01:00:18,559

a big sudden response to that um so

1622

01:00:23,190 --> 01:00:20,799

that's the type of geoengineering like

1623

01:00:25,030 --> 01:00:23,200

messing with the atmosphere and and like

1624

01:00:27,190 --> 01:00:25,040

the energy coming in from the sun where

1625

01:00:30,150 --> 01:00:27,200

i start to feel uncomfortable

1626

01:00:32,390 --> 01:00:30,160

right here's a uh rob on earth

1627

01:00:34,150 --> 01:00:32,400

that's a good name for this show if we

1628

01:00:36,630 --> 01:00:34,160

stopped using fossil fuels today how

1629

01:00:39,510 --> 01:00:36,640

much warming would we see after things

1630

01:00:46,069 --> 01:00:42,549

if we were to succeed in

1631

01:00:49,109 --> 01:00:46,079

completely ceasing all emissions today

1632

01:00:51,990 --> 01:00:49,119

we would definitely stay below the two

1633

01:00:53,910 --> 01:00:52,000

degrees celsius warming target

1634

01:00:56,549 --> 01:00:53,920

like i probably would say there's like a

1635

01:00:58,630 --> 01:00:56,559

tenth of a degree or two tenths of a

1636

01:01:01,670 --> 01:00:58,640

degree that would happen as a

1637

01:01:03,430 --> 01:01:01,680

consequence of all of our past emissions

1638

01:01:05,829 --> 01:01:03,440

but um

1639

01:01:08,470 --> 01:01:05,839

it's it's just it's not gonna happen you

1640

01:01:10,710 --> 01:01:08,480

know like i wish it would um

1641

01:01:12,230 --> 01:01:10,720

so so that's why

1642

01:01:14,150 --> 01:01:12,240

these climate scientists are like we

1643

01:01:15,750 --> 01:01:14,160

have a narrow window of time to make

1644

01:01:18,630 --> 01:01:15,760

this happen it's because it is still

1645

01:01:19,910 --> 01:01:18,640

possible um but the more we

1646

01:01:22,630 --> 01:01:19,920

allow

1647

01:01:25,990 --> 01:01:22,640

this accumulation of carbon dioxide to

1648

01:01:27,430 --> 01:01:26,000

build up and methane to build up

1649

01:01:29,270 --> 01:01:27,440

is going to make it

1650

01:01:31,109 --> 01:01:29,280

really really hard for us to pull the

1651

01:01:32,470 --> 01:01:31,119

ball back up onto the precipice it's

1652

01:01:33,990 --> 01:01:32,480

going to get further and further away

1653

01:01:35,430 --> 01:01:34,000

from us and it's going to take more of a

1654

01:01:36,870 --> 01:01:35,440

herculean

1655

01:01:38,789 --> 01:01:36,880

effort to

1656

01:01:39,670 --> 01:01:38,799

to pull it back up to

1657

01:01:43,030 --> 01:01:39,680

a

1658

01:01:45,510 --> 01:01:43,040

live in so

1659

01:01:48,069 --> 01:01:45,520

um yeah if we completely suddenly were

1660

01:01:49,829 --> 01:01:48,079

like boom we have nuclear fusion boom we

1661

01:01:51,910 --> 01:01:49,839

have renewables everywhere we don't need

1662

01:01:54,710 --> 01:01:51,920

to burn any more carbon dioxide like

1663

01:01:57,109 --> 01:01:54,720

amazing we'd be good to go um we would

1664

01:01:59,109 --> 01:01:57,119

still experience a little bit of warming

1665

01:01:59,990 --> 01:01:59,119

but not enough to be like we have wiped

1666

01:02:01,589 --> 01:02:00,000

out

1667

01:02:03,990 --> 01:02:01,599

earth

1668

01:02:05,990 --> 01:02:04,000

yeah i think that the model you know the

1669

01:02:07,510 --> 01:02:06,000

so one and a half degrees is kind of

1670

01:02:10,230 --> 01:02:07,520

this current

1671

01:02:12,230 --> 01:02:10,240

you know benchmark that we're aiming for

1672

01:02:14,549 --> 01:02:12,240

i think nothing is on target for that

1673

01:02:16,950 --> 01:02:14,559

like the paris agreement the agreements

1674

01:02:18,470 --> 01:02:16,960

made in glasgow recently like

1675

01:02:20,549 --> 01:02:18,480

none of that is going to get us to that

1676

01:02:21,990 --> 01:02:20,559

one and a half degree

1677

01:02:24,950 --> 01:02:22,000

benchmark but

1678

01:02:27,190 --> 01:02:24,960

the um you know the modeling scenarios

1679

01:02:28,950 --> 01:02:27,200

that are looking at you know

1680

01:02:32,309 --> 01:02:28,960

how would it be possible to get there

1681

01:02:35,190 --> 01:02:32,319

they all involve you know transitioning

1682

01:02:36,870 --> 01:02:35,200

um you know to these uh low carbon

1683

01:02:39,750 --> 01:02:36,880

emission

1684

01:02:41,910 --> 01:02:39,760

sources and then making you know lots of

1685

01:02:42,630 --> 01:02:41,920

changes to our transportation systems

1686

01:02:46,390 --> 01:02:42,640

and

1687

01:02:48,549 --> 01:02:46,400

involved was some sort of form of this

1688

01:02:50,150 --> 01:02:48,559

carbon capture so this moving and

1689

01:02:52,150 --> 01:02:50,160

sequestering our carbon out of the

1690

01:02:53,990 --> 01:02:52,160

atmosphere and storing it in soils or

1691

01:02:54,789 --> 01:02:54,000

storing it below ground

1692

01:02:56,230 --> 01:02:54,799

um

1693

01:02:57,109 --> 01:02:56,240

so

1694

01:03:00,230 --> 01:02:57,119

yeah

1695

01:03:01,270 --> 01:03:00,240

um one of the things i i've heard people

1696

01:03:02,789 --> 01:03:01,280

say

1697

01:03:04,630 --> 01:03:02,799

in the past is

1698

01:03:06,789 --> 01:03:04,640

why should we as a nation do anything

1699

01:03:09,670 --> 01:03:06,799

about this of course i know we're the

1700

01:03:11,430 --> 01:03:09,680

number one use you know uh offender but

1701
01:03:13,349 --> 01:03:11,440
why should we do anything as a nation

1702
01:03:15,430 --> 01:03:13,359
about this if other countries that are

1703
01:03:19,430 --> 01:03:15,440
not part of the paris climate accord for

1704
01:03:21,349 --> 01:03:19,440
one uh will not do anything themselves

1705
01:03:22,230 --> 01:03:21,359
so

1706
01:03:27,750 --> 01:03:22,240
um

1707
01:03:29,829 --> 01:03:27,760
uh in the u.s we we are like we've

1708
01:03:32,069 --> 01:03:29,839
emitted the most carbon and we are

1709
01:03:34,309 --> 01:03:32,079
currently like per person the largest

1710
01:03:36,230 --> 01:03:34,319
emitters of carbon um

1711
01:03:37,589 --> 01:03:36,240
so i think you know

1712
01:03:39,589 --> 01:03:37,599
we've gone

1713
01:03:41,349 --> 01:03:39,599

like most of the carbon dioxide that

1714

01:03:43,270 --> 01:03:41,359

exists in the atmosphere

1715

01:03:45,349 --> 01:03:43,280

is because of us and what we've done

1716

01:03:47,510 --> 01:03:45,359

here in the us and so

1717

01:03:50,150 --> 01:03:47,520

um you know other countries are

1718

01:03:52,069 --> 01:03:50,160

following in our footsteps and

1719

01:03:53,990 --> 01:03:52,079

you know we can't blame them for that

1720

01:03:57,349 --> 01:03:54,000

because we have this amazing quality of

1721

01:03:59,349 --> 01:03:57,359

life that other nations want to achieve

1722

01:04:01,349 --> 01:03:59,359

um so i think

1723

01:04:03,029 --> 01:04:01,359

we should be the leaders

1724

01:04:04,950 --> 01:04:03,039

kind of saying like okay we've had the

1725

01:04:07,109 --> 01:04:04,960

benefit of all this

1726
01:04:08,069 --> 01:04:07,119
carbon we've achieved this great quality

1727
01:04:09,910 --> 01:04:08,079
of life

1728
01:04:11,029 --> 01:04:09,920
and you know we have the ability to

1729
01:04:14,710 --> 01:04:11,039
invest

1730
01:04:17,190 --> 01:04:14,720
and create this you know low carbon

1731
01:04:18,150 --> 01:04:17,200
technology and pathways and then you

1732
01:04:20,870 --> 01:04:18,160
know

1733
01:04:22,069 --> 01:04:20,880
help other countries develop using that

1734
01:04:23,270 --> 01:04:22,079
low carbon

1735
01:04:25,750 --> 01:04:23,280
um

1736
01:04:28,150 --> 01:04:25,760
you know and also

1737
01:04:32,390 --> 01:04:29,990
if you look at who's going to suffer the

1738
01:04:34,789 --> 01:04:32,400

consequences of climate change it's all

1739

01:04:37,349 --> 01:04:34,799

the people who did not emit the carbon

1740

01:04:39,190 --> 01:04:37,359

right i mean we we are going to suffer

1741

01:04:41,670 --> 01:04:39,200

from climate change but

1742

01:04:43,510 --> 01:04:41,680

the people who are really gonna be like

1743

01:04:44,789 --> 01:04:43,520

having the negative health effects you

1744

01:04:47,270 --> 01:04:44,799

know being

1745

01:04:49,430 --> 01:04:47,280

uh refugees because they can't live at

1746

01:04:52,470 --> 01:04:49,440

the equator any longer you know it's

1747

01:04:55,109 --> 01:04:52,480

these kind of poorer nations that their

1748

01:04:57,670 --> 01:04:55,119

carbon footprint is tiny compared to us

1749

01:05:00,069 --> 01:04:57,680

and so i personally see it as kind of an

1750

01:05:01,910 --> 01:05:00,079

ethical issue right like

1751

01:05:04,470 --> 01:05:01,920

this is the

1752

01:05:05,990 --> 01:05:04,480

this is our dirty laundry basically like

1753

01:05:09,430 --> 01:05:06,000

we need to

1754

01:05:11,829 --> 01:05:09,440

take care of it

1755

01:05:13,990 --> 01:05:11,839

very good uh we had phil long time

1756

01:05:16,069 --> 01:05:14,000

listener phil he wanted to know why

1757

01:05:17,829 --> 01:05:16,079

would a warmer earth be worse than a

1758

01:05:19,589 --> 01:05:17,839

colder earth

1759

01:05:21,670 --> 01:05:19,599

he said it sounds like a funny question

1760

01:05:23,510 --> 01:05:21,680

but he wanted that address

1761

01:05:24,549 --> 01:05:23,520

it's and the cat the cat's already got

1762

01:05:26,309 --> 01:05:24,559

that one

1763

01:05:29,029 --> 01:05:26,319

it's not necessary like i don't want to

1764

01:05:30,630 --> 01:05:29,039

say like it's good or bad like earth has

1765

01:05:33,109 --> 01:05:30,640

done all kinds of stuff it's been all

1766

01:05:34,870 --> 01:05:33,119

types of temperatures in the past again

1767

01:05:37,430 --> 01:05:34,880

it's the rate of change and it's the

1768

01:05:39,750 --> 01:05:37,440

ability for the organisms that currently

1769

01:05:41,589 --> 01:05:39,760

live on this planet under the under the

1770

01:05:42,470 --> 01:05:41,599

climate conditions that they've evolved

1771

01:05:45,029 --> 01:05:42,480

under

1772

01:05:46,150 --> 01:05:45,039

not being able to adapt in time i mean

1773

01:05:50,470 --> 01:05:46,160

we

1774

01:05:52,870 --> 01:05:50,480

mass extinction right now and that's

1775

01:05:55,750 --> 01:05:52,880

because of habitat loss habitat

1776

01:05:58,150 --> 01:05:55,760

fragmentation um lack of lack of

1777

01:05:59,829 --> 01:05:58,160

resources for animals and um i

1778

01:06:02,549 --> 01:05:59,839

personally don't want to live in a world

1779

01:06:06,390 --> 01:06:02,559

where we only have domesticated

1780

01:06:08,950 --> 01:06:06,400

animals for company and and you know our

1781

01:06:11,829 --> 01:06:08,960

our entire um

1782

01:06:13,990 --> 01:06:11,839

existence is intricately linked whether

1783

01:06:17,109 --> 01:06:14,000

or not we realize it with the multitude

1784

01:06:18,390 --> 01:06:17,119

of bugs and birds and biodiversity and

1785

01:06:20,710 --> 01:06:18,400

fish and

1786

01:06:21,990 --> 01:06:20,720

and um you know there's so many types of

1787

01:06:24,549 --> 01:06:22,000

life and there was such a great

1788

01:06:26,710 --> 01:06:24,559

abundance of life that um it's worth

1789

01:06:28,789 --> 01:06:26,720

it's worth preserving and we know what's

1790

01:06:30,870 --> 01:06:28,799

happening and why these species are

1791

01:06:32,630 --> 01:06:30,880

dying off and it's um

1792

01:06:35,589 --> 01:06:32,640

it's also an ethical question of

1793

01:06:38,309 --> 01:06:35,599

preserving non-human life forms that

1794

01:06:40,549 --> 01:06:38,319

don't that can't vote that can't cast a

1795

01:06:42,870 --> 01:06:40,559

ballot that can't put their money toward

1796

01:06:44,950 --> 01:06:42,880

organizations um and i think that

1797

01:06:47,589 --> 01:06:44,960

there's value to those species in and of

1798

01:06:50,630 --> 01:06:47,599

themselves just as existing on this

1799

01:06:53,190 --> 01:06:50,640

planet um yeah it's two up to two

1800

01:06:53,910 --> 01:06:53,200

thousand species a year become extinct

1801

01:06:55,829 --> 01:06:53,920

yeah

1802

01:06:57,670 --> 01:06:55,839

and a lot of that is climate change it's

1803

01:06:59,430 --> 01:06:57,680

a hundred to a thousand times faster

1804

01:07:01,349 --> 01:06:59,440

than the normal background rate of

1805

01:07:02,470 --> 01:07:01,359

extinction because species go extinct

1806

01:07:04,710 --> 01:07:02,480

all the time we can see it in the

1807

01:07:07,109 --> 01:07:04,720

geologic record that's not new

1808

01:07:10,390 --> 01:07:07,119

information but it is happening a lot

1809

01:07:12,069 --> 01:07:10,400

faster because of the exponential curve

1810

01:07:15,109 --> 01:07:12,079

that big swoop

1811

01:07:18,309 --> 01:07:15,119

toward hotter temperatures and um more

1812

01:07:20,789 --> 01:07:18,319

more co2 co2 um so we should care i mean

1813

01:07:21,670 --> 01:07:20,799

we should care about um biodiversity

1814

01:07:22,549 --> 01:07:21,680

because

1815

01:07:24,230 --> 01:07:22,559

um

1816

01:07:25,990 --> 01:07:24,240

you can care about it for its own sake

1817

01:07:27,910 --> 01:07:26,000

but also you can care about it in a

1818

01:07:30,870 --> 01:07:27,920

selfish way because we humans are

1819

01:07:32,549 --> 01:07:30,880

dependent upon plants and animals

1820

01:07:34,549 --> 01:07:32,559

directly and indirectly for our own

1821

01:07:35,910 --> 01:07:34,559

well-being

1822

01:07:37,910 --> 01:07:35,920

right

1823

01:07:40,870 --> 01:07:37,920

and the other question was what volume

1824

01:07:43,349 --> 01:07:40,880

of greenhouse gases were released from

1825

01:07:45,670 --> 01:07:43,359

the mega underwater volcanic eruption

1826

01:07:48,230 --> 01:07:45,680

last week and how does that compare to

1827

01:07:48,950 --> 01:07:48,240

human activity i probably don't have

1828

01:07:52,230 --> 01:07:48,960

that

1829

01:07:54,630 --> 01:07:52,240

i don't know if you do either one of you

1830

01:07:57,109 --> 01:07:54,640

do i don't have it readily available

1831

01:07:58,630 --> 01:07:57,119

yeah but well let's just say the general

1832

01:08:01,910 --> 01:07:58,640

question how would that

1833

01:08:03,510 --> 01:08:01,920

volcano eruption compare to human

1834

01:08:06,710 --> 01:08:03,520

activity as far as

1835

01:08:09,109 --> 01:08:06,720

i mean i guess it's tiny it's tiny if we

1836

01:08:11,270 --> 01:08:09,119

were if every single volcano on earth

1837

01:08:13,349 --> 01:08:11,280

would erupt at the same time it would

1838

01:08:15,829 --> 01:08:13,359

still be orders of magnitude smaller

1839

01:08:18,149 --> 01:08:15,839

than what human beings are emitting

1840

01:08:19,829 --> 01:08:18,159

actively to power our lifestyle to

1841

01:08:21,430 --> 01:08:19,839

energize our

1842

01:08:23,269 --> 01:08:21,440

electrical grid

1843

01:08:24,390 --> 01:08:23,279

and transport ourselves all around the

1844

01:08:25,910 --> 01:08:24,400

world so

1845

01:08:28,309 --> 01:08:25,920

we would we would definitely have a

1846

01:08:30,550 --> 01:08:28,319

cooling down for a number of years if we

1847

01:08:33,269 --> 01:08:30,560

had a major volcano if we had a lot of

1848

01:08:35,030 --> 01:08:33,279

aerosols in the in the atmosphere

1849

01:08:36,789 --> 01:08:35,040

blocking out the sun for a while we

1850

01:08:38,550 --> 01:08:36,799

would have a nice

1851
01:08:41,030 --> 01:08:38,560
but it would be temporary and it would

1852
01:08:43,110 --> 01:08:41,040
be over again

1853
01:08:44,229 --> 01:08:43,120
by us

1854
01:08:47,189 --> 01:08:44,239
yeah

1855
01:08:49,269 --> 01:08:47,199
um so i think we're getting sort of

1856
01:08:51,590 --> 01:08:49,279
toward the end and so i'd like to this

1857
01:08:53,749 --> 01:08:51,600
was a question you gave me megan is how

1858
01:08:56,470 --> 01:08:53,759
can we work toward ensuring our children

1859
01:08:59,430 --> 01:08:56,480
and grandchildren inherit a habitable

1860
01:09:01,430 --> 01:08:59,440
planet i mean you we're kind of you've

1861
01:09:04,309 --> 01:09:01,440
sort of both sort of talked about that a

1862
01:09:06,390 --> 01:09:04,319
little bit but any other input on that

1863
01:09:09,510 --> 01:09:06,400

yeah jan asked that really good question

1864

01:09:12,630 --> 01:09:09,520

about what we can do as individuals um

1865

01:09:15,749 --> 01:09:12,640

but like so sustainability means like um

1866

01:09:18,390 --> 01:09:15,759

meeting our needs as this present

1867

01:09:20,870 --> 01:09:18,400

iteration of humans on the planet um

1868

01:09:23,110 --> 01:09:20,880

without taking the ability of future

1869

01:09:25,829 --> 01:09:23,120

generations to meet their needs and that

1870

01:09:28,550 --> 01:09:25,839

means we really need to rethink about

1871

01:09:32,390 --> 01:09:28,560

how the economy is represented because

1872

01:09:34,950 --> 01:09:32,400

fresh water and arable soil that is

1873

01:09:37,510 --> 01:09:34,960

able to grow crops those should be

1874

01:09:39,829 --> 01:09:37,520

valued the same way that gold is valued

1875

01:09:42,470 --> 01:09:39,839

or that minerals are valued like those

1876

01:09:45,349 --> 01:09:42,480

are resources that sustain life and so

1877

01:09:47,990 --> 01:09:45,359

we need to incorporate um environmental

1878

01:09:48,870 --> 01:09:48,000

economics into our way of thinking about

1879

01:09:51,269 --> 01:09:48,880

um

1880

01:09:54,790 --> 01:09:51,279

how we exist on this planet we need we

1881

01:09:57,350 --> 01:09:54,800

need natural systems we need biological

1882

01:09:59,189 --> 01:09:57,360

services in order to sustain our own

1883

01:10:01,990 --> 01:09:59,199

life forces so

1884

01:10:04,870 --> 01:10:02,000

if we were to completely revamp the way

1885

01:10:08,070 --> 01:10:04,880

that we examine our economic activity

1886

01:10:09,750 --> 01:10:08,080

and our consumption to include those

1887

01:10:11,510 --> 01:10:09,760

natural resources that we're like oh

1888

01:10:13,669 --> 01:10:11,520

we'll never run out of fresh water oh

1889

01:10:15,430 --> 01:10:13,679

we'll never run out of you know soil no

1890

01:10:17,750 --> 01:10:15,440

we're running out of them we really are

1891

01:10:21,189 --> 01:10:17,760

like one percent is fresh water and

1892

01:10:24,470 --> 01:10:21,199

we're polluting it we're um we're over

1893

01:10:25,990 --> 01:10:24,480

using it we're um wasting it you know

1894

01:10:28,630 --> 01:10:26,000

it's um

1895

01:10:30,390 --> 01:10:28,640

it's important for us to kind of have a

1896

01:10:33,430 --> 01:10:30,400

paradigm shift

1897

01:10:36,149 --> 01:10:33,440

in how we value the natural resources

1898

01:10:39,110 --> 01:10:36,159

available to us and if we are able to do

1899

01:10:42,070 --> 01:10:39,120

that and if we're able to safeguard our

1900

01:10:45,590 --> 01:10:42,080

our soil our water our atmosphere

1901

01:10:48,870 --> 01:10:45,600

um and to keep our temperature range

1902

01:10:50,550 --> 01:10:48,880

viable for human life then um yeah our

1903

01:10:52,070 --> 01:10:50,560

kids and grandkids will be just fine if

1904

01:10:54,070 --> 01:10:52,080

we can do all of those things and we

1905

01:10:57,669 --> 01:10:54,080

have the technology and

1906

01:11:00,310 --> 01:10:57,679

and uh we just need the will to do it

1907

01:11:02,870 --> 01:11:00,320

i've been um thank you megan that's i

1908

01:11:03,990 --> 01:11:02,880

think i see the cat finally um yeah yeah

1909

01:11:08,149 --> 01:11:04,000

sorry

1910

01:11:10,870 --> 01:11:08,159

if i keep them out then they yell to

1911

01:11:12,550 --> 01:11:10,880

come in so i figured this out

1912

01:11:14,149 --> 01:11:12,560

um

1913

01:11:15,430 --> 01:11:14,159

i was just say you know at my

1914

01:11:17,350 --> 01:11:15,440

institution

1915

01:11:20,229 --> 01:11:17,360

one thing that um

1916

01:11:22,229 --> 01:11:20,239

kind of i and collectively other people

1917

01:11:23,430 --> 01:11:22,239

are working on is is trying to get you

1918

01:11:25,430 --> 01:11:23,440

know like when

1919

01:11:28,390 --> 01:11:25,440

when our institution is looking at a new

1920

01:11:30,310 --> 01:11:28,400

project you know to build in what that

1921

01:11:32,149 --> 01:11:30,320

you know there is a cost of carbon and

1922

01:11:35,110 --> 01:11:32,159

we can we can like

1923

01:11:37,669 --> 01:11:35,120

economists have like pegged an actual

1924

01:11:40,630 --> 01:11:37,679

amount to that which is you know

1925

01:11:43,189 --> 01:11:40,640

you know the cost of all the like damage

1926

01:11:45,590 --> 01:11:43,199

that it does you know to human life and

1927

01:11:47,830 --> 01:11:45,600

ecosystems you know so there there is an

1928

01:11:48,790 --> 01:11:47,840

economic framework for us to actually

1929

01:11:51,110 --> 01:11:48,800

value

1930

01:11:52,709 --> 01:11:51,120

these services that megan was talking

1931

01:11:54,870 --> 01:11:52,719

about and

1932

01:11:57,430 --> 01:11:54,880

you know and and so like you know when

1933

01:11:59,110 --> 01:11:57,440

an institution is like we want to build

1934

01:12:01,750 --> 01:11:59,120

a new building you know and they create

1935

01:12:04,070 --> 01:12:01,760

a budget for that building

1936

01:12:06,550 --> 01:12:04,080

you know pushing for them to include in

1937

01:12:08,950 --> 01:12:06,560

that budget that you know the

1938

01:12:11,830 --> 01:12:08,960

like the cost of the carbon associated

1939

01:12:14,310 --> 01:12:11,840

with that building right and and

1940

01:12:16,149 --> 01:12:14,320

so i think it's maybe

1941

01:12:18,550 --> 01:12:16,159

yeah broadening out our economic

1942

01:12:20,870 --> 01:12:18,560

framework and to realize that you know

1943

01:12:23,110 --> 01:12:20,880

these um

1944

01:12:25,590 --> 01:12:23,120

things like climate change and pollution

1945

01:12:27,910 --> 01:12:25,600

and they they have actual costs and

1946

01:12:30,790 --> 01:12:27,920

economists have pegged dollar values to

1947

01:12:32,630 --> 01:12:30,800

those costs um based on the damages that

1948

01:12:34,630 --> 01:12:32,640

they do to people's lives and

1949

01:12:36,630 --> 01:12:34,640

productivity which has impacts on the

1950

01:12:39,110 --> 01:12:36,640

larger economy and so

1951

01:12:41,189 --> 01:12:39,120

i think trying to feed that into the way

1952

01:12:43,189 --> 01:12:41,199

that we make decisions and

1953

01:12:45,350 --> 01:12:43,199

and think about what the true cost of a

1954

01:12:47,270 --> 01:12:45,360

project is i think is a really important

1955

01:12:48,950 --> 01:12:47,280

way to move forward that's really

1956

01:12:51,030 --> 01:12:48,960

interesting and something i would have

1957

01:12:52,630 --> 01:12:51,040

never thought of i do want to answer uh

1958

01:12:53,510 --> 01:12:52,640

get a couple of chat questions that are

1959

01:12:54,390 --> 01:12:53,520

up there

1960

01:12:55,990 --> 01:12:54,400

um

1961

01:12:58,070 --> 01:12:56,000

this gentleman claims he's been looking

1962

01:13:00,950 --> 01:12:58,080

into this quite a while do you

1963

01:13:02,830 --> 01:13:00,960

understand that question since ipcc was

1964

01:13:05,590 --> 01:13:02,840

formed our emissions of

1965

01:13:08,229 --> 01:13:05,600

ghgs has doubled another group of

1966

01:13:09,910 --> 01:13:08,239

countries should be formed who want to

1967

01:13:11,990 --> 01:13:09,920

do something about it do you understand

1968

01:13:15,510 --> 01:13:12,000

that question either one of you

1969

01:13:17,669 --> 01:13:15,520

um i think you say so the ipcc is the

1970

01:13:20,149 --> 01:13:17,679

intergovernmental panel for climate

1971

01:13:22,470 --> 01:13:20,159

change so it's a group of

1972

01:13:24,950 --> 01:13:22,480

scientists and i think policymakers you

1973

01:13:27,430 --> 01:13:24,960

know that have come together and

1974

01:13:29,990 --> 01:13:27,440

um have you know put out

1975

01:13:31,669 --> 01:13:30,000

these pretty regular reports kind of on

1976

01:13:33,510 --> 01:13:31,679

the status of

1977

01:13:35,669 --> 01:13:33,520

you know what the climate is and what

1978

01:13:37,750 --> 01:13:35,679

the impacts are and you know what what

1979

01:13:39,510 --> 01:13:37,760

we know is certainty and

1980

01:13:41,430 --> 01:13:39,520

less certainty based on kind of the

1981

01:13:44,870 --> 01:13:41,440

state of the science

1982

01:13:46,709 --> 01:13:44,880

um and so ghd is greenhouse gases so

1983

01:13:48,149 --> 01:13:46,719

this person is saying that you know

1984

01:13:49,910 --> 01:13:48,159

since this

1985

01:13:51,590 --> 01:13:49,920

effort to kind of

1986

01:13:54,149 --> 01:13:51,600

document what the

1987

01:13:56,310 --> 01:13:54,159

science what is known about climate

1988

01:13:58,470 --> 01:13:56,320

change um our missions have continued to

1989

01:13:59,830 --> 01:13:58,480

double

1990

01:14:00,950 --> 01:13:59,840

i don't know about another group of

1991

01:14:02,870 --> 01:14:00,960

countries

1992

01:14:05,430 --> 01:14:02,880

um

1993

01:14:07,590 --> 01:14:05,440

should be formed i guess maybe the

1994

01:14:09,990 --> 01:14:07,600

country's involved in the ipcc i mean i

1995

01:14:11,510 --> 01:14:10,000

think this is this is more it's less an

1996

01:14:13,590 --> 01:14:11,520

issue about the science which i feel

1997

01:14:15,830 --> 01:14:13,600

like the ipcc is about

1998

01:14:18,550 --> 01:14:15,840

trying to inform and motivate the policy

1999

01:14:20,149 --> 01:14:18,560

makers and i think it's the greenhouse

2000

01:14:21,910 --> 01:14:20,159

gases have doubled

2001

01:14:24,149 --> 01:14:21,920

not because of a lack of scientific

2002

01:14:25,830 --> 01:14:24,159

understanding but really kind of a lack

2003

01:14:27,510 --> 01:14:25,840

of political will

2004

01:14:30,790 --> 01:14:27,520

yeah i would say science has been

2005

01:14:33,910 --> 01:14:30,800

crystal clear for decades yes yes the

2006

01:14:35,830 --> 01:14:33,920

science has been crystal clear and also

2007

01:14:38,790 --> 01:14:35,840

we have to be

2008

01:14:41,910 --> 01:14:38,800

the people that make our nation the

2009

01:14:44,550 --> 01:14:41,920

united states be a leader in renewable

2010

01:14:45,350 --> 01:14:44,560

energies and then decarbonization we

2011

01:14:47,990 --> 01:14:45,360

like

2012

01:14:50,149 --> 01:14:48,000

you know pretty much most of the

2013

01:14:52,950 --> 01:14:50,159

countries in the world are are part of

2014

01:14:53,830 --> 01:14:52,960

this intergovernmental organization

2015

01:14:56,229 --> 01:14:53,840

um

2016

01:14:58,709 --> 01:14:56,239

the ipcc most of them are i would say

2017

01:15:01,430 --> 01:14:58,719

like they're like a handful

2018

01:15:03,750 --> 01:15:01,440

that are not and so for tho that handful

2019

01:15:06,470 --> 01:15:03,760

of nations to stand up to

2020

01:15:09,430 --> 01:15:06,480

um the biggest emitters

2021

01:15:12,310 --> 01:15:09,440

is like trying to defeat goliath and so

2022

01:15:15,830 --> 01:15:12,320

like we need to kind of be the

2023

01:15:18,390 --> 01:15:15,840

the force from within from um from

2024

01:15:21,669 --> 01:15:18,400

the the most powerful nation the biggest

2025

01:15:24,630 --> 01:15:21,679

emitter to change our behavior use your

2026

01:15:26,390 --> 01:15:24,640

voice use it it's it's powerful we have

2027

01:15:27,910 --> 01:15:26,400

these thoughts in our brains that we can

2028

01:15:30,229 --> 01:15:27,920

communicate with these sounds with our

2029

01:15:32,790 --> 01:15:30,239

mouths and it's important that we

2030

01:15:35,350 --> 01:15:32,800

work together to to to build a

2031

01:15:36,950 --> 01:15:35,360

sustainable future so that yeah we can

2032

01:15:38,709 --> 01:15:36,960

we can pass the planet down it's a

2033

01:15:41,189 --> 01:15:38,719

really cool planet i think it's awesome

2034

01:15:43,990 --> 01:15:41,199

it's amazing i do i almost want to end

2035

01:15:46,709 --> 01:15:44,000

on that note but i do want to i do want

2036

01:15:48,390 --> 01:15:46,719

to discuss this quickly uh china is the

2037

01:15:49,910 --> 01:15:48,400

worst environmental criminal in every

2038

01:15:51,910 --> 01:15:49,920

measurable way

2039

01:15:54,470 --> 01:15:51,920

because becca we were talking a little

2040

01:15:55,750 --> 01:15:54,480

bit about this before megan came on

2041

01:15:57,990 --> 01:15:55,760

ahead of the show

2042

01:16:00,550 --> 01:15:58,000

uh ahead of in the back in the back room

2043

01:16:04,229 --> 01:16:00,560

before we went live and you were you

2044

01:16:08,630 --> 01:16:04,239

kind of said that if if china china is

2045

01:16:10,550 --> 01:16:08,640

starting to uh work on their climate um

2046

01:16:12,470 --> 01:16:10,560

pollution

2047

01:16:14,070 --> 01:16:12,480

well okay so i would say that you know

2048

01:16:16,229 --> 01:16:14,080

again

2049

01:16:18,630 --> 01:16:16,239

in the u.s right we have followed this

2050

01:16:20,950 --> 01:16:18,640

path of development china is following

2051

01:16:21,990 --> 01:16:20,960

the same path that we took so

2052

01:16:27,189 --> 01:16:22,000

you know we

2053

01:16:29,030 --> 01:16:27,199

emitted co2 in the atmosphere

2054

01:16:31,270 --> 01:16:29,040

you know and i think

2055

01:16:33,189 --> 01:16:31,280

you know china's more or less following

2056

01:16:34,950 --> 01:16:33,199

that same trajectory so

2057

01:16:36,870 --> 01:16:34,960

um i don't think we can

2058

01:16:38,790 --> 01:16:36,880

consider ourselves blameless i think

2059

01:16:41,030 --> 01:16:38,800

it's just you know we're further along

2060

01:16:43,510 --> 01:16:41,040

this pathway so we now have the benefit

2061

01:16:45,669 --> 01:16:43,520

of hindsight and and like you know

2062

01:16:46,630 --> 01:16:45,679

moving into the space where we

2063

01:16:48,229 --> 01:16:46,640

you know

2064

01:16:49,990 --> 01:16:48,239
are paying attention to these

2065

01:16:51,750 --> 01:16:50,000
environmental issues

2066

01:16:53,830 --> 01:16:51,760
um

2067

01:16:54,709 --> 01:16:53,840
you know i think china

2068

01:16:57,350 --> 01:16:54,719
um

2069

01:17:01,189 --> 01:16:57,360
also per person we are still emitting

2070

01:17:02,630 --> 01:17:01,199
more co2 than a chinese individual is

2071

01:17:04,550 --> 01:17:02,640
right so

2072

01:17:06,550 --> 01:17:04,560
um we need to kind of keep that

2073

01:17:07,910 --> 01:17:06,560
perspective in mind

2074

01:17:09,830 --> 01:17:07,920
um

2075

01:17:11,030 --> 01:17:09,840
you know that said like

2076

01:17:13,590 --> 01:17:11,040

china

2077

01:17:15,510 --> 01:17:13,600

is putting coal into the atmosphere and

2078

01:17:16,630 --> 01:17:15,520

is emitting you know large amounts of

2079

01:17:18,310 --> 01:17:16,640

co2

2080

01:17:21,750 --> 01:17:18,320

i think maybe the thing i was saying is

2081

01:17:22,950 --> 01:17:21,760

that um if china decided

2082

01:17:49,189 --> 01:17:22,960

i

2083

01:17:51,350 --> 01:17:49,199

when they want to

2084

01:17:54,070 --> 01:17:51,360

they built the wall for crying out loud

2085

01:17:56,070 --> 01:17:54,080

um so this this question here what is

2086

01:17:59,189 --> 01:17:56,080

the what is your opinion opinion about

2087

01:18:02,070 --> 01:17:59,199

the biosphere 2 and ariz i do you know

2088

01:18:05,510 --> 01:18:02,080

anything about that the biosphere 2 was

2089

01:18:08,470 --> 01:18:05,520

an attempt for us to recreate earth with

2090

01:18:10,790 --> 01:18:08,480

like multiple different types of

2091

01:18:13,110 --> 01:18:10,800

landscapes and

2092

01:18:15,110 --> 01:18:13,120

different organisms all working together

2093

01:18:17,590 --> 01:18:15,120

um and it was a really cool idea but it

2094

01:18:20,149 --> 01:18:17,600

was an utter failure and like the it was

2095

01:18:22,630 --> 01:18:20,159

an enclosed space and the

2096

01:18:25,270 --> 01:18:22,640

humans living there and documenting the

2097

01:18:28,470 --> 01:18:25,280

experiment were like hey we're losing

2098

01:18:30,229 --> 01:18:28,480

oxygen right and they eventually had to

2099

01:18:32,550 --> 01:18:30,239

scrap the project because they couldn't

2100

01:18:34,709 --> 01:18:32,560

solve why the oxygen levels were

2101

01:18:36,950 --> 01:18:34,719

dropping so dramatically and i think

2102

01:18:39,430 --> 01:18:36,960

that really just illustrates that like

2103

01:18:40,950 --> 01:18:39,440

earth is very complex and it's all these

2104

01:18:44,550 --> 01:18:40,960

systems working together it's like a

2105

01:18:45,990 --> 01:18:44,560

human body except a planet-sized scale

2106

01:18:46,950 --> 01:18:46,000

and so we

2107

01:18:47,830 --> 01:18:46,960

we

2108

01:18:53,110 --> 01:18:47,840

don't

2109

01:18:55,110 --> 01:18:53,120

individual and like our collective

2110

01:18:57,350 --> 01:18:55,120

knowledge of how the planet works is

2111

01:19:00,149 --> 01:18:57,360

improving all the time but it's it's not

2112

01:19:02,229 --> 01:19:00,159

complete it's not perfect and

2113

01:19:04,070 --> 01:19:02,239

um that experiment really showed that

2114

01:19:06,310 --> 01:19:04,080

like we can't engineer something as

2115

01:19:08,550 --> 01:19:06,320

complex as earth and to figure out all

2116

01:19:09,470 --> 01:19:08,560

the moving pieces and all their

2117

01:19:12,310 --> 01:19:09,480

um

2118

01:19:14,550 --> 01:19:12,320

biogeological chemical processes that

2119

01:19:16,870 --> 01:19:14,560

unfold in order to sustain

2120

01:19:19,990 --> 01:19:16,880

the multitude of life that the planet is

2121

01:19:21,189 --> 01:19:20,000

able to sustain um so like

2122

01:19:28,470 --> 01:19:21,199

it

2123

01:19:29,430 --> 01:19:28,480

we we aren't capable of building a

2124

01:19:33,910 --> 01:19:29,440

planet

2125

01:19:37,189 --> 01:19:33,920

um because there's a lot of information

2126

01:19:39,750 --> 01:19:37,199

that we're missing so yeah i believe

2127

01:19:41,430 --> 01:19:39,760

that so i think we can

2128

01:19:44,870 --> 01:19:41,440

say good night but i like the way you

2129

01:19:48,070 --> 01:19:44,880

were talking me this is i agree i love

2130

01:19:50,550 --> 01:19:48,080

i love nature and this is a beautiful

2131

01:19:52,790 --> 01:19:50,560

planet and the only one we have and you

2132

01:19:54,229 --> 01:19:52,800

look back at the blue marble as they did

2133

01:19:56,149 --> 01:19:54,239

you know from space

2134

01:19:58,790 --> 01:19:56,159

and everything that's ever happened that

2135

01:20:00,790 --> 01:19:58,800

we know about has happened here and we

2136

01:20:02,070 --> 01:20:00,800

really do have to protect it any final

2137

01:20:11,830 --> 01:20:02,080

words either one of you would like to

2138

01:20:15,990 --> 01:20:13,669

we need to act and

2139

01:20:18,709 --> 01:20:16,000

um you know and we got to keep that

2140

01:20:19,510 --> 01:20:18,719

balance of urgency and optimism to the

2141

01:20:24,229 --> 01:20:19,520

yeah

2142

01:20:26,470 --> 01:20:24,239

completely overwhelmed by this like i

2143

01:20:27,910 --> 01:20:26,480

had a bad mental health day today and i

2144

01:20:29,750 --> 01:20:27,920

was like oh i'm gonna like do this

2145

01:20:33,510 --> 01:20:29,760

podcast and i i think about it

2146

01:20:35,510 --> 01:20:33,520

constantly um rebecca obviously also is

2147

01:20:37,030 --> 01:20:35,520

she's a climate professional i'm a i'm a

2148

01:20:39,510 --> 01:20:37,040

climate writer i think about this

2149

01:20:41,830 --> 01:20:39,520

constantly so i know it's easy to

2150

01:20:44,470 --> 01:20:41,840

despair but like nihilism isn't a choice

2151
01:20:47,510 --> 01:20:44,480
man it's in our genes to want to survive

2152
01:20:49,830 --> 01:20:47,520
we literally like you know the earth

2153
01:20:51,910 --> 01:20:49,840
if you compare it to the titanic like

2154
01:20:54,149 --> 01:20:51,920
it's taken on water right now but we can

2155
01:20:56,229 --> 01:20:54,159
bail it if we all work together like we

2156
01:20:59,590 --> 01:20:56,239
got to start bailing now but it's like

2157
01:21:01,110 --> 01:20:59,600
it's it's ingrained into our beings to

2158
01:21:02,790 --> 01:21:01,120
want to get away from the water that's

2159
01:21:05,669 --> 01:21:02,800
trying to kill us so

2160
01:21:09,110 --> 01:21:05,679
we can do this we have the technology we

2161
01:21:11,189 --> 01:21:09,120
have economic tools available to us to

2162
01:21:12,390 --> 01:21:11,199
incentivize the changes that need to

2163
01:21:14,550 --> 01:21:12,400

occur

2164

01:21:16,229 --> 01:21:14,560

and we really just need to we need to

2165

01:21:17,590 --> 01:21:16,239

get that political will and that

2166

01:21:20,870 --> 01:21:17,600

cultural shift

2167

01:21:23,189 --> 01:21:20,880

and um economic revaluation

2168

01:21:24,790 --> 01:21:23,199

as part of mainstream as part of what

2169

01:21:26,149 --> 01:21:24,800

we're all working toward together

2170

01:21:28,390 --> 01:21:26,159

because um

2171

01:21:30,390 --> 01:21:28,400

yeah we're we're on this earth ship this

2172

01:21:32,229 --> 01:21:30,400

rock floating in space and it's

2173

01:21:34,470 --> 01:21:32,239

protected from the solar winds by a

2174

01:21:36,709 --> 01:21:34,480

magnetic field and we have air to

2175

01:21:37,590 --> 01:21:36,719

breathe and water to drink and

2176

01:21:41,110 --> 01:21:37,600

um

2177

01:21:43,830 --> 01:21:41,120

that that is worth more money than could

2178

01:21:46,070 --> 01:21:43,840

even be fathomed it's it's invaluable

2179

01:21:48,070 --> 01:21:46,080

it's everything it is everything all

2180

01:21:50,310 --> 01:21:48,080

right you too thank you so much

2181

01:22:12,310 --> 01:21:50,320

all right everyone thanks for watching